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## Treating Thyroid Cancer

If you've been diagnosed with thyroid cancer, your cancer care team will discuss your treatment options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

### How is thyroid cancer treated?

The treatment options for thyroid cancer might include:

- [Surgery for Thyroid Cancer](#)
- [Radioactive Iodine \(Radioiodine\) Therapy for Thyroid Cancer](#)
- [Thyroid Hormone Therapy](#)
- [External Beam Radiation Therapy for Thyroid Cancer](#)
- [Chemotherapy for Thyroid Cancer](#)
- [Targeted Therapy for Thyroid Cancer](#)

### Common treatment approaches

Most thyroid cancers can be cured, especially if they have not spread to distant parts of the body. If the cancer can't be cured, the goal of treatment may be to remove or destroy as much of the cancer as possible and to keep it from growing, spreading, or returning for as long as possible. Sometimes treatment is aimed at palliating (relieving) symptoms such as pain or problems with breathing and swallowing.

In choosing a treatment plan, factors to consider include the type and stage of the cancer and your general health. Often, more than one type of treatment is needed.

- [Treatment of Thyroid Cancer, by Type and Stage](#)

## Who treats thyroid cancer?

Depending on the type and stage of your thyroid cancer, you may need more than one type of treatment. Doctors on your cancer treatment team may include:

- A **surgeon**: a doctor who uses surgery to treat cancers or other problems
- An **endocrinologist**: a doctor who treats diseases in glands that secrete hormones
- A **radiation oncologist**: a doctor who uses radiation to treat cancer
- A **medical oncologist**: a doctor who uses chemotherapy and other medicines to treat cancer

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals.

- [Health Professionals Associated With Cancer Care<sup>1</sup>](#)

## Making treatment decisions

It's important to discuss all of your treatment options as well as their possible side effects with your family and your treatment team to make the choice that best fits your needs. If there's anything you don't understand, ask to have it explained.

Some treatments for thyroid cancer might affect your ability to have children later in life. If this might be a concern for you, talk to your doctor about it before you decide on treatment.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

- [Questions to Ask About Thyroid Cancer<sup>2</sup>](#)
- [Seeking a Second Opinion<sup>3</sup>](#)

## Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to

treat cancer. Still, they're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- [Clinical Trials](#)<sup>4</sup>

### **Considering complementary and alternative methods**

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- [Complementary and Alternative Medicine](#)<sup>5</sup>

### **Help getting through cancer treatment**

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

- [Find Support Programs and Services in Your Area](#)<sup>6</sup>

### **Choosing to stop treatment or choosing no treatment at all**

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

- [If Cancer Treatments Stop Working](#)<sup>7</sup>
- [Palliative or Supportive Care](#)<sup>8</sup>

*The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

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## Surgery for Thyroid Cancer

Surgery is the main treatment in nearly every case of thyroid cancer, except for some anaplastic thyroid cancers. If thyroid cancer is diagnosed by a [fine needle aspiration \(FNA\) biopsy](#)<sup>1</sup>, surgery to remove the tumor and all or part of the remaining thyroid gland is usually recommended.

### Lobectomy

A lobectomy is an operation that removes the lobe containing the cancer, usually along with the isthmus (the small piece of the gland that acts as a bridge between the left and right lobes). It is sometimes used to treat differentiated (papillary or follicular) thyroid cancers that are small and show no signs of spread beyond the thyroid gland. It is also sometimes used to diagnose thyroid cancer if an FNA biopsy result doesn't provide a clear diagnosis (see [Tests for Thyroid Cancer](#)<sup>2</sup>).

An advantage of this surgery is that some patients might not need to take thyroid hormone pills afterward because it leaves part of the gland behind. But having some thyroid left can interfere with some tests that look for cancer recurrence after treatment, such as radioiodine scans and thyroglobulin blood tests.

## Thyroidectomy

Thyroidectomy is surgery to remove the thyroid gland. It is the most common surgery for thyroid cancer. As with lobectomy, this is typically done through an incision a few inches long across the front of the neck. You will have a small scar across the front of your neck after surgery, but this should become less noticeable over time.

