AMERICAN THYROID ASSOCIATION 2026 GUIDELINES FOR THYROID DISEASE IN PRECONCEPTION, PREGNANCY, AND POSTPARTUM

Introduction

- **This guideline updates the 2017 American Thyroid Association (ATA) recommendations for the diagnosis and management of thyroid disease before pregnancy, during pregnancy, and in the postpartum period.**

THYROID PHYSIOLOGY AND THYROID FUNCTION TESTING

What's New in This Guideline

- The guideline introduces updated approaches for assessing thyroid hormone availability during pregnancy.
- Advantages and limitations of different free thyroxine (fT4) testing methods are reviewed.
- Risk factors for thyroid disease during pregnancy have been updated.

  Maternal age, parity, and body mass index are no longer considered major screening criteria.

Thyroid Physiology During Pregnancy

- Ovarian stimulation increases estrogen, leading to higher thyroxine-binding globulin (TBG) concentrations and increased thyroid hormone requirements.
- During pregnancy, TBG rises from week 7, peaks around week 16, and then stabilizes. Total T4 and Total T3 concentrations increase in parallel with TBG.
- Human chorionic gonadotropin (hCG) stimulates thyroid hormone production, with maximal effects near the end of the first trimester.
- Pregnancy is characterized by a transient increase in fT4 and a physiological reduction in TSH, with values below 0.4 mU/L commonly observed.

- 1-As pregnancy progresses, there is an increase in the transfer of maternal T4 to the fetal compartment
- 2- an increase in T4 degradation by type 3 deiodinase expressed in the placenta
- 3- an increase in renal iodine excretion

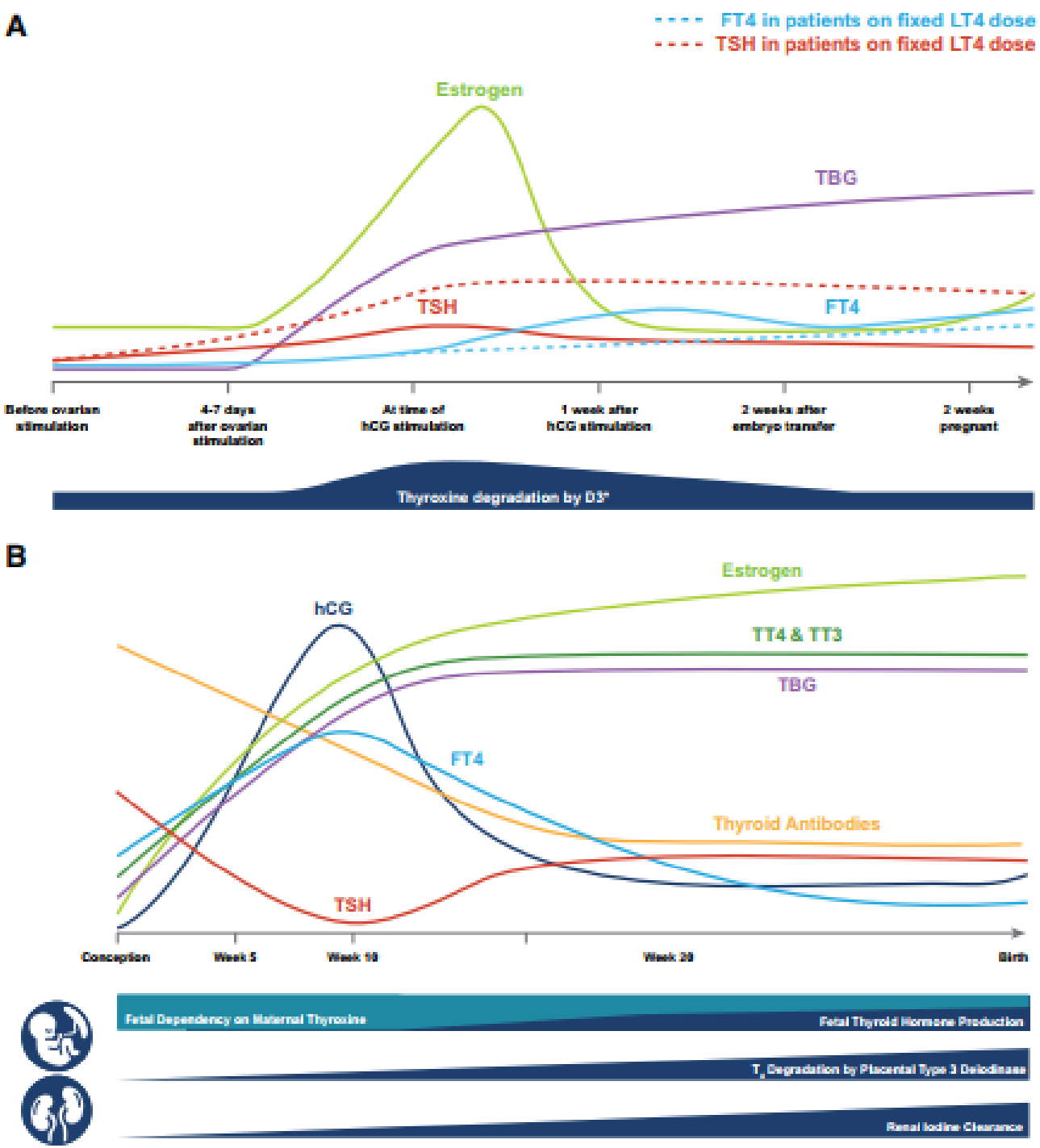


FIG. 1. (A) Thyroid physiology during ovarian stimulation. Physiological alterations of serum TSH, fT4, and TBG concentrations are expected from the rise of estrogen during ovarian stimulation. Thyroxine requirements are extracted from studies of women with hypothyroidism taking fixed levothyroxine doses. (B) Thyroid physiology during pregnancy. Physiological alterations of serum TSH, TT3, TT4, fT4, and thyroid antibody concentrations are expected from the effects of hCG, estrogen, and other factors during pregnancy.

Special Physiological Conditions

- Women receiving levothyroxine (LT4) who undergo assisted reproductive technology may experience an average TSH increase of approximately 1.5 mU/L.
- Twin pregnancies produce higher hCG concentrations, resulting in lower TSH and higher fT4 levels.
- Women with hypothyroidism carrying twins often require larger LT4 dose adjustments.
- TPO antibody-positive women have a higher risk of overt hypothyroidism because of a reduced thyroidal response to hCG stimulation.

- increase in free fatty acids and a decrease in albumin concentrations, may influence the performance of fT4 immunoassays. It is known that these could result in falsely lower serum fT4 concentrations in a method-specific manner,especially during the second half of pregnancy

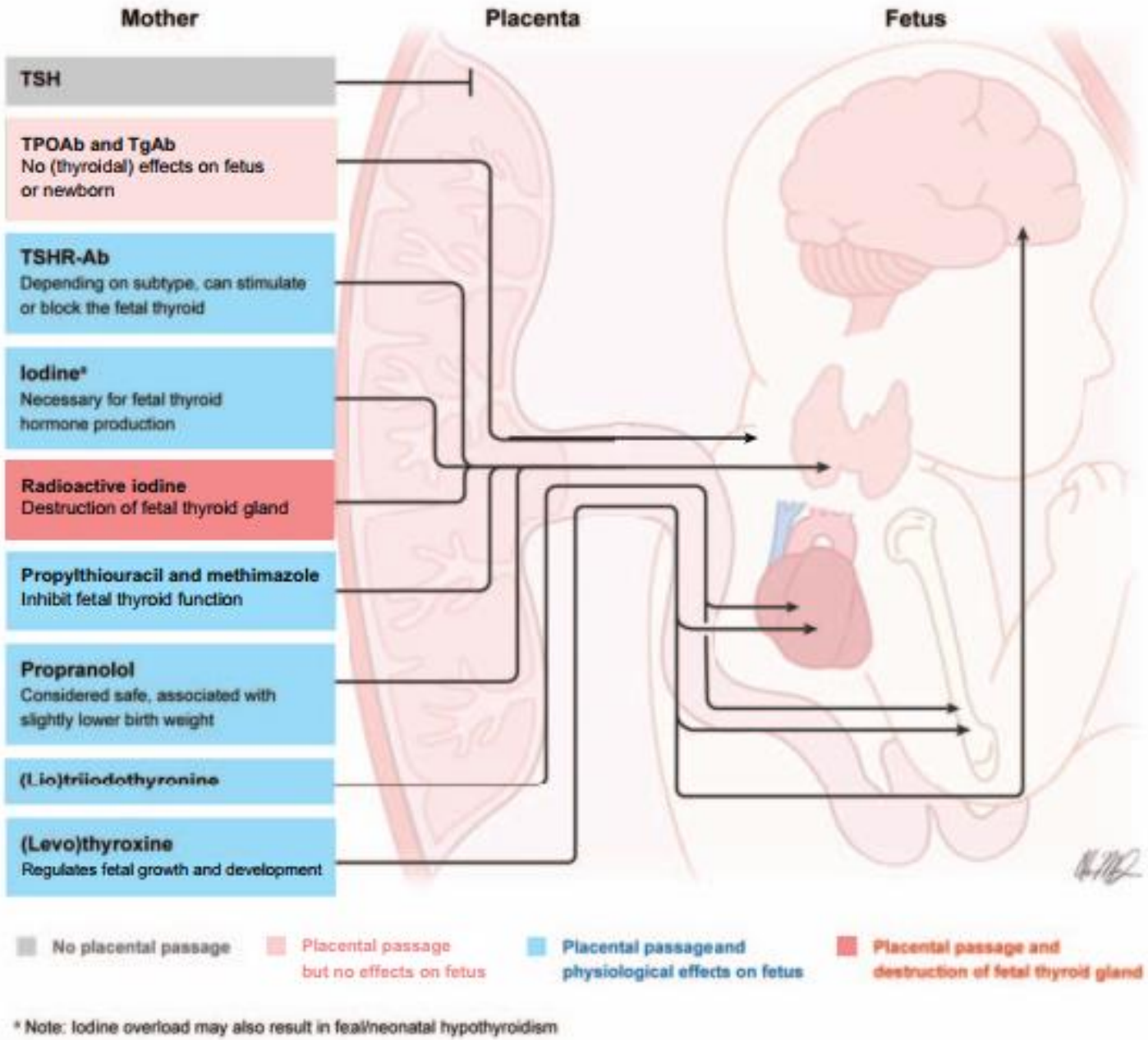


FIG. 2. Transplacental passage of thyroid parameters and drugs. Maternal TSHR-Ab, iodine, radioactive iodine, the antithyroid drugs (propylthiouracil and methimazole), propanolol, and the thyroid hormones [(lio)thyronine and (levo) thyroxine] all traverse the placenta and have the potential to induce direct effects to the fetus. Maternal TPOAb and TgAb can also traverse the placenta but do not affect the fetus. Maternal TSH does not cross the placenta.

Laboratory Assessment During Pregnancy

- Pregnancy-related physiological changes may reduce the accuracy of fT4 immunoassays, particularly during the second half of pregnancy.
- Analog fT4 immunoassays correlate better with TSH during the first trimester than total T4 measurements.
- Alternative strategies include equilibrium dialysis, ultrafiltration with LC-MS/MS, the fT4 index, and adjusted total T4 measurements.
- Each method has specific advantages and important limitations.

Clinical Considerations

.A fixed upper TSH limit of 4.0 mU/L identifies only 46.1% of women with overt hypothyroidism.

.Mild thyroid function abnormalities are transient in approximately 50% of cases.

.Laboratory reference intervals should always be interpreted together with clinical findings and individual patient characteristics.

Interpretation of Thyroid Function Tests

- **Maternal TSH remains the most reliable indicator of thyroid status during pregnancy.**
- **Free and total T3 measurements have limited clinical value except in the evaluation of hyperthyroidism.**
- **If trimester-specific reference intervals are unavailable, a first-trimester TSH reference interval of 0.1–4.0 mU/L is considered acceptable.**
- **In cases where fT4 interpretation is uncertain (e.g., due to assay limitations in the second half of pregnancy), maternal TSH should be prioritized. Third-generation TSH immunoassays are not affected by pregnancy-related changes in binding proteins and remain the most reliable indicator of maternal thyroid status.**

Recommendations

- **Laboratory- and trimester-specific TSH and fT4 reference intervals should be used whenever available.**
- **In the absence of pregnancy-specific reference ranges, a first-trimester TSH reference interval of 0.1–4.0 mU/L, or a 0.5 mU/L reduction from the local non-pregnant upper limit, is acceptable.**

Definition of (ab)normal thyroid function tests

Recommendations Table 1: Definitions of (Ab)normal Thyroid Function Tests	Strength*	Level #
Preconception and during fertility treatment		
Apply the same definition of (ab)normal thyroid function tests to women planning a pregnancy as those used for the general non-pregnant population.	Good Practice Statement	
Pregnancy		
A lab and trimester-specific reference interval[a] for TSH and FT4 is suggested as the preferred standard for use during pregnancy.	Conditional	Low
If a lab and trimester-specific reference interval for TSH is unavailable, a TSH reference interval of 0.1-4.0 mU/L can be used during the first and second trimesters.[b]	Conditional	Low
If a lab and trimester-specific reference interval for FT4 is unavailable, the following options may be used to define (ab)normal FT4, with the understanding of the limitations inherent to each testing platform: - A FT4 surrogate (TT4 adjusted for gestational week[c] or the FT4 index[d]) - The non-pregnancy FT4 reference interval[e]	Conditional	Low
The concept that serum TSH concentrations typically best reflects maternal thyroid function should be emphasized during clinical decision-making.	Good Practice Statement	
The same thyroid function test methods/assay should be used for individual patient follow-up over the course of pregnancy to reduce analytic variability.	Good Practice Statement	

b the non-pregnancy upper limit for TSH is above 4.5 mU/L. For the third trimester, the reference intervals for general non-pregnant population TSH concentrations will likely suffice.

c The non-pregnancy reference interval limit for total T4 can be used before gestational week 6. For gestational weeks 7 to 16, non-pregnancy reference interval limits for total T4 can be increased by 5% per week (total T4 percentage increase in pregnancy = [gestational week – 6] x 0.05) with a maximum increase of 50% by the 16th week of pregnancy. For gestational weeks >16, a 50% increase of total T4 may be estimated.

d Typically defined as: TT4 (mcg/ml) x T3 uptake (%)/100 (pregnancy reference intervals typically not available)

e The assay-related underestimation of FT4 concentrations during the second half of pregnancy should be taken into account, which can lead to slightly more diagnoses of isolated hypothyroxinemia and overt hypothyroidism as compared to a laboratory and trimester-specific reference interval.

Box 1. Preferred definitions of thyroid function test abnormalities during pregnancy

- A laboratory and trimester-specific reference interval is optimally defined as the 2.5th-97.5th percentile range of a population representative of a healthcare provider's patient population that only includes women without major thyroid interfering factors (e.g. TPOAb negative women with a singleton pregnancy, no known thyroid disease, and no [regional] severe iodine deficiency).
- Various other factors that may be associated with higher mean TSH and FT4 concentrations (e.g. comorbidities, assisted reproductive technology, or thyroglobulin antibody [TgAb] positivity) have not been shown to substantially change the reference interval limits for TSH or FT4 during pregnancy. However, removal of additional cases from a study population could impact the quality of the reference intervals by lowering the number of included individuals.[50] Thus, it does not seem necessary to use these additional exclusion criteria.
- Thyroid dysfunction during pregnancy is defined as follows:
    - **Overt primary hypothyroidism**: increased (>97.5th percentile) TSH concentration with a decreased (<2.5th percentile) FT4 concentration.
    - **Subclinical hypothyroidism**: increased TSH concentration with a normal (2.5th -97.5th percentile) FT4 concentration.
    - **Isolated maternal hypothyroxinemia**: decreased FT4 concentration with a normal TSH concentration.
    - **Overt hyperthyroidism**: decreased TSH concentration with elevated FT4 and/or (F)T3 concentration.
    - **Subclinical hyperthyroidism**: decreased TSH concentration with normal FT4 and (F)T3 concentration.

TPOAb, thyroperoxidase antibody; TSH, thyroid stimulating hormone; FT4, free thyroxine; TgAb, thyroglobulin antibody; FT3, free triiodothyronine

Recommendations Table 2: Indications for Thyroid Function Testing	Strength*	Level #
Pregnancy		
All newly pregnant women should undergo clinical evaluation and assessment for risk factors[a] for thyroid dysfunction in pregnancy.	Good Practice Statement	
In women without known thyroid disease, it is suggested that TSH testing be offered upon a positive pregnancy test to those at increased risk of thyroid dysfunction during pregnancy.[a]	Conditional	Moderate
In women treated with levothyroxine, TSH testing may be performed upon pregnancy confirmation, approximately every 4 weeks during the first half of pregnancy, at least once in the third trimester, and 4-6 weeks after any dose adjustment.	Conditional	Moderate
Postpartum		
Apply the same thyroid function testing indications to postpartum women as those for the general non-pregnant population. Specifically for women using levothyroxine, thyroid function testing should be performed around 6 weeks postpartum or following any levothyroxine dose adjustment.	Good Practice Statement	

For recommendations preconception (including fertility treatments), see section E
[a] As defined in Table 1
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TSH, thyroid stimulating hormone

Dissenting comments for Recommendations Table 2 from ATA members within the guidelines' writing group are reported in Supplementary Table 3.

