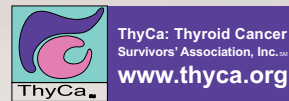


Thyroid Cancer

Presented with support from:





LEARNING that you have cancer can be overwhelming.

The goal of this book is to help you know your options. It explains which cancer tests and treatments are recommended by experts for thyroid cancer.

The National Comprehensive Cancer Network® (NCCN®) is a not-for-profit alliance of 27 of the world's leading cancer centers. Experts from NCCN have written treatment guidelines for doctors who treat thyroid cancer. These treatment guidelines suggest what the best practice is for cancer care. The information in this patient book is based on the guidelines written for doctors.

This book focuses on the treatment of thyroid cancer. Key points of the book are summarized in the [NCCN Quick Guide™](#) series for Thyroid Cancer. NCCN also offers patient books on breast cancer, lung cancer, melanoma, and many other cancer types. Visit [NCCN.org/patients](https://www.nccn.org/patients) for the full library of patient books, summaries, and other resources.

About



These patient guidelines for cancer care are produced by the National Comprehensive Cancer Network® (NCCN®).

The mission of NCCN is to improve cancer care so people can live better lives. At the core of NCCN are the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®). NCCN Guidelines® contain information to help health care workers plan the best cancer care. They list options for cancer care that are most likely to have the best results. The NCCN Guidelines for Patients® present the information from the NCCN Guidelines in an easy-to-learn format.

Panels of experts create the NCCN Guidelines. Most of the experts are from NCCN Member Institutions. Their areas of expertise are diverse. Many panels also include a patient advocate. Recommendations in the NCCN Guidelines are based on clinical trials and the experience of the panelists. The NCCN Guidelines are updated at least once a year. When funded, the patient books are updated to reflect the most recent version of the NCCN Guidelines for doctors.

For more information about the NCCN Guidelines, visit NCCN.org/clinical.asp.

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NCCN Foundation was founded by NCCN to raise funds for patient education based on the NCCN Guidelines. NCCN Foundation offers guidance to people with cancer and their caregivers at every step of their cancer journey. This is done by sharing key information from the world's leading cancer experts. This information can be found in a library of NCCN Guidelines for Patients® and other patient education resources. NCCN Foundation is also committed to advancing cancer treatment by funding the nation's promising doctors at the center of cancer research, education, and progress of cancer therapies.

For more information about NCCN Foundation, visit NCCNFoundation.org.

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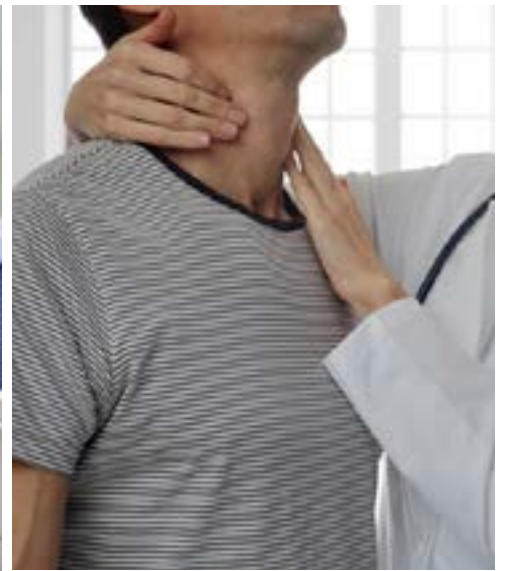
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THYROID CANCER



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Who should read this book?

This book is about thyroid cancer, also known as thyroid carcinoma. The thyroid is a gland found in your neck. Thyroid carcinoma is a cancer that starts in cells that form the thyroid gland. This book is for people with thyroid cancer and those who support them like caregivers, family, and friends.

Where should you start reading?

Starting with Part 1 may be helpful. It explains what thyroid cancer is and how this cancer is diagnosed. Part 2 shares health tests and other care needed before starting treatment. Part 3 lists the cancer stages by type of thyroid cancer and briefly describes the treatments so you can understand your options in Part 4. Tips for making treatment decisions are presented in Parts 5 through 7. Part 8 will help you with questions for your doctors and direct you to helpful resources.

Does the whole book apply to you?

This book includes information for many situations. Your treatment team can help. They can point out what information applies to you. They can also give you more information. As you read through this book, you may find it helpful to make a list of questions to ask your doctors.

The recommendations in this book are based on science and the experience of NCCN experts. However, these recommendations may not be right for your situation. Your doctors may suggest other tests and treatments based on your health and other factors. If other recommendations are given, feel free to ask your treatment team questions.

Help! What do the words mean?

In this book, many medical words are included. These are words you will likely hear from your treatment team. Most of these words may be new to you, and it may be a lot to learn.

Don't be discouraged as you read. Keep reading and review the information. Feel free to ask your treatment team to explain a word or phrase that you don't understand.

Words that you may not know are defined in the text or in the *Dictionary*. Acronyms are also defined when first used and in the *Glossary*. One example is DNA for **d**eoxyribonucleic acid.

1

Thyroid cancer

8 The thyroid

8 Cancer basics

10 Thyroid cancer

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**THYROID
CANCER**



Learning that you have cancer can be overwhelming. It is helpful to start talking with your medical team about upcoming tests and treatment options. Part 1 starts with information about the thyroid. This chapter then shares what doctors know about cancer that starts here.

The thyroid

The thyroid is a gland in the neck. It is found below the Adam's apple (thyroid cartilage) in the lower, front part of your neck. The thyroid is shaped like a butterfly. It has two lobes, right and left, with a thin piece of tissue that connects the lobes. This thin tissue is called the isthmus.

The thyroid can often be felt just below your Adam's apple on either side of the trachea. Parathyroid glands are small glands that are found in the neck near the thyroid. These glands control the amount of calcium in your bloodstream. **See Figure 1.**

How it works

Glands are organs that make fluids or hormones. The thyroid gland makes thyroid hormones. Hormones are chemicals in the body that activate cells or organs. The thyroid uses a mineral from your diet called iodine to produce these hormones. Certain foods and iodized salt contain iodine.

The thyroid contains several different kind of cells that make more than one hormone. The thyroid makes two other main hormones known as:

- T4 (thyroxine)
- T3 (triiodothyronine)

These hormones control your body temperature, blood pressure, heart rate, and metabolism (how fast food becomes fuel for your body), and many other body functions. These hormones are made by the follicular cells.

The thyroid also makes calcitonin, which has a small effect on how much calcium you have in your blood. Calcitonin is made by C cells. The follicular and the C cells that make these hormones can become cancer. Thus, the thyroid gland has different cancers that can develop.

Cancer basics

Cancer is a disease that starts in the cells of your body. Cells are the building blocks of tissue in the body. The human body contains trillions of cells. DNA (deoxyribonucleic acid) is found within each cell and controls the cells, instructing them on what to do. The coded instructions for your cells found in DNA are called genes. These instructions are the genetic code that tells cells what to become (eg, heart, lung, thyroid) and what to do (eg, pump blood, absorb oxygen, make hormones).

Normal cells grow and divide and repeat the process over and over again. Normal genes tell cells that they are supposed to die when they become old or damaged. If they don't die, and new cells start to form, this growth can get out of control. Abnormal out-of-control growth can be caused by a problem with the genes, and can lead to the growth of a solid mass of cells called a tumor. Some tumors are malignant (cancer). Solid tumors can grow anywhere in the body and can affect the way the body works. **See Figure 2.**

Figure 1 The thyroid and parathyroid glands

The thyroid is a gland in the lower, front part of your neck. The thyroid is shaped like a butterfly. The parathyroid glands are small glands that are found in the neck near the thyroid.

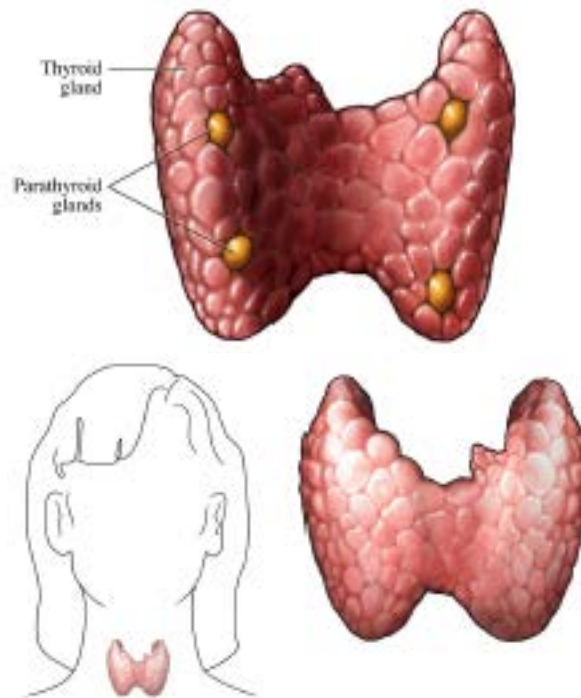


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Figure 2 Normal cell growth vs. cancer cell growth

Normal cells increase in number when they are needed and die when old or damaged. In contrast, cancer cells quickly make new cells and live longer because of abnormal changes in genes.

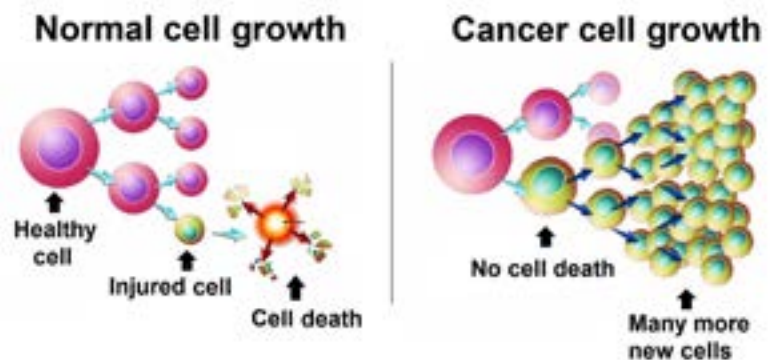


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Normal cells typically stay in one location in the body. Cancer cells can escape from where they started and move to other parts of the body. This process is called metastasis. Cancer cells can travel to distant parts of the body through the blood or lymphatic system. When cancer cells settle into new places in the body they can replace or damage healthy cells.

Thyroid cancer

About 60,000 people a year will be diagnosed with thyroid cancer in the United States. Statistics show that more women than men are diagnosed with thyroid cancer. It is the 4th most common cancer type found in women.

How this cancer starts

In general, cancer is named after the place where it starts in the body, and keeps the same name even if it happens to spread. Thyroid cancer, therefore, starts in the cells of the thyroid gland.

A biopsy can confirm a diagnosis of cancer. A sample of fluid or tissue is taken during a biopsy and examined under a microscope. Since there are different cells in the thyroid, there are different cell types of thyroid cancer, which grow and behave differently in the body.

Your doctor can test for the cell type of thyroid cancer. This is known as histology. Histology is an important piece of a cancer diagnosis and helps your doctors determine how to treat the cancer. A pathologist will classify the cell type based on the size, shape, and structure of the cells. A pathologist is a doctor who is an expert in examining cells and tissue to find disease.

The cell types for thyroid cancer are:

- Papillary, follicular, or Hürthle cell (all differentiated)
- Anaplastic (undifferentiated)
- Medullary

Differentiated cells look similar to normal cells when examined under a microscope. The most common type of differentiated thyroid cancer is papillary. Papillary thyroid cancer is usually very easy to diagnose through a needle biopsy. Further lab tests, an additional biopsy, or surgery may be needed to check for follicular and Hürthle cell carcinoma. Hürthle cell cancer is uncommon and can be difficult to diagnose. Papillary, follicular, and Hürthle cell cancers all come from the same type of cell in the thyroid, the follicular cell. These three types of thyroid cancer usually grow and spread slowly.

In contrast, undifferentiated cells look very different from normal cells under a microscope. Thyroid cancer with anaplastic cells is undifferentiated and can grow and spread quickly.

Medullary is a type of thyroid cancer that comes from the parafollicular cells, or C cells of the thyroid that make calcitonin. Some people with medullary thyroid cancer may have other family members who were diagnosed with this type of thyroid cancer.

Your treatment team will consider your treatment options based on your histology and stage (extent of cancer in your body). Doctors use the histology to decide on the treatment for thyroid cancer. To learn more about treatment options, see the treatment guides in Parts 5 through 7 for each type of thyroid cancer.

Thyroid nodules

Once you know about thyroid cancer, it is helpful to know about thyroid nodules. Nodules are small, often round areas of abnormal tissue. Most nodules are not cancer (benign) but some may be cancer (malignant). People can have one thyroid nodule or more than one at a time. The nodules can vary in size. If the nodules are small, they usually can't be felt or seen on exam.

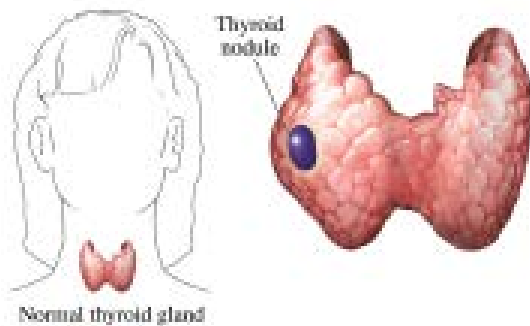


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Most thyroid nodules do not cause any symptoms. If the nodules are large, they may be found by a doctor or you while examining your neck. Many nodules are found while getting an examination for another reason such as a CT (computed tomography) scan or carotid ultrasound (heart ultrasound). Sometimes an abnormal value is found while doing a routine blood test. If any thyroid-related hormones or other values are out of range, your doctor will order more blood tests or imaging tests (for example, an ultrasound) to further check your health.

