

What is hyperthyroidism?

Hyperthyroidism is a condition where the thyroid gland becomes overactive and produces too much thyroid hormone.

In Australia, it is estimated that hyperthyroidism affects 3 in 1000 people.¹

What causes hyperthyroidism?

Hyperthyroidism can be caused by:

- Graves' disease
- Thyroiditis
- Thyroid nodules



What is Graves' disease?

Graves' disease is one cause of hyperthyroidism. It is an autoimmune disorder where the immune system produces antibodies that stimulate the thyroid gland to produce too much thyroid hormone.

Risk factors for Graves' disease include having a family history of this condition, having other autoimmune disorders and cigarette smoking. Due to changes in the immune state, post-pregnancy flares of Graves' disease are common in women who have previously been diagnosed with Graves' disease.

Graves' disease usually affects women aged between 20 and 50 years old and is far more common in women than men. Pregnant women with poorly controlled Graves' disease are at increased risk for pregnancy problems, including miscarriage and preterm birth; very rarely the foetus may develop hyperthyroidism or hypothyroidism.

What is thyroiditis?

Thyroiditis is inflammation of the thyroid gland. It can occur:

- Due to a genetic susceptibility.
- After having a baby (post-partum).
- After exposure to some viral infections.
- Due to some medications², including amiodarone (used to treat an irregular heartbeat, or arrhythmia), lithium (used to treat some psychiatric conditions) and newer immunotherapy drugs³ (used to treat some cancers).
- Following exposure to high doses of iodine² (such as that administered as an intravenous contrast/dye for CT Scans, or taking iodine supplements including kelp).

What are the symptoms of hyperthyroidism?

Hyperthyroidism has a range of symptoms, as thyroid hormones affect many parts of the body.

Symptoms of hyperthyroidism include:

- Feeling anxious, nervous, irritable
- Intolerance to heat (feeling unusually hot)
- Increased sweating
- Racing heart / heart palpitations
- Fatigue / tiredness
- Muscle weakness
- Increased appetite
- Unexpectedly losing weight
- Shortness of breath
- Tremor or shakiness
- Difficulty maintaining sleep
- An enlarged thyroid gland (felt at the front of neck)
- Diarrhoea or more frequent bowel movements
- Menstrual periods becoming irregular
- Infertility
- Hair thinning (or loss of hair)

Additional features of Graves' Disease include:

- **Graves' ophthalmopathy** – colloquially also known as Thyroid Eye Disease – where the eyes appear to swell or bulge, and feel gritty, light-sensitive and/or painful. In severe cases, there can be changes to vision (double vision or vision loss). This occurs much more commonly in smokers.
- **Graves' dermopathy** – where the skin on the feet and shins becomes thickened and red.

How is hyperthyroidism diagnosed?

1. Medical History and Physical Examination

Your doctor may ask you questions about:

Your personal health and your family's health history. This will include questions about any thyroid disease, autoimmune disorders, current and previous medications, other medical conditions or concerns and, for women, your pregnancy history.

Any symptoms that may suggest hyperthyroidism associated with thyroid disease.

Your doctor will also conduct a physical examination, feeling the front of your neck for the thyroid gland, taking your pulse, and checking for eye and skin changes associated with Graves' disease.

2. Measurement of thyroid hormones and Thyroid Stimulating Hormone (TSH)

If symptoms suggest hyperthyroidism, your doctor will order a blood test to measure the level of thyroid hormones (T4 & T3) and thyroid stimulating hormone (TSH). This is sent to the lab for tests.

What do the results mean?

- Normal levels of T4, T3 and TSH rule out hyperthyroidism.
- High levels of T4 and/or T3 with a very low level of TSH indicate hyperthyroidism. Further tests are performed to identify the cause.

How is hyperthyroidism diagnosed? (*cont'd*)

3. Measurement of thyroid antibodies

Your doctor may do a blood test to check for particular antibodies called TSH-receptor antibodies that cause Graves' disease. Thyroid peroxidase (TPO) antibodies are also often present in Graves' disease and autoimmune thyroiditis. This involves taking a small amount of blood and sending it to the laboratory for tests.

