NORTH WEST MATERNAL MEDICINE NETWORK

Lancashire & South Cumbria
Cheshire & Merseyside
Greater Manchester & Eastern Cheshire

NHS North West

NORTH WEST GUIDELINE

Thyroid Disease in Pregnancy

This guideline forms part of the Regional Endocrine Disease in Pregnancy Guideline currently in development

Document Control

Role	Name	Contact
Owners	North West Maternal Medicine Network (MMN) North West Coast SCN Greater Manchester SCN	

Version control:

Title	North West Thyroid Disease in Pregnancy Guideline
V0.1	Final Draft sent to the following groups for comments and feedback: Regional Guideline Group, MMN Board
V0.2	Comments addressed. Agreed as final by Regional Guideline Group

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Conflicts of Interest

None declared.

We are committed to serving and respecting all maternity service users, most of whom are women. The language we use reflects that but will also be varied where appropriate to recognise and affirm diverse gender identities. Best practice in inclusive language is evolving and we will strive to ensure it communicates as effectively as possible with service users and stakeholders.

So in this guideline you will see that we will always use women but we will use gender neutral language in addition as well in some of our communications when appropriate. We will ensure that we live up to the commitments made in our statement because ultimately ensuring our members, women and people who use maternity services feel that they belong is the right thing to do."

Abbreviations/Acronyms used throughout this guideline:

ATD	Antithyroid drugs
BP	Blood Pressure
CTG	Cardiotocography
hCG	Human Chorionic Gonadotropin
LMNS	Local Maternity and Neonatal Systems
MDT	Multidisciplinary Team
MMC	Maternal Medicine Centre
MMN	Maternal Medicine Network
MVA	Manual Vacuum Aspiration
PCOS	Polycystic ovary syndrome
PTU	Propylthiouracil
TBG	Thyroxin binding globulin
TFT	Thyroid Function Test
TPO	Thyroid Peroxidase
TSH	Thyroid-stimulating hormone
TRAb	Thyroid-stimulating hormone receptor antibody

Contents

1.Thyroid Disease in Pregnancy North West Maternal Medicine Network

The North West Maternal Medicine Network (NW MMN) is responsible for ensuring that all women with significant medical problems in the network's footprint receive timely specialist care and advice before, during, and after pregnancy. All constituent providers within the network must be responsible for agreeing and upholding shared protocols on the management and referral of women with medical conditions, including reviewing guidelines and referral pathways. This model of care will ensure that – where agreed appropriate – investigation and management is carried out by an experienced Multidisciplinary Team (MDT).

Most women with pre-existing medical conditions and complications during pregnancy will continue to be managed by local maternity services. The proportion of a woman's care delivered by a Maternal Medicine Centre (MMC) will vary according to individual need. For some women, a single visit to the MMC or communication with the MMC by the local unit will suffice. For the highest risk and most complex women it may be that all care will be recommended to be delivered within the MMC.

When referring women, be respectful and aware of individuals' religions, languages, cultures and diversities to ensure best care for all people. Please take into consideration the additional challenges faced by those who are from an ethnic minority, have a severe mental illness or are socially deprived as they are at a higher risk of poor physical health and poor outcomes, compared with the general population. The perinatal period adds further complexity, therefore ensure that mental health needs are considered and appropriate referral to local perinatal mental health service is made.

There is a designated MMC based in each of the three Local Maternity & Neonatal Systems (LMNS) that serve the Northwest region.

LMNS	MMC
Greater Manchester (GM)	St Mary's Hospital Manchester (SMH)
Cheshire & Merseyside (C&M)	Liverpool Women's Hospital (LWH)
Lancashire & South Cumbria (L&SC)	Royal Preston Hospital (RPH)

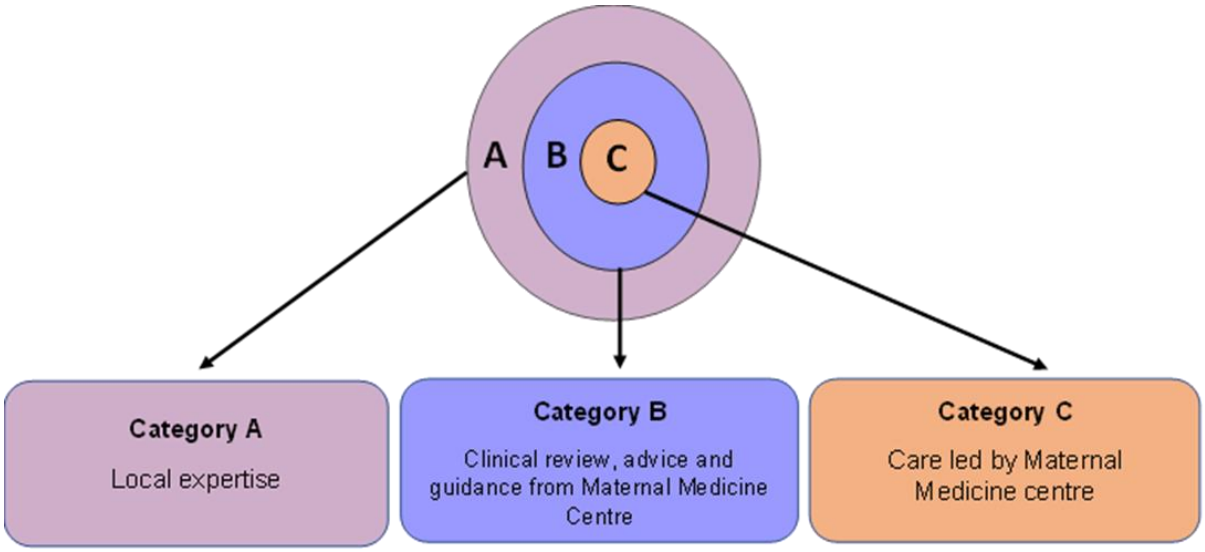
The three MMC's encompass all maternity providers within the three LMNS's (Appendix 1). The centres function collaboratively as a network enabling coordination to deliver maternal medicine care to women throughout the NW region. This integrated approach ensures equitable expert care.

For women requiring specialist input they should be referred to the local MMC (Appendix 2).

2. Endocrine Services within NW MMN

All women with endocrine disease should be risk stratified using the nationally agreed classification of maternal medicine conditions, A,B,C (NHS England MMN Service Specification). The adapted version below provides a framework for referral.

Please consider additional co-morbidities alongside endocrine disease as the presence of other health conditions may require specialist support even if ordinarily the endocrine condition is deemed manageable at a local unit.



Hypothyroidism	Thyroid hormone resistance	Primary and secondary hyperaldosteronism
Hyperthyroidism and gestational hyperthyroidism	Thyroid cancer – current or previous	Phaeochromocytoma or paraganglioma
Thyroid nodules	Macroprolactinoma	Cushing's syndrome
Microprolactinoma	Pituitary disease on hormone replacement therapy	Acromegaly
PCOS	Congenital adrenal hyperplasia	Metabolic disorders such as Glycogen storage disorder
Vitamin D deficiency	Dumping syndrome post bariatric surgery	Hyperparathyroidism
	Addison's disease	Hypoparathyroidism

Effective models of working within the NW MMN should ensure that care is integrated between local, regional, and national models of care to reduce inappropriate referrals into the specialist centres and support local units to provide the right care at the right time, in the right place.