Risk factors

Anything that increases your chances of having cancer is called a risk factor. Certain risk factors can be seen with this cancer type. Risk factors can be activities that people do, things in the environment, or traits passed from parents to children through genes. Genes are coded instructions for your cells.

A process called mutation is when something goes wrong in the genetic code. Mutations can be passed on from a parent and present before you are born (inherited), or they can be caused by genetic damage (acquired) that occurs later in life. People with inherited genetic mutations have a higher risk for certain cancers, but that doesn't mean they will definitely develop cancer. Only a small number of cancers are a result of inherited mutations.

About 1 in 100 people have a lifetime risk for developing thyroid cancer in the United States. Doctors are not completely sure what causes thyroid cancer, but are aware of certain risk factors. Ask your doctor or nurse to explain the possible risk factors for thyroid cancer. [See Guide 1.](#)

Guide 1. Risk Factors

Risk Factors

- History of contact with radiation in the head and neck area
- History of elevated TSH
- Obesity
- Family history of thyroid cancer
- Personal or family history of a syndrome related to developing thyroid cancer

People at risk

Thyroid cancer is more likely to occur in women than men. You can be diagnosed with thyroid cancer at any age. The number of people diagnosed with thyroid cancer increases at age 50. People who received radiation treatment to the head and neck area at a young age are at risk for thyroid cancer. This increases the risk of developing thyroid cancer later in life. Contact with ionizing radiation is the only thing in the environment known to cause thyroid cancer. Obesity is also a risk factor for thyroid cancer.

Having more than one first-degree relative (mom, dad, sibling, or child) with thyroid cancer puts you at risk of developing thyroid cancer. Certain inherited diseases are considered risk factors for thyroid cancer. This includes FAP (**f**amilial **a**denomatous **p**olyposis) that causes benign growths (polyps) in the large intestine (colon). FAP puts someone at risk for colon cancer and other cancers like papillary thyroid cancer. Other inherited diseases involving the thyroid like Carney complex, Cowden's syndrome, and MEN (**m**ultiple **e**ndocrine **n**eoplasia) types 2A or 2B can put someone at risk for thyroid cancer. These inherited diseases can cause tumors (abnormal masses of cells) to form. You will learn more about treatment options for inherited medullary thyroid cancer in Part 7.

Symptoms

Doctors need to assess your health and learn about your symptoms. Keep in mind, symptoms of thyroid cancer may be similar to those of other medical conditions. Some people with thyroid cancer may have only one symptom, others may have many, and many people may have no symptoms at all. [See Guide 2.](#)

Your doctor may want to check for thyroid cancer when he or she finds a nodule in the neck or thyroid. He or she may also consider thyroid cancer based on symptoms you share or findings on an imaging test obtained for some other condition. Currently, there is no screening test for thyroid cancer. Screening is when tests are done on a regular basis to detect a disease in someone without symptoms.

It is important to tell your doctor how you are feeling during your visit or call if you have any symptoms. Ask what tests you will have and why they are being done. If your doctor suspects thyroid cancer, he or she will check your neck and order tests to get more information about your health. If needed, your doctor can order an FNA (**f**ine-**n**eedle **a**spiration) biopsy to further assess for thyroid cancer.

Guide 2. Symptoms

Symptoms

- Lump or nodule in the neck
- Neck pain
- Voice change
- Trouble breathing
- Problems swallowing
- Abnormal blood tests

2

Testing for thyroid cancer

15 Medical history and physical exam

15 Blood tests

17 Imaging tests

18 Biopsy

19 Test results

22 Review



Part 2 discusses tests used to diagnose thyroid cancer. Doctors will test your blood and tissue samples to confirm a diagnosis of cancer. The test results will help your doctors and you decide on a treatment plan.

Medical history and physical exam

Two basic tools of diagnosis are when your doctor takes your medical history and does an exam of your body. Your doctor will ask about your medical history, which should include everything that has ever happened to you related to your health.

Your doctor will ask you about:

- Health events in your life including surgeries, accidents, and past illnesses
- Recent sickness
- Medications you are taking now and those you may be allergic to
 - It is helpful to keep a list of your meds. Include any supplements and over-the-counter medicine you take.
- Family history of disease such as cancer, heart disease, or diabetes

When the doctor checks your body for signs of disease, it is called a physical exam. Doctors often perform a physical exam along with taking a medical history.

Your doctor will check your:

- Eyes, ears, nose, and neck
- Lungs, heart, and belly (abdomen)
- Body by feeling and using pressure to see if organs are of normal size, soft or hard, or cause pain when touched

Blood tests

Blood tests can be done for many reasons including during a routine visit. The results will give the doctor a picture of what is going on in your body. He or she may learn about an unknown disease in the body that has no symptoms, or check for disease like cancer. Blood tests give your doctors information to plan the next steps for other testing or treatment. Blood tests for thyroid cancer may include:

Complete blood count with differential

One of the most common blood tests is the CBC (complete blood count). The CBC is a measure of the various types of cells found in the blood. This test checks the number of white blood cells (fight infection), red blood cells (carry oxygen), and platelets (form blood clots). These numbers are then compared to the normal range for those cells in a healthy person who is about your age. The CBC does not tell doctors if you have thyroid cancer.

Comprehensive metabolic panel

Proteins, electrolytes, and other substances in your blood come from your liver, bone, and other organs. A comprehensive metabolic panel often includes tests for up to 14 of these. The tests show if the levels of proteins or electrolytes are too low or high. Abnormal levels can be caused by cancer or other health problems. These tests will allow your doctor to assess if the kidneys and liver are functioning well.

TSH

A blood test to check the TSH (thyroid-stimulating hormone) is recommended when a thyroid nodule is present. Your doctor may also check this level during a routine blood test. This hormone is made by the pituitary gland. This gland is found near the base of your brain and its purpose is to regulate the thyroid.

TSH tells the thyroid to make hormones that control things like your metabolism. In general, when the TSH is high it usually means that the thyroid levels are low. Likewise, when the TSH is low, it usually means that the thyroid levels are high.

If the TSH level is normal or high, your doctor may suggest further testing of a nodule. This includes an FNA biopsy. TSH is not used to diagnose thyroid cancer. This level can be low or high because of other thyroid disease. When TSH is tested along with an ultrasound, your doctor can review the results and decide which tests may be done next.

Thyroglobulin

Tg (thyroglobulin) is made by the thyroid. It is a protein that can be measured after treatment (surgery) and during follow-up care. If the protein is present, there may still be cancer cells in the body. If it becomes elevated, this could be a sign that the cancer is coming back and more treatment is needed.

Tg antibodies can be found in a small amount of people with thyroid cancer. Antibodies are made by plasma cells (a type of white blood cell) and in this case, they respond to thyroglobulin. They are called anti-Tg antibodies. These antibodies are found in the blood and can interfere with the Tg level. If the anti-Tg antibody goes from positive to negative this may be a sign that treatment is working. If it increases, this can be a cause for concern.

Further testing should be done to check for a recurrence. A recurrence means the cancer came back.

CEA

A tumor marker known as CEA (carcinoembryonic antigen) can also be found in the blood of people with medullary thyroid cancer. CEA is a protein and may be measured at diagnosis and after treatment. Doctors know this level can be high because of other conditions, so this test is not used alone for a diagnosis.

Calcitonin

The C cells in the thyroid make calcitonin. Medullary thyroid cancer starts in the C cells. If you are at risk for medullary thyroid cancer, you may have your calcitonin level checked. It can also be measured after treatment for medullary thyroid cancer. Calcitonin may affect how calcium is made in the body. Your calcium level may be checked along with calcitonin.

Your medical records:

- ✓ Your doctors will order tests and schedule visits to talk about your care plan.
- ✓ It is helpful to keep track of your test results at all times. Ask your doctors questions about the results.

Imaging tests

Imaging tests are used to take pictures (images) of the inside of your body. Your doctor will want to check the thyroid and central neck area. Imaging can be used to see if there is cancer in the body. These tests can see if the cancer is in more than one area. Imaging tests may also be done during or after treatment to see how the body is responding. Ultrasound is the most common imaging test used for thyroid cancer. [See Guide 3.](#)

An ultrasound is a test that uses sound waves to take pictures of the inside of the body. During this test, you will be asked to lie on a table or sit in a chair. A hand-held device will be used called an ultrasound probe. A gel will be put on the skin. The probe will then be moved back and forth over the skin. It will send sound waves to tissues and organs. Echoes will bounce off the tissues and organs, and this is what will form pictures on the screen.

These pictures will allow your doctors to assess the size, shape, contents, and place of a nodule. An ultrasound of the thyroid and neck is not painful. It usually takes 10 to 30 minutes to complete. A health professional or your doctor will do the test and review the results.

Although ultrasound is the most common imaging test, CT scan, PET (**positron emission tomography**) scan, and MRI (**magnetic resonance imaging**) are imaging tests that might be done in certain situations. A PET/CT (**positron emission tomography/computed tomography**) with a radiotracer called FDG (**18F-fluorodeoxyglucose**) is a recommended imaging test for more aggressive thyroid cancers such as poorly differentiated cancer or anaplastic thyroid cancer. FDG is made of fluoride and sugar (glucose). Cancer cells use more FDG than normal cells, so they show up as bright spots on the PET scan pictures. [See Guide 3.](#)

Guide 3. Imaging tests

Imaging test	What is your doctor checking?
Ultrasound - high-energy sound waves to make pictures.	<ul style="list-style-type: none"> Your thyroid, neck, and lymph nodes in that area
Radioiodine scan (also known as RAI imaging or 131I imaging) - radiotracer allows a camera to detect if the thyroid or thyroid cancer cells in the body take up radioiodine.	<ul style="list-style-type: none"> Your thyroid Your whole body after thyroid surgery to see if any thyroid cancer cells remain
MRI (magnetic resonance imaging) scan - radio waves and strong magnets to make detailed pictures.	<ul style="list-style-type: none"> Your neck or other areas of the body like the liver
CT (computed tomography) scan - x-rays are done to take pictures from many angles.	<ul style="list-style-type: none"> Your neck Your chest, abdomen, and pelvis <ul style="list-style-type: none"> You can get dye (contrast material) for this type of scan
PET (positron emission tomography) scan - a tracer detects disease and takes 3-D pictures.	<ul style="list-style-type: none"> How your body is working Can be combined with CT scan for more detailed images

Biopsy

Tissue or fluid must be removed from your body and tested to diagnose cancer. A biopsy removes samples of fluid or tissue. Sometimes a sample of tissue from the biopsy does not have enough cells to check for cancer. It can be abnormal but not cancer. If this happens, you may have another biopsy. Your doctor may also consider surgery to remove the whole thyroid lobe (about half of the thyroid).

If needed, a small sample of tissue from a lymph node or organ is removed by incisional biopsy, core needle biopsy, or FNA. An FNA is a type of biopsy that uses a thin needle to take small samples of suspicious tissue. During an FNA of the thyroid or lymph nodes, doctors usually do an ultrasound. The sample is then sent for testing in a lab. FNA is the recommended form of biopsy to assess abnormal thyroid nodules.

FNA is the next step in testing if you have normal or higher than normal levels of TSH and either:

- Abnormal findings on an ultrasound

or

- Other possible signs of cancer

Nodules smaller than 1 cm usually do not require an FNA. You may have more ultrasounds later on to assess these smaller nodules for growth. If the nodules grow, you may need an FNA biopsy.

Your doctor will want to watch the nodules closely to see if there is any change over time. If you have a very low TSH, you may not need an FNA because this might be a situation where the chance of cancer is very low.

Pathology review

The biopsy samples will be sent to a pathologist. A pathologist is a doctor who's an expert in examining cells to find disease. He or she will look at the size, shape, type, and specific features of the cells. Sometimes the results are not clear. Types like follicular and Hürthle cell thyroid cancer can be difficult to diagnose. More testing or surgery may be needed.

Sometimes there is not enough of the sample to confirm cancer. The results could also come back as AUS (atypia of undetermined significance) or FLUS (follicular lesion of undetermined significance). This means the results are not showing whether or not it is cancer. Thus, more testing may be needed. Molecular testing is being used in many of these situations.

Your doctors may look for genetic mutations such as BRAF V600E, RET/PTC, RAS, or PAX8/PPAR (peroxisome proliferator-activated receptors) gamma. These mutations can be seen with certain types of thyroid cancers.

The results of the lab tests, including those described next, are recorded in a pathology report. It's a good idea to get a copy of your pathology report. It may take a few days to get a copy. Your doctors will use the results to plan further testing and your treatment.

Some people also consider a 2nd opinion when it comes to pathology results. A 2nd opinion involves having another pathologist review your results to assist or confirm a diagnosis. It may be helpful to consider this after a second FNA or another biopsy like a core needle biopsy. A core needle biopsy may be done if there is a concern for anaplastic thyroid cancer.

Test results

The results from your TSH, ultrasound, and FNA will determine your next steps of cancer care. Tests may happen while a nodule is being watched for change. They can continue during treatment and after treatment is over. Blood tests may be done more often. Imaging tests will be done at a certain time.