What do the results mean?

The presence of TSH-receptor antibodies and/or TPO antibodies means the hyperthyroidism is caused by Graves' disease. In some cases of Graves' disease, TSH-receptor antibodies are absent, and the diagnosis can be determined using a thyroid nuclear scan and assessment of all clinical features.

4. Thyroid nuclear scan

A thyroid nuclear scan is used to help determine the cause of the excess thyroid hormone. This scan involves injecting a small amount of radioactive substance into a vein in the arm. This substance emits energy, which is detected using a special camera. After 20 minutes, images are taken of the thyroid (neck) area while you are lying down with your neck outstretched. These images require about 20 minutes to take.

This scan uses a radioactive substance, so is not suitable for pregnant or breast-feeding women. Some other pre-existing conditions may also prevent you from having a radioactive scan. Your doctor can discuss this with you.

What do the results mean?

- If the scan shows a marked increase in uptake of the radioactive tracer (i.e. is a 'hot' scan) Graves' disease is confirmed.
- If the scan shows increased uptake of the radioactive tracer in one discrete area, this can indicate a 'hot nodule', where one main nodule is over-producing thyroid hormones. Several patchy areas of increased uptake suggest more than one nodule is actively producing too much thyroid hormone.
- If the scan shows no or very little uptake of the radioactive tracer, this indicates thyroiditis or an excess iodine load as the likely cause of hyperthyroidism.

5. Thyroid ultrasound

A thyroid ultrasound should only be performed if the doctor can feel an enlargement of the whole or a part of the thyroid gland. It is a non-invasive imaging method that uses sound waves to take pictures of the thyroid gland and surrounding neck structures such as lymph nodes. It allows measurements to be made of the size of the thyroid gland, and of any thyroid nodules together with a description of what the nodules look like.

What do the results mean?

- In Graves' disease, there is often an enlargement of the whole thyroid gland and, in the majority of cases, there are no nodules
- Where nodules are present, the doctor utilises a variety of criteria to determine if certain nodules require a fine needle biopsy to rule out cancerous cells (see information about thyroid nodules). 'Hot' nodules that are over producing thyroid hormones are usually benign (harmless), so a fine needle biopsy of these nodules is generally not warranted.

How is hyperthyroidism treated?

Your doctor will treat your hyperthyroidism based on your symptoms and test results. The goal of treatment is to improve symptoms through reducing thyroid hormone levels. The choice and length of treatment depends on the cause of hyperthyroidism, and how well the treatment controls the symptoms.

Causes

Graves' disease

Graves' disease requires initial treatment with anti-thyroid medication for 18 months. Graves' disease returns in approximately half of patients, usually within the first two years of stopping anti-thyroid medication. If this happens, treatment options to consider are radioactive iodine therapy or surgery for permanent control of Graves' disease, or an anti-thyroid medication long term, as tolerated.

Thyroiditis

The treatment of thyroiditis depends on its cause. If it is due to an autoimmune condition, or occurs post-partum, anti-thyroid medications are not effective. The thyroiditis usually settles spontaneously, but other medications (beta-blockers) can be used to manage hyperthyroid symptoms. The thyroiditis may return and can, in the long-term, cause permanent hypothyroidism.

If viral thyroiditis is diagnosed on the basis of a 'sore throat/thyroid', high fever, body aches and pains and blood test results, anti-inflammatory medication can be helpful. In more severe cases, a medication (prednisolone) can be given to reduce pain, inflammation and swelling. Thyroid function generally returns to normal over several weeks.

Drug-induced causes of thyroiditis are treated according to the drug concerned.

If thyroid nodules are present, excess iodine intake may contribute to hyperthyroidism. This means it may be important to avoid iodine if possible. Your endocrinologist will be able to discuss this further with you.

Single or multiple nodules

Single or multiple nodules that actively produce excess thyroid hormones are best treated with radioactive iodine therapy or surgery. Anti-thyroid medications can be used in preparation for surgery, or in people who are not well enough to have either surgery or radioactive iodine therapy. If an anti-thyroid medication is used for these particular patients, the treatment must be continued indefinitely, and is not the preferred treatment.