Each MMC is equipped to facilitate and organise telemedicine across the MMN if it is safe for the woman. The option to facilitate consultations via telemedicine is available where it is difficult for the woman to attend a face-to-face appointment. Telemedicine will also be used where expertise is required for specific cases and clinicians from several providers need to work together as an MDT to implement joint care plans. This mitigates the geographical challenges that occur when experts are not based at the same Trust.
Women stratified as category A should have most of their antenatal and intrapartum care at their local hospital, with endocrinology reviews in the provider unit they would usually attend for their endocrine care. If this is uncertain or there are concerns in the local hospital, they should be referred to the obstetric endocrine clinic at their local MMC for review or advice.

Women stratified as category B should be referred to the obstetric endocrinology clinic at their local MMC for MDT consideration.

Women stratified as category C should be referred to the obstetric endocrinology clinic at the local MMC for MDT consideration about where antenatal and intrapartum care is most appropriately located irrespective of where they usually attend for their endocrine care.

MMC	Obstetrician	Endocrinologist	Frequency
St Mary's Hospital	Dr Emma Shawkat Prof Jenny Myers Dr Kim Macleod Dr Teresa Kelly Dr Melissa Whitworth Dr Shimma Rahman	Dr Clare Mumby	Tuesday (pm) Weekly
Switchboard	**SMH: 0161 2761234**	**MRI: 0161 2741234**	
Liverpool Women's	Dr Dyan Dickins Dr Naomi McGuinness Dr Rebecc Ashworth Dr Maheshie Obeysekera	Dr Tejpal Purewal Dr Deepa Beeharry Dr Sabnam Samad Dr Emily Brown Dr Helmine Kejem	Tuesday (pm) Weekly
Switchboard	**LWH: 0151 708 9988**	**RLUH: 0151 706 2000**	
Royal Preston Hospital	Dr Charlotte Cox	Dr Simon Howell	Wednesday (am) Alternate Weeks
Switchboard	**01772716565**	**01772716565**	

3. Pre-pregnancy Counselling and Support

Pre-conceptual care can be offered by the patient's GP, local endocrinology or joint specialist pre-conception clinics at the MMC depending on expertise and complexity. Pre-conception discussions should be undertaken in:

- Any woman who is known to have a pre-existing endocrine disorder
- Any woman planning to undergo assisted reproduction who has significant endocrine disease e.g. Category B/C conditions
- Any woman with a family history or genetic confirmation of an inherited endocrine disorder e.g. Multiple Endocrine Neoplasia

NB Members of the women's family should not be used as interpreters during pre-conceptual consultations

The pre-pregnancy consultation should include:

- Assessment and information gathering
- Previous endocrine history, obstetric history and co-morbidities
- Assessment of current status - symptoms, biochemistry, relevant imaging and other investigations e.g. visual fields
- Review of current medication

Optimisation

- Optimise condition – medical, surgical or other interventions
- Consider adjusting treatments to pregnancy targets e.g. Hypothyroidism aim TSH <2.5, aim BP <140/90
- Lifestyle modification, smoking cessation, folic acid, Vitamin D and iodine supplementation as per routine pre pregnancy vitamin, reduction in salt intake, and reduction or avoidance of alcohol.

Drugs

Determine which drugs can be continued in pregnancy and plans for changing any which cannot be used in pregnancy. Some may need to be stopped or changed prior to pregnancy and the woman reassessed after stopping them. e.g. switching Carbimazole to Propylthiouracil for hyperthyroidism.

Information giving

Give the woman information about the risks to them and the fetus (including morbidity and mortality)

- Discussion about need for well controlled endocrine disease prior to pregnancy to optimise maternal wellbeing and fetal outcomes
- Discuss the need for additional fetal and neonatal surveillance in certain endocrine conditions e.g. TSH receptor positivity
- Outline a plan of management of pregnancy, delivery and post-partum care
- Clear documentation of discussions/information given to the woman to facilitate their decision on whether to proceed or not with a pregnancy
- Discussion around any additional issues around assisted conception treatment where relevant
- Information about appropriate contraception
- Information regarding access to contraception options, termination of pregnancy services and how to access care when pregnant

4.Termination of Pregnancy

Rapid access to termination of pregnancy services should be facilitated if, for whatever reason, a woman opts for this. Multidisciplinary care will be necessary for some women around the time of termination of pregnancy. For women with complex endocrine disease, it is important that the termination occurs in an NHS hospital setting, with access to specialist facilities. E.g. Addison's disease requiring steroid cover for termination

Clinicians should recognise the difficulty in making these types of decisions and be supportive of the woman's decision.

5. Miscarriage

The care of women who miscarry may require a multi-disciplinary approach. The multidisciplinary team should decide the best place and method for management of the woman having a miscarriage. The options for management of the miscarriage are surgical evacuation, medical management or Manual Vacuum Aspiration (MVA). These all have their own risks and benefits. Surgical evacuation requires an anaesthetic but has a lower risk of retained products and the timing is more predictable.

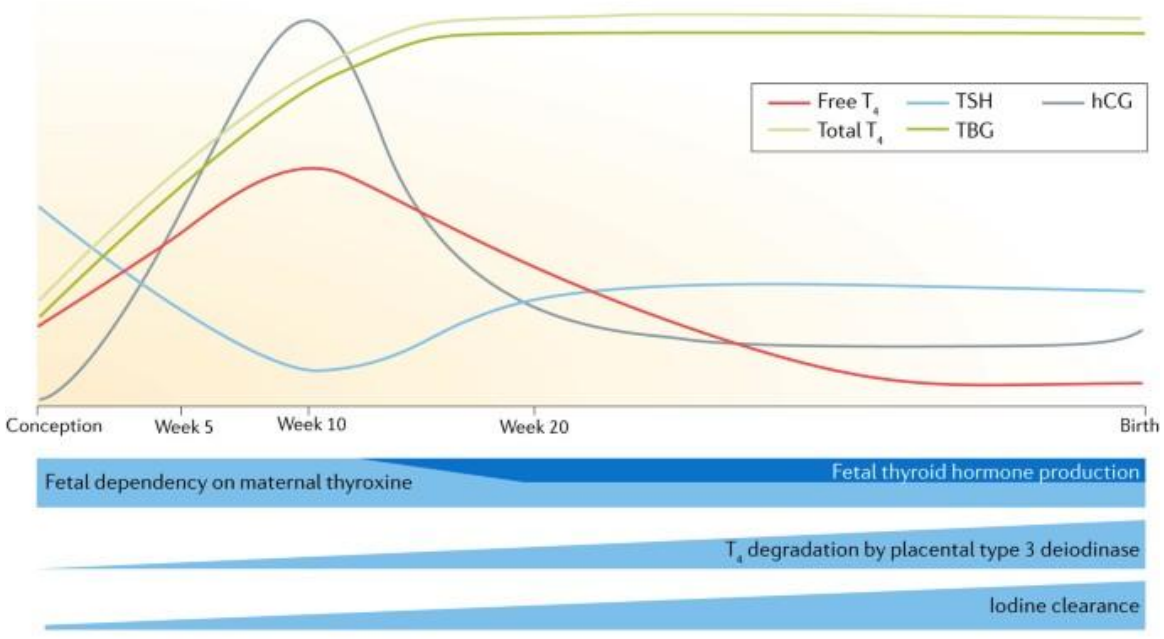
6. Thyroid Disease in Pregnancy

6.1 Thyroid Physiology During Pregnancy

To meet the increased metabolic needs during a normal pregnancy, there are changes in thyroid physiology that are reflected in altered thyroid function tests.