Doctors can use NCCN treatment guidelines to make a care plan. This plan is then based on recommendations from science and the experience of NCCN experts. Ask your doctors for more information when it comes to having a biopsy and pathology review.



Thyroid cancer changed my life.

- Karen

Finding thyroid nodules

Thyroid nodules may only be seen on an imaging test like an ultrasound. Most often thyroid nodules are not cancer. If a nodule is found, it is recommended that 2 tests be done:

- Blood test for the TSH level
- Ultrasound of the thyroid and neck

TSH controls the hormones made by the thyroid and may be normal or abnormal for people with thyroid cancer. If the TSH is low (which may indicate hyperthyroidism), your doctor may order a radioiodine imaging uptake test.

You will be given a small amount of radioactive iodine about 3 to 6 hours before a scan of the thyroid. The test itself only takes about 10 minutes. It will show how much of the thyroid takes up iodine. Too much or too little could indicate other thyroid problems, like hyperthyroidism (overactive thyroid) or hypothyroidism (underactive thyroid).

A radioiodine imaging test could find that the thyroid nodule is autonomously functioning. This means it is functioning on its own without the need for TSH. This is also sometimes called a “hot nodule.” If the nodule is “hot” it most likely is not cancer. You may have an FNA if the nodule is hypofunctional (low functioning) or “cold.”

If the nodule is most likely not cancer, it may be followed by an ultrasound in 6 to 12 months. If no change is seen, then you will have an ultrasound in 1 to 2 years, and if still no change then every 3 to 5 years after that. You may have an FNA with or without an ultrasound if the nodule is hypofunctional.

Guide 4. Ultrasounds results

Type of finding on ultrasound results		Will an FNA biopsy be done?
Solid nodule <ul style="list-style-type: none"> • With abnormal features • Without abnormal features 	→	Yes, when nodule is 1.0 cm or more
	→	Yes, when nodule is 1.5 cm or more
Mixed cystic-solid nodule (fluid & solid part) <ul style="list-style-type: none"> • With abnormal features • Without abnormal features 	→	Yes, with solid part more than 1.0 cm
	→	Yes, with solid part more than 1.5 cm
Spongiform (sponge-like) nodule	→	Yes, when nodule is 2.0 cm or more
Simple cyst (fluid-filled nodule)	→	No FNA (only treat cyst as needed)
Suspicious cervical lymph node	→	Yes, FNA of cervical lymph node with or without FNA of other thyroid nodule or nodules

The ultrasound will show if the nodule is solid or liquid. Your doctor can see the size and location. [See Guide 4](#). Thyroid nodules that are suspicious for cancer should be assessed further. Your doctors will look at certain features of nodules that could be a sign of cancer. These can include:

- Irregular borders
- Microcalcifications (small white dots in the nodule)
- Nodules that are more tall than wide
- Increased blood flow to the nodule

If there is a nodule on an imaging test, your doctor will decide whether or not you will need a biopsy. An FNA biopsy is used to test thyroid nodules. [See Guide 5](#).

An FNA biopsy can show if a nodule is fluid filled (cyst). FNA does not always show you if a thyroid nodule is cancer. More tests may be needed to confirm a diagnosis of cancer, especially for follicular and Hürthle cell thyroid cancer.

Guide 5. FNA results

FNA results	Details of the FNA results		Will I get treatment?
Thyroid cancer or Concern for thyroid cancer		Papillary or concern for papillary	→ Yes, treatment for papillary
		Medullary or concern for medullary	→ Yes, treatment for medullary
		Anaplastic or concern for anaplastic	→ Yes, treatment for anaplastic
Concern for follicular or Hürthle cell neoplasm	→	High concern for cancer or concern from imaging test	 Yes, consider removing lobe of thyroid or whole thyroid to check for cancer No, consider: • Removing lobe of thyroid for testing • Molecular testing (for follicular) • Observe, if risk is low for thyroid cancer
AUS/FLUS (atypia of undetermined significance/follicular lesion of undetermined significance)	→		 Yes, consider removing lobe of thyroid or whole thyroid to check for cancer No, consider: • Removing lobe of thyroid for testing • Molecular testing • Observe, if risk is low for thyroid cancer
Thyroid lymphoma (rare type of thyroid cancer)	→		Yes, see recommended treatment for non-Hodgkin's lymphoma
Insufficient biopsy (not enough of sample)		Cyst (fluid)	→ No, consider: • Ultrasound • FNA areas of concern again
		Solid nodule	→ Yes, consider removing nodule
Benign (not cancer)	→		• Observe • If nodule growth, do FNA or consider removing nodule

Before doing an FNA, things are considered like the size of the nodule, location, and features. Certain nodule features and your health history may alert a doctor to do more testing. You may not have an FNA for larger nodules in some cases. For example, nodules larger than 4 cm may involve surgery to remove a lobe of the thyroid or the whole thyroid. See Part 4 for more information on surgery.

Review

- ▶ Two basic tools of diagnosis are when your doctor takes your medical history and does an exam of your body.
- ▶ Blood tests give the doctor information to plan the next steps for other testing or treatment.
- ▶ Imaging tests are used to take pictures (images) of the inside of your body.
- ▶ Tissue or fluid must be removed from your body and tested to diagnose cancer. A biopsy removes samples of fluid or tissue.
- ▶ FNA is the recommended form of biopsy to assess abnormal thyroid nodules.
- ▶ TSH controls the hormones made by the thyroid and may be normal or abnormal for thyroid cancer.

3

Thyroid cancer stages and treatment planning

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25 Cancer stages

28 Treatment planning

28 Treatment and follow-up care

29 Review



Part 3 covers the stages of thyroid cancer. Each stage tells the extent of cancer in the body. This part of the book also introduces you to the treatment options for thyroid cancer. The cancer stage and type of thyroid cancer help your doctors and you make a treatment plan.

Treatment team

The next step of care involves a multidisciplinary team of experts who have experience treating thyroid cancer. Your treatment team of doctors may include an endocrinologist, radiologist, nuclear medicine doctor, surgeon, radiation oncologist, and medical oncologist.

Your treatment team will come together and decide on a treatment plan. This treatment plan will be based on the type of thyroid cancer, extent of cancer in your body, and your other health needs. A treatment plan is a written course of action that covers every stage of the treatment process.

Cancer stages

When it comes to thyroid cancer, your doctors want to know if the cancer is only in the thyroid or if it has gone beyond the thyroid into nearby or distant areas. Cancer can stay in its original place or spread to other areas in the body. When cancer spreads it is called metastatic disease. That is why the results of the blood tests, imaging tests, and biopsies are important. The results help doctors determine if and how far the cancer has spread.

The cancer stage is based on how much the cancer has grown and spread in the body. The AJCC (American Joint Committee on Cancer) staging system is the one most often used for thyroid cancer.

In this system, there are four cancer stages based on the growth and spread of the cancer. The different types of thyroid cancer have different staging systems.

These types include:

- Differentiated, which has papillary and follicular grouped together (separated by 45 years and younger, or 45 years and older).
- Hürthle cell grouped with follicular when it comes to staging and treatment.
- Medullary and anaplastic thyroid cancers each have their own staging.

To see details on the thyroid cancer stages, [see Guides 6 through 8](#) on pages 26 and 27.

Once your doctors know more about your diagnosis and stage, they can talk to you about what to expect. Talking with your doctor about the type of thyroid cancer and cancer stage can help with treatment planning. Shared decision-making is a process in which you and your doctors plan treatment together. Shared decision-making is an important part of your care. This communication between doctor and patient can help you decide what care is best for you.

Helpful tips:

- ✓ Keep a list of contact information of all of your health care providers.
- ✓ Ask a caregiver to help you plan your appointments.
- ✓ Use a calendar or day planner to keep track of your appointments.

Guide 6. Papillary and follicular thyroid cancer stages

Age – younger than 45 years

Stage	Details of that stage
I	<ul style="list-style-type: none"> • Tumor of any size and cancer may have spread to nearby tissue or lymph nodes
II	<ul style="list-style-type: none"> • Tumor of any size and cancer has spread to distant parts of the body

Age – 45 years and older

Stage	Details of that stage
I	<ul style="list-style-type: none"> • Tumor is only in the thyroid and 2 cm or smaller
II	<ul style="list-style-type: none"> • Tumor is only in the thyroid and larger than 2 cm but smaller than 4 cm
III	<ul style="list-style-type: none"> • Tumor is only in the thyroid and 4 cm or larger • Tumor is of any size and cancer spread to nearby tissue (not lymph nodes) • Tumor is of any size and cancer spread to nearby tissue or lymph nodes in the neck near the trachea (windpipe) or larynx (voice box)
IVA	<ul style="list-style-type: none"> • Tumor of any size and cancer has spread to nearby tissue in the neck or spread to nerves that lead to the larynx, and possibly nearby lymph nodes • Tumor of any size that has spread to nearby tissue and lymph nodes in the neck or those in the upper chest
IVB	<ul style="list-style-type: none"> • Cancer has spread to tissue near the spinal column or large blood vessels in the chest • Cancer may have spread to the lymph nodes
IVC	<ul style="list-style-type: none"> • Tumor of any size and cancer has spread to distant parts of the body and may have spread to the lymph nodes

Guide 7. Medullary thyroid cancer stages

Stage	Details of that stage
I	<ul style="list-style-type: none"> Tumor only in the thyroid and 2 cm or smaller
II	<ul style="list-style-type: none"> Tumor only in the thyroid and larger than 2 cm but smaller than 4 cm Tumor of any size and cancer has spread to nearby tissue (not lymph nodes)
III	<ul style="list-style-type: none"> Tumor of any size and cancer has spread to lymph nodes in the neck near the trachea (windpipe) or larynx (voice box), and may have spread to nearby tissue
IVA	<ul style="list-style-type: none"> Tumor of any size and cancer has spread to nearby tissue in the neck or spread to nerves that lead to the larynx, and possibly nearby lymph nodes Tumor of any size that has spread to nearby tissue and lymph nodes in the neck or those in the upper chest
IVB	<ul style="list-style-type: none"> Cancer has spread to tissue near the spinal column or large blood vessels in the chest Cancer may have spread to the lymph nodes
IVC	<ul style="list-style-type: none"> Tumor of any size and cancer has spread to distant parts of the body, and may have spread to the lymph nodes

Guide 8. Anaplastic thyroid cancer stages

This type is considered stage IV at diagnosis

Stage	Details of that stage
IVA	<ul style="list-style-type: none"> Tumor only in the thyroid and cancer may have spread to the lymph nodes
IVB	<ul style="list-style-type: none"> Tumor has grown outside the thyroid and may have spread to the lymph nodes
IVC	<ul style="list-style-type: none"> Cancer has spread to distant parts of the body and may have spread to the lymph nodes

Treatment planning

Before treatment, you may have more tests or ones you did not have when your doctor first checked for cancer. These tests may include an ultrasound of the thyroid, along with the front and sides of the neck to check for abnormal lymph nodes. Other imaging tests may include a CT or MRI of nodules that require further testing. This might be a nodule attached to a structure (fixed), large (bulky), or growing down towards the chest area (substernal). Cancer can sometimes harm the vocal cords, so this may be checked as well.

Your doctor might order these tests either before or after thyroid cancer is confirmed. You will then move on to primary treatment once the tests are complete and your doctor can review your results.

Treatment and follow-up care

The first treatment options are called primary treatment. This is the first treatment in line when it comes to your treatment plan. Further treatment may be needed after primary treatment. Primary treatment is usually surgery for thyroid cancer. As always, a clinical trial is a treatment option.

When your treatment is finished, testing will be done to check treatment results. Blood samples are drawn for testing. This includes checking TSH, Tg, and anti-Tg antibody levels. They should be low or negative after treatment. Imaging tests are also frequently used. Ultrasound is the most commonly used imaging test. Other imaging tests may include whole body radioiodine imaging and CT of the chest. Your doctor will also check if you show any symptoms or signs of thyroid cancer.

Surveillance and maintenance

After primary treatment, your doctor will assess your situation and decide if you need more treatment or if you should just be watched closely. Keep in mind, you will be watched closely by your treatment team whether you start treatment right away or not.

Surveillance includes seeing your doctors for physical examination, blood tests, and imaging studies. Other follow-up tests may also be done after treatment ends to look for new tumors or the return of cancer. It may be that some people only need primary treatment and then move to surveillance and maintenance after surgery. Some people have surgery followed by other treatments like radioactive iodine, or occasionally, radiation therapy.

If you need more treatment, your doctor will plan your next treatment based on many factors. Further treatment depends on the type of thyroid cancer and if there is thought to be any remaining disease after primary treatment.

Next steps

Follow-up care is needed after any cancer treatment is finished. Follow-up care includes a medical history, physical exam, blood tests, and imaging tests. During this time, you will have more than one doctor's visit to monitor your health. If the cancer re-appears, a biopsy may be done to confirm there is cancer. If cancer is present, your doctor may try the treatment options listed in this part of the book or recommend a clinical trial.

Your doctor will base your next treatment on many factors. The decision is based on things specific to you and the characteristics of the tumor. Your next steps also depend on whether the cancer is gone, stable, or growing.