Treatments

Anti-thyroid medications

If your thyroid hormone production is too high, an anti-thyroid medication (carbimazole or propylthiouracil) may be given. This medication reduces the production of thyroid hormones. The length of treatment depends on the cause of hyperthyroidism. Anti-thyroid medications can have minor side-effects in some people, including painful joints, nausea, rash, itching or hives. In rare cases, bone marrow toxicity may occur, so it is important to tell your doctor if you have any fever, sore throat, skin rash or mouth ulcers. Your doctor will advise to stop taking this medication until the result of a full blood examination is known. Regular blood tests will be ordered by your doctor, once you start an anti-thyroid medication to check hormone levels return to a normal range.

Radioactive iodine

Radioactive iodine may be used to reduce thyroid hormone production by destroying some or all of the thyroid gland. For most patients, this is a single treatment, taken as a pill that releases radioactive iodine. The thyroid gland absorbs the iodine, and the radiation damages and destroys the overactive thyroid cells. Other parts of your body are not affected by the radiation, as they do not use iodine like the thyroid gland. Symptoms generally improve within a month, although the radioactive iodine keeps working for about 6 months. If symptoms continue after 6 to 12 months or anti-thyroid medications are still required, a second dose might be needed. Sometimes thyroid hormones levels drop too low and lifelong thyroid hormone replacement (levothyroxine) therapy is needed to bring levels back to normal.

This treatment should not be used if you are pregnant, considering pregnancy over the next 6 months or breast feeding. Caution should also be given if the patient has significant thyroid eye disease.

Surgery

Surgery is sometimes required if too much thyroid hormone is being produced by the thyroid gland, which cannot be controlled by an anti-thyroid medication or radioactive iodine treatment or surgery is the preference of the person with hyperthyroidism. For Graves' disease, surgery involves removing all the thyroid gland ('total thyroidectomy'), whereas for thyroid nodules, part ('thyroid lobectomy') or all of the thyroid gland may be removed. Surgery is performed as an inpatient in hospital. This surgery will leave a small scar at the base of the neck near the top of the breast bone. After a total thyroidectomy, lifelong thyroid hormone replacement therapy (levothyroxine) will be needed so that your body gets enough thyroid hormone to keep working properly. This requires taking a pill containing thyroid hormone (levothyroxine; T4) every day and this is generally well tolerated and keeps the body functioning in the same way as when the thyroid gland was present.

Medications to control other symptoms

At times, other symptoms caused by hyperthyroidism require additional short-term treatment with beta-blockers. This medication is commonly provided to treat rapid heart rate and heart palpitations, trembling, heat intolerance and/or anxiety.

What can I do to help?

If you have hyperthyroidism, it can help to understand the symptoms associated with too much or too little thyroid hormone. By monitoring symptoms and discussing any changes with your doctor, your medication dose can be adjusted to avoid over or under treatment.

If you smoke cigarettes, this is a good time to think about quitting, as smoking can make symptoms worse. Support is available through the Quit Line, either by phone (137 848) or website <https://www.quit.org.au>. Your doctor can also provide information and advice to help you.

FAQs about hyperthyroidism

How long do I need to take my anti-thyroid medication?

This depends on the cause of hyperthyroidism. Some causes will need treatment for a few months, while others will require life-long therapy. It is important to take your medication for the whole length of time your doctor has advised, as symptoms can return once medication is stopped. If you develop side-effects to the medication, contact your doctor immediately.

Do I need to keep taking anti-thyroid medication, or can I have surgery instead?

Surgical removal of the thyroid gland is a permanent cure for hyperthyroidism, and may be a good option in certain situations. Your endocrinologist will be able to discuss this further with you. Thyroid surgery should only be performed by experienced thyroid endocrine surgeons as this helps minimise risks of damage to areas around the thyroid gland, such as the voice box and the parathyroid glands. Surgery is an option when other treatments haven't worked, if the thyroid gland is very large and causing symptoms, if nodules are cancerous or pre-cancerous, or for active Thyroid Eye Disease. After surgery, lifelong thyroid hormone replacement (levothyroxine) must be taken daily, as soon as you wake in the morning with water only at least 15 minutes before food.