- hCG has a similar molecular structure to TSH. High levels in early pregnancy causes a suppression of TSH and increased release Free T4 and Free T3
- Increased oestrogen causes a 2-3x increase in thyroid thyroxine binding globulin by mid-pregnancy (TBG). This results in a fall in free T4 and Free T3.

It is important that pregnancy specific thyroid function test reference ranges are used. Units may have their own local reference range otherwise see appendix 3 for commonly used assays.



. Nature Reviews | Endocrinology

6.2 Hypothyroidism in Pregnancy

The incidence of hypothyroidism in pregnancy is approximately 1-2%. The most common cause of hypothyroidism is chronic autoimmune thyroiditis (Hashimoto's disease). It is important that clinicians establish if women have had previous surgery or radioactive iodine treatment for hyperthyroidism (particularly Grave's Disease) or previous thyroid cancer as this may alter management.

Women with well controlled hypothyroidism are not at increased risk of adverse pregnancy outcomes. Clinicians should aim to control hypothyroidism optimally prior to conception. Uncontrolled hypothyroidism is known to increase the risk of miscarriage and obstetric complications including premature birth and low birth weight. The fetus is dependent on maternal T4 levels in early pregnancy and uncontrolled hypothyroidism is associated with increased risk of neurodevelopmental abnormalities. These risks are related to the severity of the raised TSH level.

6.2.1 Definitions of Hypothyroidism

	TSH (use pregnancy specific range)	Free T4 (use pregnancy specific)
Overt hypothyroidism	**Increased – TSH >10mU/l**	**Decreased**
Severe Subclinical Hypothyroidism	**Increased – TSH >10mU/l**	**Normal**
Subclinical Hypothyroidism	**Raised (>4mU/l if no reference range available)**	**Normal**
Isolated Hypothyroxaemia	**Normal**	**Decreased**

6.2.2 Management of hypothyroidism: pre-pregnancy and diagnosis in pregnancy

- Symptoms of hypothyroidism include fatigue, weight gain, cold intolerance and constipation. These symptoms may mimic normal pregnancy making diagnosis challenging.
- In women with hypothyroidism who are planning pregnancy there should be an assessment of thyroid function pre-conceptionally Levothyroxine dose adjusted to achieve a TSH value between the lower reference limit and 2.5mU/L.
- Women may require a dose increase during pregnancy. Women may be advised to increase their Levothyroxine by 25-30% on a positive pregnancy test or alternatively attend for early thyroid function tests particularly if they had been optimised prior to conception to reduce the risk of overtreatment.
- Levothyroxine should be titrated with an aim of TSH concentrations below 2.5mU/L in pregnancy. Liothyronine (T3) should not be given in pregnancy. T3 does not cross the placenta and therefore there is a risk the fetus will not receive adequate T4 (Levothyroxine).
- Treatment of overt hypothyroidism is recommended during pregnancy as there is good evidence of reduction in adverse pregnancy outcomes.
- For women newly diagnosed with overt hypothyroidism (TSH >10 and low T4) in pregnancy Levothyroxine should be commenced immediately at a dose of 1.6 mcg/kg/day with TFTs repeated after 4 weeks. Care should be taken with women with known cardiac disease. Use booking weight when deciding dose.
- Following delivery, Levothyroxine should be reduced to the patient's preconception dose as soon as possible unless this was not controlling disease pre-pregnancy.
- Thyroid function testing should be performed at approximately 6 weeks postpartum at the GP.

6.2.3 Management of Subclinical Hypothyroidism

- Women with severe subclinical hypothyroidism should be offered Levothyroxine treatment at a dose of 1.6mg/kg/per day as adverse outcomes are more commonly seen with TSH >10mI/l
- Women with subclinical hypothyroidism (TSH above reference range but <10mU/l) should be considered for Levothyroxine following discussion with appropriate clinician to counsel on risks and benefits. There is no clear evidence that treating subclinical hypothyroidism improves maternal or fetal outcomes or impacts childhood cognition. However, Levothyroxine treatment is safe if monitored appropriately and there is not overtreatment.
- If Levothyroxine is to be commenced start 1.0 mcg/kg/day.
- If levothyroxine is not commenced then a plan should be made for TFT monitoring – every 4-6 weeks up to 20/40, then at 28/40. Treatment should be commenced if overt or severe subclinical hypothyroidism develops.

6.2.4 Isolated Hypothyroxaemia

- Ensure diagnosis is made using the pregnancy specific references for T4 as levels physiologically fall in the second half of pregnancy.
- Isolated hypothyroxaemia does not require treatment with Levothyroxine in pregnancy
- Important differential is secondary hypothyroidism (pituitary disease). Clinicians should consider:
    - any symptoms of pituitary disease – fatigue, weight loss, visual disturbance, headaches
    - Any risk factors for pituitary disease e.g. previous pituitary surgery, cranial radiotherapy
    - Consider performing an early morning cortisol

6.2.5 Thyroid Peroxidase Antibodies

- There is no treatment for elevated TPO antibodies
- TPO antibody levels do not need to checked or repeated during pregnancy
- Women known to have TPO antibodies and normal thyroid function do not need Levothyroxine replacement. They do need thyroid function checking in first trimester and at 20/40.

6.2.6 Treatment and Monitoring of Hypothyroidism

- Well controlled hypothyroidism in pregnancy will usually not require management in a Joint Endocrine Antenatal Clinic.
- Referral should be made for:
    - Poorly controlled hypothyroidism
    - Women with history of treated Grave's disease who may have elevated levels TSH receptor antibodies
    - Women with history of thyroid cancer
- Women treated with Levothyroxine should have thyroid function tests every 4-6 weeks up to 20/40 and then again at 28/40 with an aim for TSH <2.5. More frequent monitoring may be required for women where ongoing adjustment is still taking place. Over treatment should be avoided as this can increase the risk of adverse outcomes.
- Iron supplements can impair gastrointestinal absorption and therefore should be administered at least 4 hours after the Levothyroxine.