If the entire thyroid gland is removed, it is called a *total thyroidectomy*. Sometimes the surgeon may not be able to remove the entire thyroid. If nearly all of the gland is removed, it is called a *near-total thyroidectomy*.

After a near-total or total thyroidectomy, you will need to take daily thyroid hormone (levothyroxine) pills. But one advantage of this surgery over lobectomy is that your doctor will be able to check for recurrence (cancer coming back) afterward using radioiodine scans and thyroglobulin blood tests.

## Lymph node removal

If cancer has spread to nearby lymph nodes in the neck, these will be removed at the same time surgery is done on the thyroid. This is especially important for treatment of medullary thyroid cancer and for anaplastic cancer (when surgery is an option).

For papillary or follicular cancer where only 1 or 2 enlarged lymph nodes are thought to contain cancer, the enlarged nodes may be removed and any small deposits of cancer cells that may be left are then treated with radioactive iodine. (See [Radioactive Iodine \[Radioiodine\] Therapy<sup>3</sup>](#).) More often, several lymph nodes near the thyroid are removed in an operation called a *central compartment neck dissection*. Removal of even more lymph nodes, including those on the side of the neck, is called a *modified radical neck dissection*.

## Risks and side effects of thyroid surgery

Complications are less likely to happen when your operation is done by an experienced thyroid surgeon. Patients who have thyroid surgery are often ready to leave the hospital within a day after the operation. Potential complications of thyroid surgery include:

- Temporary or permanent hoarseness or loss of voice. This can happen if the larynx (voice box) or windpipe is irritated by the breathing tube that was used during surgery. It may also occur if the nerves to the larynx (or vocal cords) are damaged during surgery. The doctor should examine your vocal cords before surgery to see if they move normally. (See [Tests for Thyroid Cancer](#)<sup>4</sup>.)
- Damage to the parathyroid glands (small glands behind the thyroid that help regulate calcium levels). This can lead to low blood calcium levels, causing muscle spasms and feelings of numbness and tingling.
- Excessive bleeding or formation of a major blood clot in the neck (called a *hematoma*)
- Infection

## More information about Surgery

For more general information about surgery as a treatment for cancer, see [Cancer Surgery](#)<sup>5</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>6</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/understanding-your-diagnosis/tests/testing-biopsy-and-cytology-specimens-for-cancer/biopsy-types.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/testing-biopsy-and-cytology-specimens-for-cancer/biopsy-types.html)
2. [www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/how-diagnosed.html)
3. [www.cancer.org/cancer/thyroid-cancer/treating/radioactive-iodine.html](http://www.cancer.org/cancer/thyroid-cancer/treating/radioactive-iodine.html)
4. [www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/how-diagnosed.html)
5. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html)
6. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

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## Radioactive Iodine (Radioiodine) Therapy for Thyroid Cancer

Your thyroid gland absorbs nearly all of the iodine in your body. Because of this, radioactive iodine (RAI, also called I-131) can be used to treat thyroid cancer. The RAI collects mainly in thyroid cells, where the radiation can destroy the thyroid gland and any other thyroid cells (including cancer cells) that take up iodine, with little effect on the rest of your body. The radiation dose used here is much stronger than the one used in

radioiodine scans, which are described in [Tests for Thyroid Cancer](#)<sup>1</sup>.

This treatment can be used to ablate (destroy) any thyroid tissue not removed by surgery or to treat some types of thyroid cancer that have spread to lymph nodes and other parts of the body.

Radioactive iodine therapy helps people live longer if they have papillary or follicular thyroid cancer (differentiated thyroid cancer) that has spread to the neck or other body parts, and it is now standard practice in such cases. But the benefits of RAI therapy are less clear for people with small cancers of the thyroid gland that do not seem to have spread, which can often be removed completely with [surgery](#)<sup>2</sup>. Discuss your risks and benefits of RAI therapy with your doctor. Radioactive iodine therapy cannot be used to treat anaplastic (undifferentiated) and medullary thyroid carcinomas because these types of cancer do not take up iodine.