Table 1. Risk Factors for Thyroid Dysfunction During Pregnancy

Risk factor	Suggested TSH testing frequency
History of (subclinical) hypothyroidism/hyperthyroidism including postpartum thyroiditis	At presentation of pregnancy
Known thyroid antibody positivity	Every 4-6 weeks up to mid-pregnancy
Symptoms of thyroid dysfunction or goiter	At presentation of pregnancy
Concurrent medication use associated with thyroid dysfunction[c]	At presentation of pregnancy & every trimester
Personal history of:	
Autoimmune disease[a]	At presentation of pregnancy
Two or more miscarriages[b]	At presentation of pregnancy
Infertility[b]	At presentation of pregnancy
Down syndrome or Turner syndrome	At presentation of pregnancy
Treatment with ionizing radiation to the head and neck region or radioactive iodine	At presentation of pregnancy & every trimester
Prior thyroid surgery	At presentation of pregnancy & every trimester
Family history of autoimmune thyroid disease	At presentation of pregnancy
Residing in an area of severe iodine insufficiency[d] while not using iodine-containing supplements or iodized salt	At presentation of pregnancy & every 4-6 weeks up to mid-pregnancy

a Including but not limited to type 1 diabetes mellitus, pernicious anemia, celiac disease, Addison's disease, vitiligo, premature ovarian failure,multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus

b Screening is only indicated if it was not performed preconception, or if there are other risk factors present

c Including but not limited to amiodarone, lithium, rifampin, ethionamide, phenobarbital, phenytoin, carbamazepine, and recent cancer-related immunotherapy (used within 6 months) or iodinated contrast (administered within 2 months)

IODINE

Iodine: Background and What's New

- **Iodine is an essential trace element required for thyroid hormone synthesis.**
  The human body contains approximately 15–20 mg of iodine, with more than 70% stored in the thyroid gland.
- **Pregnancy increases iodine requirements because of higher thyroid hormone production, increased renal iodine excretion, and fetal iodine demand.**
- **Adequate iodine intake should ideally be achieved before conception.**
- ***New in this guideline:*** **There is currently no validated biomarker that accurately reflects long-term iodine status in an individual. Biomarkers such as urinary iodine concentration (UIC) should be interpreted only at the population level, while individual risk factors remain essential for clinical assessment.**
- **Urinary iodine concentration (UIC) is a population-level biomarker only and should NOT be used to diagnose iodine deficiency in an individual patient. Individual dietary habits and regional iodine availability remain the primary tools for clinical assessment.**

Epidemiology and Clinical Impact

- In 2023, 18 of 127 countries had insufficient dietary iodine intake, affecting approximately one-third of the global population.
- Severe maternal iodine deficiency is associated with maternal and neonatal hypothyroidism, adverse obstetric outcomes, perinatal and infant mortality, reduced child IQ, and impaired neurodevelopment.
- Mild-to-moderate iodine deficiency has not consistently been associated with adverse obstetric outcomes but has been linked to impaired fetal brain development.
- Children of mothers with iodine deficiency before 14 weeks of gestation demonstrate lower IQ scores in a dose-dependent manner.

Physiology and Assessment of Iodine Status

- There is no reliable biomarker for assessing chronic iodine intake in an individual.
- Population iodine status is primarily evaluated using the median urinary iodine concentration (UIC).
- Median UIC values of 100–199 mcg/L indicate adequate iodine nutrition in nonpregnant women, whereas 150–249 mcg/L indicate adequate iodine status during pregnancy.

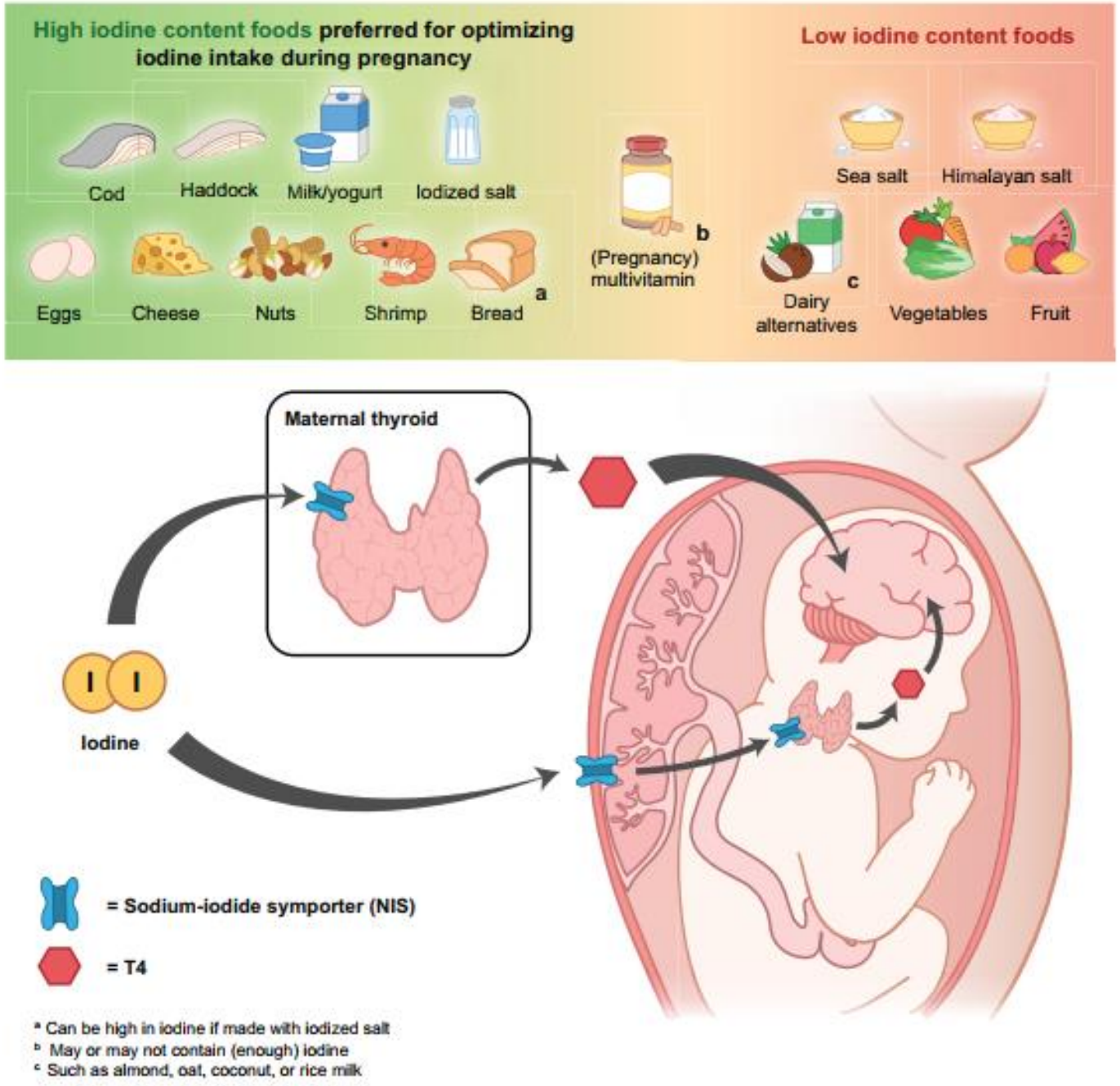


FIG. 3. Iodine availability during pregnancy. Examples of supplements and foods with high and low iodine content are shown. Iodine is taken up by the NIS at the basolateral membrane of the thyroid follicular cell in both the mother and fetus, as needed for thyroid hormone production, for which requirements are higher during pregnancy

Biomarkers and Diagnostic Considerations

- Serum thyroglobulin and neonatal TSH may provide additional information regarding population iodine status.
- In iodine-sufficient populations, neonatal TSH >5.0 mU/L should occur in less than 3% of newborns.
- Thyroid function tests are not sufficiently sensitive to assess iodine nutrition at the population level.
- During lactation, urinary iodine alone may underestimate iodine status because iodine is also secreted into breast milk.
- A median breast milk iodine concentration (BMIC) of 100–200 mcg/L is generally considered adequate, although no universally accepted threshold exists.

Iodine Supplementation and Management

- **Pregnant and lactating women should receive a total iodine intake of 250 mcg/day from diet and supplements.**

  A daily supplement containing 150 mcg of iodine is recommended before conception, throughout pregnancy, and during lactation.

  Supplementation should ideally begin at least 3 months before conception.

  Women with higher risk of iodine deficiency, including those who avoid iodized salt, or consume vegan diets, may require additional iodine intake.

  Reported supplementation doses in clinical studies have ranged from 50 to 300 mcg/day, depending on regional iodine intake.

Excess Iodine Exposure

- **Excessive iodine intake during pregnancy should generally be avoided.**
- **Sustained iodine supplementation exceeding 500 mcg/day may increase the risk of maternal and fetal thyroid dysfunction.**
- **Clinicians should carefully evaluate the use of iodine-containing medications, including amiodarone and iodinated contrast agents, during pregnancy.**

  Potassium iodide may be used only in selected situations, such as preparation for thyroid surgery or specific treatment of Graves' disease.

  In resource-limited settings without salt iodization, an annual 400 mg dose of iodized oil may be considered for women of reproductive age.

Recommendations Table 3: Iodine Nutrition	Strength*	Level #
Pregnant and lactating women should strive for a daily iodine intake of 250 mcg as provided by dietary iodine intake complemented by iodine supplements as required.	Strong	Moderate
For women at risk of iodine deficiency given geographic region, dietary restrictions or malabsorption, we suggest starting 150 mcg per day iodine supplementation ideally at least 3 months before planned pregnancy and continued until lactation is complete.	Conditional	Moderate
An annual dose of 400 mg iodized oil in women of childbearing age and pregnant women can be given in low-resource countries and/or regions with severe iodine deficiency, where neither salt iodization nor daily iodine supplements are feasible.	Conditional	Moderate
We suggest applying similar iodine supplementation recommendations for pregnant women taking antithyroid drugs (ATDs) for Graves' hyperthyroidism and those taking levothyroxine for hypothyroidism.	Conditional	Low
Excessive iodine exposure during pregnancy should be avoided with the exception of certain medical indications, such as the use of saturated solution of potassium iodide (SSKI) or iodinated contrast media.	Strong	Moderate
Sustained excessive dietary iodine intake and dietary supplements use exceeding 500 mcg daily should be avoided during pregnancy due to concerns for fetal and maternal thyroid dysfunction.	Strong	Moderate

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
ATD, antithyroid drug; SSKI, saturated solution of potassium iodide

THYROID DYSFUNCTION AND INFERTILITY

Thyroid Dysfunction and Infertility: Background

- **The evaluation and management of thyroid dysfunction in women with infertility are generally similar to those in the general population.**
- **Women with infertility often require earlier diagnosis and treatment because the opportunity for conception is limited.**
- **Fertility treatments increase thyroid hormone requirements.**

  Early identification of thyroid dysfunction is essential to optimize fertility treatment and pregnancy outcomes

What's New in This Guideline

- Levothyroxine (LT4) should not be routinely prescribed for euthyroid women who are TPOAb-positive and have infertility or recurrent miscarriage.
- Instead, thyroid function should be monitored every 3–6 months before conception because 7–9% may develop overt or subclinical hypothyroidism.
- Subclinical hypothyroidism should preferably be confirmed with repeat thyroid function testing before initiating LT4 therapy.
- Many women with an initially elevated TSH will have normal thyroid function upon repeat assessment.

Initial Evaluation Before Pregnancy

- **Thyroid function testing is recommended in women with infertility or recurrent miscarriage because hypothyroidism is part of the differential diagnosis.**
- **Measurement of TPO antibodies helps identify women at increased risk of future hypothyroidism.**
- **TPOAb positivity also predicts miscarriage, preterm birth, and postpartum thyroiditis.**

  Routine antibody screening is not universally recommended and should be individualized according to clinical risk.

Overt Hypothyroidism IN INFERTILITY

- The prevalence of previously undiagnosed overt hypothyroidism is approximately 0.2% among women with infertility or recurrent miscarriage.
- Approximately 70% of affected women are TPOAb positive.

  Untreated overt hypothyroidism is associated with menstrual disturbances, ovulatory dysfunction, infertility, and recurrent miscarriage.
- Menstrual abnormalities occur in approximately 23% of untreated women.
- Hypothyroidism accounts for approximately 2–3% of all cases of anovulation.

Recommendations Table 4: Thyroid Function Testing and Monitoring in Women with Infertility	Strength*	Level #
TSH testing should be performed in all non-pregnant women who present with infertility or recurrent miscarriages.	Good Practice Statement	
TPOAb testing may be performed in all women who present with infertility or recurrent miscarriages.	Conditional	Low
For women with infertility or recurrent miscarriage who are taking levothyroxine, utilize a target TSH of 0.5-2.5 mU/L preconception and in pregnancy.	Good Practice Statement	
For women using levothyroxine, TSH may be checked once within 6-12 weeks prior to controlled ovarian stimulation, approximately two weeks after a positive pregnancy test and then according to pregnancy recommendations (see elsewhere).	Conditional	Low

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TSH, thyroid stimulating hormone; TPOAb, thyroperoxidase antibody

Recommendations Table 5: Overt Hypothyroidism in Women with Infertility	Strength*	Level #
In women with newly diagnosed or uncontrolled overt hypothyroidism, fertility treatment should be delayed until euthyroidism is restored.	Good Practice Statement	
Women with overt hypothyroidism who are planning pregnancy should be treated with levothyroxine (LT4).	Strong	Moderate
Thyroid preparations other than levothyroxine (LT4), such as liothyronine (LT3) or desiccated thyroid extract, should not be used in women planning pregnancy.	Strong	Low

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
LT4, levothyroxine; LT3, liothyronine

Subclinical Hypothyroidism and infertility

.The prevalence of subclinical hypothyroidism is approximately 2.4% in women with infertility or recurrent miscarriage.

.Around 40% of women are TPOAb positive, increasing to 80% when TSH exceeds 10 mU/L.

.Most women are asymptomatic and diagnosed during infertility investigations.

Obesity and thyroid autoimmunity are major risk factors.

Recommendations Table 6: Subclinical Hypothyroidism in Women with Infertility	Strength*	Level #
In women with newly diagnosed or uncontrolled subclinical hypothyroidism, fertility treatment may be delayed until the spontaneous restoration or therapy-induced restoration of euthyroidism.	Conditional	Low
Subclinical hypothyroidism with a TSH >10 mU/L should be treated with levothyroxine.	Good Practice Statement	
For all women with newly diagnosed subclinical hypothyroidism, diagnostic confirmation with rechecking TSH and FT4 may be done in 4-6 weeks.	Conditional	Moderate
If the TSH concentration normalizes upon repeat measurement: 1) TPOAb negative women do not require biochemical follow-up and may be advised to seek medical evaluation upon the development of hypothyroid symptoms. 2) TPOAb positive women may be followed-up with TSH testing every 3-6 months when planning pregnancy, and once pregnant, every 4-6 weeks during the first half of pregnancy, at least once in the third trimester, and 4-6 weeks after any dose adjustment.	Conditional	Low
If subclinical hypothyroidism is persistent upon repeat testing: 1) Low dose (25-75 mcg/day) levothyroxine may be started, with a TSH measurement after 4-6 weeks and levothyroxine dose titrated to a target TSH between 0.5-2.5 mU/L.		

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TSH, thyroid stimulating hormone; FT4, free thyroxine; TPOAb, thyroperoxidase antibody

Evidence for LT4 Therapy

- **Untreated subclinical hypothyroidism is associated with a modest reduction in conception rates and a slightly increased miscarriage risk.**
- **During IVF/ICSI, LT4 therapy improved implantation, miscarriage, and live birth rates in one randomized trial.**
- **LT4 treatment may prevent progression from subclinical to overt hypothyroidism during ovarian stimulation and pregnancy.**
- **Immediate low-dose LT4 (25–75 mcg/day) may be considered when repeat testing is impractical.**

Euthyroid TPOAb-Positive Women

- TPOAb positivity occurs in approximately 8–11% of women with infertility.
- The prevalence may be nearly doubled in women with recurrent miscarriage.
- Approximately 7–9% of euthyroid TPOAb-positive women develop hypothyroidism within one year.
- Thyroid function should therefore be reassessed every 3–6 months before conception.
- TPOAb positivity is associated with increased risks of miscarriage and postpartum thyroiditis.

Levothyroxine in Euthyroid TPOAb-Positive Women

- Three high-quality randomized controlled trials demonstrated no fertility or pregnancy benefit from LT4 therapy in euthyroid TPOAb-positive women.
- LT4 did not improve conception rates, miscarriage rates, or live birth outcomes.
- Current evidence does not support selenium, glucocorticoids, or immunomodulatory therapies for improving reproductive outcomes.