Should I avoid exposure to iodine or eating foods that contain iodine?

People with hyperthyroidism should avoid exposure to foods or supplements that have large amounts of iodine, for example kelp and iodine or kelp supplements. Most other foods, e.g. iodised salt or fish/seafood and multivitamins do not contain enough iodine to be a concern. Exposure to the large amounts of iodine in Lugol's iodine (aqueous iodine) and radiology contrast should also be avoided. If you are concerned about the amount of iodine you should consume, please check with your doctor.

Is radioactive iodine safe?

The amount of radioactive iodine used to treat hyperthyroidism is high enough to destroy some of the thyroid gland but low enough to make it safe for the rest of your body. This is because the thyroid gland is far more sensitive to radioactive iodine than any other part of the body. This treatment does not cause cancer or infertility problems. Women who are pregnant or breastfeeding should not be treated with radioactive iodine. If you have symptoms of Thyroid Eye Disease, caution should be given before treatment is prescribed.

Can I take medications if I want to get pregnant and while I'm pregnant?

It is very important to discuss with your doctor the best medications to control your thyroid hormones when trying to get pregnant, throughout pregnancy and while breastfeeding. This will keep you and your baby safe, as uncontrolled hormone levels and some medicines can harm babies during development.

What should I do if I miss taking my anti-thyroid medication?

Take your dose as soon as you remember, and then continue with the next dose at your usual time. If you remember your medications close to your next dose, take them together with your next dose and keep to your usual times.

Where to go for more information and support?

For more information...

Contact your doctor (GP)

Your Endocrinologist

Visit The Australian Thyroid Foundation: <https://www.thyroidfoundation.org.au/>

When to see your doctor?

See your doctor if you have a family history of thyroid or Graves' disease and develop symptoms.

See your doctor immediately if you develop any fever, sore throat, skin rash or mouth ulcers after starting anti-thyroid medication. These side effects are very rare, but need to be reported to your doctor who will do a full blood examination.

See your doctor if you have any other side effects after starting your medication, such as a rash, hives, itchiness, painful joints or nausea.

If you are taking anti-thyroid medication, see your doctor if symptoms change or get worse. Symptoms can change if your thyroid hormones get too low, which sometimes happens when the dose of medication needs adjustment. Symptoms caused by low thyroid hormones include tiredness, unexpected weight gain, sensitivity to the cold and constipation. It is important to let your doctor know if you have taken more or fewer doses than prescribed so your dose can be adjusted correctly.

Questions to ask your doctor

Seeing your doctor or having a medical problem can be stressful. It often takes time for information to sink in and it is very common to feel overwhelmed by what is happening.

Sometimes it helps to write down questions before you go.

Some questions that might be useful for you are:

- What is causing my hyperthyroidism?
- Do I need medication?
- How long will I need medication?
- Do I need a scan?
- Do I need surgery?
- What medication do I take if I am trying to get pregnant?
- What medication can I take while I am pregnant or breastfeeding?
- Should I be taking supplements?
- If I have Graves' disease, should other members of my family get checked?
- When do I need another appointment?

Common terms and definitions

Amenorrhoea – Loss of menstrual periods

Autoimmune disorder – A condition where the body's immune system attacks healthy cells.

Benign - A benign tumour is one that is not cancerous

Bone marrow toxicity - Decreased production of white blood cells and/or red blood cells and/or platelets. This can result in compromised immune function, anaemia and/or problems with blood clotting.

Congenital – A condition present from birth

Hashimoto's disease – An autoimmune disease where the immune system attacks the thyroid gland usually resulting in long-term hypothyroidism.

Insomnia – Trouble sleeping or staying asleep

Malignant – Contains cancerous cells.

Menorrhagia – Heavy menstrual periods

Subclinical – When a disease is not severe enough to reach the criteria for diagnosis.

Tumour – An abnormal growth in the body. Tumours can be benign or malignant

About this fact sheet

The content on this page was medically reviewed by Dr Rosemary Wong and Prof John Walsh.

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