## Preparing for RAI therapy

For RAI therapy to be most effective, you must have a high level of thyroid-stimulating hormone (TSH or thyrotropin) in the blood. This hormone is what makes thyroid tissue (and cancer cells) take up radioactive iodine. If your thyroid has been removed, there are a couple of ways to raise TSH levels before being treated with RAI:

- One way is to stop taking thyroid hormone pills for several weeks. This causes very low thyroid hormone levels (hypothyroidism), which makes the pituitary gland to release more TSH. This intentional hypothyroidism is temporary, but it often causes symptoms like tiredness, depression, weight gain, constipation, muscle aches, and reduced concentration.
- Another way is to get an injection (shot) of thyrotropin (Thyrogen), which can make withholding thyroid hormone for a long period of time unnecessary. This drug is given daily for 2 days, followed by RAI on the 3<sup>rd</sup> day.

Most doctors also recommend that you follow a low iodine diet for 1 or 2 weeks before treatment. This means avoiding foods that contain iodized salt and red dye #3, as well as dairy products, eggs, seafood, and soy.

## Risks and side effects

Your body will give off radiation for some time after you get RAI therapy. Depending on the dose of radioiodine used and where you are being treated, you might need to be in



the hospital for a few days after treatment, staying in a special isolation room to prevent others from being exposed to radiation. Some people may not need to be hospitalized. Once you are allowed to go home after treatment, you will be given instructions on how to protect others from radiation exposure and how long you need to take these precautions. These instructions may vary slightly by treatment center. Be sure you understand the instructions before you leave the hospital.

Short-term side effects of RAI treatment may include:

- Neck tenderness and swelling
- [Nausea and vomiting](#)<sup>3</sup>
- Swelling and [tenderness](#)<sup>4</sup> of the salivary glands
- [Dry mouth](#)<sup>5</sup>
- [Taste changes](#)<sup>6</sup>

Chewing gum or sucking on hard candy may help with salivary gland problems.

Radioiodine treatment also reduces tear formation in some people, leading to dry eyes. If you wear contact lenses, ask your doctor how long you should keep them out.

Men who receive large total doses of radiation because of many treatments with RAI may have lower sperm counts or, rarely, become infertile. Radioactive iodine may also affect a woman's ovaries, and some women may have irregular periods for up to a year after treatment. Many doctors recommend that women avoid becoming pregnant for 6 months to a year after treatment. No ill effects have been noted in the children born to parents who received radioactive iodine in the past.

Both men and women who have had RAI therapy may have a slightly increased risk of developing [leukemia](#)<sup>7</sup> in the future. Doctors disagree on exactly how much this risk is increased, but most of the largest studies have found that this is an extremely rare complication. Some research even suggests the risk of leukemia may not be significantly increased.

Talk to your health care team if you have any questions about the possible risks and benefits of your treatment.

## Hyperlinks

1. [www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/how-diagnosed.html)

2. [www.cancer.org/cancer/thyroid-cancer/treating/surgery.html](http://www.cancer.org/cancer/thyroid-cancer/treating/surgery.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html)
4. [www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition/nutrition-during-treatment/mouth-throat-pain-or-sores.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition/nutrition-during-treatment/mouth-throat-pain-or-sores.html)
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6. [www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition/nutrition-during-treatment/taste-smell-changes.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition/nutrition-during-treatment/taste-smell-changes.html)
7. [www.cancer.org/cancer/leukemia.html](http://www.cancer.org/cancer/leukemia.html)

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## Thyroid Hormone Therapy

If your thyroid has been removed (thyroidectomy), your body can no longer make the thyroid hormone it needs. You will need to take thyroid hormone (levothyroxine) pills to replace the natural hormone and help maintain normal metabolism and possibly lower your risk of the cancer coming back.