Recommendations Table 7: Thyroid Autoimmunity in Women with Infertility	Strength*	Level #
For euthyroid TPOAb and/or TgAb positive women with infertility, levothyroxine treatment should not be offered.[a]	Strong	High
For euthyroid TPOAb and/or TgAb positive women planning pregnancy, TSH and FT4 may be rechecked every 3-6 months.	Conditional	Low
For TPOAb and/or TgAb positive women with infertility, do not offer oral prednisolone or intravenous immunoglobulin treatment.	Conditional	Low

[a] Regardless of TSH concentration or miscarriage history
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TPOAb, thyroperoxidase antibody; TgAb, thyroglobulin antibody; TSH, thyroid stimulating hormone; FT4, free thyroxine

Dissenting comments for Recommendations Table 7 from ATA members within the guidelines' writing group are reported in Supplementary Table 3.

Hyperthyroidism and Fertility

- **Women with hyperthyroidism require rapid evaluation because fertility treatment is often time-sensitive.**
- **Achieving euthyroidism before conception remains the primary treatment goal.**
- **Persistent TSH suppression (<0.1 mU/L) with normal fT4 and T3 requires close monitoring.**
- **Low-dose propylthiouracil (PTU) may be considered in selected women before conception.**
- **PTU should be discontinued immediately after pregnancy confirmation whenever clinically appropriate.**

Recommendations Table 8: Subclinical and Overt Hyperthyroidism Preconception	Strength*	Level #
Diagnostic confirmation of subclinical hyperthyroidism in women with infertility should be performed by rechecking TSH and FT4 after 4-6 weeks.	Good Practice Statement	
Overt hyperthyroidism in women with infertility should be treated preconception, either according to the underlying cause or with a low dose of antithyroid drugs if no underlying cause can be identified.	Good Practice Statement	

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TSH, thyroid stimulating hormone; FT4, free thyroxine

HYPOTHYROIDISM, THYROID AUTOIMMUNITY, AND HYPOTHYROXINEMIA PRECONCEPTION AND IN PREGNANCY

Hypothyroidism, Thyroid Autoimmunity, and Hypothyroxinemia

- **Management depends on when thyroid dysfunction is diagnosed (preconception or during pregnancy) and its severity (overt vs. subclinical hypothyroidism).**

What's New in This Guideline?

- **TPOAb status is no longer used to determine LT4 treatment in women with subclinical hypothyroidism.**
- **LT4 treatment decisions now depend primarily on the timing of diagnosis, as treatment started after the first trimester has shown limited benefit.**
- **Mild overt or subclinical hypothyroidism (TSH <6 mU/L) should be confirmed with repeat thyroid testing before treatment whenever possible.**
- **More than 50% of mild abnormalities normalize spontaneously, reducing unnecessary diagnosis and overtreatment.**
- ***Emphasis on repeat testing: More than 50% of mild abnormalities (TSH <6 mU/L) spontaneously normalize upon rechecking within 2-3 weeks. Therefore, confirmatory testing is strongly encouraged before initiating levothyroxine therapy to reduce overdiagnosis and overtreatment.***

Overt Hypothyroidism: Epidemiology and Risks

- Overt hypothyroidism affects approximately 0.2% of women of reproductive age and 0.4–0.5% of pregnancies.
- Thyroid autoimmunity is the leading cause, while autoimmune diseases and advanced maternal age further increase risk.
- Untreated disease increases the risk of miscarriage, gestational hypertension, preterm birth, and impaired offspring neurodevelopment.
- Higher maternal TSH levels are associated with greater fetal risk.

Clinical Features and Evaluation

- **Most pregnant women are diagnosed during routine antenatal screening and remain asymptomatic.**
- **Evaluate iodine deficiency risk and measure TPO antibodies to determine etiology and future monitoring.**

Recommendation

- Women planning pregnancy should maintain TSH below 2.5 mU/L while remaining within the reference range.
- Levothyroxine (LT4) monotherapy is the recommended treatment before conception.
- Women receiving liothyronine (T3) or desiccated thyroid extract should switch to LT4 before pregnancy.
- Adequate thyroid control before conception provides sufficient maternal thyroid hormone for fetal brain development.
- TSH ≥6 mU/L requires immediate LT4 treatment.
- Mild overt hypothyroidism (TSH <6 mU/L) may be confirmed by repeat testing before treatment if clinically appropriate.
- Initial LT4 replacement is approximately 1.5–1.7 µg/kg/day, with an additional 20–30% increase during pregnancy.
- Thyroid function should be monitored regularly throughout gestation.

Recommendations Table 9: Overt Hypothyroidism Preconception and in Pregnancy	Strength*	Level #
For new onset maternal overt hypothyroidism during pregnancy with a TSH less than 6 mU/L, confirmatory testing may be performed within 3 weeks to verify an indication for levothyroxine treatment.	Conditional	Low
New onset maternal overt hypothyroidism during pregnancy with a TSH equal or above 6 mU/L, or overt hypothyroidism that persists after retesting should be treated with levothyroxine.	Strong	Moderate
Maternal hypothyroidism during pregnancy should be treated with levothyroxine monotherapy. Other thyroid preparations such as LT3 or desiccated thyroid should not be used in pregnancy.	Strong	Low

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TSH, thyroid stimulating hormone, LT3, liothyronine

Box 3. Preconception and gestational considerations for the management of hypothyroidism

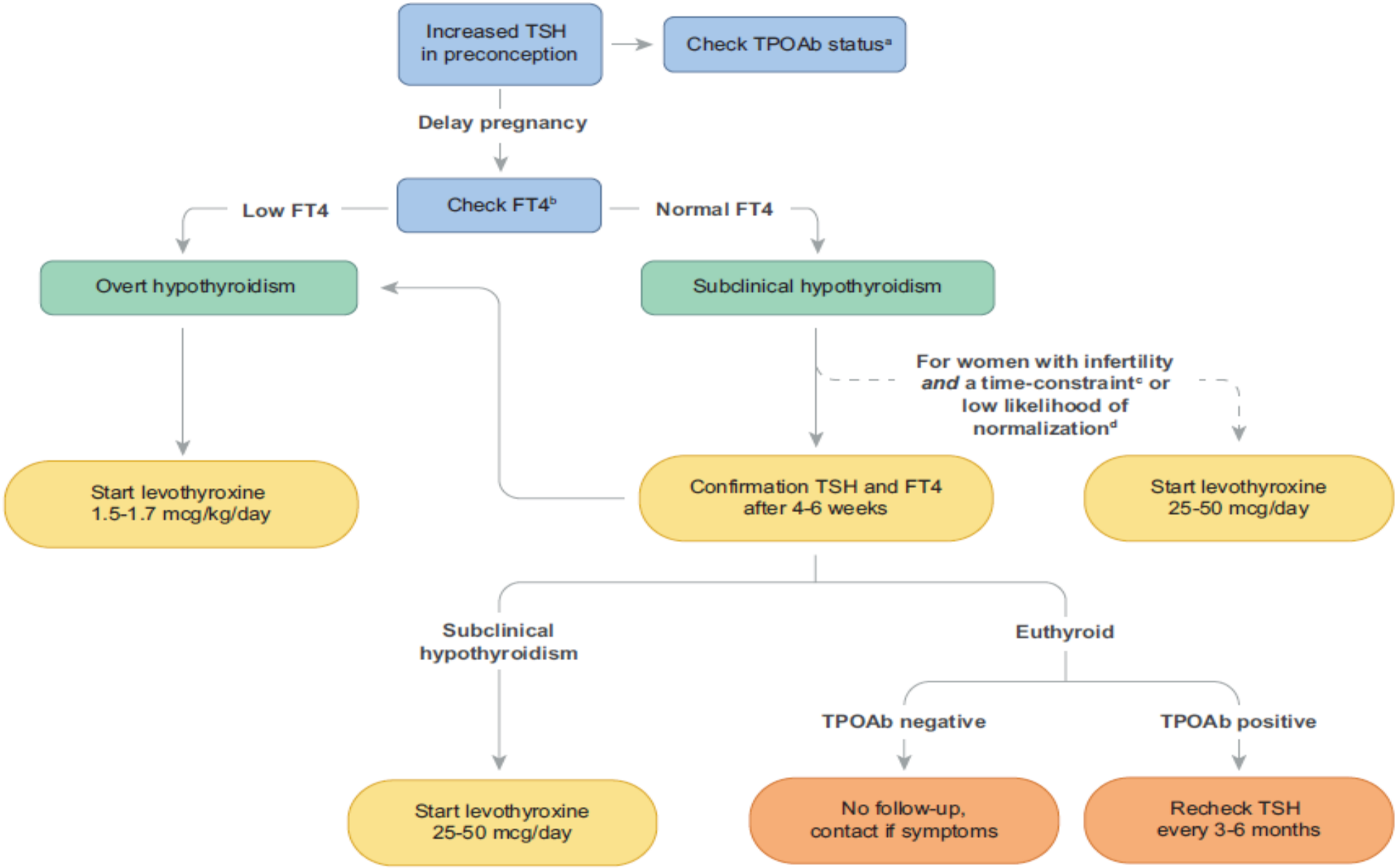
Preconception

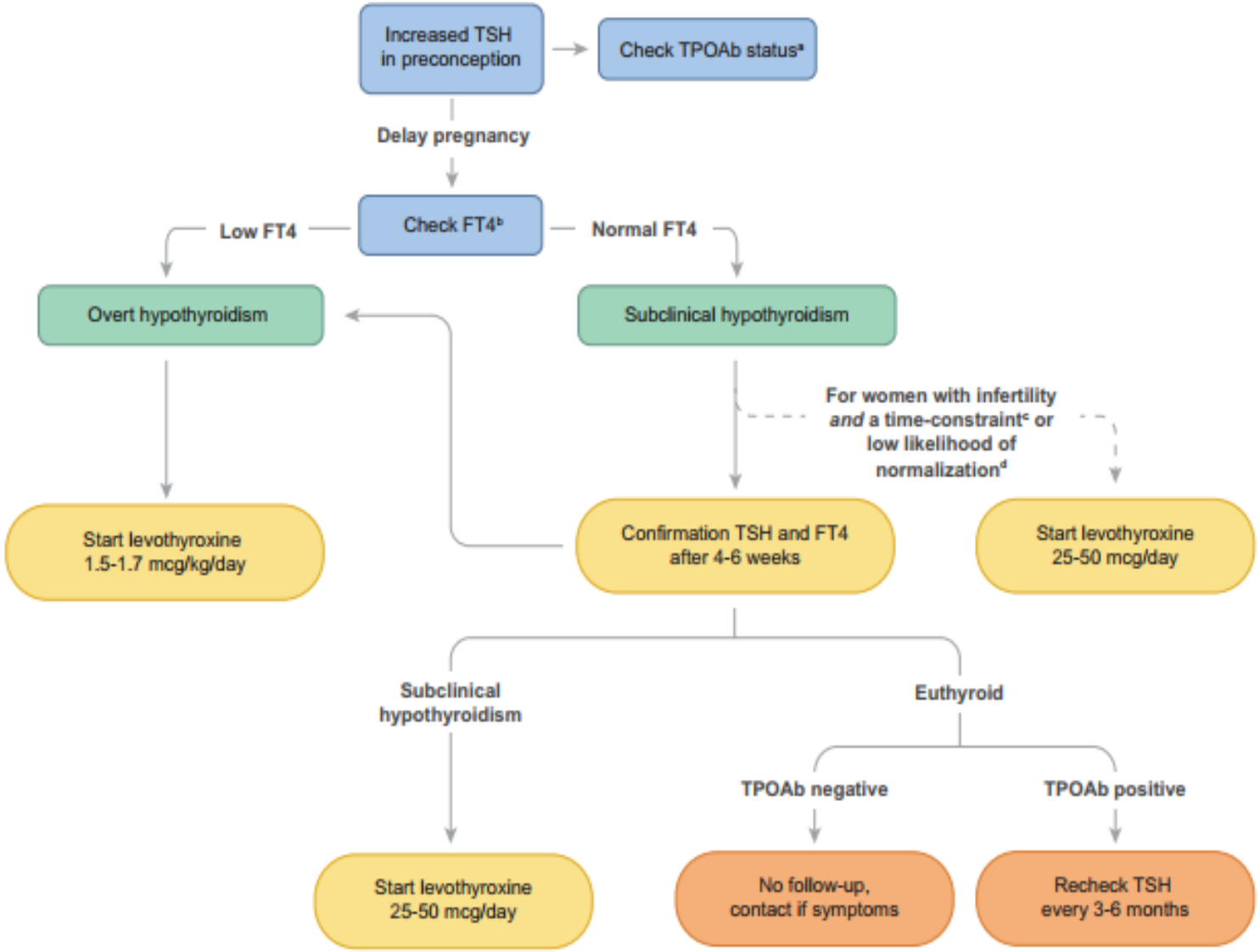
- Active assessment of a woman's desire to become pregnant and/or advising patients to seek guidance for a future pregnancy wil optimize preconception and gestational management of hypothyroidism.
- If levothyroxine treatment establishes biochemical euthyroidism, the chance of conception is optimized and the risk of adverse fertility/pregnancy outcomes is similar to women without hypothyroidism.
- If treated with levothyroxine, a preconception TSH target of 0.5-2.5 mU/L can be used to lower the risk of undertreatment during fertility treatments and/or early pregnancy.
- It is reasonable to temporarily increase the thyroid function testing frequency to once every 3-6 months in women with treated hypothyroidism who are trying to conceive.

Gestational

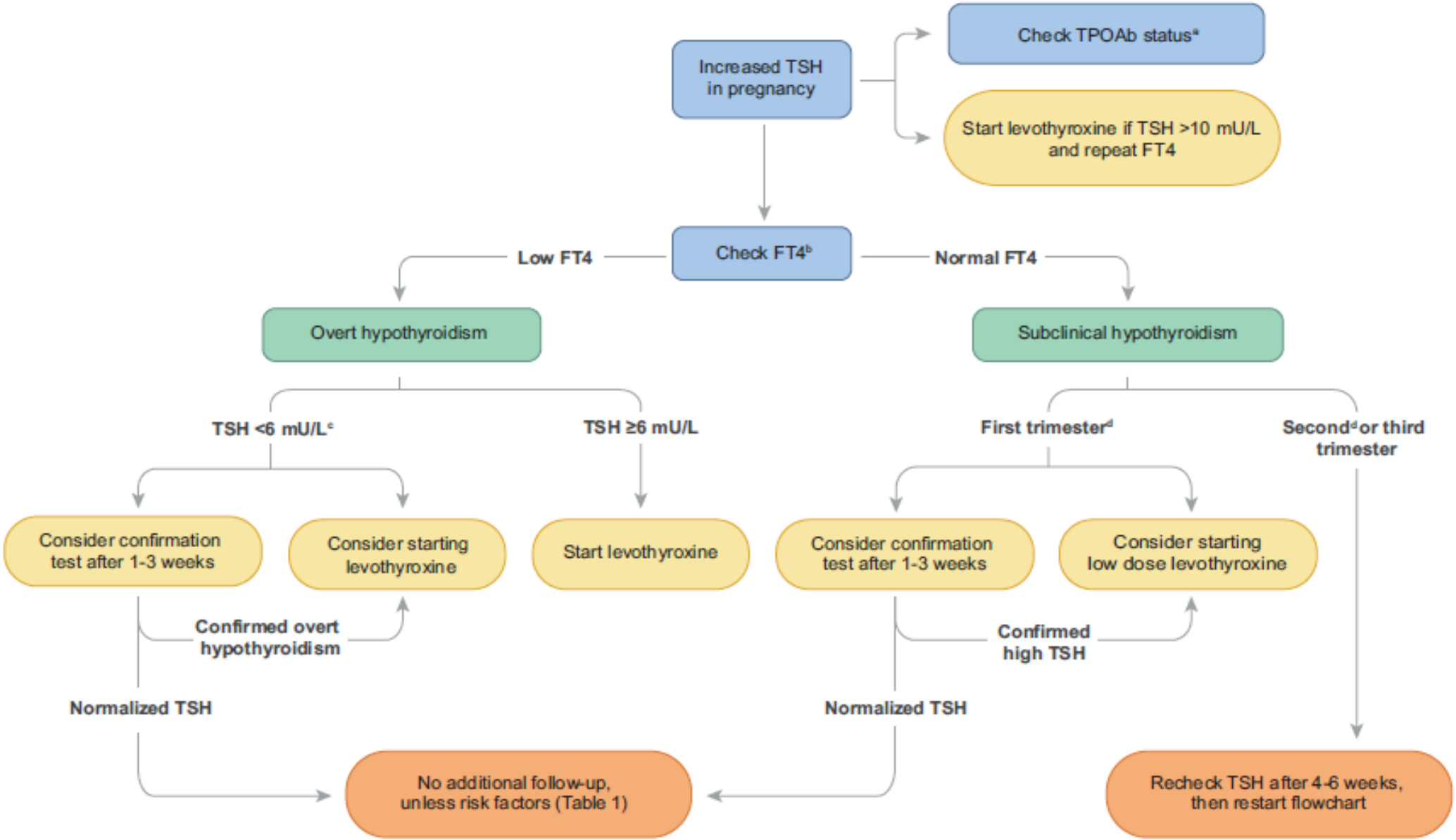
- Most women will require a levothyroxine dose increase of approximately 25% by week 12 and 50% by week 20, and the levothyroxine dose should thus be increased by about 25% upon a positive pregnancy test considering the half-life of levothyroxine. However, overtreatment with this approach is possible (see text).
- A typical monitoring strategy in women with treated hypothyroidism would include thyroid function testing every 4 weeks until midgestation and at least once near 30 weeks gestation.