Prognostic factors

Your prognosis should be something that comes up when discussing plans with your doctor. A prognostic factor is something that affects or helps predict the likely outcome of a disease. It is a prediction that is based on many factors. A doctor considers your personal traits like age, test results, and extent of cancer when talking about survival (your prognosis). For thyroid cancer, things like age, tumor type, and cancer stage play an important role in prognosis. Prognosis may be better for those patients younger than age 40 years. Thyroid cancer also tends to be slightly more aggressive in men but prognosis is similar to women.

When cancer is diagnosed very late or keeps progressing despite all treatment efforts, it may be time to set some new goals. Fortunately, in thyroid cancer this is uncommon. If it becomes clear that cure is not possible, treatment becomes about symptom relief and making the most of your time.

Sometimes a doctor may introduce hospice care as an option. Hospice care may be started because you aren't interested in more cancer treatment, no other cancer treatment is available, or you may be too sick for cancer treatment. Hospice care allows you to have the best quality of life possible. It includes both physical and emotional care for people who are close to the end of life. Care is given all day, every day of the week. You can choose to have hospice care at home or at a hospice center.

Review

- ▶ Your treatment team of doctors may include an endocrinologist, radiologist, nuclear medicine doctor, surgeon, radiation oncologist, and medical oncologist.
- ▶ When it comes to thyroid cancer, your doctors want to know if the cancer is only in the thyroid or if it has gone beyond the thyroid into nearby or distant areas.
- ▶ The cancer stage is based on how much the cancer has grown and spread in the body.
- ▶ The first treatment option is called primary treatment and is usually surgery.
- ▶ Follow-up care is needed after any cancer treatment is finished.
- ▶ For thyroid cancer, things like age, tumor type, and cancer stage play an important role in prognosis.



It may not always be life-threatening but it is always life-altering and a lifelong journey.

- Evelyn

4

Overview of cancer treatments

- 31 Surgery
- 32 Radioactive iodine
- 33 Radiation therapy
- 34 Thyroid hormone replacement therapy
- 34 Chemotherapy
- 35 Targeted therapy
- 36 Clinical trials
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It is helpful to learn all you can about treatment. Ask your doctor which options you have. Part 4 will discuss different treatment types for thyroid cancer. Surgery is the main treatment for thyroid cancer.

Surgery

Surgery is the main treatment for thyroid cancer. Typically, either a lobe of the thyroid gland (thyroid lobectomy) or the whole thyroid (total thyroidectomy) will be performed with or without removal of neck lymph nodes. This depends on the type of thyroid cancer, size of the cancer, location of disease, and if you are able to have surgery. Surgery may follow an FNA biopsy that had unclear results. It is the primary treatment in almost all cases. Primary treatment is the first treatment used to rid your body of cancer.

Surgical treatment is recommended for most types of thyroid cancer. It may not be an option for some people with anaplastic thyroid cancer, due to the extent of disease. The type of doctor that performs surgery is called a surgeon. He or she is a specialist in the field of surgery. Thus, it is important that the surgeon has experience with thyroid surgery and performs it frequently.

Lobectomy

A thyroid lobectomy removes one lobe of the thyroid (about half of the thyroid gland), which contains the nodule. The isthmus is usually removed, too. You may have a lobectomy after an FNA that did not have clear results. This type of surgery is usually done for smaller papillary and follicular types of thyroid cancer.

Total thyroidectomy

A total thyroidectomy involves removing the whole thyroid gland. The surgery itself generally takes 1 to 3 hours. You will be placed under general anesthesia. An incision will be made in the front of your neck for removal of the thyroid. It is helpful to ask your doctor for more information about the surgery itself and what you can expect.

Keep in mind, other treatment may be given soon after this surgery. The hope is to treat any cancer cells that could remain after surgery. Other treatment like radioactive iodine therapy (see page 32) may be given for papillary and follicular thyroid cancers. After treatment, you will take hormone pills to replace the hormones made by the thyroid.

Sometimes lymph nodes are also removed if they are cancerous or are a concern for cancer. This is called a neck dissection. A neck dissection may be done with the goal to treat or relieve symptoms caused by the lymph nodes. This surgery can remove lymph nodes on the same side as the thyroid nodule (ipsilateral), opposite side of the nodule (contralateral), or both sides of the neck (bilateral). Other tissue, besides lymph nodes, in the neck may also be removed during a neck dissection.

Any treatment can have side effects. Side effects happen when healthy tissue is damaged during treatment. Some people have one side effect, others have more than one, and others have none at all.

Possible side effects of thyroid surgery may include:

- Hypoparathyroidism (low levels of calcium in the blood)
- Damage to the nerves that lead to the voice box, which control your voice and swallowing

Not all the side effects of surgery are listed here. With any surgery, there is risk of infection, bleeding, or pain. Your treatment team can give you a complete list of side effects.

After surgery, you will stay in the hospital for a couple of days and then be discharged to home. It is important that you follow your doctor's orders when it comes to healing. Call your doctor or nurse if you have any side effects, especially if they continue, get worse, or come on suddenly.

Plan and schedule your follow-up appointments so your doctor knows how you are feeling. He or she will tell you when you can return to your normal activities. Ask your doctor about your next steps of care.

Radioactive iodine

Many cancers that come from the thyroid gland take up iodine in your body. Papillary and follicular cancers usually "eat" iodine and use it in the cancer cells. Thus, RAI (radioactive iodine) can be given as treatment. The cancer cells that eat enough radioactive iodine are killed by the radiation. This treatment is also known as ^{131}I or ^{131}I ablation. If this is the case, this type of treatment may be an option. RAI is given as a treatment for papillary and follicular thyroid cancer. RAI may not work for Hürthle cell cancer. RAI does not work for medullary or anaplastic thyroid cancer.

Radioactive iodine treatment will target the thyroid cancer cells in the neck. It will also go after those cells that have moved from the thyroid to other areas of the body. The doses are higher with this treatment than those given during a radioactive imaging scan. The goal is to treat only the thyroid cells and avoid harming your healthy tissue. RAI is usually given after thyroid cancer surgery.

RAI is not effective to destroy the cancer without first having a surgeon remove the thyroid gland and cancer that can be surgically removed. Radioactive iodine treatment is effective when used for two reasons: 1) to get rid of any remaining thyroid tissue; and 2) to destroy any thyroid cancer cells that remain after surgery (adjuvant therapy).

RAI therapy comes in liquid or pill form and is taken by mouth. You may be asked to eat a diet low in iodine for 1 to 2 weeks before getting this treatment. This type of treatment works best when the TSH level is high and Tg is present. Hormone injections may be given to increase the TSH several days before giving RAI. This treatment is typically given if thyroid cancer is growing beyond the thyroid, the main tumor is more than 4 cm, and Tg is 5 to 10 ng/mL.

RAI therapy is recommended for those at higher risk for the cancer to come back, such as some cancers of smaller size with extension outside the thyroid gland (1–4 cm), or cancer in the lymph nodes. Your doctor will gather information and decide if RAI is an option for you. If your doctor and you decide RAI will follow surgery, here are some side effects that may occur:

- Swollen neck
- Neck pain
- Nausea and vomiting
- Dry mouth or eyes
- Abnormal tearing
- Change in taste or smell
- RAI can affect both a man and woman's reproductive system

If you have a CT scan with contrast, it can delay the start of treatment with RAI therapy. Your doctor will consider this when planning your care. A CT may be necessary to see more of the neck or chest area to check for disease.

The radiation itself will exit your body through urine and other body fluids. Thus, your body will give off small amounts of radiation after treatment. For a short period, you may need to take special safety measures around other people, especially children or pregnant women. Ask your doctor to share a complete list of instructions on your care before, during, and after RAI therapy.

Radiation therapy

Radiation therapy uses high-energy rays to treat cancer. The rays damage a cell's instructions for making and controlling cells. This either kills the cancer cells or stops new cancer cells from being made. Radiation can also harm normal cells and cause side effects.

External beam radiation is sometimes given to treat medullary and almost always given to treat anaplastic thyroid cancer. Radiation may also be given when the cancer does not respond to RAI therapy, if it cannot be completely surgically removed.

Two ways radiation is given for thyroid cancer include:

- EBRT (**e**xternal **b**eam **r**adiation **t**herapy) is given using a machine outside the body.
- IMRT (**i**ntensity-**m**odulated **r**adiation **t**herapy) involves giving smaller doses of radiation for a few weeks with x-ray beams of different strengths based on the thickness of the tumor.

Radiation therapy plan and schedule

Before beginning radiation therapy, pictures of the cancer in your body will be taken with a CT scan using contrast. This process is called simulation. Your radiation oncologist will use the pictures to decide the radiation dose and to shape the radiation beams. Beams are shaped with computer software and hardware added to the radiation machine. PET scans may also be used for radiation treatment planning (simulation).

Your treatment team will decide the best time to have radiation therapy after surgery. During radiation treatment, you will lie on a table in the same position as done during simulation. Devices may be used to keep you from moving so that the radiation targets the tumor. Likewise, methods may be applied to control breathing.

You will be alone while the technician operates the radiation machine from a nearby room. He or she will be able to see, hear, and speak with you at all times. As treatment is given, you may hear noises. One treatment session can take between 30 to 60 minutes. You will likely have 5 sessions a week.

Radiation may also relieve symptoms caused by cancer. For thyroid cancer that has spread, this could include difficulty or pain swallowing, loss of your voice, or pain or stiffness in your neck. It is helpful to ask your radiation treatment team for a complete list of side effects and care instructions.

Common side effects of radiation to the neck area may include:

- Skin rash or redness
- Problems swallowing
- Dry mouth
- Extreme tiredness (fatigue)

Thyroid hormone replacement therapy

After a thyroidectomy, you will need to replace the hormones made by the thyroid. Drugs can be given to replace the thyroid hormones that your body needs in order to function. A replacement hormone is needed to control your metabolism and keep your TSH low. If thyroid hormones are too low in your blood stream, this signals the pituitary gland to make more TSH. If the TSH is high, this may cause thyroid cancer cells to grow, or for thyroid cancer to come back. When thyroid cancer returns, it is called a recurrence.

Doctors recommend levothyroxine to keep your TSH in the low normal range. Levothyroxine is a thyroid hormone. It is a common treatment for thyroid cancer, hypothyroidism (not enough thyroid hormone), and an enlarged thyroid (goiter). It comes in pill form and is taken by mouth once a day. Giving enough levothyroxine to keep your TSH low is called "TSH suppression." TSH suppression is especially useful for papillary, follicular, or Hürthle cell thyroid cancer. You may also need to take a calcium and vitamin D supplement.

Common side effects of levothyroxine may include:

- Weight loss
- Sweating
- Anxiety
- Trouble sleeping

Your doctor or pharmacist can share a full list of side effects with you. When given in excess, this drug can affect bone density (bone strength), cause heart rhythm problems, and cause thyrotoxicosis (condition caused by too much thyroid hormone).

Your doctor needs to consider the benefits and risks before deciding how much levothyroxine you should take. Your doctor will also monitor you closely to find out what dose of hormones you need. Thyroid hormone replacement therapy is needed for life so you will have regular blood tests to check your TSH and hormone levels. If you take thyroid replacement hormone therapy, ask your doctor or nurse to go over the dose and schedule.



The right dosage of thyroid hormone replacement is critical to decent quality of life for thyroid cancer patients who have their thyroid removed.

- Peter

Chemotherapy

Chemotherapy, or chemo, is a main systemic cancer treatment. Systemic treatment travels throughout the body to treat or control areas of cancer. Chemotherapy, or "chemo," includes drugs that disrupt the life cycle of cancer cells. Some damage DNA directly; others get in the way of processes that help cancer cells build DNA.

Most chemotherapy drugs are given as liquids that are slowly injected into a vein. Some chemotherapy is in the form of pills that are swallowed. Chemotherapy may consist of one or more drugs. When only one drug is used, it is called a single agent.

Chemotherapy is usually given to people with anaplastic thyroid cancer, but is used for other types of cancers only in very rare cases. For anaplastic thyroid cancer, chemotherapy drugs like paclitaxel or doxorubicin may be given alone. Combinations of chemotherapy drugs for anaplastic thyroid cancer may include paclitaxel and carboplatin, or docetaxel and doxorubicin.

When chemotherapy is combined with radiation treatment it is called chemoradiation. It is usually not used to treat other types of thyroid cancer. Chemotherapy may also be used to treat thyroid cancer that is not responding to other treatment. Since it is systemic, it may be used to treat cancer that has spread to distant areas of the body.

A side effect is when the cancer treatment harms the healthy tissue in your body. Chemotherapy drugs attack fast-dividing cancer cells and can also damage normal cells that are dividing rapidly. Some people have many side effects, while others have a few or even none at all. Some side effects can be very serious while others can be hard to cope with, but not serious. Most side effects appear when treatment starts and stop when treatment is over.

Common side effects of chemotherapy may include:

- Extreme tiredness (fatigue)
- Nausea and vomiting
- Diarrhea
- Constipation
- Hair loss
- Mouth sores
- Not wanting to eat
- Low blood cell counts

Not all side effects of chemotherapy are listed here. Side effects are usually grouped by whether they are more or less likely to occur. Some effects can be long-term or appear years later like another cancer, heart disease, or not being able to have children (infertility). It is helpful to ask your doctor for a complete list of side effects. Learn how you can prevent and cope with possible side effects.