Normal thyroid function is regulated by the pituitary gland. The pituitary makes a hormone called TSH that causes the thyroid gland to make thyroid hormone for the body. TSH also promotes growth of the thyroid gland and probably of thyroid cancer cells. The level of TSH, in turn, is regulated by how much thyroid hormone is in the blood. If the level of thyroid hormone is low, the pituitary makes more TSH. If the level of thyroid hormone is high, not as much TSH is needed, so the pituitary makes less of it.

Doctors have learned that by giving higher than normal doses of thyroid hormone, TSH levels can be kept very low. This may slow the growth of any remaining cancer cells and lower the chance of some thyroid cancers (especially high-risk cancers) coming back.

### Possible side effects

Taking higher than normal levels of thyroid hormone seems to have few short-term side effects, but some doctors have expressed concerns about taking them for long periods of time. High levels of thyroid hormone can lead to problems with a rapid or irregular heartbeat. Over the long run, high doses of thyroid hormone can also lead to weak bones (osteoporosis). Because of this, doctors might avoid giving high doses of thyroid hormone unless you have a differentiated thyroid cancer and are at high risk of recurrence.

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## External Beam Radiation Therapy for

# Thyroid Cancer

External beam radiation therapy uses high-energy rays (or particles) to destroy cancer cells or slow their growth. A carefully focused beam of radiation is delivered from a machine outside the body.

This type of radiation therapy is most often used to treat medullary thyroid cancer and anaplastic thyroid cancer. For cancers that take up iodine (most differentiated thyroid cancers) [radioiodine therapy](#)<sup>1</sup> is usually a better treatment.

External beam radiation therapy is often used for cancers that don't take up iodine and have spread beyond the thyroid. This might be done to help treat the cancer or to lower the chance of cancer coming back in the neck after surgery.

If a cancer does not respond to radioiodine therapy, external radiation therapy may be used to treat cancer that has come back in the neck or distant metastases that are causing pain or other symptoms.

External beam radiation therapy is usually given 5 days a week for several weeks. Before your treatments start, the medical team will take careful measurements to find the correct angles for aiming the radiation beams and the proper dose of radiation. The treatment itself is painless and much like getting a regular x-ray. Each treatment lasts only a few minutes, although the setup time — getting you into place for treatment — usually takes longer.

## Possible side effects

The main drawback of this treatment is that the radiation can destroy nearby healthy tissue along with the cancer cells. Some patients get skin changes similar to a sunburn, but this slowly fades away. Trouble swallowing, dry mouth, hoarseness, and fatigue are also potential side effects of external beam radiation therapy aimed at or near the thyroid.

To reduce the risk of side effects, doctors carefully figure out the exact dose needed and aim the beam as accurately as they can to hit the target.

## More information about radiation therapy

To learn more about how radiation is used to treat cancer, see [Radiation Therapy](#)<sup>2</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/thyroid-cancer/treating/radioactive-iodine.html](http://www.cancer.org/cancer/thyroid-cancer/treating/radioactive-iodine.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

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[cancer/references.html](#))

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## Chemotherapy for Thyroid Cancer

Chemotherapy (chemo) uses anti-cancer drugs that are injected into a vein or are taken by mouth. Chemotherapy is systemic therapy, which means that the drug enters the bloodstream and travels throughout the body to reach and destroy cancer cells.

Chemotherapy is seldom helpful for most types of thyroid cancer, but fortunately it is not needed in most cases. It is often combined with [external beam radiation therapy](#)<sup>1</sup> for anaplastic thyroid cancer and is sometimes used for other advanced cancers that no longer respond to other treatments.

The chemotherapy drugs most commonly used to treat mainly medullary thyroid cancer and anaplastic thyroid cancer include:

- Dacarbazine
- Vincristine
- Cyclophosphamide
- Doxorubicin
- Streptozocin
- Fluorouracil
- Paclitaxel
- Docetaxel
- Carboplatin

### Possible side effects

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow, the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemotherapy, which can lead to side effects.