TSH, thyroid stimulating hormone


Increased TSH in preconception
Check TPOAb status[a]
Delay pregnancy
Check FT4[b]
Low FT4
Normal FT4
Overt hypothyroidism
Subclinical hypothyroidism
For women with infertility and a time-constraint[c] or low likelihood of normalization[d]
Start levothyroxine 1.5-1.7 mcg/kg/day
Confirmation TSH and FT4 after 4-6 weeks
Start levothyroxine 25-50 mcg/day
Subclinical hypothyroidism
Euthyroid
TPOAb negative
TPOAb positive
Start levothyroxine 25-50 mcg/day
No follow-up, contact if symptoms
Recheck TSH every 3-6 months



FLOWCHART 1. Approach to increased TSH levels in preconception. Green boxes indicate a diagnosis, yellow boxes indicate an action, and orange boxes indicate recommended follow-up. [a]Women with a high TSH have a higher risk of TPOAb positivity. TPOAb positivity is associated with a 7–9% risk of developing subclinical hypothyroidism preconception or during pregnancy. TPOAb status can guide screening in a future pregnancy and aid in counseling for postpartum thyroiditis risk. Euthyroid TPOAb positivity is not an indication for levothyroxine (refer to Recommendations Table 7). [b]Or alternatives as described in the thyroid function testing subsection of this guideline. [c]For example, when fertility is already planned or when the chance of a successful pregnancy due to age or comorbidities would be further limited by postponing treatment. [d]Based on expert opinion, this could be defined, for example, as a TSH concentration >6 mU/L or in case of subclinical hypothyroidism with concomitant TPOAb positivity.


Increased TSH in pregnancy
Check TPOAb status[a]
Start levothyroxine if TSH >10 mU/L and repeat FT4
Check FT4[b]
Low FT4
Normal FT4
Overt hypothyroidism
Subclinical hypothyroidism
TSH <6 mU/L[c]
TSH ≥6 mU/L
First trimester[d]
Second[d] or third trimester
Consider confirmation test after 1-3 weeks
Consider starting levothyroxine
Start levothyroxine
Consider confirmation test after 1-3 weeks
Consider starting low dose levothyroxine
Confirmed overt hypothyroidism
Confirmed high TSH
Normalized TSH
Normalized TSH
No additional follow-up, unless risk factors (Table 1)
Recheck TSH after 4-6 weeks, then restart flowchart

FLOWCHART 2. Approach to increased TSH levels in pregnancy. Green boxes indicate a diagnosis, yellow boxes indicate an action, and orange boxes indicate recommended follow-up. A Women with a high TSH have a higher risk of TPOAb positivity. TPOAb positivity can be used for counseling on postpartum thyroiditis and guide screening in future pregnancies. B Or alternatives as described in the thyroid function testing subsection of this guideline. C For mild forms of overt hypothyroidism, the risk profile and chance of TSH normalization are similar to those of subclinical hypothyroidism. Therefore, confirmatory testing can be considered using a shared decision-making approach. D The distinction between the first and second trimester remains arbitrary, and management can be altered if the gestational age is within reasonable proximity on a case-by-case approach.

LT4 Dose Adjustment

- Most women require approximately 25% higher LT4 doses by 12 weeks and 50% higher doses by 20 weeks.
- Dose adjustments should consider pre-pregnancy TSH and baseline LT4 dose.
- After delivery, LT4 should usually return to the pre-pregnancy dose, followed by thyroid function assessment at 6 weeks postpartum.

Subclinical Hypothyroidism

- Subclinical hypothyroidism occurs in 2.4–6% of reproductive-age women and 3.2–3.5% of pregnancies.
- Thyroid autoimmunity remains the strongest risk factor.
- Untreated disease is associated with miscarriage, preeclampsia, placental abruption, preterm birth, and small-for-gestational-age infants.
- Absolute increases in adverse outcomes are generally modest (1–5%).

Recommendations

- Repeat thyroid function testing after 4–6 weeks before initiating LT4
- If abnormalities persist, initiate low-dose LT4 (approximately 50 µg/day).
- The treatment target remains TSH below 2.5 mU/L within the normal range.
- Women taking T3-containing preparations should switch to LT4 monotherapy.

Recommendations Table 10: Subclinical Hypothyroidism Preconception and in Pregnancy	Strength*	Level #
Profound maternal subclinical hypothyroidism (i.e. a TSH >10 mU/L) during pregnancy should be treated with levothyroxine.	Good Practice Statement	
For mild maternal subclinical hypothyroidism diagnosed in the first trimester,[a] levothyroxine treatment may be considered.	Conditional	Low
For mild maternal subclinical hypothyroidism diagnosed after the first trimester,[a] levothyroxine treatment should not be offered and follow-up TSH testing can be performed after 4-6 weeks.	Strong	High
For maternal subclinical hypothyroidism treated with levothyroxine, TSH may be checked every 4 weeks until midgestation and at least once around 30 weeks gestation.	Conditional	Low
For women using levothyroxine prior to or during pregnancy, a TSH within the normal range but below 2.5 mU/L may be targeted.	Conditional	Low

[a] Trimester cut-offs are pragmatically defined and do not reflect thyroid-related physiology. Therefore, it is reasonable to adjust this cut-off by several weeks on a case-by-case basis.

* Strength of Recommendation; # Level of Evidence; Good Practice Statement

TSH, thyroid stimulating hormone

Recommendation: First Trimester Management

- Consider LT4 primarily when subclinical hypothyroidism is diagnosed during the first trimester.
- Repeat thyroid testing within 3 weeks is appropriate when treatment is deferred.
- Begin LT4 with 25–75 µg/day, depending on TSH level and maternal characteristics.

Evidence for LT4 Therapy

- **initiating LT4 during the late first or second trimester showed no improvement in obstetric outcomes or child IQ.**

Thyroid Autoimmunity (TPOAb Positivity)

- **TPO antibodies are present in 5–15% of women of reproductive age.**
- **TPOAb concentrations may decline by about 60% as pregnancy progresses.**

Recommendations Table 11: Thyroid Autoimmunity Preconception and in Pregnancy	Strength*	Level #
For euthyroid TPOAb and/or TgAb positive pregnant women, levothyroxine treatment should not be offered.	Strong	High
For euthyroid TPOAb and/or TgAb positive pregnant women, do not offer selenium supplementation.	Conditional	Moderate
For euthyroid TPOAb and/or TgAb positive pregnant women, do not offer glucocorticoids or intravenous immunoglobulin treatment.	Conditional	Low

See Recommendations Table 1 for guidance on follow-up thyroid function testing
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TPOAb, thyroperoxidase antibody; TgAb, thyroglobulin antibody

Dissenting comments for Recommendations Table 11 from ATA members within the guidelines' writing group are reported in Supplementary Table 3.

Box 4. Perinatal TgAb positivity and other signs of thyroid autoimmunity

TgAb positivity is a reflection of thyroid autoimmunity and a risk factor for overt hypothyroidism during pregnancy.[57] However, TgAb positivity has less diagnostic accuracy for hypothyroidism than TPOAb positivity.[183,184] Furthermore, as compared to (euthyroid) TPOAb positivity, it is less likely that (euthyroid) TgAb positivity is a risk factor for miscarriage or preterm birth.[33,133,136,185] For these reasons, there are more studies available on TPOAb positivity, and TPOAb positivity remains the primary thyroid antibody to be checked for etiological or prognostic purposes both in pregnant and non-pregnant individuals. Some studies in non-pregnant individuals have suggested that thyroid sonography can identify individuals with thyroid antibody negative thyroid autoimmunity. However, the lack of data in the perinatal period limits the usefulness of ultrasound for detecting thyroid autoimmunity. Moreover, if the indication for a thyroid ultrasound is unclear, the risks of diagnosing thyroid nodules or small (i.e. not clinically meaningful) thyroid cancers, which might result in additional testing or treatment, is more likely to outweigh any benefits.

- There is no indication for routine perinatal TgAb measurements.
- If a woman is known to have isolated TgAb positivity or previous incidental signs of thyroid autoimmunity on ultrasound when entering the perinatal period, it is sensible to approach thyroid management similar to the recommendations for TPOAb positive women.
- A small subgroup in which additional TgAb measurement could be considered for the purpose of identifying an indication for preconception or gestational thyroid function screening would be a euthyroid TPOAb negative woman with a high risk of thyroid autoimmunity (for example: previous thyroiditis, concomitant autoimmune disease, first degree relative with thyroid autoimmunity) and a high-normal TSH.

TgAb, thyroglobulin antibody; TPOAb, thyroperoxidase antibody; TSH, thyroid stimulating hormone

Isolated Hypothyroxinemia

- Isolated hypothyroxinemia affects approximately 2% of pregnancies.
- Important risk factors include iodine deficiency, iron deficiency, obesity, advanced maternal age, twin pregnancy, and endocrine disruptors.
- It is associated with premature rupture of membranes, gestational diabetes, preterm birth, large-for-gestational-age infants, and lower offspring IQ.
-

- **Recommendations**

1- Repeat thyroid function testing within 2–6 weeks can confirm persistence and exclude progression to hypothyroidism.

2-Assess and correct iodine deficiency and iron deficiency whenever present.

Recommendations Table 12: Isolated Hypothyroxinemia Preconception and in Pregnancy	Strength*	Level #
For maternal isolated hypothyroxinemia diagnosed in the first trimester, do not offer levothyroxine treatment.	Conditional	Low
For maternal isolated hypothyroxinemia diagnosed after the first trimester, levothyroxine treatment should not be offered.	Strong	High

* Strength of Recommendation; # Level of Evidence; Good Practice Statement

Dissenting comments for Recommendations Table 12 from ATA members within the guidelines' writing group are reported in Supplementary Table 3.

THANKS FOR YOURE ATTENTION

G. HYPERTHYROIDISM PRECONCEPTION, IN PREGNANCY, AND POSTPARTUM

Hyperthyroidism

- **Hyperthyroidism during the reproductive period requires individualized management to rapidly restore euthyroidism while minimizing maternal and fetal risks.**
- **Pregnancy-related physiological changes can mimic thyrotoxicosis, making diagnosis challenging. Management differs according to disease etiology, severity, gestational age, and treatment history.**
- **Careful interpretation of thyroid function tests is essential throughout preconception, pregnancy, and postpartum.**

Recommendations Table 13: Evaluation of Hyperthyroidism in Pregnancy	Strength*	Level #
Thyroid function testing should not be pursued in pregnant women with hyperemesis gravidarum if there are no other clinical signs of hyperthyroidism[a].	Good Practice Statement	
Thyroid ultrasonography is not suggested as a method to distinguish GTT from Graves' disease in pregnant women.	Conditional	Low
Isotope scanning is contraindicated in pregnancy and should not be used in the diagnostic evaluation of hyperthyroidism.	Good Practice Statement	

[a] Predominantly palpitations that persist after rehydration and antiemetics. If palpitations are caused by GTT, these can be treated symptomatically with propranolol.
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
GTT, gestational transient thyrotoxicosis

What is new in this guideline

- Urgent thyroid surgery can be performed during any trimester if necessary, although the second trimester remains the preferred timing.
- TRAb/TSI levels and the duration of antibody positivity are now emphasized when deciding whether antithyroid drugs (ATDs) can be safely discontinued before conception.
- Shared decision-making is recommended when planning pregnancy in women with Graves' disease.

Causes of Hyperthyroidism in Pregnancy

- The most common physiological cause is Gestational Transient Thyrotoxicosis (GTT) caused by high hCG levels.
- The most common pathological cause is Graves' disease.
- Less common causes include toxic multinodular goiter, toxic adenoma, thyroiditis, TSH-secreting pituitary adenoma, struma ovarii, thyroid hormone overtreatment, and thyroid cancer metastases.
- Differentiating GTT from Graves' disease is the first diagnostic step.
- Painless (silent) thyroiditis – rare in pregnancy, but should be differentiated from Graves' disease. Characterized by suppressed TSH, mildly elevated fT4, and negative TRAb/TSI antibodies. Antithyroid drugs are not indicated as the mechanism is destructive (not increased production).

Gestational Transient Thyrotoxicosis (GTT)

- GTT results from hCG stimulation of the TSH receptor and usually presents with suppressed TSH and mildly elevated fT4 during early pregnancy.
- It occurs in <1–11% of pregnancies and in up to 66% of women with hyperemesis gravidarum.
- Most cases resolve spontaneously and are not associated with increased risks of preeclampsia, preterm birth, gestational hypertension, or fetal growth restriction.

Box 5. Considerations of (F)T3 testing in gestational hyperthyroidism

In the case of suspected hyperthyroidism in pregnancy, several pertinent issues should be noted when considering the measurement of serum (F)T3.

- Analytic concerns of the free thyroid hormone assays in pregnancy, particularly for FT3, may limit their usefulness (Section C). Compared to total T3, FT3 is not altered by binding proteins and appears to be more stable throughout pregnancy[12,207], although FT3 may be not as widely available as total T3. When T3 estimates are needed, it is reasonable to apply the same considerations as described for free and total T4 in Section C, while noting the general limitations of the FT3 assay similar to its concerns in nonpregnant individuals.
- In general, serum (F)T3 testing can be performed in cases of a suppressed TSH and normal FT4, to distinguish subclinical hyperthyroidism from overt hyperthyroidism, especially if this would change management.[208]
- If T3 thyrotoxicosis is suspected, for example hyperthyroidism caused by Graves' disease or a T3-producing thyroid nodule, T3 testing may be considered in a pregnant woman with a normal FT4 and a TSH <0.01 mU/L, or TSH ranging from >0.01 to <0.3 mU/L in the presence of thyrotoxic symptoms, thyroid eye disease, a palpable thyroid nodule, and absent use of ATDs or thyroid hormone medication.[208]

In general, serum T3 testing may be helpful to initially distinguish the etiology of hyperthyroidism during pregnancy and can be used to guide the diagnosis between GTT, Graves' disease (Table 2), and a T3-producing thyroid nodule. However, maternal T3 concentrations are not associated with fetal T3 or (F)T4, and as such, targeting a normal (F)T3 during pregnancy can cause fetal hypothyroidism.[209] Therefore, (F)T3 should not be used to monitor or inform medical management for GTT or Graves' disease during pregnancy.[209]

FT3, free triiodothyronine; T3, triiodothyronine; TSH, thyroid stimulating hormone; FT4, free thyroxine; ATD, antithyroid drug; GTT, gestational transient thyrotoxicosis

Graves' Disease in Pregnancy

- Graves' disease affects approximately 0.4% of women before conception and 0.2% during pregnancy.
- Untreated disease may cause significant maternal and fetal complications. Disease activity often improves during pregnancy because of immune tolerance but commonly relapses after delivery.
- Maternal TRAb antibodies can cross the placenta and stimulate the fetal thyroid.

Diagnostic Evaluation:

- Women with suppressed TSH should first undergo free T4 measurement. If fT4 is elevated, TRAb or TSI should be measured to distinguish Graves' disease from GTT.
- T3 measurement may be useful when fT4 is normal or when T3 thyrotoxicosis is suspected.
- Thyroid ultrasound cannot reliably distinguish Graves' disease from GTT during pregnancy.

Preconception management of hyperthyroidism (Graves' disease)

Recommendations Table 14: Graves' Disease Preconception	Strength*	Level #
The desire for conception should be assessed in women of childbearing age who have new or existing hyperthyroidism.	Good Practice Statement	
The risks and benefits of treatment options for hyperthyroidism, their impacts on a future pregnancy, and desired timeline to conception should be discussed in women with existing hyperthyroidism who are planning pregnancy.	Good Practice Statement	
Women taking methimazole (MMI) should be switched to propylthiouracil (PTU) if they are planning pregnancy.[a]	Strong	Moderate

[a] If PTU is not available or if there are contraindications (allergy), we recommend that women continue MMI while trying to conceive, along with a discussion on the pros and cons of stopping MMI upon a positive pregnancy test and the option to pursue definitive therapy prior to pregnancy.
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
MMI, methimazole; PTU, propylthiouracil

Distinguishing Graves' Disease from GTT

- Features favoring Graves' disease include persistent hyperthyroidism beyond the first trimester, positive TRAb/TSI, thyroid eye disease, previous Graves' disease, and autoimmune family history.
- GTT is more likely in early pregnancy, multiple gestation, and hyperemesis gravidarum.
- Women with isolated hyperemesis generally do not require routine thyroid testing unless clinically indicated.