6.2.7 Fetal surveillance in Hypothyroidism

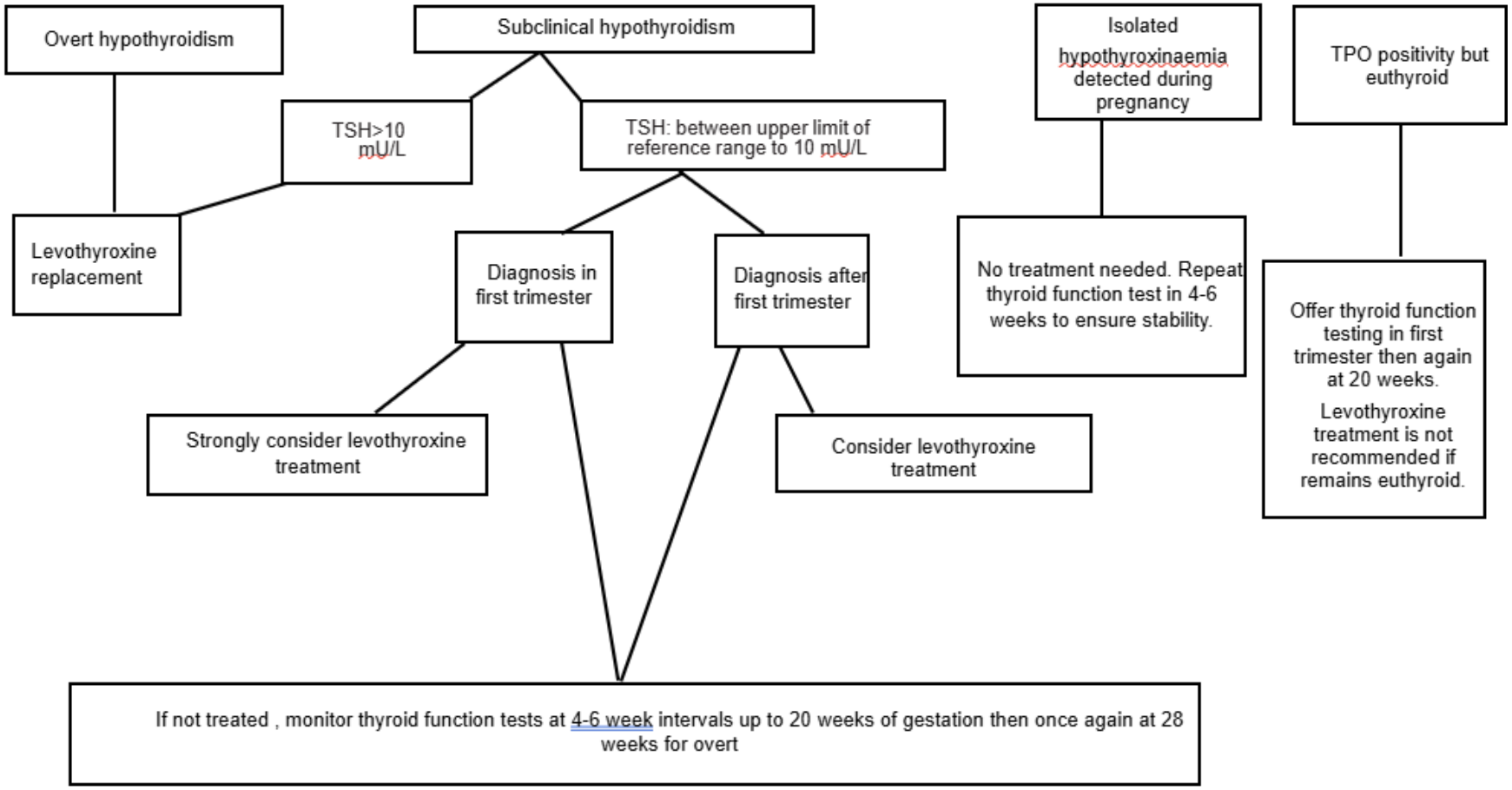
- No additional antenatal or intrapartum fetal surveillance is necessary in mothers with hypothyroidism unless TSH receptor positive, see Hyperthyroidism section.

6.2.8 Postpartum care in Hypothyroidism

Following birth:

- Women adequately controlled on Levothyroxine pre-pregnancy should revert to pre-pregnancy dose and have TFTs checked 6-8 weeks postpartum at their GP.
- Women started on Levothyroxine pre-pregnancy for overt hypothyroidism or severe subclinical hypothyroidism (TSH >10) should continue treatment and have TFTs checked 6-8 weeks postpartum at their GP.
- Women started on Levothyroxine for subclinical hypothyroidism stop and have TFTs checked 6-8 weeks postpartum at their GP.
- Women with high TPO levels are at risk of developing postpartum thyroiditis and should be counselled about symptoms. Routine testing for postpartum thyroid is not recommended. Women with symptoms and signs of thyrotoxicosis should have TFTs checked. Post partum thyroiditis can occur any time in the 12 months after delivery.

6.2.9 Summary of Management of Hypothyroidism in Pregnancy



6.3 Hyperthyroidism in Pregnancy

Hyperthyroidism complicates approximately 0.2% of pregnancies. The most common cause is Graves' disease associated with TSH receptor antibodies (occurring in 0.1 to 1 percent of all pregnancies). Toxic adenomas, toxic multinodular goitre or subacute or acute thyroiditis (de Quervain's or viral) causing passive release of thyroid hormones from a damaged thyroid gland are less common causes of thyrotoxicosis in pregnancy.

The most common cause of abnormal thyroid function tests showing the appearance of hyperthyroidism is hCG-mediated gestational hyperthyroidism affecting 1-3% of pregnancies.

Maternal and fetal outcomes in well controlled hyperthyroidism are good. Obstetric risks in women with hyperthyroidism include; miscarriage, fetal growth restriction, low birth weight, preterm labour and pre-eclampsia. In uncontrolled hyperthyroidism there is also an increased risk of maternal cardiac arrhythmias, congestive cardiac failure and thyroid storm.

6.3.1 Clinical manifestations of Hyperthyroidism

- Many of the non-specific symptoms and signs associated with pregnancy are similar to those associated with hyperthyroidism, including tachycardia, heat intolerance, and increased perspiration. Additional symptoms include anxiety, hand tremor, and weight loss, despite a normal or increased appetite.
- The most diagnostic clinical features distinguishing thyroid disease from gestational thyrotoxicosis are weight loss, tremor, persistent tachycardia and signs of Graves's thyroid eye disease including grittiness, photophobia, excess lacrimation, chemosis (conjunctival swelling), and exophthalmos.

6.3.2 Diagnosis of Hyperthyroidism

- The diagnosis of hyperthyroidism during pregnancy should be based primarily upon a finding of a suppressed or undetectable serum TSH value and elevated thyroid hormone levels that exceed the reference ranges for pregnancy (Appendix 3).
- When a suppressed serum TSH is detected in the first trimester in the presence of signs and symptoms of thyrotoxicosis it is important to distinguish between Graves' disease and gestational thyrotoxicosis. A detailed medical history, physical examination, and measurement of maternal serum fT4 and TSH Receptor antibodies (TRAb) concentrations should be performed. The findings of no prior history of thyroid disease, no stigmata of Graves' Disease (goitre, orbitopathy), a self-limited mild disorder, and symptoms of hyperemesis favour the diagnosis of gestational thyrotoxicosis which is a transient abnormality.
- Positive TRAb is consistent with a diagnosis of Graves' disease. A serum fT3 can be helpful in women with suppressed TSH and normal fT4.

6.3.3 Preconception Care in Hyperthyroidism

Pregnancy should be postponed until euthyroid status is reached on a stable dose of treatment. There should be discussions regarding the risks and benefits of definitive treatment for the hyperthyroidism prior to pregnancy including surgery or radioiodine therapy. Pregnancy should be delayed for 6 months post radioiodine therapy and contraception is advised during that period.