The side effects of chemotherapy depend on the type and dose of drugs given and the length of time they are taken. Common side effects of chemo include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea
- Increased chance of infections (from too few white blood cells)
- Easy bruising or bleeding (from too few blood platelets)
- Fatigue (from too few red blood cells)

These side effects are usually short-term and go away after treatment is finished. There are often ways to lessen these side effects. For example, drugs can be given to help prevent or reduce nausea and vomiting.

Some chemotherapy drugs may have other specific side effects that require monitoring. For example, doxorubicin (one of the most common chemo drugs used in thyroid cancer) can affect heart function. If you are taking doxorubicin, your doctor will check your heart regularly using tests such as echocardiograms.

## More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy](#)<sup>2</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/thyroid-cancer/treating/external-beam-radiation.html](http://www.cancer.org/cancer/thyroid-cancer/treating/external-beam-radiation.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html)
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## Targeted Therapy for Thyroid Cancer

Newer drugs that specifically target the changes inside cells that cause them to become cancerous are being used to treat thyroid cancer.

## Targeted drugs for papillary or follicular thyroid cancer

Fortunately, most of these cancers can be treated effectively with [surgery](#)<sup>1</sup> and [radioactive iodine therapy](#)<sup>2</sup>, so there is less need for other drugs to treat them. But when those treatments aren't effective, targeted drugs can be helpful.

**Sorafenib (Nexavar)** and **lenvatinib (Lenvima)** are both types of targeted drugs known as *kinase inhibitors*. They work in 2 ways:

- They help block tumors from forming new blood vessels, which the tumors need to grow.
- They target some of the proteins made by cancer cells that normally help them grow.

These drugs can help stop cancer growth for a time for people with differentiated thyroid cancer (papillary and follicular thyroid cancers) whose treatment with radioactive iodine is no longer working. It isn't yet clear if these drugs help people live longer.

Both of these drugs are taken by mouth. Common side effects include fatigue, rash, loss of appetite, diarrhea, nausea, high blood pressure, and hand foot syndrome (redness, pain, swelling, or blisters on the palms of the hands or soles of the feet). Other more serious side effects can also occur. Ask your doctor what you can expect.

## Targeted drugs for medullary thyroid cancer

Doctors have been especially interested in finding targeted drugs to treat medullary thyroid cancer (MTC) because thyroid hormone-based treatments (including radioactive iodine therapy) are not effective against these cancers.

**Vandetanib (Caprelsa)** and **Cabozantinib (Cometriq)** are targeted drugs used to treat advanced MTC. They each can stop cancers from growing for a time, although it is not yet clear if they can help people live longer. These drugs are not given together but are taken in pill form once a day.

Some common side effects of vandetanib include diarrhea, rash, nausea, high blood pressure, headache, fatigue, decreased appetite, and belly (abdominal) pain. Rarely, it can also cause serious problems with heart rhythm and infection that can lead to death. Because of its potential side effects, doctors must get special training before they are allowed to prescribe this drug.

Common side effects of cabozantinib include diarrhea, constipation, belly pain, mouth sores, decreased appetite, nausea, weight loss, fatigue, high blood pressure, loss of hair color, and hand-foot syndrome (redness, pain, and swelling of the hands and feet). Rarely, this drug can also cause serious side effects, such as severe bleeding and holes in the intestine.

## Targeted drugs for anaplastic thyroid cancer

Doctors have been very interested in finding targeted drugs to treat anaplastic thyroid cancer because most other treatments are not very effective against these cancers.

Some anaplastic thyroid cancers have changes in the *BRAF* gene, which causes them to make proteins that help them grow.

**Dabrafenib (Tafinlar)** and **trametinib (Mekinist)** are drugs that target some of these proteins. These drugs can be used together to treat anaplastic thyroid cancers that have a certain type of *BRAF* gene change and that can't be removed completely with surgery.

These drugs are taken as pills or capsules each day.

Common side effects can include skin changes, rash, itching, sensitivity to the sun, headache, fever, chills, joint or muscle pain, fatigue, cough, hair loss, nausea, diarrhea, and high blood pressure.