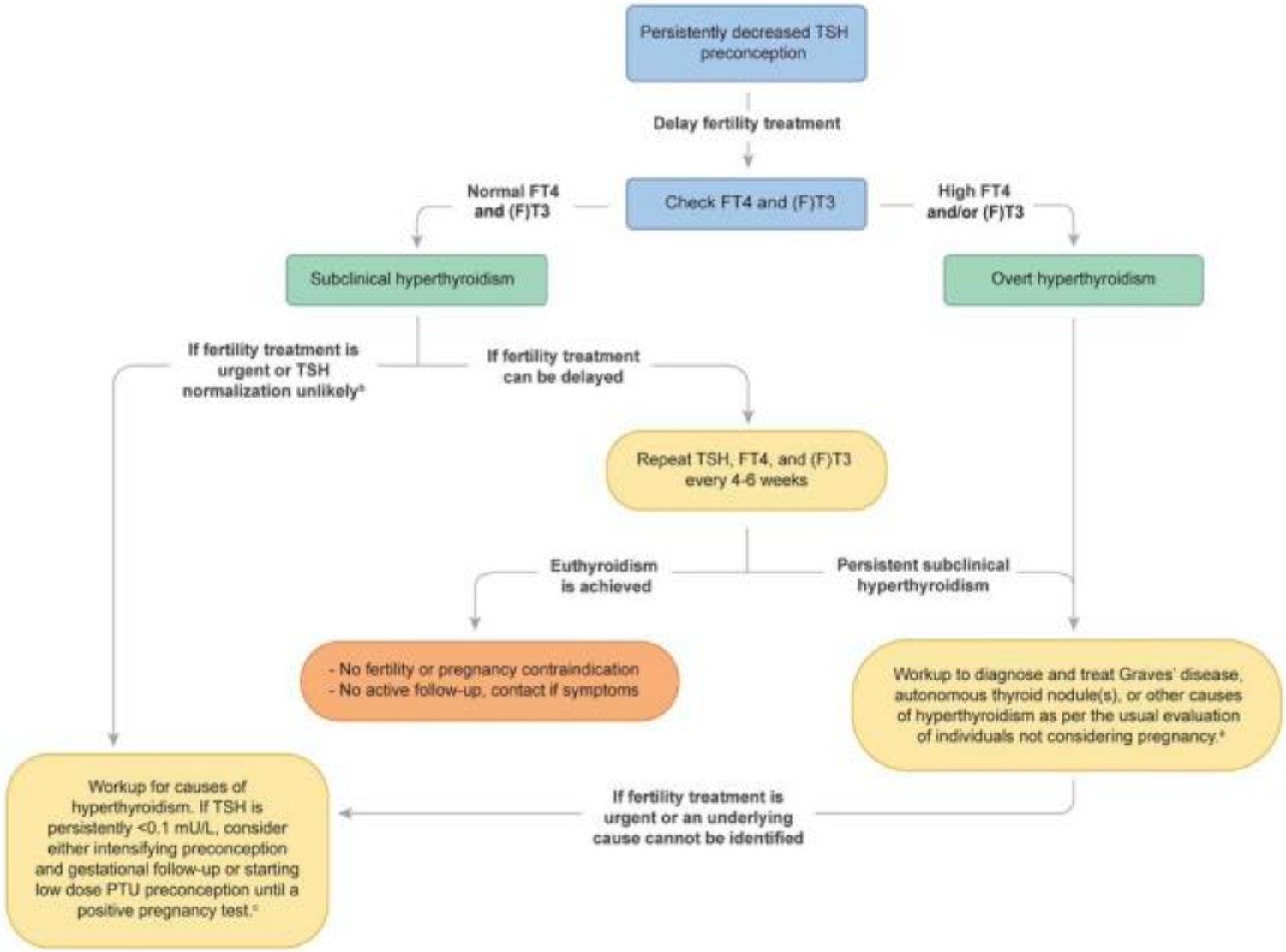
Table 2. Distinguishing Between Gestational Transient Thyrotoxicosis (GTT) and Graves' Disease

Feature	GTT	Graves' Disease
Symptoms of thyrotoxicosis before pregnancy	None	Often
Symptoms of hyperemesis gravidarum (nausea/vomiting)	Often	Usually not present
Personal or family history of thyroid disease	Usually absent	Often present
Presence of goiter	None/low	May be present as diffuse goiter
Signs of thyroid eye disease	None	May be present
Serum FT3 concentration (Box 6)	Usually normal or mildly raised	Raised
Serum TRAb and/or TSI concentration	Normal	Raised
Serum TT3 (ng/dL)/TT4 (mcg/dL) ratio[329]	Typically <20	Typically >20
Serum TSH concentration	Usually normalizes by the third trimester of pregnancy	Often suppressed throughout pregnancy

GTT, gestational transient thyrotoxicosis; FT3, free triiodothyronine; TRAb, TSH receptor antibodies; TSI, thyroid stimulating immunoglobulin; TT3, total triiodothyronine; TT4, total thyroxine; TSH, thyroid stimulating hormone

Hyperthyroidism Before Conception

- Women planning pregnancy should achieve stable euthyroidism before conception.
- Normal thyroid function should be confirmed by two consecutive tests at least six weeks apart.
- Restoring euthyroidism improves menstrual regularity and fertility and reduces pregnancy complications.



FLOWCHART 3. Approach to decreased TSH levels in preconception. Green boxes indicate a diagnosis, yellow boxes indicate an action, and orange boxes indicate recommended follow-up. [a]Ideally, the treatment for the etiology of hyperthyroidism should be completed and euthyroidism restored (confirmed by two TSH concentrations in the reference range at least six weeks apart) before fertility treatment begins. [b]For example, if the TSH has been persistently <0.1 mU/L. [c]Refer to "Subclinical and Overt Hyperthyroidism in Infertility" in Section E.

Treatment Options Before Pregnancy

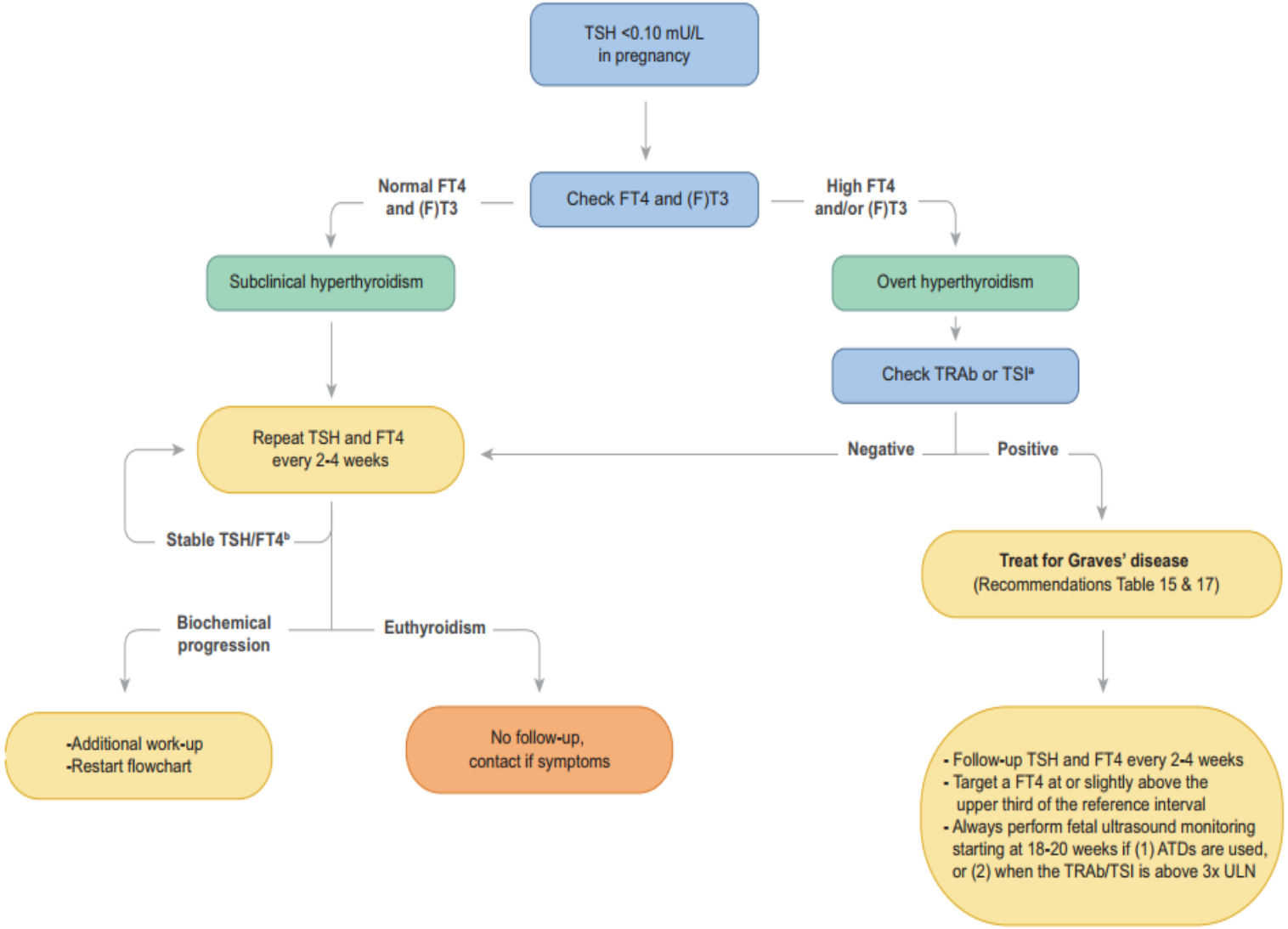
- **Management options for Graves' disease include:**

  Antithyroid drugs (ATDs)

  Radioactive iodine (^{131}I)

  Total thyroidectomy

  Treatment selection should consider future fertility, fetal safety, relapse risk, and patient preferences through shared decision-making.



FLOWCHART 4. Approach to decreased TSH levels in pregnancy. Green boxes indicate a diagnosis, yellow boxes indicate an action, and orange boxes indicate recommended follow-up. (f)T3 = serum free and/or total T3 (see Box 5 in these guidelines). [a]For women with a clear presentation of hCG-induced hyperthyroidism/gestational transient thyrotoxicosis (e.g., with a nonfully suppressed TSH, twin pregnancy, or hyperemesis gravidarum without extrathyroidal signs of Graves' disease), it is reasonable to follow up with a TSH and fT4 in two to four weeks before checking TRAb and/ or TSI. [b]Assess for a palpable thyroid nodule. If present, then follow biochemical progression and consider ATDs depending on the severity of hyperthyroidism. For example, repeat TRAb and/or TSI, (f)T3 measurement, thyroid ultrasound, and postpartum diagnostic imaging. TSI, thyroid-stimulating immunoglobulin.

Antithyroid Drugs Before Pregnancy

- Women receiving methimazole (MMI) should switch to propylthiouracil (PTU) once actively trying to conceive whenever possible.
- If PTU is unavailable, the lowest effective MMI dose should be used.
- Women should immediately informtheir physician if pregnancy occurs during ATD therapy.

Radioactive Iodine (RAI)

- RAI therapy may increase TRAb concentrations, increasing fetal and neonatal hyperthyroidism risk.
- Pregnancy should only be attempted after antibody levels have fallen below 3× the upper limit of normal.
- Stable thyroid function should also be confirmed before conception.

Discontinuing Antithyroid Drugs

Recommendation

Women with:

1. **Low-dose ATD therapy**
2. **Stable thyroid function for >6 months**
3. **TSH >0.35 mU/L**
4. **Negative TRAb/TSI**

   may be considered for ATD withdrawal before pregnancy because relapse risk is lowest in this group.

Monitoring After ATD Withdrawal

- Recommendation

  Following discontinuation:

  Monitor TSH and fT4 every 1–2 weeks during the first trimester.

  Continue testing every 2–4 weeks afterward.

  Restart therapy if biochemical relapse develops.

ATDs During Pregnancy

- **Both PTU and MMI cross the placenta and may cause congenital malformations.**
- **PTU is preferred during the first trimester because associated birth defects are generally less severe than those seen with MMI.**
- ***After 16 weeks, evidence is insufficient to recommend PTU over MMI.***

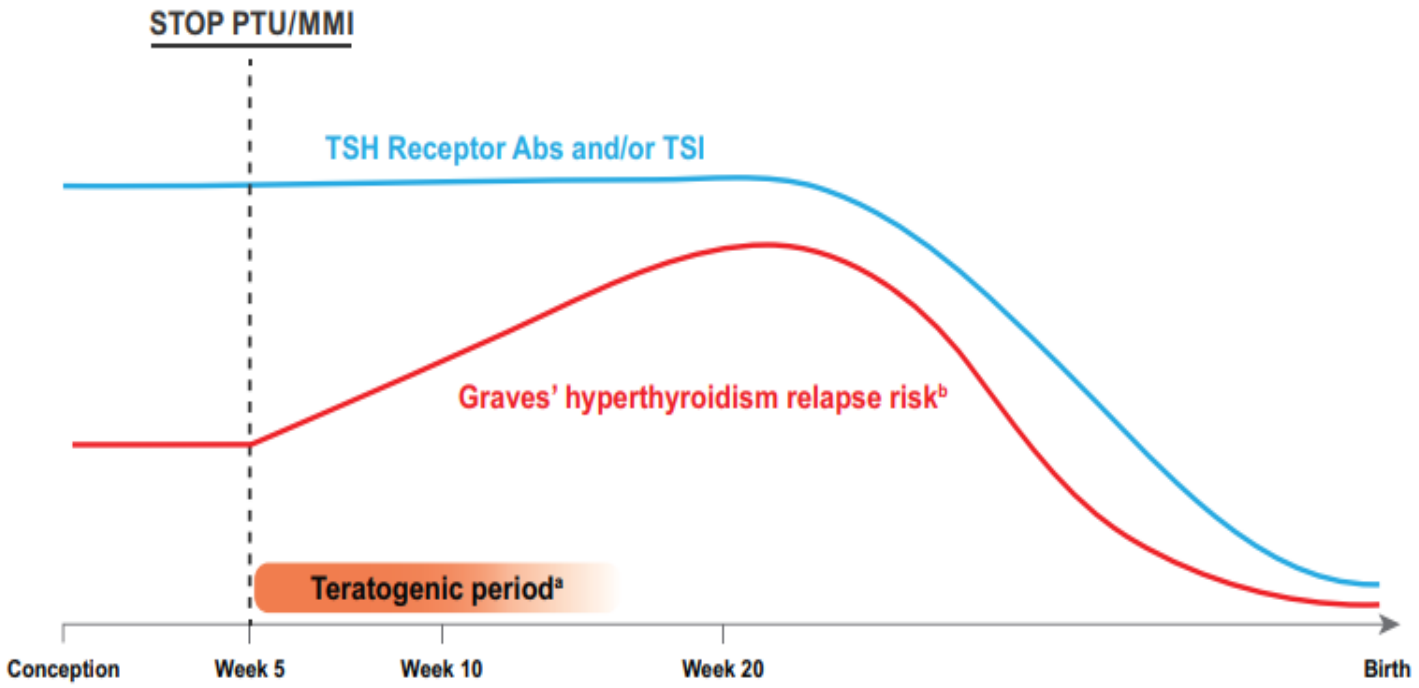
Congenital Malformation Risk

Compared with women not receiving ATDs:

1. **PTU increased congenital malformations by 8.8 per 1000 births.**
2. **MMI increased malformations by 17.1 per 1000 births.**
3. **Higher cumulative MMI doses (>495 mg) were associated with greater risk.**