Targeted therapy

Targeted therapies are drugs that sometimes can directly kill cancer cells. They may also affect the chemical signals between different cells and stop their growth. This treatment is somewhat less likely to harm normal cells than chemotherapy. Targeted therapies can be used alone as a single agent or combined with other drugs. People with thyroid cancers that have recurred or are metastatic, and cannot be treated by surgery alone may be given targeted therapy.

Kinase inhibitors are a type of targeted therapy. Some of these targeted therapies have proven to be helpful in treating or controlling the growth of thyroid cancer. Kinase inhibitors (ie, lenvatinib, sorafenib) may be given to treat thyroid cancer that does not respond to other treatment like RAI therapy. If RAI therapy is not an option and other systemic treatment or clinical trials are not an option, other kinase inhibitors may be considered for differentiated thyroid cancer that is metastatic and/or causing symptoms. This includes kinase inhibitors such as axitinib, everolimus, pazopanib, sunitinib, vandetanib, vemurafenib (BRAF-positive disease), or cabozantinib.

For medullary thyroid cancer not responding (progressing) on vandetanib or cabozantinib, or when these drugs or a clinical trial are not an option, other kinase inhibitors may be considered. These include sorafenib, sunitinib, lenvatinib, or pazopanib.

Your doctor will offer treatment options based on your health and disease status. He or she will have information to share with you about the type of targeted therapy and its possible effects on your body.

Common side effects of targeted therapy may include:

- Extreme tiredness (fatigue)
- Body aches
- Rash
- Not wanting to eat
- Nausea and vomiting
- Diarrhea
- Constipation
- Low blood cell counts
- High blood pressure
- Abnormal bleeding

Some targeted therapies have serious side effects that can affect your heart, skin, and digestive system. Ask your treatment team for a complete list of side effects for the cancer drug you are taking. Share any side effects you have with your treatment team so they can help you feel better.

Clinical trials

A clinical trial is a type of research study that people choose to take part in. Clinical trials help doctors learn how to prevent, diagnose, and treat a disease

like cancer. Because of clinical trials, doctors find safe and helpful ways to improve cancer care. This guide provides information about many of those tests and treatments used to help people with cancer.

Clinical trials go through levels or phases of testing. These phases help move the research along to find out what works best for patients with cancer.

- Phase I looks at how much drug to give, its side effects, and how often to give the treatment.
- Phase II tests for side effects and how it works on the cancer type.
- Phase III compares the new treatment (or new use of treatment) to what is commonly used.
- Phase IV follows late side effects and if the treatment still works after a long period.

All clinical trials have a plan and are carefully led by a medical team. Patients in a clinical trial are often alike with their cancer type and general health. You can join a clinical trial when you meet certain terms (eligibility criteria).

If you decide to join a trial, you will need to review and sign a paper called an informed consent form. This form describes the clinical trial in detail, including the risks and benefits. Even after you sign consent, you can stop taking part in a clinical trial at any time.

Some benefits of a clinical trial:

- You'll have access to the most current cancer care
- You will be closely watched by your medical team
- You may help other patients with cancer

Some risks of a clinical trial:

- Like any test or treatment, there may be side effects
- New tests or treatments may not work
- You may have to visit the hospital more

Ask your doctor or nurse if a clinical trial may be an option for you. There may be clinical trials where you're getting treatment or at other treatment centers nearby. You can also find clinical trials through the websites listed in Part 8, *Resources*.

Review

- Surgery is the main treatment for thyroid cancer.
- Radioactive iodine therapy may be an option for papillary and follicular thyroid cancer.
- Radiation therapy uses high-energy rays to treat cancer.
- Drugs can be given to replace the thyroid hormones you need to function.
- Chemotherapy is usually given to people with anaplastic thyroid cancer, but is used for other types of cancers only in very rare cases.
- Targeted therapies are drugs that sometimes can directly kill cancer cells. Kinase inhibitors are a type of targeted therapy.
- Clinical trials help doctors learn how to prevent, diagnose, and treat a disease like cancer.

Complementary and alternative medicine

CAM (complementary and alternative medicine) is a group of treatments sometimes used by people with cancer. Many CAMs are being studied to see if they are truly helpful.

- Complementary medicines are meant to be used alongside standard therapies, most often for relaxation, improving your health, or to prevent or reduce side effects.
- Alternative medicine is treatment or techniques that are used instead of standard treatments such as chemotherapy or radiation. Some are sold as cures even though they haven't been proven to work in clinical trials.

Many cancer centers or local hospitals have complementary therapy programs that offer acupuncture, yoga, and other types of therapy.

It's important to tell your treatment team if you are using any complementary medicine, especially supplements, vitamins, or herbs. Some of these things can interfere with your cancer treatment. For more information about CAM, ask your doctor and visit the websites in Part 8.

5

Treatment guide for differentiated thyroid cancer

39 Differentiated thyroid cancer

39 Papillary thyroid cancer
This section presents treatment options for papillary thyroid cancer.

42 Follicular and Hürthle cell thyroid cancer
This section presents treatment options for follicular and Hürthle cell thyroid cancer.

44 Papillary, follicular and Hürthle cell thyroid cancer
This section presents treatment options for papillary, follicular and Hürthle cell thyroid cancer.

54 Review



Part 5 is a chapter on the treatment options for people with differentiated types of thyroid cancer. Differentiated types include papillary, follicular, and Hürthle cell. Find out which options may be right for you. Ask your doctors questions about your treatment plan and decide on your next steps.

This information is taken from the treatment guidelines written by NCCN experts of thyroid cancer. These treatment guidelines list options for people with thyroid cancer in general. Thus, your doctors may suggest other treatment for you based on your health and personal needs. Discuss and decide on your treatment plan with your doctor.

Differentiated thyroid cancer

Differentiated thyroid cancer includes papillary, follicular, and Hürthle cell. The follicular type of thyroid cancer has cells that look almost like normal cells when examined under a microscope. Patients usually don't have symptoms when these cancers are found. Differentiated thyroid cancers are the most commonly diagnosed type of thyroid cancer. Within this group, there are differences for each cell type. The results from testing can also differ for these types.

Papillary thyroid cancer

Papillary is the most common type of thyroid cancer. Family history of thyroid cancer, a history of an elevated TSH, and contact with radiation at a young age have all been factors with

papillary thyroid cancer. It is usually a slow-growing type of thyroid cancer. It usually starts in one lobe of the thyroid and can spread to nearby tissue or lymph nodes. Age is important in the staging of this cancer.

Papillary thyroid cancer is broken down even further into subtypes. The subtypes include:

- FVPTC (follicular variant of papillary thyroid carcinoma)
- Tall-cell variant
- Columnar variant
- Diffuse sclerosing variant



FVPTC is the most common subtype. The other subtypes can grow and spread more quickly.

When an ultrasound shows further testing is needed, an FNA is usually done. When FNA results show papillary thyroid cancer, further testing is done for treatment planning. An ultrasound of the thyroid and front and sides of the neck is recommended. Other imaging tests may include a CT or MRI. The vocal cord may also be assessed since the cancer can cause harm to it. Any lymph nodes seen on ultrasound (side view) may be biopsied to find out the extent of cancer. Once the testing is complete, surgery will come next. Surgery is the primary treatment for papillary thyroid cancer. [See Guide 9.](#)

Navigating the guides in Part 5

The first set of treatment guides (9–10) will list options for papillary thyroid cancer found on FNA. Guide 11 lists options for follicular and Hürthle cell thyroid cancer. These options include primary treatment and possible next steps of care.

Guide 9. Papillary found on an FNA biopsy

Primary treatment		Consider after treatment	Next steps of care
Lobectomy with removal of the isthmus		<ul style="list-style-type: none"> • Tumor larger than 4 cm • Positive margins • Vascular (blood vessels) invasion • Spread of cancer in the neck area 	<ul style="list-style-type: none"> • Complete thyroidectomy
		<ul style="list-style-type: none"> • Negative margins • No cancer in the other thyroid lobe • (NIFTP) noninvasive follicular thyroid neoplasm with papillary-like nuclear features 	<ul style="list-style-type: none"> • Check Tg 6 to 12 weeks after surgery to plan follow-up care • Consider levothyroxine therapy to keep TSH low or normal
Total thyroidectomy			<ul style="list-style-type: none"> • Care after surgery (See Guides 15 and 16)

Guide 9 shares the first treatment options for papillary thyroid cancer found on FNA. This is called primary treatment. Surgery is the primary treatment option for papillary thyroid cancer. Before surgery, your doctors consider many factors like whether you need a lobe of the thyroid removed or the whole thyroid removed. This depends on the size and location of the cancer and whether or not it has spread.

Once surgery is complete, the tumor size and any remaining disease will be factors in your next steps of care. This may include more surgery or further testing to monitor your health. Your doctor may also recommend that you take levothyroxine to replace the hormones normally made by the thyroid. It is helpful to ask your doctor for more information on surgery. You can also find out what you can expect when it comes to your care after surgery.

Guide 10. Observe or thyroidectomy for papillary

Primary treatment	Consider after treatment	Next steps of care	
Lobectomy with removal of the isthmus	<ul style="list-style-type: none"> • Tumor larger than 4 cm • Positive margins • Vascular (blood vessel) invasion 	<ul style="list-style-type: none"> • Complete thyroidectomy 	
	<ul style="list-style-type: none"> • Spread of cancer in areas such as the lymph nodes, other thyroid lobe, and beyond the thyroid • Poorly differentiated (may spread quickly) 	<ul style="list-style-type: none"> • Complete thyroidectomy 	
	<ul style="list-style-type: none"> • Tumor 1 to 4 cm or • Cancer has spread to the lymph vessels 	<ul style="list-style-type: none"> • Observe 	<ul style="list-style-type: none"> • Consider levothyroxine therapy to keep TSH low or normal
	<ul style="list-style-type: none"> • Tumor smaller than 1 cm • Negative margins • No cancer in the other thyroid lobe • No concern for cancer in lymph nodes 	<ul style="list-style-type: none"> • Observe 	<ul style="list-style-type: none"> • Consider levothyroxine therapy to keep TSH low or normal

Guide 10 describes what can happen after you have a lobectomy with removal of the isthmus for papillary thyroid cancer. Your doctor considers the tumor size and the margin status (if cancer remains in the normal-looking tissue around the tumor). He or she also wants to know if and where the cancer has spread in the neck area. This includes checking your lymph nodes.

If the tumor is larger than 4 cm and other factors are present like the spread of cancer into blood vessels or lymph nodes, you may have a complete thyroidectomy. You may also have a complete thyroidectomy if the tumor is 1 to 4 cm or in the lymph vessels (lymphatic invasion). If the tumor is smaller than 1 cm and there is no further cancer or concern for cancer, your doctor may watch you closely (observe) for any disease growth. You may also take levothyroxine to keep the TSH low or normal.

Follicular and Hürthle cell thyroid cancer

Follicular thyroid cancer is another type of differentiated thyroid cancer. It is the next most common type after papillary. About 5 out of 100 people with thyroid cancer are diagnosed with this type. Follicular thyroid cancer is slow growing and if the cancer spreads, it usually goes to distant parts of the body like the lungs or bones.

Hürthle cell thyroid cancer is also another type of differentiated thyroid cancer. It accounts for a small number of people diagnosed with thyroid cancer. It is considered to be a type of follicular thyroid cancer. Both follicular and Hürthle cell can be hard to diagnose by FNA. Sometimes molecular testing is needed and is more likely to be helpful to diagnose the follicular variety. This is most helpful for FNA results that are of “undetermined significance.” Your doctor can also consider removing a lobe of the thyroid or the whole thyroid gland to further examine for cancer.

Hürthle cell can be an aggressive type of thyroid cancer. It can grow into the blood vessels or grow large, over 4 cm. This type usually spreads in the neck or to distant parts of the body. It is often treated the same way as follicular thyroid cancer. The only difference is this type can spread to the local lymph nodes so treatment may involve removing those lymph nodes.

Hürthle cell thyroid cancer does not usually take up iodine. Thus, RAI therapy may not work as well as it does for other thyroid cancer types. Surgery is the treatment for follicular and Hürthle cell thyroid cancer.

Primary treatment

Surgery is usually the primary (first) treatment. It will help your doctor learn more about the type of thyroid cancer.

If you have cancer, you may have further treatment after surgery. If there is no cancer after surgery, your doctor may watch you closely to see if there is any change.

Learn more about surgery and other treatment for thyroid cancer in Part 4, *Overview of cancer treatments*.

Guide 11. Follicular or Hürthle cell neoplasm found on an FNA biopsy

Primary treatment		Consider after treatment	Next steps of care			
Total thyroidectomy	→	• Not cancer	→	• Levothyroxine to keep TSH normal		
	→	• Papillary thyroid cancer	→	• See papillary treatment guides		
	→	• Follicular thyroid cancer	→	• Care after surgery		
	→	• Hürthle cell thyroid cancer				
Lobectomy with removal of the isthmus	→	• Invasive cancer (extensive vascular invasion - large spread of cancer in the blood vessels)	→	• Complete thyroidectomy	→	• Care after surgery
	→	• Minimally invasive cancer (eg, well-defined tumor)	→	• Complete thyroidectomy	→	• Care after surgery
		• (NIFTP) noninvasive follicular thyroid neoplasm with papillary-like nuclear features		or • Observe	→	• Consider levothyroxine therapy to keep TSH low or normal
	→	• Not cancer	→	• Observe		
→	• Papillary thyroid cancer	→	• See primary treatment, then surveillance and management for papillary			

Guide 11 shows the primary treatment options when an FNA biopsy is read as follicular cell neoplasm or Hürthle cell neoplasm. A neoplasm is an abnormal growth of tissue. It is also called a tumor.