Less common but serious side effects can include bleeding, heart rhythm problems, liver or kidney problems, lung problems, severe allergic reactions, severe skin or eye problems, and increased blood sugar levels.

Some people treated with these drugs develop skin cancers, especially [squamous cell skin cancers](#)<sup>3</sup>. Your doctor will want to check your skin often during treatment. You should also let your doctor know right away if you notice any new growths or abnormal areas on your skin.

**Larotrectinib (Vitrakvi)** is a drug that targets the NTRK gene. It is an option for any advanced thyroid cancer that has the NTRK gene mutation (change) and limited options for treatment. It is a pill that is taken twice a day. Common side effects include fatigue, nausea, vomiting, cough, dizziness, diarrhea and abnormal liver tests.

## More information about targeted therapy

To learn more about how targeted drugs are used to treat cancer, see [Targeted Cancer Therapy](#)<sup>4</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>5</sup>.

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## Treatment of Thyroid Cancer, by Type and Stage

The type of treatment your doctor will recommend depends on the [type](#)<sup>1</sup> and [stage](#)<sup>2</sup> of the cancer and on your overall health. Talk to your doctor if you have any questions about the treatment plan he or she recommends.

### Papillary cancer and its variants

Most cancers are treated with [removal of the thyroid gland](#)<sup>3</sup> (thyroidectomy), although small tumors that have not spread outside the thyroid gland may be treated by just removing the side of the thyroid containing the tumor (lobectomy). If lymph nodes are enlarged or show signs of cancer spread, they will be removed as well.

In addition, recent studies have suggested that people with micro-papillary cancers (very small thyroid cancers) may safely choose to be watched closely with routine ultrasounds rather than have immediate surgery.

Even if the lymph nodes aren't enlarged, some doctors recommend [central compartment neck dissection](#)<sup>4</sup> (surgical removal of lymph nodes next to the thyroid) along with removal of the thyroid. Although this operation has not been shown to improve cancer survival, it might lower the risk of cancer coming back in the neck area. Because removing the lymph nodes allows them to be checked for cancer, this surgery also makes it easier to accurately [stage](#)<sup>5</sup>[e](#)<sup>6</sup> the cancer. If cancer has spread to other neck lymph nodes, a modified radical neck dissection (a more extensive removal of lymph nodes from the neck) is often done.

Treatment after surgery depends on the stage of the cancer:

- [Radioactive iodine \(RAI\) treatment](#)<sup>7</sup> is sometimes used after thyroidectomy for early stage cancers (T1 or T2), but the cure rate with surgery alone is excellent. If the cancer does come back, radioiodine treatment can still be given.
- RAI therapy is often given for more advanced cancers such as T3 or T4 tumors, or cancers that have spread to lymph nodes or distant areas. The goal is to destroy any remaining thyroid tissue and to try to treat any cancer remaining in the body. Areas of distant spread that do not respond to RAI might need to be treated with [external beam radiation therapy](#)<sup>8</sup>, [targeted therapy](#)<sup>9</sup>, or [chemotherapy](#)<sup>10</sup>.

People who have had a thyroidectomy will need to take daily thyroid hormone (levothyroxine) pills. If RAI treatment is planned, the start of [thyroid hormone therapy](#)<sup>11</sup> may be delayed until the treatment is finished (usually about 6 to 12 weeks after surgery).

**Recurrent cancer:** Treatment of cancer that comes back after initial treatment depends mainly on where the cancer is growing, although other factors may be important as well. The recurrence might be found by either [blood tests or imaging tests](#)<sup>12</sup> such as ultrasound or radioiodine scans.

If cancer comes back in the neck, an ultrasound-guided biopsy is done to confirm that it is cancer. If the tumor appears to be resectable (removable), surgery is often used. If the cancer shows up on a radioiodine scan (meaning the cells are taking up iodine), radioactive iodine (RAI) therapy may be used, either alone or with surgery. If the cancer does not show up on the radioiodine scan but is found by other imaging tests (such as an MRI or PET scan), external radiation may be used.