Discussion regarding antithyroid medications:

- There is an increased risk of antithyroid drug-associated birth defects
- Propylthiouracil (PTU) is the preferred drug during the first trimester with the greatest benefits seen if taken 3 months pre-conception. Women should be counselled regarding the small risk of hepatotoxicity and liver failure.
- Carbimazole has a dose dependent risk of congenital abnormalities and it is reasonable for women taking a very low dose to choose to remain on this after counselling.
- There is the possibility of stopping antithyroid drugs (ATD) if euthyroid in early pregnancy particularly if women have been stable on a low dose for over 6 months
- Block and replace treatment should not be used in pregnancy
- All women on PTU or carbimazole should be counselled regarding the risks of agranulocytosis and advised to have a full blood count measured if they develop fevers, mouth ulcers or very sore throat.

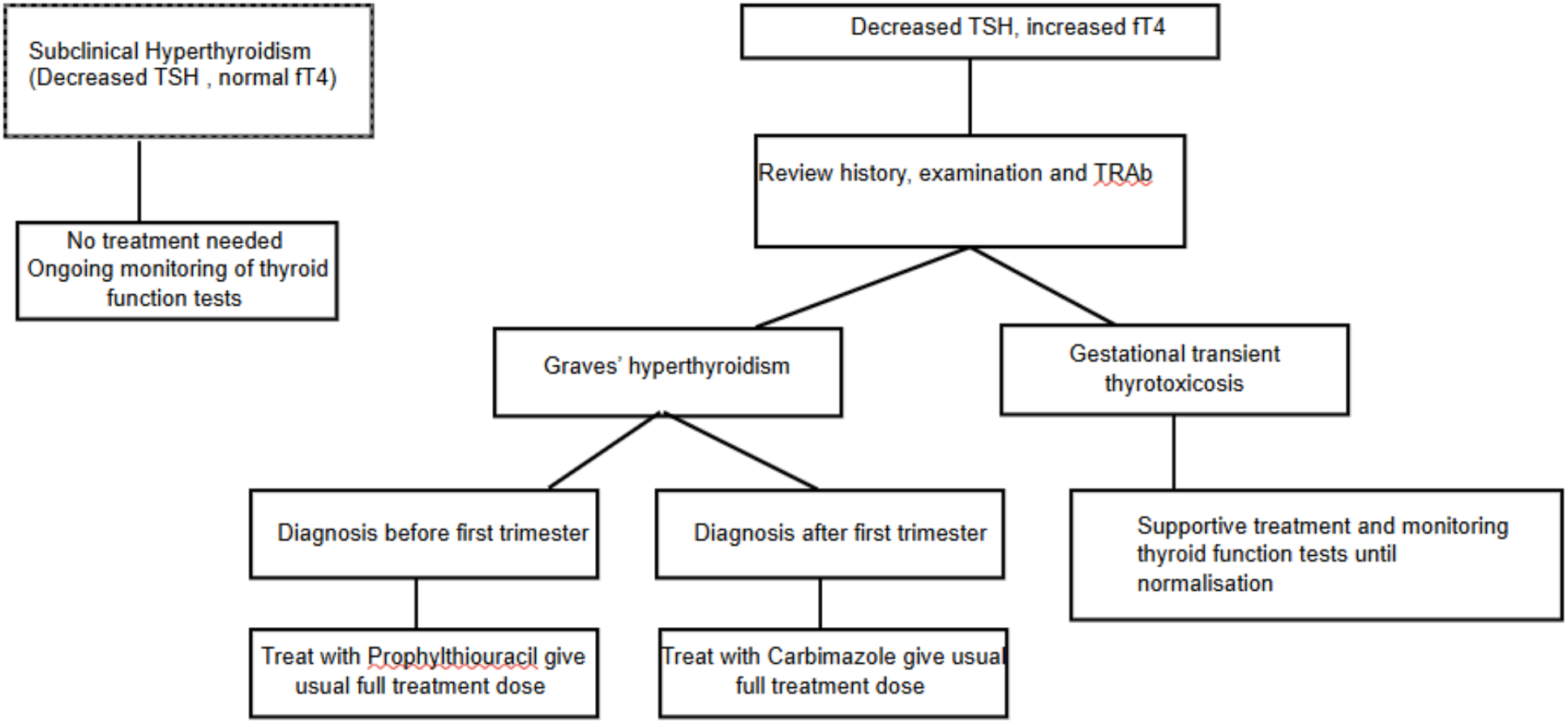
6.3.4 Antenatal Management of Hyperthyroidism

- Women with hyperthyroidism should be managed jointly by Endocrinology and Obstetrics.
- They should be referred for initial assessment as early as possible to plan antenatal care.
- Care should take place as follows:

Booking visit	History of thyroid disease, current medications TFTs and TRAb (if Graves disease) with booking bloods. Referral to joint endocrine/obstetric clinic
First visit with endocrinology review	History of thyroid disease and exact diagnosis confirmed by Endocrinologist. Women with previous thyroidectomy or radioiodine for Graves' hyperthyroidism who are euthyroid or hypothyroid need TRAb levels. Review/send TRAb and TFTs. Review medications - if conceived on high dose of carbimazole and less than 10 weeks gestation offer switch to PTU
Ongoing monitoring of thyroid	TFTs – monitor every 2-4 weeks Medications: • titrate antithyroid medications to maintain T4 in upper half of pregnancy specific reference range and avoid over-treatment of fetus • At 16/40 discuss change to Carbimazole – Ratio 1:10. • Medication may be able to be stopped as pregnancy advances TRAb – ensure checked in 1st trimester and if positive repeat at 24-28 weeks to plan fetal monitoring
Fetal monitoring	There is a risk of fetal thyrotoxicosis if TRAb 3x upper limit of normal range Serial US for biometry and umbilical doppler should be undertaken from 28 weeks in women who have any of the following: • uncontrolled Grave's during the pregnancy • On antithyroid medication • TRAb 3x upper limit normal In women with very significantly raised TRAb consider fetal heart auscultation 2-4 weekly with community midwife from 20 weeks until scan pathway commences. If concern about fetal thyrotoxicosis – Fetal tachycardia >170bpm, fetal goitre, advanced bone age, poor growth, craniosynostosis, any concern regarding cardiac failure refer to FMU Fetal thyrotoxicosis requires management between fetal medicine and endocrinology.

Management should be documented in care plans (Example care plans can be found in Appendix 4).

6.3.5 Summary of Management of Hyperthyroidism in Pregnancy – should be led by Endocrinologist



6.3.6Treatment options for hyperthyroidism in Pregnancy

Antithyroid drugs – Thionamines Can cross the placenta with potential for teratogenicity Can cause agranulocytosis in mother (0.15%)	• Propylthiouracil (PTU) - associated with severe maternal hepatocellular damage and liver failure (1:1000), risk of embryopathy (2-3%) mainly face and neck cysts and urinary tract abnormalities in males • Carbimazole – embryopathy risk 2-4% including aplasia cutis, choanal atresia, gastrointestinal abnormalities and abdominal wall defects
B blockers – usually Propranolol	• Can be used to alleviate vasomotor symptoms of hyperthyroidism • Wean off once biochemical and symptom improvement with thionamides • Prolonged use associated with fetal growth restriction, neonatal hypoglycaemia, respiratory depression and bradycardia
Thyroidectomy	• Very rarely necessary but it is an option for women who cannot tolerate thionamides because of allergy or agranulocytosis. • Surgery should ideally be timed in the second trimester.
Radioiodine	• Contraindicated in pregnancy

6.3.7 Management of Thyroid storm in Pregnancy

- Thyroid storm is a medical emergency
- It is a rare life-threatening condition characterized by severe or exaggerated clinical manifestations of thyrotoxicosis.
- It may occur in an otherwise undiagnosed patient.
- It is usually precipitated by an acute event such as thyroid or non-thyroidal surgery, trauma, infection, an acute iodine load or giving birth.