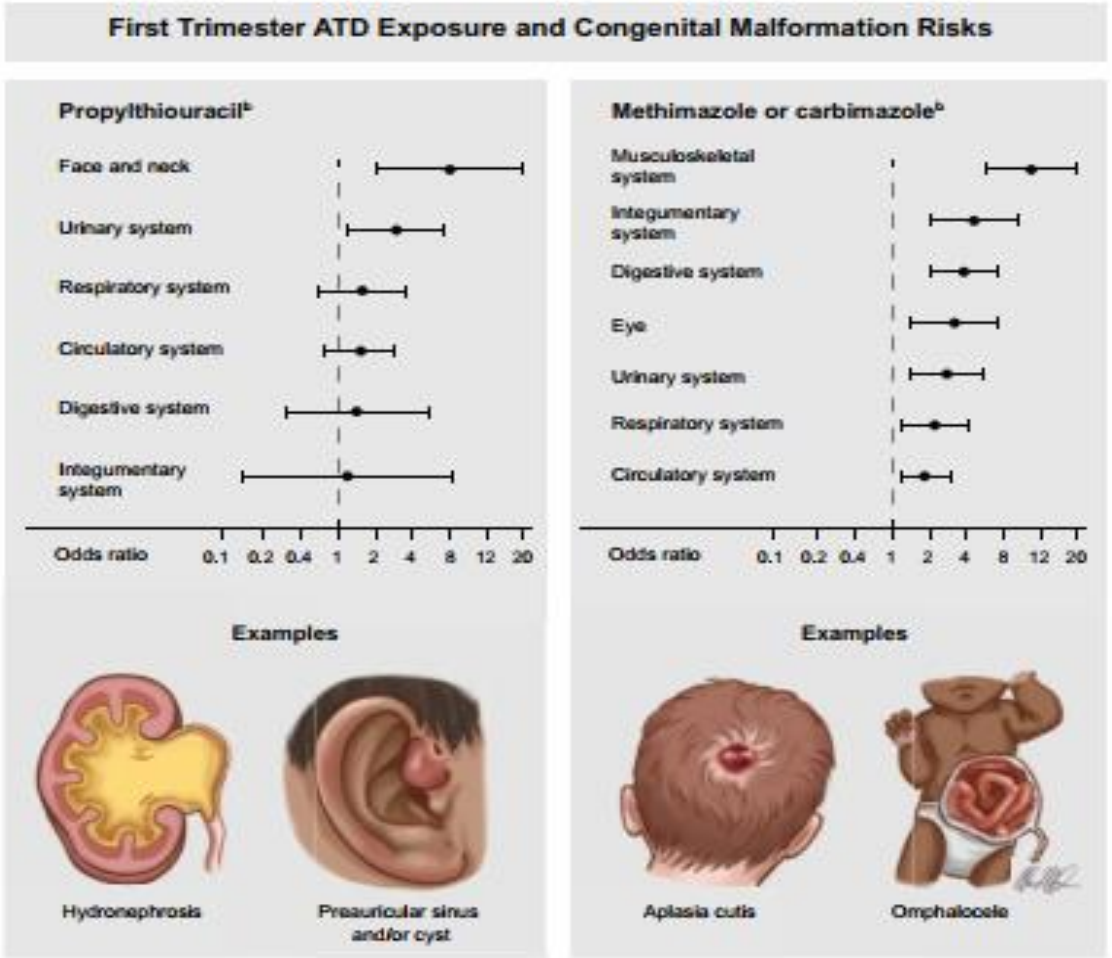
Recommendations Table 17: ATD Treatment of Graves' Disease Preconception and in Pregnancy	Strength*	Level #
Consider discontinuing ATD therapy for Graves' disease upon confirmed pregnancy if the woman is euthyroid on low dose ATD (MMI <5–10 mg/day or PTU <100–200 mg/day) taken for >6 months pre-pregnancy (Figure 4).	Conditional	Low
Following the discontinuation of ATD use in pregnancy, serum TSH, FT4 and clinical examination may be monitored every 1-2 weeks in the first trimester, then every 2-4 weeks in the second and third trimesters.	Conditional	Low
In pregnant women with a new diagnosis of Graves' hyperthyroidism or who have high risk of developing thyrotoxicosis if ATDs were to be discontinued, treatment with ATDs is advised as follows:		
Pregnant women with active Graves' disease managed with ATDs should have serum TSH, FT4, and TRAb and/or TSI concentrations measured as soon as pregnancy is confirmed and monitored with TSH and FT4 every 2-4 weeks thereafter.	Good Practice Statement	
PTU may be used if initiating ATD for the treatment of hyperthyroidism before 16 weeks of pregnancy.	Conditional	Low
If a woman is taking MMI during pregnancy, switching to PTU[a] may be considered until 16 weeks[b] depending on the time of presentation and MMI dose (see text).	Good Practice Statement	
If PTU is not available, MMI may be continued at the lowest effective dose for the shortest duration possible.	Conditional	Low
In case of thyrotoxicosis, propranolol may be used in routine dosages to ameliorate hyperthyroidism-related symptoms.	Good Practice Statement	

[a] When switching from MMI to PTU, a dose ratio of approximately 1:20 should be used (e.g., MMI 5mg once daily = PTU 50mg twice daily).
[b] If ATD therapy continues to be required after 16 weeks gestation, it remains unclear whether PTU should be continued or switched to MMI.
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
ATD, antithyroid drug; MMI, methimazole; PTU, propylthiouracil; TSH, thyroid stimulating hormone; FT4, free thyroxine; TRAb, TSH receptor antibodies; TSI, thyroid stimulating immunoglobulin



[a] For MMI/CMZ, the teratogenic period ends at approximately 16 weeks for skin defects, while the risks for other congenital anomalies remain elevated generally throughout the first trimester.
[b] The 1 year risk of Graves' disease relapse typically ranges between 30-70% following ATD discontinuation based on risk factors in the text.
ATD, antithyroid drug; TSHR-Ab, thyrotropin receptor antibody; TSI, thyroid stimulating immunoglobulin

FIG. 5. Strategy for ATD discontinuation upon pregnancy confirmation. Factors important for considering when maternal ATD may be successfully discontinued in pregnancy include the duration and dose of ATD use, maternal TSH concentration, signs of Graves' disease burden (i.e., thyroid eye disease, goiter), and the maternal TRAb and/or TSI concentration. The 1-year risk of Graves' disease relapse typically ranges between 30% and 70% following ATD discontinuation based on these risk factors



Prevalence of congenital malformations			
Unexposed ATD group	PTU use only	MMI/CMZ use only	Both PTU and MMI/CMZ
	Within 1 year of birth[a]		
5.9% (N=170,716/2,872,109)	7.0% (N=699/9,930)	8.1% (N=91/1,120)	8.0% (N=147/1,841)
	Within 2 years of birth[a]		
5.7% (N=45,982/811,730)	8.0% (N=45/564)	9.1% (N=100/1,097)	10.1% (N=16/159)

[a] Seo GH, et al. Ann Intern Med 2018;168(6):405-413.
[b] Andersen SL, et al. J Clin Endocrinol Metab 2019;104(12):6040-6048.

FIG. 6. Risks of antithyroid drugs during pregnancy. The relative and absolute risks, as well as examples of affected organ systems and severity of congenital malformations, associated with maternal antithyroid drug use during pregnancy are summarized from data reported in two large epidemiological studies. CMZ, carbimazole; MMI, methimazole

Switching from MMI to PTU

- Recommendation

  Women who become pregnant while taking MMI should switch to PTU as early as possible during the first trimester if continued treatment is required.

- ***An approximate conversion ratio is:MMI 5 mg/day ≈ PTU 50 mg twice daily.***

Monitoring During Pregnancy

- Recommendation

Women treated with ATDs should have:

1. **TSH and fT4 measured at pregnancy confirmation.**
2. **Repeat thyroid function tests every 2–4 weeks.**
3. **TRAb/TSI measured during the first trimester.**
4. **The ATD dose should be reduced whenever possible while maintaining euthyroidism.**

Recommendations Table 15: Subclinical and Overt Hyperthyroidism in Pregnancy	Strength*	Level #
Subclinical hyperthyroidism or GTT should not be treated with ATD therapy, but propranolol may be used to ameliorate hyperthyroidism-related palpitations.	Strong	Moderate
In pregnant women with subclinical hyperthyroidism whose TSH concentration is <0.1 mU/L, serum thyroid function should be monitored without treatment every 2-4 weeks.	Good Practice Statement	
Overt hyperthyroidism that is not due to GTT (i.e. Graves' disease, autonomous thyroid nodule) should be treated, to minimize the duration of uncontrolled thyrotoxicosis in pregnancy.	Good Practice Statement	
Overt hyperthyroidism not due to GTT (i.e. Graves' disease, autonomous thyroid nodule) may be treated with ATD therapy, targeting a FT4 concentration at or slightly above the upper third of the reference interval.[a]	Conditional	Moderate

[a] Because FT4 concentrations below this range are associated with a high risk of fetal hypothyroidism
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
GTT, gestational transient thyrotoxicosis; ATD, antithyroid drug; TSH, thyroid stimulating hormone; FT4, free thyroxine

Dissenting comments for Recommendations Table 15 from ATA members within the guidelines' writing group are reported in Supplementary Table 3.

Recommendations Table 16: Monitoring Graves' Disease in Pregnancy	Strength*	Level #
All pregnant women with a history of Graves' disease should have serum TSH, FT4, and TRAb and/or TSI measured in the first trimester.	Good Practice Statement	
For women with a history of Graves' disease who are not taking ATDs[a] and who have TRAb and/or TSI measured in the first trimester: A. If the TRAb and/or TSI concentration is >3 fold the upper limit of normal, TRAb and/or TSI measurements should be repeated at 18-22 and 30-34 weeks along with monitoring for signs of fetal hyperthyroidism (link to neonatal/fetal hyperthyroidism section). B. If the TRAb and/or TSI concentration at any time during pregnancy is <3 times the upper limit of normal and mother remains euthyroid, TRAb and/or TSI follow-up measurements and fetal hyperthyroidism monitoring should be stopped.	Strong	Moderate
Euthyroid women with a history of Graves' disease without prior definitive treatment and who have been in remission for >1 year should be monitored with thyroid function testing each trimester (Table 1), followed by maternal thyroid testing at 4-6 weeks and 4-6 months post-partum.	Good Practice Statement	

Thyroid Surgery During Pregnancy

- Thyroidectomy should only be considered for severe ATD intolerance or uncontrolled hyperthyroidism.
- If surgery is necessary, the second trimester is preferred.
- Surgery should be performed by experienced high-volume thyroid surgeons to minimize complications.

Graves' Disease Relapse

- Pregnancy suppresses autoimmune activity, making relapse uncommon during gestation.
- However, postpartum immune rebound results in a 25–55% relapse risk.
- Women in remission should continue thyroid function monitoring during each trimester and 3–6 months postpartum.

Recommendations Table 18: Thyroid Surgery for Graves' Disease in Pregnancy	Strength*	Level #
The definitive treatment for Graves' disease during pregnancy with a total thyroidectomy may be considered in exceptional circumstances.[a]	Conditional	Low

[a] Including for example in the management of thyroid storm in pregnancy after failing medical management.
* Strength of Recommendation; # Level of Evidence; Good Practice Statement

Table 5. Monitoring Fetal and Neonatal Hyperthyroidism in Pregnant Women with Active or Past History of Graves' Disease

Group at risk	Recommended monitoring
Pregnant women with active or past Graves' disease (treated with I-131 or total thyroidectomy)	• Measure TRAb and/or TSI in the first trimester, and obtain a monthly fetal ultrasound after 18-20 weeks if the TRAb and/or TSI level remains >3x the upper limit of normal.[a] • Continually assess for signs and symptoms of fetal hyperthyroidism by fetal ultrasound.

[a] Even in hypothyroid women, high TRAb and/or TSI concentrations can necessitate maternal ATD treatment (as a vehicle to treat or prevent fetal hyperthyroidism) in combination with levothyroxine (to maintain maternal euthyroidism).
TRAb, TSH receptor antibodies; TSI, thyroid stimulating immunoglobulin

Recommendations Table 19: Fetal Hyperthyroidism	Strength*	Level #
Fetal hyperthyroidism may be treated with maternal ATD therapy. In women with underlying hypothyroidism from past I-131 or total thyroidectomy treatment of Graves' disease where maternal ATD therapy is required for the management or prevention of fetal hyperthyroidism, levothyroxine is continued for maintenance of maternal hypothyroidism, while ATD is added for management of fetal hyperthyroidism. Outside of this setting, block and replace therapy is not to be used in pregnancy.	Conditional	Low

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
ATD, antithyroid drug

Fetal and Neonatal Hyperthyroidism

- Maternal TRAb >3× upper limit of normal significantly increases fetal and neonatal hyperthyroidism risk.
- Monitoring should include serial fetal ultrasound and multidisciplinary care.
- Neonatal Graves' disease usually resolves by 20 weeks, and almost always by 48 weeks after birth.

Autonomous Thyroid Nodules (ATNs)

- Definitive treatment of ATNs should ideally occur before pregnancy.
- During pregnancy, thyroid scintigraphy is contraindicated; diagnosis relies on biochemical findings and clinical examination.
- Persistent hyperthyroidism may require ATDs, with fetal ultrasound performed monthly.

TABLE 6. SIGNS AND SYMPTOMS OF FETAL AND NEONATAL HYPERTHYROIDISM (A) AND HYPOTHYROIDISM (B)

A

Fetus	Neonate
• Goiter or thyromegaly (thyroid volume >90-95th percentile), although this finding cannot distinguish between fetal hyperthyroidism and hypothyroidism • Growth restriction • Accelerated bone maturation (distal femoral ossification center visible at <31 weeks) • Craniosynostosis • Heart failure • Fetal hydrops • Cardiomegaly • Tachycardia (persistent heart rate >160-180 beats per minute) [relatively late sign] • Intrauterine demise	• Small for gestational age at birth • Hyperexcitability • Diarrhea • Failure to thrive • Vomiting • Ophthalmopathy • Heart failure and cardiac arrhythmias • Systemic and pulmonary hypertension • Hepatosplenomegaly • Jaundice • Hyperviscosity syndrome • Thrombocytopenia • Craniosynostosis • Small anterior fontanelle

B

Fetus	Neonate[a]
• Goiter, which may be accompanied by hyperextension of the neck and tracheal compression • Polyhydramnios • Delayed bone maturation	• Dull look • Puffy facial features • Thickened tongue • Poor feeding • Constipation • Short stature and/or failure to grow • Poor muscle tone

[a] Only a minority of neonates are diagnosed with congenital hypothyroidism based on clinical findings, highlighting the importance of systematic neonatal screening.

Recommendations Table 20: Autonomous Thyroid Nodules	Strength*	Level #
Preconception		
Overt hyperthyroidism arising from autonomous thyroid nodules in women desiring pregnancy should be treated preconception, either surgically, with focal ablation, or with I-131.[a]	Good Practice Statement	
Pregnancy should be avoided for at least 6 months following I-131 treatment of autonomous thyroid nodules.	Good Practice Statement	
During pregnancy		
Women with overt hyperthyroidism arising from autonomous thyroid nodules during pregnancy should be treated with ATD therapy, targeting a FT4 concentration at or slightly above the upper third of the reference interval. For T3-predominant secreting thyroid nodules, the treatment target is a total or free T3 at or slightly above the upper limit of the reference interval.	Good Practice Statement	

a The decision regarding surgical or I-131 treatment can depend upon patient preferences including the timing of trying to conceive and risks of complications. Definitive treatment in the preconception phase is important in order to mitigate the risks associated with maternal hyperthyroidism and ATD exposure during pregnancy.

**** Strength of Recommendation; # Level of Evidence; Good Practice Statement***

TABLE 3. ADVANTAGES AND DISADVANTAGES OF TREATMENTS FOR PRECONCEPTION GRAVES' DISEASE

Graves' disease treatment option	Advantages related to pregnancy planning	Disadvantages related to pregnancy planning
ATDs continued in pregnancy	• Treatment is easy to take, discontinue or modify, and generally inexpensive • Usually the quickest option to achieve euthyroidism (achievable in majority of cases within 1-2 months) • Very low risk of permanent hypothyroidism • Relatively rapid decrease of TRAb and/or TSI concentrations	• Risk of congenital anomalies: +3% (PTU), +5% (MMI)[216-217] • Overtreatment associated with fetal and neonatal hypothyroidism • Requires additional fetal ultrasounds during pregnancy • Risk of post-partum relapse (if stopped during pregnancy)
ATDs stopped upon pregnancy (Figure 5)	• Discontinuation can be considered if there is a low risk of relapse (>6 months of treatment with ATD, normal TSH requiring <10 mg methimazole or <200 mg PTU per day, and TRAb concentrations <3x upper limit).	• Risk of early pregnancy and post-partum relapse
I-131 therapy	• Non-invasive and definitive treatment option • Oral administration • Decreased goiter size usually seen	• Pregnancy contraindicated for at least 6 months • TRAb/TSI concentrations may increase transiently over the course of 1-3 years following I-131 administration, which may increase the risk of fetal and neonatal hyperthyroidism • Permanent maternal hypothyroidism is likely • Contraindicated in active moderate/severe thyroid eye disease • More than one dose may be needed
Total thyroidectomy	• Definitive treatment option • Euthyroidism usually easily achievable with thyroid hormone replacement within 1-2 months • Serum TRAb/TSI concentrations fall relatively quickly • Alleviates symptomatic goiter, if present	• Permanent hypothyroidism is guaranteed, requiring lifelong thyroid hormone replacement • Surgical risks, including recurrent laryngeal nerve injury (temporary ~7%, permanent <1%) and hypoparathyroidism (up to 6% permanent) • Recovery period

ATD, antithyroid drug; TRAb, TSH receptor antibodies; TSI, thyroid stimulating immunoglobulin; PTU, propylthiouracil; MMI, methimazole; TSH, thyroid stimulating hormone

Table 4. Risks and Guidance for Treating Graves' Disease During Pregnancy

Graves' disease treatment option	Risks	Guidance
ATDs	Congenital anomalies (more severe with MMI than PTU)	• Discuss ATD risks in pregnancy through shared decision-making in preconception. • Confirm pregnancy promptly if suspected. • Consider discontinuing ATDs in pregnant women at low risk of disease relapse during the first trimester. • If PTU is available, consider switching from MMI to PTU as soon as pregnancy is confirmed, using a dosing ratio of 1:20 (MMI to PTU). • If ATD use continues to be needed during pregnancy, treat with PTU (if available) until 16 weeks gestation. The choice for a preferred ATD after 16 weeks gestation is unknown.
	Fetal goiter	• Monitor maternal thyroid function every 2-4 weeks, aiming for FT4 concentration at or slightly above the upper third of the reference interval. • Fetal ultrasound monitoring should be performed monthly starting at 18-20 weeks gestation if the mother uses ATDs during pregnancy, monitoring frequency can be reduced for low dose ATD on a case-by-case basis. • If ATDs can be discontinued in pregnancy, then the maternal TRAb and/or TSI concentration can be checked[a] and subsequent fetal ultrasound follow-up can be continued if the result remains >3 times the upper limit of normal after approximately 18-20 weeks gestation.
	Fetal and neonatal thyroid dysfunction	• Same guidance as for "Fetal goiter" above. • Consider discontinuing ATD treatment by 30-34 weeks gestation if appropriate.
Total thyroidectomy	Fetal and neonatal hyperthyroidism	• Measure serum TRAb and/or TSI at time of surgery, and plan to repeat at 18-20 weeks and 30-34 weeks gestation if the result is >3 times upper limit of normal.
	Maternal thyroid storm and complications from anesthesia	• Aim to achieve euthyroidism preoperatively, which likely requires ATD use and other therapies (such as potassium iodide, glucocorticoids, cholestyramine, plasmapheresis) if appropriate.
	Maternal hypothyroidism	• Higher doses of thyroid hormone replacement are required for pregnancy. Patient should be closely monitored with serum thyroid function testing postoperatively.
	Surgical complications (hypoparathyroidism, RLN damage)	• Refer to a high-volume surgeon.