The [targeted therapy](#)<sup>13</sup> drugs sorafenib (Nexavar) and lenvatinib (Lenvima) may be tried if the cancer has spread to several places and RAI and other treatments are not helpful. Because these cancers can be hard to treat, taking part in a [clinical trial](#)<sup>14</sup> of newer treatments is another choice.

## Follicular and Hürthle cell cancers

Often, it isn't clear that a tumor is a follicular cancer based on a FNA biopsy. If the biopsy results are unclear, they might list "follicular neoplasm" as a diagnosis. Only about 2 of every 10 follicular neoplasms will actually turn out to be cancer, so the next step is usually [surgery](#)<sup>15</sup> to remove the half of the thyroid gland that has the tumor (a lobectomy).

If the tumor turns out to be a follicular cancer, a second operation to remove the rest of the thyroid is usually needed (this is called a completion thyroidectomy). If the patient is only willing to have one operation, the doctor may just remove the whole thyroid gland in the first surgery. Still, for most patients, this isn't really needed.

If there are signs the cancer has spread before surgery, the tumor must be a cancer and so a thyroidectomy will be done.

Hürthle (Hurthle) cell cancer can also be hard to diagnose based on a FNA biopsy. Tumors suspected of being Hürthle cell cancer are often treated like follicular neoplasms. A lobectomy is usually done first. If cancer is confirmed, a completion thyroidectomy is done. A thyroidectomy may be done as the first surgery if there are signs the cancer has spread or if the patient wants to avoid having more surgery later.

As with papillary cancer, some lymph nodes usually are removed and tested for cancer. If cancer has spread to lymph nodes, a central compartment or modified neck dissection (surgical removal of lymph nodes from the neck) may be done. Because the thyroid is removed, patients will need to take [thyroid hormone therapy](#)<sup>16</sup> as well, although it is often not started right away.

Radioiodine scanning is usually done after surgery to look for areas still taking up iodine. Spread to nearby lymph nodes and to distant sites that shows up on the scan can be [treated by radioactive iodine \(RAI\)](#)<sup>17</sup>. For cancers that don't take up iodine, [external beam radiation therapy](#)<sup>18</sup> may help treat the tumor or prevent it from growing back in the neck.

Cancer that has spread to distant areas such as the lungs or liver may need to be treated with external beam radiation therapy, or [targeted therapy](#)<sup>19</sup> with sorafenib (Nexavar) or lenvatinib (Lenvima) if they do not respond to RAI. Another option is taking part in a [clinical trial](#)<sup>20</sup> of newer treatments or [chemotherapy](#)<sup>21</sup>

**Recurrent cancer:** Treatment of cancer that comes back after initial therapy depends mainly on where the cancer is growing, although other factors may be important as well. The recurrence might be found by either [blood tests or imaging tests](#)<sup>22</sup> such as



ultrasound or radioiodine scans.

If cancer comes back in the neck, an ultrasound-guided biopsy is first done to confirm that it is cancer. If the tumor appears to be resectable (removable), surgery is often used. If the cancer shows up on a radioiodine scan (meaning the cells are taking up iodine), radioactive iodine (RAI) therapy may be used, either alone or with surgery. If the cancer does not show up on the radioiodine scan but is found by other imaging tests (such as an MRI or PET scan), external radiation may be used.

Targeted therapy with sorafenib (Nexavar) and lenvatinib (Lenvima) is tried first if the cancer has spread to several places and RAI was not helpful. Chemotherapy and taking part in a clinical trial of newer treatments are also options.

## Medullary thyroid cancer

Most doctors advise that patients diagnosed with medullary thyroid cancer (MTC) be tested for other tumors that are typically seen in patients with the MEN 2 syndromes (see [Thyroid Cancer Risk Factors](#)<sup>23</sup>), such as pheochromocytoma and parathyroid tumors. Screening for pheochromocytoma is particularly important, because anesthesia and [surgery](#)<sup>24</sup> can be extremely dangerous when these tumors are present. If surgeons and anesthesiologists know about such tumors ahead of time, they can treat the patient with medicines before and during surgery to make surgery safe.