There are some benign tumors of the thyroid that look like follicular or Hürthle cell cancer on

FNA biopsy. Neither of these cancers can be diagnosed with standard FNA biopsy alone. To diagnose follicular or Hürthle cell thyroid cancer, the pathologist has to see vascular (veins and arteries) invasion or capsular (capsule around the thyroid) invasion under the microscope. This means cancer has grown into those areas.

An FNA biopsy can have uncertain results and may not tell a benign tumor from a thyroid cancer. Molecular testing may be considered to learn genetic information about the type of abnormal growth before surgery is offered.

Papillary, follicular, and Hürthle cell thyroid cancer

Navigating the guides in Part 5

The next set of treatment guides (12–18) will list further treatment options for papillary, follicular, and Hürthle cell thyroid cancer. Some guides include recommended testing and results. You will also learn about possible next steps based on your response to primary treatment. These next steps may include surveillance and maintenance of disease during follow-up care.

Guide 12. Observe or further treatment after surgery for papillary, follicular, or Hürthle cell

Remaining disease		Next steps of care				
Surgery	→	• No remaining disease	→		• Consider RAI therapy after thyroidectomy	
		• Remaining disease	Follow the arrows below			
Not able to have surgery	→	• TSH and Tg (plus anti-Tg antibodies) measured 6 to 12 weeks after surgery • Consider whole body radioiodine imaging	→	• Not enough RAI uptake on imaging scan	→	• Observe or • Consider radiation (EBRT/IMRT)
			→	• Enough RAI uptake on imaging scan	→	• Radioiodine treatment (preferred) • 131I imaging after treatment • Consider radiation (EBRT/IMRT)
			→	• No RAI imaging done		
<ul style="list-style-type: none"> • If no disease after first surgery, go right to considering RAI therapy • After radioiodine treatment, 131I imaging, or EBRT/IMRT consider levothyroxine to suppress TSH 						

Guide 12 shares further testing or treatment after surgery. Your doctor will check for any remaining disease. If there is no disease, your treatment may be RAI therapy. If you can't have surgery or there is disease remaining, you may have your TSH, Tg, and anti-Tg antibody level measured. You may also have a whole body radioiodine imaging test to see if any cancer cells remain. The results of these tests will determine if you move forward with more treatment or your doctor watches you closely for cancer growth (observes you).

Guide 13. Consider RAI therapy for papillary, follicular, or Hürthle cell

6 to 12 weeks after thyroidectomy

RAI therapy	Test results	Further testing	Next steps of care
Based on pathology for papillary, RAI therapy may not be recommended	<ul style="list-style-type: none"> Tg less than 1 ng/mL and negative anti-Tg antibodies or <ul style="list-style-type: none"> Select patients, with small volume disease, lower-risk pathology, and Tg less than 5-10 ng/mL 		<ul style="list-style-type: none"> RAI therapy may not be recommended
Based on pathology for follicular and Hürthle cell, RAI therapy may not be recommended	<ul style="list-style-type: none"> Tg more than 5–10 ng/mL and negative anti-Tg antibodies No concern on neck ultrasound 	<ul style="list-style-type: none"> Consider more imaging of the neck and chest CT 	<ul style="list-style-type: none"> Consider further surgery before RAI therapy Consider RAI therapy/ adjuvant therapy
	<ul style="list-style-type: none"> Tg less than 5–10 ng/mL and negative anti-Tg antibodies No concern on neck ultrasound 		<ul style="list-style-type: none"> Follow without RAI therapy and See surveillance and maintenance (Guides 15 and 16) and Levothyroxine
	<ul style="list-style-type: none"> Concern for cervical lymph nodes on neck ultrasound 	<ul style="list-style-type: none"> No cancer on FNA Cancer on FNA 	<ul style="list-style-type: none"> Consider further surgery before RAI therapy

Guide 13 (continued). Consider RAI therapy for papillary, follicular, or Hürthle cell 6 to 12 weeks after thyroidectomy

RAI therapy	Test results	Further testing	Next steps of care
Based on pathology, RAI therapy may be recommended	<ul style="list-style-type: none"> No or minor radioiodine uptake on thyroid bed Unstimulated Tg less than 1 ng/mL and negative anti-Tg antibodies 	→	<ul style="list-style-type: none"> Follow without RAI therapy
	<ul style="list-style-type: none"> Suspected or proven radioiodine uptake on thyroid bed 	→	<ul style="list-style-type: none"> Follow without RAI therapy or Smaller dose of RAI for smaller area of disease or Adjuvant therapy (RAI); imaging after treatment
	<ul style="list-style-type: none"> Suspected or proven radioiodine uptake in metastases 	→	<ul style="list-style-type: none"> RAI therapy; imaging after treatment
			<ul style="list-style-type: none"> See surveillance and maintenance (Guides 15 and 16) and Levothyroxine

Guide 14. Consider RAI therapy for metastatic papillary, follicular, or Hürthle cell
6 to 12 weeks after thyroidectomy

RAI therapy	Test results	Next steps of care
Recommended for metastatic disease	<ul style="list-style-type: none"> Confirmed radioiodine uptake in tumor 	<ul style="list-style-type: none"> RAI therapy and imaging after treatment
	<ul style="list-style-type: none"> Cervical disease (only) radioiodine uptake (Central cervical for follicular and Hürthle cell) 	<ul style="list-style-type: none"> Consider RAI therapy, adjuvant therapy, and imaging after treatment

After treatment:

- Surveillance and maintenance starts (See Guides 15 and 16)
- Levothyroxine is given to control TSH

When the thyroid cancer takes up (eats) radioiodine, RAI therapy will be considered for treatment. [See Guides 13 and 14](#) on pages 46 to 48. If there is no uptake, a different treatment will be considered.

Tests will be done before treatment. This might include imaging (ultrasound or 123I imaging) and blood tests (Tg and anti-Tg antibodies), or even an FNA if there are lymph nodes that may be cancer. From there you may have further surgery, start levothyroxine to control TSH, or consider RAI therapy again.

If it is recommended or may be recommended that you have RAI therapy, you will start RAI after your imaging test. If not completely seen but there is concern for cancer spread, you may get smaller doses for a small area of cancer. Your doctor may also consider different doses of RAI therapy based on the extent of disease. The dose would increase for metastatic disease that has spread to other areas.

The dose of RAI therapy is also adjusted for children with thyroid cancer and people on dialysis for kidney disease. For some patients, rhTSH (**recombinant human TSH**) may be given before RAI therapy. rhTSH is given to help with iodine uptake so people can continue to take levothyroxine during RAI therapy. If any cancer can be removed by surgery, this should be considered before starting RAI therapy.

Guide 15. After treatment, surveillance and maintenance for papillary, follicular, or Hürthle cell

Surveillance and maintenance

- Physical exam
- TSH and Tg measurement (plus anti-Tg antibodies) at 6 and 12 months, then yearly if disease free
- Ultrasound of the neck
 - * For low-risk patients, only done if concern cancer will come back (recur)
- TSH stimulated (check TSH level off of thyroid medication) radioiodine imaging for:
 - High-risk patients
 - Prior RAI therapy that worked for metastatic disease
 - Abnormal Tg levels
 - Stable or rising anti-Tg antibodies
 - Abnormal ultrasound results

Guide 16. Testing results during surveillance and maintenance for papillary, follicular, or Hürthle cell

Test results	Next steps of care
No disease found	<ul style="list-style-type: none"> • Long-term surveillance with unstimulated Tg (continuing thyroid medication during testing) done yearly and routine neck ultrasound for: <ul style="list-style-type: none"> • Prior RAI therapy and a negative ultrasound • Stimulated Tg less than 2 ng/mL with negative anti-Tg antibodies • Negative results on RAI imaging (if done) • TSH-stimulated testing or other imaging tests may be done if there is a concern the cancer will come back (recurrence)
Abnormal results	<ul style="list-style-type: none"> • More testing if: <ul style="list-style-type: none"> • RAI uptake is present with the Tg level found, or distant metastases, or cancer in soft tissue (found on tests used to stage the cancer)—get radioiodine imaging every 12 to 24 months until RAI therapy is no longer working • Radioiodine imaging is negative and Tg is less than 2 to 5 ng/mL—consider other imaging tests like ultrasound, neck CT, or chest CT

Guide 17. Options for recurrent papillary, follicular, or Hürthle cell

Test results	Next steps of care			
<ul style="list-style-type: none"> Stimulated Tg 1 to 10 ng/mL Tumors that can't be removed Not able to get RAI therapy 	→	<ul style="list-style-type: none"> Consider levothyroxine 	→	<ul style="list-style-type: none"> Continue surveillance with unstimulated Tg test, ultrasound, and other imaging tests as needed
<ul style="list-style-type: none"> Stimulated Tg more than 10 ng/mL Imaging tests are negative (including PET) 	→	<ul style="list-style-type: none"> Consider radioiodine therapy and ¹³¹I imaging after treatment (more RAI should be given to those who responded to prior RAI therapy) 		
<ul style="list-style-type: none"> Local recurrence of cancer 	→	<ul style="list-style-type: none"> Surgery is preferred, if possible and/or RAI therapy, if radioiodine imaging is positive and/or Local therapy when available (eg, ethanol ablation or RFA [radiofrequency ablation]) and/or Radiation (EBRT/IMRT), if radioiodine imaging is negative and no response to other treatment 		

Guides 17 and 18 focus on treatment for disease that has spread to nearby or distant areas, or disease that has come back (recurred). Levothyroxine suppression of TSH is recommended for Tg less than 10 ng/mL that can't be removed. If Tg is greater than 10 ng/mL but no disease is seen on imaging, then RAI therapy is recommended. If it is a local recurrence, then multiple options are considered.

Your doctor would consider surgery (preferred), radiation, RAI therapy, or another local therapy. This other therapy might include treating the cancer with ethanol (alcohol) or using radiofrequency waves that generate heat to remove the cancer (radiofrequency ablation).

Guide 18. Options for metastatic papillary, follicular, or Hürthle cell

When RAI therapy is not a treatment option

Disease status	Area of disease	Next steps of care
Persistent (continuing) disease	<ul style="list-style-type: none"> Persistent disease or recurrent local disease 	<ul style="list-style-type: none"> For disease that is growing or causing symptoms: <ul style="list-style-type: none"> Lenvatinib or sorafenib Other kinase inhibitors (only for certain people—not for slow-growing/stable disease with other treatment options) Surgery for distant areas, and/or radiation therapy (EBRT/SBRT/IMRT) to those areas Local therapy (eg, ethanol ablation, cryoablation, RFA)
	<ul style="list-style-type: none"> Soft tissue metastases (eg, lungs, liver, muscle) 	
or		
Recurrent disease in the neck area (local disease, also called locoregional)	<ul style="list-style-type: none"> Bone metastases 	<ul style="list-style-type: none"> Surgery, radiation (EBRT/SBRT), or local therapy to relieve symptoms Block the blood vessels that feed the growing cancer (embolization) IV (intravenous) bisphosphonate or denosumab For disease that is growing or causing symptoms: <ul style="list-style-type: none"> Lenvatinib or sorafenib Other kinase inhibitors (only for certain people—not for slow-growing/stable disease with other treatment options)
or		
Distant areas of disease (distant metastases)	<ul style="list-style-type: none"> CNS (central nervous system- brain and spinal cord) metastases 	<ul style="list-style-type: none"> Depends on single or multiple tumors, growing disease, and symptoms: <ul style="list-style-type: none"> Surgery Radiation therapy (EBRT/IMRT) Stereotactic radiosurgery Lenvatinib or sorafenib Other kinase inhibitors (only for certain people—not for slow-growing/stable disease with other treatment options)

For this disease status:

- Continue levothyroxine to keep TSH low or normal
- RAI therapy is not an option and chemotherapy may have little effect on this type of cancer
- Surveillance may be an option when disease is slow growing and not causing symptoms
- Clinical trials may be an option, ask your treatment team

If the disease is persistent and continues to grow, or spreads to other areas whether local or distant, more treatment can be given. It may be treatment you had before or a new option. The treatment options are listed in [Guide 18](#).

Some are local treatments like surgery or radiation to a specific area. For example, SBRT (**s**tereotactic **b**ody radiation **t**herapy) may be considered for metastatic disease when RAI therapy is not possible. Other options are systemic treatment with drugs like lenvatinib, sorafenib, or other kinase inhibitors. For example, when disease is in the bone, doctors give drugs like a bisphosphonate or denosumab to slow down damage to bones.

The treatment offered depends on the location of disease and whether or not it is slow growing. Your doctor will assess how far and how quickly the cancer is growing. Ask your doctor questions so you understand what options are available to you.

Review

- Differentiated thyroid cancers include papillary, follicular, and Hürthle cell.
- Surgery is the preferred primary treatment option for papillary thyroid cancer.
- Surgery is the most common treatment for follicular and Hürthle cell thyroid cancer.
- Hürthle cell cancer also often does not take up iodine, so treatment with RAI may not work as it will for other thyroid cancer types.
- When the thyroid cancer takes up (eats) radioiodine, RAI therapy will be considered for treatment.
- After any treatment, the surveillance and maintenance phase will start. This will include follow-up care with blood tests, imaging tests, and physical exams.
- If the disease is persistent and continues to grow, or spreads to other areas whether local or distant, more treatment can be given.