- Symptoms of thyroid storm:
  - Fever
  - Tachycardia
  - High output cardiac failure
  - Restlessness, coma, seizures

- GI symptoms – pain diarrhoea, vomiting.

- Thyroid storm should be managed by an experienced multidisciplinary team comprising an obstetrician, endocrinologist, anaesthetist and neonatologist in a critical care environment.
  - The treatment usually includes beta blockers, antithyroid medications, steroids and iodine, in addition to supportive therapy and treatment of any precipitating factors (e.g. infection).

6.3.8 Intrapartum Management of Hyperthyroidism

- CTG monitoring is generally not required in labour for women with hyperthyroidism.

- If the hyperthyroidism is well controlled and there are no fetal concerns delivery on a midwife led unit may be considered.

6.3.9 Postpartum Management of Hyperthyroidism

- Neonates of women with Grave's disease particularly with raised TRAb (3 x upper limit of normal) or receiving antithyroid medications are at risk of abnormal thyroid function. The neonatal team should be made aware. Example flowchart for management of babies of mothers with thyroid disease can be found in Appendix 5.

- Neonatal thyrotoxicosis is a transient condition but may require treatment.

- Breastfeeding:
  - PTU and carbimazole are safe in mothers wishing to breastfeed. However, carbimazole is preferable, given the concerns for hepatotoxicity with PTU.
  - At doses Carbimazole <20mg daily and PTU <450mg per day is very unlikely to cause any problems. If higher doses are required, the neonate will require TFT monitoring due to risk of neonatal hypothyroidism.

- Women who have had their antithyroid medication stopped during pregnancy do not necessarily to re-start immediately after giving birth. TFTs should be repeated by the Endocrine maternity team 6 weeks with further follow up arranged with Endocrinology.

6.4 Goitre

- Goitre describes an enlargement of the thyroid gland this can be due to a number of causes:
  - Iodine deficiency
  - Autoimmune inflammation – Hashimoto's or Grave's disease
  - Pregnancy – physiological enlargement which is temporary
  - Large nodules
- If a new goitre is identified TFTs should be checked and an US considered, particularly if examination raises suspicion of nodules.
- A large goitre may cause compress the airways and should prompt an anaesthetic referral.

6.5 Thyroid nodules and Thyroid Cancer

- Thyroid cancer is relatively common in women of childbearing age.
- Pregnant women with a thyroid nodule can be safely investigated and treated in pregnancy
    - Ultrasound imaging
    - Fine needle aspiration
    - Surgery if required
    - Radio-iodine ablation is contraindicated in pregnancy
- Women with a history of thyroid cancer will have a risk assessed TSH range recommendation. This should be documented.
    - Those at highest risk may have a supressed TSH. On discussion with Endocrinology/Oncology this may be relaxed a little in pregnancy to balance the risk of hyperthyroidism in pregnancy.

6.6 Anaesthetic Considerations

- Antenatal anaesthetic review
    - Anaesthetic review in a high-risk clinic should be reserved for women with poorly controlled, symptomatic thyroid disease and/or concerns regarding the airway. The main causes of airway concern in this population are goitre or a history of neck dissection or radiotherapy.
    - Such patients should be seen antenatally in an obstetric anaesthetic high-risk clinic, where a comprehensive airway assessment should be performed and a detailed airway management plan documented in the medical notes.
    - If a difficult airway is anticipated, this should be discussed at the Maternal Medicine Multidisciplinary Team (MDT) meeting. These considerations become particularly important when planning delivery in centres that may be relatively isolated or have limited resources.
    - Poorly controlled thyroid disease can have significant cardiorespiratory and metabolic effects, which may be of particular concern during anaesthesia. There is also increased risk of postpartum haemorrhage, due to impaired uterine contractility and coagulation abnormalities.
- Hypothyroidism
    - Women with hypothyroidism are susceptible to bradycardia, decreased cardiac output, hypotension, hypoventilation, and a reduction in respiratory drive. Additionally, drug metabolism is often slowed, leading to heightened sensitivity to the respiratory depressant effects of sedatives as well as the myocardial depressant properties of both volatile and intravenous anaesthetics. There is an increased risk of hypothermia, making close temperature monitoring and active measures to maintain normothermia essential during perioperative care.
    - Hypothyroidism is also linked to obstructive sleep apnoea, and the presence of ileus and delayed gastric emptying increases the risk of aspiration in these women.
    - Severe hypothyroidism, or myxoedema coma, is rare in pregnancy but can be triggered by stressors such as surgery, infection, haemorrhage, cold,

sedatives, or cardiovascular events. It carries a high mortality rate and requires urgent supportive care from a multidisciplinary team.

- Hyperthyroidism
  - Uncontrolled hyperthyroidism increases cardiovascular reactivity, presenting as maternal arrhythmias and hypertension. Close haemodynamic monitoring is essential during labour and delivery. Key priorities include maintaining normothermia, providing effective analgesia, and avoiding hypertensive responses to uterotonic agents. Senior anaesthetic oversight is advised for operative procedures due to the risk of rapid deterioration. In severe cases, invasive monitoring and critical care may be required.
  - Congestive cardiac failure and thyroid storm, though rare, are potentially life threatening complications associated with hyperthyroid disease. These events most commonly arise during periods of physiological stress, such as labour, the postpartum period, or emergency surgery. The anaesthetist is integral to multidisciplinary management. Supportive care, including airway management, may be required.
- Elective Surgery in Pregnancy
  - Elective surgery in pregnant women with thyroid disease should, where possible, be delayed until the woman is in a euthyroid state. The ideal timing for such procedures is during the second trimester.

7 Contraception

Specialist contraception advice may be required for some women. Details for services within each locality can be found in Appendix 6.

8 Sources of Support

British Thyroid Foundation	https://www.btf-thyroid.org/
RCOG	https://www.rcog.org.uk/for-the-public/browse-our-patient-information/thyroid-problems-in-pregnancy/
Breastfeeding support	https://laleche.org.uk/diabetes-and-breastfeeding/ https://www.breastfeedingnetwork.org.uk/

9 Monitoring and Audit

This guideline has been peer reviewed by the Regional Guidelines Group. It is the responsibility of the authors to update the guideline every 3 years or sooner should substantial amendments be required.