**Stages I and II:** [Total thyroidectomy](#)<sup>25</sup> is the main treatment for MTC and often cures patients with stage I or stage II MTC. Nearby lymph nodes are usually removed as well. Because the thyroid gland is removed, [thyroid hormone therapy](#)<sup>26</sup> is needed after surgery. For MTC, thyroid hormone therapy is meant to provide enough hormone to keep the patient healthy, but it does not reduce the risk that the cancer will come back. Because MTC cells do not take up radioactive iodine, there is no role for [radioactive iodine therapy](#)<sup>27</sup> in treating MTC.

**Stages III and IV:** Surgery is the same as for stages I and II (usually after screening for MEN 2 syndrome and pheochromocytoma). Thyroid hormone therapy is given afterward. When the tumor is extensive and invades many nearby tissues or cannot be completely removed, [external beam radiation therapy](#)<sup>28</sup> may be given after surgery to try to reduce the chance of recurrence in the neck.

For cancers that have spread to distant parts of the body, surgery, radiation therapy, or similar treatments may be used if possible. If these treatments can't be used, vandetanib (Caprelsa), cabozantinib (Cometriq), or other [targeted drugs](#)<sup>29</sup> may be tried. [Chemotherapy](#)<sup>30</sup> may be another option. Because these cancers can be hard to treat,



another option is taking part in a clinical trial of newer treatments.

**Recurrent cancer:** If the cancer recurs in the neck or elsewhere, surgery, external radiation therapy, targeted therapy (such as vandetanib or cabozantinib), or chemotherapy may be needed. [Clinical trials](#)<sup>31</sup> of new treatments may also be an option.

**Genetic testing in medullary thyroid cancer:** If you are told that you have MTC, even if you are the first one in the family to be diagnosed with this disease, ask your doctor about genetic counseling and testing. Genetic testing can find mutations in the *RET* gene, which is seen in cases of familial MTC and the MEN 2 syndromes.

If you have one of these mutations, it's important that close family members (children, brothers, sisters, and parents) be tested as well. Because almost all children and adults with mutations in this gene will develop MTC at some time, most doctors agree that anyone who has a *RET* gene mutation should have their thyroid removed to prevent MTC soon after getting the test results. This includes children, since some hereditary forms of MTC affect children and pre-teens. Total thyroidectomy can prevent this cancer in people with *RET* mutations who have not yet developed it. In this case, lifelong thyroid hormone replacement will be needed.

## Anaplastic cancer

Because this cancer is already widespread when it is diagnosed, surgery is often not helpful as treatment. If the cancer is confined to the area around the thyroid, which is rare, the entire thyroid and nearby lymph nodes may be removed. The goal of surgery is to remove as much cancer in the neck area as possible, ideally leaving no cancer behind. Because of the way anaplastic cancer spreads, this is often difficult or impossible.

Radioactive iodine treatment is not used because it does not work in this cancer.

[External beam radiation therapy](#)<sup>32</sup> may be used alone or combined with [chemotherapy](#)<sup>33</sup>:

- To try to **shrink the cancer** before surgery to increase the chance of removing it completely
- After surgery to try to **control any cancer that remains** in the neck
- When the tumor is **too large or widespread to be treated by surgery**

If the cancer is causing (or may eventually cause) trouble breathing, a hole may be placed surgically in the front of the neck and into the windpipe to bypass the tumor and

allow the patient to breathe more comfortably. This hole is called a *tracheostomy*.

For cancers that have spread, chemotherapy alone can be used. If the cancer cells have certain changes in the *BRAF* or *NTRK* genes, treatment with the [targeted drugs](#)<sup>34</sup> dabrafenib (Tafinlar) and trametinib (Mekinist) or larotrectinib (Vitrakvi) are other options.

Because these cancers can be hard to treat, [clinical trials](#)<sup>35</sup> of newer treatments are an option as well.

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