6

Treatment guide for medullary thyroid cancer

56 Medullary thyroid cancer
This section presents treatment guides for medullary thyroid cancer.

61 Next steps of care
This section presents guides for the surveillance and maintenance phase of care.

62 Review



This information is taken from the treatment guidelines written by NCCN experts of thyroid cancer. These treatment guidelines list options for people with thyroid cancer in general. Thus, your doctors may suggest other treatment for you based on your health and personal needs. Discuss and decide on your treatment plan with your doctor.

Medullary thyroid cancer

Medullary thyroid cancer starts in the neuroendocrine parafollicular C cells of the thyroid. Most people with medullary thyroid cancer did not inherit this cancer. In other words, they did not have a family member with a genetic mutation for thyroid cancer and they cannot pass this cancer on to their children.

About 20 out of 100 medullary thyroid cancers are caused by a genetic mutation. This change in the gene can be passed from parent to child. Some people who discover that they have this mutation choose to have prophylactic surgery before the cancer develops to prevent medullary thyroid cancer from occurring. The inherited type of medullary thyroid cancer is called familial medullary thyroid cancer or MEN2. It can start at a young age unlike the non-inherited version, which can start at age 50 to 60 years of age.

This type of thyroid cancer tends to spread to the lymph nodes or distant parts of the body like the lung, liver, or bones. FNA biopsy can diagnosis this type of thyroid cancer. Further testing will occur for treatment planning. This may include measuring the level of calcitonin produced by this cell type. Other levels that are tested are CEA and calcium in the blood. Molecular testing is usually done to check for RET mutations in families.

Testing for other tumors are done if an inherited medullary cancer is suspected. An ultrasound of the thyroid, including the front and sides of the neck, should be done before surgery. Other imaging tests may include a CT scan of the chest or MRI of the liver. Once the results are reviewed, treatment planning will begin and treatment usually starts with surgery.

Guide 19. Primary treatment for medullary

Disease status		Primary treatment	Next steps of care
1.0 cm or smaller (diameter or bilateral) thyroid cancer	→	<ul style="list-style-type: none"> • Total thyroidectomy and central neck dissection • Consider lateral neck dissection (same side as nodule or both sides) • Consider radiation therapy (EBRT/IMRT) for incomplete surgery (when additional surgery is not an option) or after surgery (adjuvant therapy - rarely recommended) • Levothyroxine (after surgery) to normalize TSH 	→ <ul style="list-style-type: none"> • Care 2 to 3 months after surgery (See Guide 21)
Smaller than 1.0 cm (diameter and unilateral) thyroid cancer	→	Total thyroidectomy and consider neck dissection	→ <ul style="list-style-type: none"> • Care 2 to 3 months after surgery (See Guide 21)
Medullary diagnosed after initial thyroid surgery	→	• RET positive	→ <ul style="list-style-type: none"> • See primary treatment in Guide 20
		• RET negative	→ <ul style="list-style-type: none"> • Care 2 to 3 months after surgery (See Guide 21)

Guides 19 and 20 discuss primary treatment options for medullary thyroid cancer. They are separated to show the options for disease that does not run in families and when it does run in families (inherited).

For medullary thyroid cancer that is not inherited, treatment may involve surgery with possible neck dissection, radiation therapy, and levothyroxine. **See Guide 19.** Treatment depends on the size of disease. If you have molecular testing before surgery and it shows that you inherited a RET mutation, see the primary treatment options for inherited medullary thyroid cancer in guide 20.

Guide 20. Primary treatment for inherited medullary

Mutation	Tests			Primary treatment
MEN 2A/ Familial medullary thyroid cancer	<ul style="list-style-type: none"> • Calcitonin • CEA • Neck ultrasound (if not done before) • Screen for pheochromocytoma (tumor in adrenal glands) • Calcium with or without PTH (parathyroid hormone) blood test 	→	Measure calcium with or without PTH: <ul style="list-style-type: none"> • No primary hyperparathyroidism 	→ <ul style="list-style-type: none"> • Total thyroidectomy • Consider neck dissection (same or both sides) if high calcitonin or abnormal CEA or ultrasound results • Consider preventative neck dissection • Levothyroxine (after surgery) to normalize TSH
		→	Measure calcium with or without PTH: <ul style="list-style-type: none"> • Primary hyperparathyroidism 	→ <ul style="list-style-type: none"> • See treatment in box above • During surgery: <ul style="list-style-type: none"> • Explore parathyroid to remove disease, autotransplant of parathyroid tissue in muscle (usually arm), or leave tissue the size of one parathyroid gland • Consider cryopreservation (freezing) of parathyroid tissue
MEN 2B	<ul style="list-style-type: none"> • Calcitonin • CEA • Neck ultrasound (if not done before) • Screen for pheochromocytoma (tumor of adrenal glands) • Calcium with or without PTH (parathyroid hormone) blood test 		→	<ul style="list-style-type: none"> • Total thyroidectomy • Consider central neck dissection (both sides or tumors larger than 0.5 cm in diameter) • Consider radiation therapy (EBRT/IMRT) after surgery (adjuvant therapy - rarely recommended) • Levothyroxine (after surgery) to normalize TSH




Guide 21. After treatment, surveillance for medullary

2 to 3 months after surgery				Surveillance		
Elevated calcitonin or elevated CEA	→	<ul style="list-style-type: none"> • Neck imaging • If calcitonin is 150 pg/mL do contrast CT or MRI of neck, chest, and abdomen and include liver 	→	<ul style="list-style-type: none"> • Symptoms or imaging shows disease 	→	<ul style="list-style-type: none"> • Seek care for recurrent or persistent disease
			→	<ul style="list-style-type: none"> • No symptoms or imaging shows no disease 	→	<ul style="list-style-type: none"> • Serum (blood) calcitonin and CEA every 6 to 12 months • If needed, more or frequent tests based on calcitonin and CEA • No imaging needed if calcitonin and CEA are stable
Calcitonin and CEA are within normal range	→	<ul style="list-style-type: none"> • Observe 	→	<ul style="list-style-type: none"> • Yearly calcitonin and CEA • Consider ultrasound of the front and sides of neck • If needed, more or frequent tests if rising calcitonin and CEA • No imaging needed if calcitonin and CEA are stable • For MEN 2B or 2A, check for pheochromocytoma and hyperparathyroidism (MEN 2A) 		

Testing results during surveillance:

- Positive results - seek care for recurrent or persistent disease
- Negative results - continue observation, check for elevated basal calcitonin or elevated CEA, or consider cervical surgery again (if primary surgery was incomplete)

Guide 22. Options for metastatic and recurrent medullary

Test results	Next steps of care
Local recurrence of cancer	 <ul style="list-style-type: none"> • Surgery is preferred, if possible or • Radiation therapy (EBRT/IMRT) when surgery is not possible, or after surgery (less common) or • Consider vandetanib or cabozantinib when surgery is not possible and symptoms occur or the disease is progressing (worsening) or • Surveillance
No symptoms of disease	 <ul style="list-style-type: none"> • Observe or • Consider surgery when possible, ablation (eg, RFA, embolization), or other local therapy or • Consider vandetanib or cabozantinib when surgery is not possible and symptoms occur, or the disease is progressing (worsening)
Disease with symptoms or that is progressing (worsening)	 <ul style="list-style-type: none"> • Vandetanib, or cabozantinib, or clinical trial, or consider other small molecule kinase inhibitor, or dacarbazine (DTIC)-based chemotherapy • Radiation therapy (EBRT/IMRT) for symptoms • Consider IV bisphosphonate or denosumab for bone metastases • Consider surgery to relieve symptoms, ablation (eg, RFA, embolization) or other local therapy • Best supportive care (relieve symptoms)

Next steps of care

After primary treatment for medullary thyroid cancer, the surveillance and maintenance phase will start. Your doctor will do a blood test to check your calcitonin and CEA levels to see if they are within normal range. If the calcitonin or CEA start to rise, your doctor may order imaging tests to check for recurrent disease. If things are stable, your doctor will continue to check the calcitonin and CEA over time. [See Guide 21.](#)

[Guide 22](#) discusses options for recurrent or metastatic medullary thyroid cancer. Your doctor will consider the extent of disease and whether or not you have symptoms. Surgery is the preferred option for disease that comes back in the neck area. Radiation, vandetanib, or cabozantinib will also be considered. Your doctor may also offer to observe the disease and not treat it right away.

If you don't have symptoms, your doctor may observe or consider surgery. If surgery is not possible, he or she may offer vandetanib or cabozantinib for symptoms or disease that is worsening. If the disease is worsening, refer to the options listed in [Guide 22](#). Your doctor may offer supportive care to help relieve any symptoms you are having. This treatment is not to cure disease but to help control or treat symptoms that may interfere with your daily life.

Review

- ▶ Medullary thyroid cancer starts in the neuroendocrine parafollicular C cells of the thyroid.
- ▶ The inherited type of medullary thyroid cancers are called MEN2 and familial medullary thyroid cancer.
- ▶ Primary treatment for medullary thyroid cancer is usually surgery.
- ▶ Planning for primary treatment requires checking calcitonin and CEA, performing imaging, other blood tests, and possibly genetic testing before surgery.
- ▶ After primary treatment for medullary thyroid cancer, the surveillance and maintenance phase will start.
- ▶ For recurrent or metastatic medullary thyroid cancer, your doctor will consider the extent of disease.
- ▶ Your doctor may offer supportive care to help relieve any symptoms you are having.

7

Treatment guide for anaplastic (undifferentiated) thyroid cancer

64 Anaplastic thyroid cancer
This section presents treatment guides with the next steps of care for anaplastic thyroid cancer.

66 Review



This information is taken from the treatment guidelines written by NCCN experts of thyroid cancer. These treatment guidelines list options for people with thyroid cancer in general. Thus, your doctors may suggest other treatment for you based on your health and personal needs. Discuss and decide on your treatment plan with your doctor.

Anaplastic thyroid cancer

Anaplastic is the least common type of thyroid cancer. About 1 out of 100 people diagnosed with thyroid cancer have this type. It is what the pathologists call an “undifferentiated” type. The cells look very different from normal cells under a microscope.

Anaplastic is an aggressive form of thyroid cancer. It is considered stage IV at diagnosis. If biopsy results detect this type of thyroid cancer, more testing is done to find out the extent of cancer. This includes blood tests, an ultrasound of the neck, and CT of the head, chest, abdomen, and pelvis. A laryngoscopy (exam of the back of your throat) and FDG PET/CT (18F-fluorodeoxyglucose positron emission tomography/computed tomography) may also be done. Doctors want to know if the cancer is causing problems in the airway or elsewhere. [See Guide 23.](#)

Guide 23. Anaplastic found on an FNA or core biopsy

Results	Tests	Goals of therapy
Anaplastic thyroid cancer	<ul style="list-style-type: none"> • CBC and chemistry • TSH • Neck ultrasound • CT head, neck, chest, abdomen, and pelvis • Laryngoscopy to view the inside of the throat • FDG PET/CT • Bronchoscopy to check for disease in the airway 	<ul style="list-style-type: none"> • Seek care from multidisciplinary team of doctors who specialize in anaplastic thyroid cancer • Discuss prognosis • Discuss the benefits and risks of treatment options • Discuss options to relieve symptoms

Guide 24. Treatment by stage for anaplastic

Stage		Treatment		Next steps of care			
Stage IVA or IVB		• Surgery			• Adjuvant radiation (EBRT/IMRT) with or without chemotherapy		
		• Surgery not possible or disease not able to be completely removed			• Radiation (EBRT/IMRT) with or without chemotherapy		
Stage IVC	• Aggressive therapy		<ul style="list-style-type: none"> • Total thyroidectomy with lymph node dissection, if possible • Radiation therapy to local area • Systemic therapy • Consider a clinical trial 		<ul style="list-style-type: none"> • Regular imaging of brain, neck, chest, abdomen, and pelvis • Consider FDG PET/CT 3 to 6 months after first therapy 		<ul style="list-style-type: none"> • Continue to observe if no disease • Palliative radiation to local area • Tumor control (eg, bone or brain) • Second-line (next in line) or clinical trial • See NCCN Guidelines for Palliative Care • Hospice or best supportive care
	• Palliative care (relieving symptoms)		<ul style="list-style-type: none"> • Palliative radiation therapy to local area • Surgery or radiation to control tumor (eg, bone or brain) • See NCCN Guidelines for CNS Cancer • Hospice or best supportive care 				

See Guide 24. Treatment may involve systemic treatment like chemotherapy. Many people also get radiation therapy for this type of thyroid cancer. Learn more about forms of systemic treatment and radiation in Part 4, *Overview of cancer treatments*.

The goal of treatment for anaplastic thyroid cancer is considered. Your doctor may focus on controlling the tumor growth and improving your quality of life. Your doctor may offer treatment to help with symptom relief. This treatment is called supportive care. Doctors may also refer to this as palliative care. For example, IV bisphosphonates (pamidronate disodium or zoledronic acid) or denosumab may be given as palliative care for bone metastases.