10 Consultation with Stakeholders

Midwives, Obstetricians, Endocrinologists and specialist nurses working in the North West Regional Maternity Network and service users and maternity and neonatal voices partnership

Appendix 1: North West maternity providers

LMNS	Cheshire & Merseyside	Greater Manchester	Lancashire & South Cumbria
MMC	Liverpool Women's Hospital NHS FT	Manchester University NHS FT St Mary's Hospital Oxford Road Campus	Lancashire Teaching Hospital (Preston)
Provider Trust's	Countess of Chester Hospital NHS FT Mid-Cheshire Hospitals NHS FT (Leighton) St Helen's & Knowsley NHS Trust Southport and Ormskirk NHS FT Warrington & Halton Teaching Hospitals NHS FT Wirral University Teaching Hospital NHS FT East Cheshire NHS Trust (Macclesfield)	Bolton FT MFT North Manchester General Hospital MFT Wythenshawe Northern Care Alliance NHS FT Stockport NHS FT Tameside & Glossop NHS FT Wrightington, Wigan and Leigh NHS FT	East Lancashire Hospital NHS Trust University Hospital Morecambe Bay NHS FT (Furness) University Hospital Morecambe Bay NHS FT (Lancaster) Blackpool Teaching Hospitals NHS FT

Appendix 2 Referral details for MMC

St Marys Hospital Manchester MMC	
MDT co-ordinator (Mon-Fri 8-4)	MDT Coordinator Email: mft.nwmaternalmedicine@nhs.net
Referral form	
EMERGENCY	On call Consultant Obstetrician: Switchboard: 0161 2761234 ask for Obstetric Consultant on call Bleep 6000 or via Vocera

Liverpool Women's Hospital MMC	
MDT co-ordinator (Mon-Fri 8-4)	Tel: 0151 702 4271 Email: maternal.medicine@lwh.nhs.uk
Referral form	https://tinyurl.com/LWHMatMedReferral
EMERGENCY	On call consultant Obstetrician: Switchboard: 0151 708 9988 ask for Obstetric Consultant on call Bleep 100

Lancashire Teaching Hospital (Preston) MMC	
MDT co-ordinator (Mon-Fri 8-4)	maternal.medicine@lthtr.nhs.uk
Referral Process	For patients on BadgerNet use maternal medicine referral form in each patients notes For Patients not on BadgerNet email maternal.medicine@lthtr.nhs.uk
EMERGENCY	On call consultant Obstetrician : Switch board 01772716565 Bleep 4371 Out of hours medical registrar on call via switch board

Appendix 3 Reference Ranges in Pregnancy

	Abbott Architect	Beckman Access/Dxl	Roche Cobas/ Elecsys	Siemens Advia Centaur
First Trimester	TSH: 0.09–3.46	TSH: 0.06–3.32	TSH: 0.12–4.10	TSH: 0.06–3.67
	fT4: 10.9–18.7	fT4: 8.7–15.6	fT4: 11.6–20.3	fT4: 11.9–19.2
Second Trimester	TSH: 0.32–3.31	TSH: 0.32–3.31	TSH: 0.11–4.26	TSH: 0.47–4.46
	fT4: 9.7–17.2	fT4: 6.8–12.4	fT4: 9.9–17.7	fT4: 11.6–17.6
Third Trimester	TSH: 0.38–4.34	TSH: 0.34–5.02	TSH: 0.50–4.71	TSH: 0.60–4.60
	fT4: 8.8–14.9	fT4: 6.0–11.7	fT4: 8.7–15.2	fT4: 9.6–16.5

Appendix 4: Care Plans

Patient Summary at referral

Referrer name:	
Job role	
Referring organisation	

Date	**Patient Details:**
Parity	
Relevant Obstetric History	
Current gestation	
BMI	
First language	**Interpreter required Yes No (please circle)**
EDD	
Next appointment	
Condition & reason for referral	
Diagnosis/Interventions	
Current status of condition	
Relevant Medical/Anaesthetic History	
Medication / Allergies	

Thromboprophylaxis	
Patient individual preferences/comments	

MDT Summary

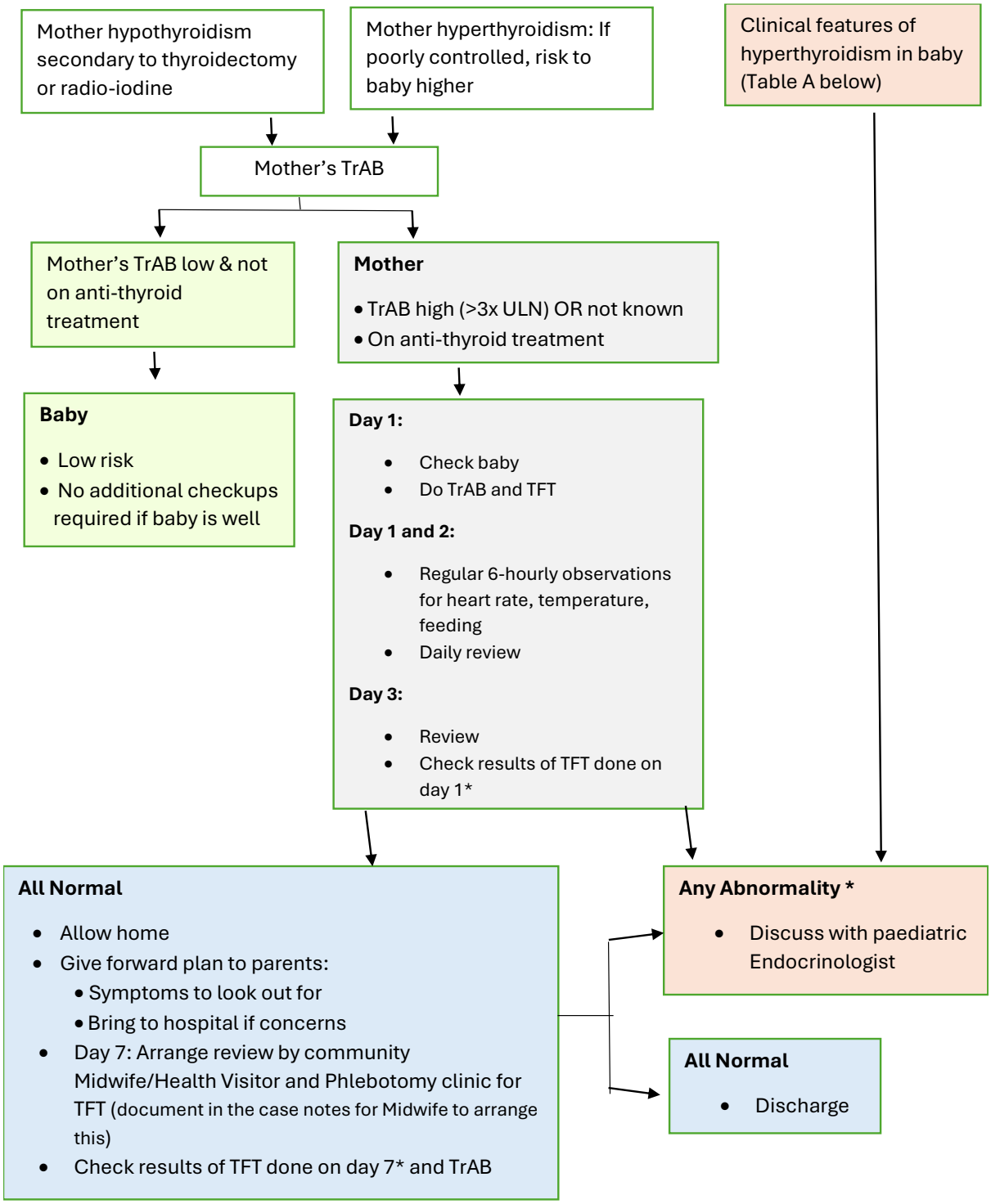
Name	
DOB	
Hospital No	
MDT attendees	
Diagnosis Include: Parity, Condition, Medication	
Investigations	
MDT Discussion	Plan: Actions: Outcome:
Antenatal Plan	
Intrapartum recommendations **(include place of delivery)**	
Postpartum recommendations	
Anaesthetic considerations	
Neonatal considerations	
Outstanding actions/investigations	
Plan in the event of an emergency	
Contact details	Generic MMC e-mail: MMC midwife: MDT co-ordinator:

Delivery Plan

Patient Name:		
Hospital & NHS Number:		
Address		
Date of Birth		
Allergies:		
Condition/Diagnosis		
EDD		
Obstetric History (Including CS)		
Medical/Surgical History		
Medications		
Planned mode of delivery **(date of elective C/S or IOL if applicable)**		
Staff alert: On call Consultant Obstetrician and Labour ward coordinator to be informed on admission for all Red and Amber patients		Please circle the tick as appropriate ✓ Red Cat A: inform all on call staff immediately on admission, immediate HDU care ✓ Amber Cat B: Inform on call team within 4 hours ✓ Green Cat C: routine care with attention to care plan
Anaesthetic review recommendations		
LSCS	Indication	If labours spontaneously
	Location	Location post op
Induction (continued on next page)	Location-	
	Oxytocin regime	

	Considerations/recommendations: -Fluids -Additional monitoring & frequency -Thromboprophylaxis plan	
Vaginal delivery	Special considerations/recommendations: First stage – Second stage –	
Third stage	Usual management or other recommendations: Drugs to avoid:	
Post-delivery Please Circle as appropriate and add comments	Stay on ITU	Yes / No
	Stay on labour ward (how long?)	Yes / No
	Stay in hospital (how long?)	
	Medication plan (breastfeeding considerations)	
	Daily examination by Doctor -	Yes / No
	State investigations before discharge	
	Thromboprophylaxis	Yes / No Dose & Duration
	PN follow arranged/planned	Yes / No
Contact Details	Generic MMC e-mail:	
	MMC midwife:	
	MDT co-ordinator:	

Appendix 5: Example flowchart for management of babies of mothers with thyroid disease



***Normal values for thyroid function in newborn babies and infants <3 months age**

TSH	<10 mU/L after 1st 24 hours
Free thyroxine (FT4)	15 - 34 pmol/L
Free triiodothyronine (FT3)	2.2 - 8.5 pmol/L

Table A. Symptoms and signs of neonatal hyperthyroidism and fetal hyperthyroidism

Neonatal hyperthyroidism	Fetal hyperthyroidism
• Poor feeding • Poor weight gain • Excessive wakefulness, irritability • Jitteriness • Tachycardia • Tachypnoea • Jaundice • Hepatosplenomegaly • Petechiae, bruising, low platelets • Prominent eyes • Goitre – may compress the trachea	• Fetal tachycardia (heart rate >160/min) associated with • Fetal goitre • Intrauterine growth retardation • Low birth weight • Microcephaly

Appendix 6: Contraception

Greater Manchester and Eastern Cheshire	Sexual and Reproductive Health team at The Hathersage Centre on telephone no. 0161 701 1555 Alternatively, patients can identify their nearest clinic using the following link https://mft.nhs.uk/mri/services/northern-sexual-health-service/
Cheshire and Merseyside	Specialist contraceptive advice can be obtained through Axess sexual health clinic (0300 323 1300). Patients with a Liverpool GP can also self-refer to the PCN hub (clpcn.co.uk). Alternatively, patients can identify their nearest clinic using the following link https://www.axess.clinic/find-service/
Lancashire and South Cumbria	Patients can identify their nearest clinic using the following link https://lancashiresexualhealth.nhs.uk/find-nearest-centre/

References

NHS E MMN Specification

RCOG Management if Thyroid Disease

Korevaar, T., Medici, M., Visser, T. *et al.* Thyroid disease in pregnancy: new insights in diagnosis and clinical management. *Nat Rev Endocrinol* **13**, 610–622 (2017). https://doi.org/10.1038/nrendo.2017.93

Equality Impact Assessment

Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the group to identify where a policy or service may have a negative impact on an individual or particular group of people.

Information Category	Detailed Information
Name of the strategy / policy / proposal / service function to be assessed:	Thyroid Disease in Pregnancy Guideline
Directorate and service area:	Maternal Medicine Network NW Regional Guideline
Is this a new or existing Policy?	New
Name of individual completing EIA (Should be completed by an individual with a good understanding of the Service/Policy):	Charlotte Bryant NW MMN Manager
Contact details:	Charlotte.bryant11@nhs.net

Information Category	Detailed Information
1. Policy Aim - Who is the Policy aimed at? (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed)	*This is a North West Guideline aimed at all health care providers who provide care to women before the birth of their baby, during pregnancy and in the postnatal period.* *The guideline also aligns itself to the wider NHS Maternity agenda and other maternal medicine guidelines.*
2. Policy Objectives	• *To align and standardise diabetes care across the North West region and ensure care is tailored to women and their health and social care needs* • *Reduce Health inequalities.* • *Strengthen local expertise.* • *Improves clinical outcomes and reduces risk.*
3. Policy Intended Outcomes	*Embed the policy across the North West* *Improve clinical outcomes.* *Improve service user experience*
4. How will you measure each outcome?	*Audit of NW data*
5. Who is intended to benefit from the policy?	*Women with thyroid disease accessing maternity services within their local maternity provider or at the regional maternal medicine centre.*

Information Category	Detailed Information
6a. Who did you consult with? (Please select Yes or No for each category)	• Workforce: *Yes* • Patients/ visitors: *Yes* • Local groups/ system partners: *Yes* • External organisations: *No* • Other: *Yes*
6b. Please list the individuals/groups who have been consulted about this policy.	**Please record specific names of individuals/ groups:** *All North West Maternity Providers inclusive of midwifery, obstetric, endocrinology specialist teams at provider site* *Diabetes/Endocrine Leads* *Neonates* *Specialist nurses* *North West Maternity and Neonatal Voice Partnership Leads*
6c. What was the outcome of the consultation?	*Building collaborative partnerships to co-produce this guideline*
6d. Have you used any of the following to assist your assessment?	**National or local statistics, audits, activity reports, process maps, complaints, staff, or patient surveys:** RCOG Management if Thyroid Disease

7. The Impact
Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

Protected Characteristic	(Yes or No)	Rationale
Age	*No*	*Any person of childbearing age*
Sex (male or female)	*Yes*	*Statement re using the term women*
Gender reassignment (Transgender, non-binary, gender fluid etc.)	*Yes*	*Statement at the start of the guideline developed with co-production group*
Race	*Yes*	*Statement at the start of the guideline developed with co-production group*

Protected Characteristic	(Yes or No)	Rationale
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	*Yes*	*Statement at the start of the guideline developed with co-production group*
Religion or belief	*Yes*	*Statement at the start of the guideline developed with co-production group*
Marriage and civil partnership	*No*	
Pregnancy and maternity	*No*	
Sexual orientation (e.g. gay, straight, bisexual, lesbian etc.)	*Yes*	*Statement at the start of the guideline developed with co-production group*

A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.
I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy. Name of person confirming result of initial impact assessment: Charlotte Bryant .....