[a] Serum TRAb and/or TSI should initially be measured in the first trimester, and if elevated to >3 times the upper limit of normal, the measurement should be repeated at 18-22 weeks and 30-34 weeks gestation to guide need for a fetal ultrasound if the elevated TRAb and/or TSI concentration is sustained.

MMI, methimazole; PTU, propylthiouracil; ATD, antithyroid drug;FT4, free thyroxine; TRAb, TSH receptor antibodies; TSI, thyroid stimulating immunoglobulin; RLN, recurrent laryngeal nerve

Box 6. Management of uncontrollable hyperthyroidism and thyroid storm in pregnancy

For the treatment of decompensated hyperthyroidism during pregnancy, the same principles would apply as for other emergencies during pregnancy. For any therapeutic decision with a complex fetal/maternal trade-off, the health of the mother should be prioritized to safeguard maternal health and to optimize fetal outcomes considering their interconnected health status. Clinicians should consult with or refer patients to centers experienced in managing thyroid storm during pregnancy and closely collaborate with obstetricians and neonatologists.

- Propranolol should be the first beta-blocker of choice to be used to control maternal hyperadrenergic symptoms of hyperthyroidism, while closely monitoring the fetal risks of maternal beta-blockade.[222,223]
- Thyroid surgery may be needed for severe cases. Although there are no data regarding the safety of SSKI therapy for the preparation for thyroidectomy in pregnancy and excess iodine is generally avoided in pregnancy (as iodide crosses the placenta [Figure 2], increasing the risk of neonatal goiter), short-term preoperative use or in the treatment of thyroid storm is unlikely to cause harm to the fetus. From limited data, long-term potassium iodide has been described as an alternative option for the management of Graves' disease in iodine sufficient populations, particularly if there is a higher risk or contraindications (i.e. allergies) to the usual therapies.[96,215]
- Measurement of thyroid function tests may be performed approximately every 2 days to ensure a favorable trajectory. While optimal serum TSH and thyroid hormones concentrations are not well defined in this circumstance, failure of thyroid hormones to decrease and worsening clinical status could be considered indications to increase treatment doses and/or consider additional treatment options.

SSKI, saturated solution of potassium iodide

Recommendations Summary

1. Achieve euthyroidism before conception.
2. Prefer PTU during the first trimester.
3. Monitor thyroid function every 2–4 weeks during pregnancy.
4. Measure TRAb/TSI in Graves' disease.
5. Reserve thyroid surgery for exceptional cases.
6. Closely monitor women at risk for fetal hyperthyroidism.
7. Continue postpartum surveillance because relapse is common.

H. THYROID NODULES AND CANCER PRECONCEPTION, IN PREGNANCY, AND POSTPARTUM

Thyroid Nodules & Cancer During Pregnancy: Overview

- Management of thyroid nodules and thyroid cancer during pregnancy requires balancing maternal and fetal safety.
- Decisions should consider whether diagnosis or treatment should be performed immediately or postponed until postpartum.
- Shared decision-making between clinicians and the patient is essential.
- Most recommendations are based on evidence from nonpregnant patients because pregnancy-specific data remain limited.
- Most thyroid cancers diagnosed during pregnancy are low-risk.

Epidemiology & Pregnancy Effects

- Thyroid nodules are detected in 9–33% of pregnant women, but only about 6% are clinically significant.
- Older maternal age and higher parity increase the likelihood of thyroid nodules. Pregnancy may slightly enlarge thyroid tumors, but this rarely has clinical importance.
- Pregnancy generally does not worsen differentiated thyroid cancer (DTC) prognosis, recurrence, or survival.
- Patients with metastatic or invasive disease require closer surveillance.

Evaluation of Thyroid Nodules

- Neck ultrasound is the primary imaging method for thyroid nodules during pregnancy.
- Serum TSH should be measured to exclude autonomous thyroid function.

  Thyroid scintigraphy is contraindicated during pregnancy.
- Evaluation of malignancy follows the same ultrasound risk criteria used outside pregnancy.
- FNA biopsy may be performed before or during pregnancy after shared decision-making.

Management of Benign Nodules & Differentiated Thyroid Cancer

- **Benign symptomatic nodules should ideally be treated before pregnancy.**

  Most low-risk differentiated thyroid cancers can safely undergo surgery after delivery.

- **Surgery during pregnancy is reserved for rapidly progressive or high-risk disease.**

  When surgery is necessary, the second trimester is generally preferred.

- **Appropriate postoperative levothyroxine replacement is essential.**

Recommendations Table 21: Differentiated Thyroid Cancer	Strength*	Level #
Preconception		
Patient-tailored preconception counseling about the effects of DTC treatment options on fertility and future pregnancy should be provided, including the potential risks of preconception I-131 administration on ovarian function.	Good Practice Statement	
In women who desire a future pregnancy, any required initial treatments of DTC should be completed preconception, while maintaining contraception.	Good Practice Statement	
The decision to administer postoperative I-131 treatment of DTC during preconception or to postpone until after pregnancy should be guided by DTC risk.[a]	Good Practice Statement	
Pregnancy should be avoided for at least 6 months following RAI treatment of DTC. In women who conceive within 6 months of receiving I-131, fetal monitoring for malformations should be considered.	Good Practice Statement	
The same DTC risk-based TSH suppression goals should be used for women planning pregnancy as for the general population, though not exceeding 2.5 mU/L.	Good Practice Statement	
Pregnancy		
Pregnant women with biopsy-suspicious thyroid nodules or biopsy-proven DTC, who do not have a high risk of thyroid cancer progression or impending tumor-related complications based on the anatomic location of the tumor, may be counseled to delay thyroid surgery until the postpartum period.	Conditional	Very Low
For DTC in pregnancy with a high risk of progression or immediate complications, the decision to undergo surgery may be based on oncologic indications, similar to if the patient was not pregnant.	Conditional	Very Low
Pregnant women with DTC may have the same TSH goal as was determined preconception, with TSH monitoring approximately every 4 weeks during the first half of pregnancy, at least once in the third trimester, and every 4-6 weeks after any dose adjustment.	Conditional	Low
Pregnant women with DTC may be followed using the same measures and frequency of cancer surveillance as was followed during preconception, with the exception of radioisotope imaging that is contraindicated.	Conditional	Very Low

[a] For intermediate-risk DTCs, it may be reasonable to delay postoperative I-131 treatment if imminent pregnancy is desired in a woman near the end of her reproductive span or with suboptimal fertility, which should be discussed in shared decision-making with the patient. For high-risk DTCs, the decision to administer I-131 therapy in the short-term or delay until after pregnancy is complete is best determined in multidisciplinary discussion. I-131 treatment cannot be administered during pregnancy or lactation.

* Strength of Recommendation; # Level of Evidence; Good Practice Statement

Radioiodine Therapy & TSH Suppression

- Radioactive iodine (^{131}I) is contraindicated during pregnancy.
- Pregnancy should be postponed for at least 6 months after radioactive iodine therapy.
- Long-term fertility is generally preserved after treatment.
- Women with previous thyroid cancer should continue levothyroxine during pregnancy.
- TSH targets should remain consistent with the patient's preconception cancer risk.

Monitoring During Pregnancy & Lactation

- **Most women with DTC require the same surveillance used outside pregnancy.**
- **Disease progression during pregnancy is uncommon.**
- **Thyroid surgery during lactation is considered safe.**
- **Breastfeeding can usually resume once the mother has recovered from anesthesia.**
- **Data regarding thermal ablation and targeted therapies during lactation remain limited.**

Recommendations Table 22: Thyroid Cancer in Lactation	Strength* Level #
If thyroid cancer surgery is indicated during lactation, a patient-centered anesthesia plan as well as the risks and benefits of continued breastfeeding versus delaying surgery until lactation is completed should be discussed in a multidisciplinary fashion.	Good Practice Statement
If postoperative I-131 ablation is indicated during lactation, a patient-centered plan considering the risks and benefits of delaying I-131 treatment in order to continue breastfeeding should be discussed in a multidisciplinary fashion.	Good Practice Statement
The same DTC risk-based TSH suppression goals should be used for breastfeeding women as for the general population.	Good Practice Statement
Lactating women who are recommended to receive targeted systemic DTC therapies should be counseled about the need to discontinue breastfeeding.[a]	Good Practice Statement

[a] If breastfeeding should be stopped, consider dopamine agonist therapy to reduce symptomatology related to abrupt breastfeeding cessation
* Strength of Recommendation; # Level of Evidence; Good Practice Statement
DTC, differentiated thyroid cancer; TSH, thyroid stimulating hormone

Medullary & Advanced Thyroid Cancer

- Medullary thyroid carcinoma (MTC) should ideally be treated before pregnancy.
- Calcitonin testing is indicated only when hereditary MTC or MEN2 is suspected.
- Pregnancy may physiologically increase calcitonin levels.
- Carcinoembryonic antigen (CEA) is a more reliable tumor marker during pregnancy.
- Advanced thyroid cancers require multidisciplinary management.

Recommendations Table 23: Medullary and Advanced Thyroid Cancers	Strength*	Level #
Medullary thyroid cancer and pregnancy		
Women diagnosed with MTC should undergo initial management (including thyroid surgery) prior to pregnancy and maintain contraception until this is complete.	Good Practice Statement	
Women diagnosed with MTC should undergo genetic testing prior to pregnancy.	Good Practice Statement	
Routine surveillance of postoperative MTC in pregnancy is similar to the non-pregnant patient. However, due to a possible pregnancy and lactation-related increase of serum calcitonin concentrations, monitoring may also include serum CEA concentrations during pregnancy and postpartum until breastfeeding is complete.	Conditional	Very Low
Advanced thyroid cancers in pregnancy		
The same urgency should be applied to pursuing thyroid surgery, EBRT, and/or systemic therapy for poorly differentiated and anaplastic thyroid cancers in pregnant women as in non-pregnant individuals, with case-by-case considerations in a multidisciplinary discussion weighing the expected risks of delaying treatment versus the fetal/maternal risks.	Good Practice Statement	

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
MTC, medullary thyroid cancer; CEA, carcinoembryonic antigen; EBRT, external beam radiation therapy

Fertility, Surgery & Radioiodine Considerations

- Thyroid surgery before pregnancy is generally safe and does not adversely affect future pregnancy.
- Untreated postoperative hypothyroidism or permanent hypoparathyroidism may increase maternal and fetal complications.
- Radioactive iodine (^{131}I) should be avoided during pregnancy, and conception should be postponed for at least 6 months after treatment.
- Current evidence suggests no major long-term reduction in fertility, although temporary decreases in ovarian reserve have been reported in some studies.
- Women planning pregnancy should achieve stable thyroid function before conception.

Special Situations & Advanced Thyroid Cancer

- Medullary thyroid carcinoma should ideally be diagnosed and treated before pregnancy, with genetic evaluation when indicated (e.g., RET mutation/MEN2).
- Serum calcitonin may rise physiologically during pregnancy and lactation, while CEA remains a more reliable tumor marker.
- Poorly differentiated, anaplastic, metastatic thyroid cancers, or grossly invasive disease require individualized multidisciplinary management.
- Targeted therapies and immune checkpoint inhibitors are generally avoided during pregnancy because of limited human safety data and potential fetal risks.
- Treatment decisions should balance maternal survival with fetal safety and be individualized for each patient.

Table 7. Guidance for the Management of DTC Preconception

Therapy	Guidance
Thyroid surgery	• Thyroid surgery for suspicious thyroid nodules and/or thyroid cancer should ideally be completed by a high-volume surgeon before conception. A patient-centered, multidisciplinary discussion can help determine optimal DTC management in the context of pregnancy planning.
Postoperative RAI treatment	• Women should be advised to wait at least 6 months after I-131 treatment of DTC before conceiving, to avoid the potential adverse effects of radiopharmaceutical use on future pregnancy.
TSH suppression	• Preconception serum TSH should be targeted to that recommended for the risk stratification of DTC though not exceeding 2.5 mU/L, as would be advised to patients not considering pregnancy.
DTC monitoring	• Women with a non-operated DTC should be counseled that the tumor size may increase slightly (though usually not in a clinically significant manner) during gestation. Patients with persistent or metastatic DTC desiring pregnancy should be managed in the context of a patient-centered, multidisciplinary approach and a desired pregnancy planned once disease is relatively stable. • Women who have received a total thyroidectomy for the treatment of DTC should be counseled that serum thyroglobulin concentrations may increase slightly during pregnancy,[285] but are likely to return to their previous concentrations after delivery.
Treatment of advanced DTC	• Data regarding fertility risks of targeted systemic therapies are extremely limited.

DTC, differentiated thyroid cancer; RAI, radioactive iodine; TSH, thyroid stimulating hormone

Table 8. Guidance for the Management of DTC in Pregnancy

Therapy	Guidance
Thyroid surgery	• For most patients with DTC diagnosed during pregnancy, delaying treatment until postpartum does not impact thyroid cancer outcomes. • If thyroid surgery is recommended in pregnancy, a patient-centered plan that incorporates case timing and fetal safety should be discussed in a multidisciplinary setting.
Postoperative RAI treatment	• Radiopharmaceutical use in pregnancy is absolutely contraindicated.
TSH suppression	• Postoperative TSH suppression requires a balance of maternal DTC treatment goals and risk of excessive levothyroxine exposure to the fetus. • Levothyroxine overtreatment in pregnancy increases the risk of pregnancy-induced hypertension, preeclampsia, preterm delivery, and fetal complications (e.g. low birth weight and adverse neurodevelopmental measures).[34,35,171,173] • There is limited evidence regarding the optimal strategies for maintaining LT4 suppression therapy during pregnancy in women with DTC.
DTC monitoring	• DTC monitoring in pregnant women should generally follow the same measures as in non-pregnant patients.
Ablative techniques	• There are insufficient data to determine if RFA and other thermal ablation techniques for thyroid cancer therapy may affect pregnancy outcomes.
Treatment of advanced DTC	• Most targeted therapies are contraindicated for use in pregnancy. Risks and benefits of treatment of advanced DTC during pregnancy should be discussed in a multidisciplinary environment weighing the risks of disease treatment with the safety of the mother and fetus.

DTC, differentiated thyroid cancer; RAI, radioactive iodine; TSH, thyroid stimulating hormone; LT4, levothyroxine; RFA, radiofrequency ablation

Key Recommendations

- **Most thyroid nodules and low-risk thyroid cancers can be managed conservatively until postpartum.**
- **Ultrasound and TSH testing remain the cornerstone of evaluation.**

  FNA biopsy is safe when clinically indicated.
- **Radioactive iodine must not be used during pregnancy.**
- **Management decisions should always balance maternal benefit and fetal safety through multidisciplinary shared decision-making.**

I. THYROID DYSFUNCTION POSTPARTUM

Postpartum Thyroid Dysfunction (Overview & PPT)

- Postpartum thyroiditis (PPT) is an autoimmune thyroid disorder occurring within 12 months after delivery or pregnancy loss.
- It typically follows three phases: transient thyrotoxicosis (1–6 months), hypothyroidism (4–8 months), and recovery to euthyroidism.
- Shared decision-making and patient education regarding symptoms and disease course are emphasized.
- Updated recommendations also clarify breastfeeding precautions during radiopharmaceutical use.

Epidemiology & Risk Factors

- PPT affects approximately 8% of postpartum women.
- Major risk factors include positive TPO antibodies, previous PPT, autoimmune disease, and family history of thyroid autoimmunity.
- Women with previous PPT have about a 70% recurrence risk in future pregnancies.
- 10–50% of women eventually develop permanent hypothyroidism.
- Routine levothyroxine or selenium supplementation is not recommended for PPT prevention.
- Postpartum thyroiditis can occur after any pregnancy, including pregnancy loss (miscarriage).· Women with a history of PPT have an approximately 70% risk of recurrence in a subsequent pregnancy.

Recommendations Table 24: Postpartum Thyroiditis	Strength*	Level #
TPOAb-positive women or those with a history of PPT may be educated about the high risk of PPT (recurrence) and symptoms that may warrant thyroid function testing.	Conditional	Low
During the thyrotoxic phase of PPT, women with hyperthyroidism-related symptoms should be treated with the lowest effective dose of a beta-blocker (propranolol or metoprolol may be used if lactating).	Strong	High
Levothyroxine may be considered during the hypothyroid phase of PPT if the woman is symptomatic, breastfeeding, or if pregnancy is planned within 6 months.	Conditional	Low
Upon normalization of thyroid function tests after PPT, thyroid function testing should be repeated after one year or upon the development of any hypothyroidism-related symptoms.	Good Practice Statement	

* Strength of Recommendation; # Level of Evidence; Good Practice Statement
TPOAb, thyroperoxidase antibody; PPT, postpartum thyroiditis

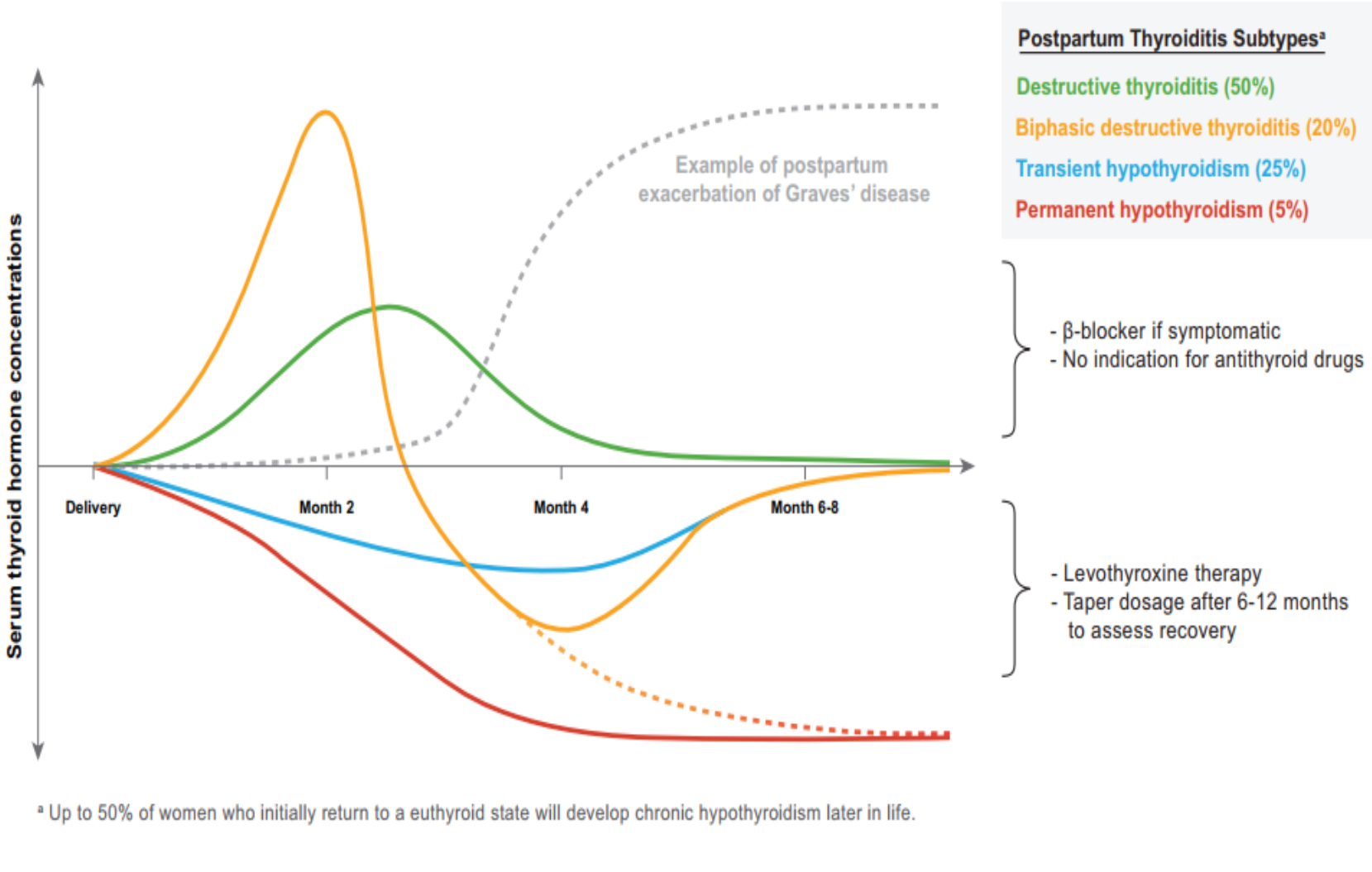


FIG. 7. Trajectories of postpartum thyroiditis subtypes. The typical trends of serum thyroid hormone concentrations seen in various subtypes of postpartum thyroiditis are summarized. During the thyrotoxic phases of the destructive subtypes, antithyroid drugs are not indicated, as the underlying etiology is not increased thyroid hormone production (as compared with the postpartum recurrence or exacerbation of Graves' disease, shown in the gray dotted line). During the hypothyroid phase of thyroiditis, a short course of thyroid hormone replacement may be considered in women with profound symptoms of hypothyroidism, with the plan to taper or stop the dose after 6–12 months.

Diagnosis & Clinical Evaluation

- **PPT should be differentiated from Graves' disease because management differs.**

  Graves' disease is suggested by positive TRAb/TSI, persistent thyrotoxicosis, and higher T3:T4 ratio.

- **PPT usually presents earlier postpartum with milder and shorter thyrotoxicosis.**

  Thyroid uptake scan may be considered only when diagnosis remains uncertain,

- **considering breastfeeding restrictions.**

- **Thyroid function testing is recommended in postpartum women with depressive symptoms.**

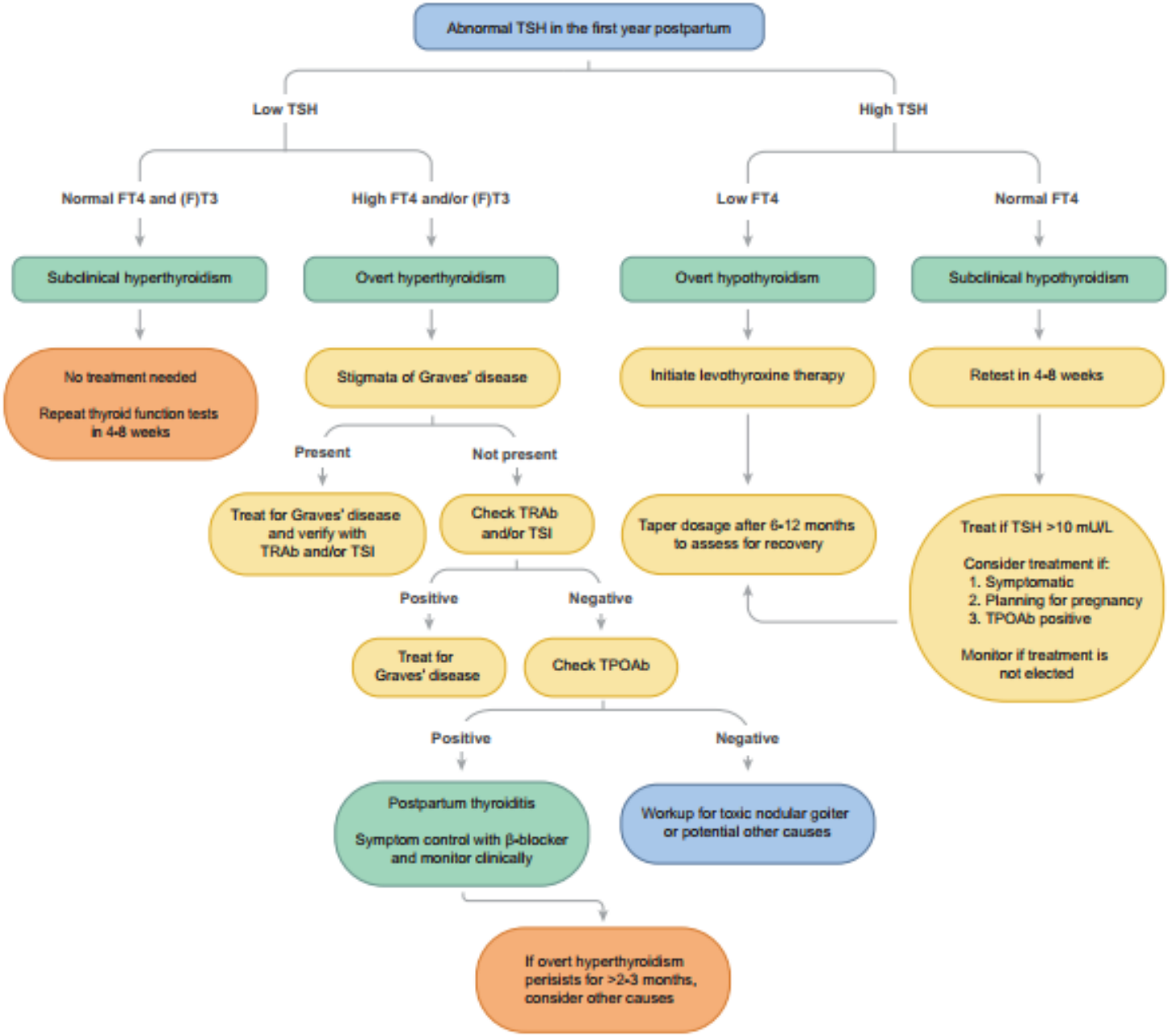
Table 9. Distinguishing Between the Thyrotoxic Phase of Postpartum Thyroiditis (PPT) and Graves' Disease

Feature	Thyrotoxic (destructive) phase of PPT	Graves' disease
Onset of thyrotoxicosis	1-6 months after delivery	3-12 months after delivery
TRAb and/or TSI concentration	Negative	Positive in most
Hyperthyroid symptoms	Usually mild	Can be severe
Eye symptoms	Absent	Can be present
Hyperthyroid signs	May be absent	May be present, along with specific signs of Graves' disease[a]
Duration of thyrotoxic phase	0-3 months	>3 months
TT3 (ng/dL) to TT4 (mcg/dL) ratio[329]	Typically <20	Typically >20
Thyroid vascularity by ultrasound	Low	High
Radioactive iodine uptake[b]	Low or absent	High

[a] Diffuse goiter, thyroid bruit, pretibial myxedema, and/or thyroid eye disease
[b] Contraindicated if the woman is lactating, thus temporary discontinuation of breastfeeding would be needed following administration of the radioisotope
PPT, postpartum thyroiditis; TRAb, TSH receptor antibodies; TSI, thyroid stimulating immunoglobulin; TT3, total triiodothyronine; TT4, total thyroxine

Management of Postpartum Thyroiditis

- During the thyrotoxic phase, symptomatic patients may receive beta-blockers (propranolol or metoprolol).
- Antithyroid drugs should not be used because hormone release is due to thyroid destruction rather than increased synthesis.
- Levothyroxine is indicated for symptomatic hypothyroidism, breastfeeding women, or those planning another pregnancy soon.
- Levothyroxine can often be tapered after 1 year if thyroid function recovers.
- Thyroid function should be reassessed every 4–8 weeks until stable.



FLOWCHART 5. Approach to abnormal TSH levels in postpartum. Green boxes indicate a diagnosis, yellow boxes indicate an action, and orange boxes indicate recommended follow-up.

Lactation & Radiopharmaceuticals

- **Diagnostic radioisotopes should be used only when clearly indicated during breastfeeding.**
- **Breastfeeding should be interrupted for 3–4 days after I-123 and 36 hours after Tc-99m pertechnetate, with expressed milk discarded.**
- **Radioactive iodine (I-131) is contraindicated during lactation, and breastfeeding must not resume after treatment.**
- **If I-131 is required, treatment should ideally be delayed until at least 3 months after breastfeeding has stopped.**
- **Expressing milk helps reduce breast radiation and maintain milk production.**

During the temporary interruption of breastfeeding, breast milk should be expressed and discarded using a pump. This practice:

- **Increases biological elimination of the radiopharmaceutical from the breast, Reduces overall radiation exposure to breast tissue, Helps maintain milk production for resuming breastfeeding.**

Hyperthyroidism & Hypothyroidism During Lactation

- Methimazole (≤20 mg/day), carbimazole (≤15 mg/day), and PTU are generally compatible with breastfeeding.
- Methimazole is preferred because of lower hepatotoxicity risk and easier dosing.
- Potassium iodide may be used in selected cases but requires infant thyroid monitoring.
- Women with preexisting hypothyroidism should usually return to their prepregnancy levothyroxine dose after delivery.
- Women started on LT4 only during pregnancy may be candidates for dose reduction or discontinuation with repeat TSH after 6 weeks.

Other postpartum thyroid dysfunction

Recommendations Table 25: Other Postpartum Thyroid Dysfunction	Strength*	Level #
Management of postpartum hyperthyroidism unrelated to PPT		
The lowest effective dose of ATD in lactation should be used.[a]	Strong	Moderate
Consider applying the same considerations for starting an ATD to women during lactation as those for the general non-pregnant population.	Conditional	Low
If scintigraphy is required during lactation for the diagnostic evaluation of hyperthyroidism, breastmilk should be pumped and discarded for 3-4 days after administering I-123 and 36 hours after administering Tc-99m, before breastfeeding is resumed.	Strong	Low
Do not offer I-131 treatment during lactation. Before I-131 therapy is administered, breastfeeding should be stopped for at least 3 months. A diagnostic I-123 uptake scan may be performed before therapy to assess for mammary iodine uptake, or off-label dopamine agonist therapy may be given to decrease mammary iodine uptake and radiation exposure to mammary tissue.	Conditional	Low
Postpartum follow-up of levothyroxine treatment initiated in pregnancy		
If levothyroxine was started for the treatment of subclinical or mild overt hypothyroidism in pregnancy, a cessation trial may be performed, the timing of which may be determined following shared decision-making. The follow-up frequency and decision to restart levothyroxine may be based on hypothyroid symptoms, thyroid function, TPOAb status, and/or if pregnancy is being planned imminently.	Conditional	Low

[a] Doses of up to 20 mg/day of MMI, or 450 mg/day of PTU do not affect newborn thyroid function or neurodevelopment. If lower doses are ineffective, MMI up to 30 mg/day during lactation may be considered in select cases based on the low passage into breast milk

* Strength of Recommendation; # Level of Evidence; Good Practice Statement

PPT, postpartum thyroiditis; ATD, antithyroid drug; TPOAb, thyroperoxidase antibody; MMI, methimazole; PTU, propylthiouracil

Dissenting comments for Recommendations Table 25 from ATA members within the guidelines' writing group are reported in Supplementary Table 3.

Key Clinical Recommendations

- Educate women at risk about the symptoms and natural course of PPT.
- Differentiate PPT from Graves' disease before initiating therapy.
- Avoid antithyroid drugs in destructive thyroiditis.
- Follow breastfeeding precautions whenever radiopharmaceuticals are required.
- Continue long-term thyroid follow-up because permanent hypothyroidism may develop years after PPT.

J. FUTURE RESEARCH DIRECTIONS

In the 2017 version of these guidelines, there were 13 suggested research directions, from which new data have considerably impacted the current guidelines for 4 of these. Below are the updated suggested research directions:

- 1. Further studies to determine risk-based reference intervals for thyroid function tests in pregnancy.
- 2. Studies assessing the cost-effectiveness of thyroid function and thyroid antibody screening in women
- with a history of miscarriage or infertility.
- 3. Studies assessing clinical (preconception) risk factors for thyroid disease during pregnancy.
- 4. A comprehensive study to assess the iodine status of pregnant and lactating women in the United States.
- 5. Studies to determine safe upper limits for iodine ingestion in pregnancy and lactation.
- 6. Studies quantifying the risk of subfertility, success of fertility treatment, and/or progression to overt thyroid disease during pregnancy in women with preconception subclinical thyroid dysfunction or thyroid autoimmunity.

In the 2017 version of these guidelines, there were 13 suggested research directions, from which new data have considerably impacted the current guidelines for 4 of these. Below are the updated suggested research directions:

- **7. A randomized trial of early LT4 intervention (preconception or early pregnancy, i.e., 6–10 weeks' gestation) in women with either subclinical hypothyroidism or isolated hypothyroxinemia to determine effects on adverse pregnancy outcomes and child IQ.**
- **8. Studies assessing the effect of LT4 on adverse pregnancy outcomes in different subgroups of euthyroid TPOAb-positive women to establish potential intervention strategies.**
- **9. Prospective studies on the risk of adverse pregnancy and offspring outcomes for women with active Graves' disease during pregnancy.**
- **10. Studies on serum (f)T3 and (f)T4 monitoring target concentrations in women with Graves' disease treated with ATD.**
- **11. Studies evaluating the safest timing of administration of different ATDs for management of hyperthyroidism in pregnancy.**
- **12. Studies assessing novel ways to differentiate fetal hyperthyroidism from fetal hypothyroidism when a fetal goiter is detected.**
- **13. Studies investigating the impact of postpartum and pre-existing thyroid dysfunction on lactation.**

THANK YOU