Your doctor may suggest hospice care during this time. Hospice care will help with the physical and emotional needs of stage IV cancer. It may be helpful to ask questions about the goal of therapy for anaplastic thyroid cancer. One goal of therapy is to seek care from experts who treat anaplastic thyroid cancer. Learn what is available for the symptoms you are having. Talk to your doctor about your treatment options. It is important to consider clinical trials for all patients with anaplastic thyroid cancer.

Review

- ▶ Anaplastic is the least common type of thyroid cancer.
- ▶ Anaplastic thyroid cancer is considered stage IV at diagnosis.
- ▶ Surgery may be a treatment option, but it will not be the only treatment offered.
- ▶ One goal of therapy is to seek care from experts who treat anaplastic thyroid cancer.
- ▶ Your doctor may offer supportive care to help relieve the symptoms you are having.

8

Making treatment decisions

68 It's your choice

68 Questions to ask your doctors

73 Deciding between options

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74 Review



Finding out you have cancer can be very stressful. While absorbing the fact that you have cancer, you also must learn about tests and treatments. In addition, the time you have to decide on a treatment plan may feel short. Parts 1 through 7 aimed to teach you about thyroid cancer. Part 8 addresses ways to assist you when deciding on a treatment plan.

It's your choice

The role patients want in choosing their treatment differs. You may feel uneasy about making treatment decisions. This may be due to a high level of stress. It may be hard to hear or know what others are saying. Stress, pain, and drugs can limit your ability to make good decisions. You may feel uneasy because you don't know much about cancer. You've never heard the words used to describe cancer, tests, or treatments. Likewise, you may think that your judgment isn't any better than your doctors'.

Letting others decide which option is best may make you feel more at ease. However, whom do you want to make the decisions? You may rely on your doctors alone to make the right decisions. However, your doctors may not tell you which to choose if you have multiple good options. You can also have loved ones help. They can gather information, speak on your behalf, and share in decision-making with your doctors. Even if others decide which treatment you will receive, you still have to agree by signing a consent form.

On the other hand, you may want to take the lead or share in decision-making. In shared decision-making, you and your doctors share information, discuss the options, and agree on a treatment plan.

Your doctors know the science behind your plan but you know your concerns and goals. By working together, you can decide on a plan that works best for you when it comes to your personal and health needs.

Questions to ask your doctors

You will likely meet with experts from different fields of medicine. It is helpful to talk with each person. Prepare questions before your visit and ask questions if the information isn't clear. You can also record your talks and get copies of your medical records. It may be helpful to have a family member or friend with you at these visits. A patient advocate or navigator might also be able to come. They can help you ask questions and remember what was said.

The questions below are suggestions for information you read about in this book. Feel free to use these questions or come up with your own personal questions to ask your doctor and other members of your treatment team.

Questions to ask your doctors about testing and results

1. What tests will I have for thyroid cancer?
2. Where and when will the tests take place?
3. How long will they take?
4. What are the risks?
5. How do I prepare for testing?
6. How soon will I know the results and who will explain them to me?
7. Have any cancer cells spread to other parts of my body?
8. Can you tell me about the symptoms of thyroid cancer?
9. What will happen if the thyroid nodule is not cancer? What tests will I have to assess the nodule?

Deciding between options

Deciding which option is best can be hard. Doctors from different fields of medicine may have different opinions about which option is best for you. This can be very confusing. Your spouse or partner may disagree with which option you want. This can be stressful. In some cases, one option hasn't been shown to work better than another, so science isn't helpful. Some ways to decide on treatment are discussed next.

Getting a 2nd opinion

Even if you like and trust your doctor, it is helpful to get a 2nd opinion. You will want to have another doctor review your test results. He or she can suggest a treatment plan or check the one you already heard about.

Things you can do to prepare:

- ▶ Check with your insurance company about its rules on 2nd opinions. You want to know about out-of-pocket costs for doctors who are not part of your insurance plan.
- ▶ Make plans to have copies of all your records sent to the doctor you will see for your 2nd opinion. Do this well before your appointment. If you run into trouble having records sent, pick them up and bring them with you.

If the new doctor offers other advice, make an appointment with your first doctor to talk about the differences. If you're not sure what to do, get a 3rd or 4th opinion. Do whatever you need to feel confident about your diagnosis and treatment plan.

Getting support

Support groups often include people at different stages of treatment. Some may be in the process of deciding while others may be finished with treatment. At support groups, you can ask questions and hear about the experiences of other people with thyroid cancer. If your hospital or community doesn't have support groups for people with thyroid cancer, check out the websites on the next page.

You can also reach out to a social worker or psychologist. They can help you find ways to cope or refer you to support services. These services may also be available to your family, friends, and those with children so they can connect and get support.



You can never run away from your cancer experience, but you can learn to adapt and live your best life.

- Brittany

Websites

Clinicaltrials.gov
clinicaltrials.gov

NCCN Guidelines for Patients®
nccn.org/patients

NCCN Find a clinical trial
nccn.org/patients/resources/clinical_trials/find_trials.aspx

ThyCa: Thyroid Cancer Survivors' Association, Inc.
thyca.org

Review

- ▶ Shared decision-making is a process in which you and your doctors plan treatment together.
- ▶ Asking your doctors questions is vital to getting the information you need to make informed decisions.
- ▶ Getting a 2nd opinion, attending support groups, and comparing benefits and risks may help you decide which treatment is best for you.

Glossary

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80 Acronyms

Dictionary

adjuvant treatment

A type of cancer drug that is given after the main treatment used to cure the cancer.

anaplastic thyroid cancer

An aggressive type of thyroid cancer with undifferentiated cells.

anesthesia

Loss of feeling with or without loss of wakefulness that is caused by drugs.

antibody

A protein made by white blood cells that helps fight off infection. Also called an immunoglobulin.

antigen

Any substance that activates the immune system.

biopsy

Removal of small amounts of tissue or fluid to be tested for disease.

blood vessel

A hollow tube that circulates blood throughout the body.

bone marrow

Soft, sponge-like tissue in the center of most bones where blood cells are made.

C cells

Cells in the thyroid that make calcitonin. These cells are also called parafollicular cells.

calcitonin

A hormone made by the C cells of the thyroid gland. It helps control the calcium level in the blood.

calcium

A mineral needed for healthy teeth, bones, and other body tissues.

cancer stage

The rating of the growth and spread of cancer.

carcinoembryonic antigen (CEA)

A tumor marker that may be found with medullary thyroid cancer or other cancer types like colon or rectal cancer.

cell subtype

Different types of cancer cells that are grouped based on how the cells look when viewed with a microscope.

central nervous system

The brain and spinal cord.

cervical lymph node

Groups of disease-fighting cells that are within the neck.

chemotherapy

Drugs that stop the life cycle of cells so they don't increase in number.

chromosome

Strands of genetic material inside of cells

clinical trial

Research on a test or treatment to assess its safety or how well it works.

complete blood count (CBC)

A test of the number of blood cells in a sample.

comprehensive metabolic panel

Tests of up to 14 chemicals in your blood.

computed tomography (CT)

A test that uses x-rays to view body parts.

contrast

A dye put into your body to make clearer pictures during imaging tests.

core needle biopsy

Removal of a large tissue sample with a wide, hollow needle to test for disease.

cyst

A closed sac in the body filled with air or fluid.

deoxyribonucleic acid (DNA)

A chain of chemicals inside cells that contains coded instructions for making and controlling cells.

diabetes

A disease that causes high levels of blood sugar.

diagnose

To identify a disease.

differential

Measurement of the different types of white blood cells present in a blood sample.

differentiated cells

Cells that look similar to normal cells when examined under a microscope.

distant metastases

The spread of cancer cells from the first tumor to a far site.

endocrine system

A system of the body that includes organs and glands that make hormones that control body functions.

endocrinologist

A doctor who specializes in the endocrine system. This system makes hormones.

external beam radiation therapy (EBRT)

Treatment with radiation received from a machine outside the body.

fatigue

Severe tiredness despite getting enough sleep that limits one's ability to function.

fine-needle aspiration (FNA)

Use of a thin needle to remove fluid or tissue from the body to test for disease.

fluorodeoxyglucose (FDG)

A mix of fluoride and glucose used to see cancer on certain imaging tests.

follicular thyroid cancer

A type of thyroid cancer that starts in the follicular cells.

gene

Instructions in cells for making and controlling cells.

gene mutation

Abnormal change in the coded instructions in cells for making and controlling cells. Also called genetic mutation.

general anesthesia

A controlled loss of wakefulness from drugs.

genetic testing

Tests that assess the chance for a disease caused by coded instructions in cells.

hormone

A chemical in the body that activates cells or organs.

Hürthle cell thyroid cancer

A rare type of thyroid cancer that is hard to diagnose.

hyperthyroidism

A treatable condition in which the thyroid makes too much thyroid hormone. It causes symptoms like weight loss, rapid heartbeat, nervousness, and poor sleep.

imaging test

A test that makes pictures (images) of the inside of the body.

immune system

The body's natural defense against illness.

immunoglobulin

A protein made by white blood cells that helps fight off infection. Also called an antibody.

immunomodulator

A type of drug that modifies some parts of the body's disease-fighting system.

intensity-modulated radiation therapy (IMRT)

Treatment with radiation that uses small beams of different strengths based on the thickness of the tissue.

iodine

The body needs this element to make thyroid hormones. Iodized salt and certain foods contain this element.

liver

Organ that removes waste from the blood and helps to digest food.

lobectomy

Surgery to remove one lobe of the thyroid gland.

local anesthesia

A controlled loss of feeling in a small area of the body caused by drugs.

lymph

A clear fluid containing white blood cells.

lymphatic system

A network in the body that collects and transports a fluid (lymph) and fights germs.

lymph node

Small groups of special disease-fighting cells located throughout the body.

lymphocyte

A type of white blood cell that helps protect the body from illness.

lymphoma

Cancer that begins in white blood cells called lymphocytes that are within the lymphatic system.

lymphoplasmacytic cells

Cells that have features of both lymphocytes and plasma cells.

lymph vessel

Tube-shaped ducts that carry lymph throughout the body.

magnetic resonance imaging (MRI)

A test that uses radio waves and powerful magnets to make pictures of the insides of the body.

maintenance

Treatment given to continue good treatment results and prevent cancer from coming back.

margin status

The presence or absence of cancer cells in the normal-looking tissue around a tumor.

medical history

All health events and medications taken to date.

medical oncologist

A doctor who is an expert in cancer drugs.

medullary thyroid cancer

A type of thyroid cancer that starts in the C cells that make calcitonin.

metastasis

The spread of cancer cells from the first tumor to another body part.

molecular test

A test of abnormal coded instructions in cells or the proteins that help cancer cells grow.

monoclonal antibody

Man-made antibodies that attach proteins on cancer cells.

multidisciplinary team

A group of health care professionals who are experts in different areas of treatment related to cancer.

neck dissection

Removal of the lymph nodes and other tissue in the neck area.

negative margin

The absence of cancer cells in the normal-looking tissue around the tumor that is removed during surgery.

nodule

A small mass of tissue.

normal range

A set of values that is based on test results of healthy people.

observation

A period of scheduled follow-up testing to watch for signs of cancer spread (metastasis) or return (recurrence).

papillary thyroid cancer

The most common type of thyroid cancer that starts in the follicular cells.

parathyroid gland

A small gland near the thyroid that makes the parathyroid hormone. The body has four parathyroid glands.

pathologist

A doctor who's an expert in testing cells to find disease.

pathology report

A document with information about cells and tissue removed from the body and examined with a microscope for disease.

persistent cancer

Cancer that is not completely removed or destroyed by treatment.

physical exam

A review of the body by a health expert for signs of disease.

pituitary gland

A gland found near the base of the brain. It makes hormones that control how other glands in the body work or make hormones.

positive margin

The presence of cancer within the normal-looking tissue around the tumor that is removed during surgery.

positron emission tomography (PET)

A test that uses radioactive material to see the shape and function of body parts.

prognosis

The expected pattern and outcome of a disease based on tests.

prognostic factor

Something that affects or helps predict the likely outcome of a disease.

progression

The growth or spread of cancer after being tested or treated.

radiation oncologist

A doctor who is an expert in radiation therapy to treat cancer.

radiation therapy

The use of radiation to treat cancer.

radiofrequency ablation

Treatment that kills cancer cells with heat.

radioactive iodine (RAI) imaging

Low doses of radioactive iodine used for a test. This may be a scan of the thyroid or whole body done before, during, or after treatment. Also known as RAI imaging, 131I imaging, or thyroid scan.

radioactive iodine (RAI) therapy

Treatment using radioactive iodine to kill thyroid cancer cells in the body. Larger doses are used for therapy.

radioiodine

Radioactive iodine used in tests or treatment for thyroid disease or other cancers.

radiologist

A doctor who is an expert in reading imaging tests.

radiotracer

A substance that releases a small amount of radiation.

recurrence

The return of cancer after a disease-free period.

regional anesthesia

A type of drug used for short-term loss of feeling or awareness in a part of the body without loss of wakefulness.

sedative

A drug that helps a person to relax or go to sleep.

side effect

An unplanned physical or emotional response to treatment.

solid nodule

A small mass of tissue with high density.

stable disease

Cancer that is not getting worse or better in terms of its growth.

stem cell transplant

A cancer treatment that destroys bone marrow then replaces it by adding healthy blood stem cells.

steroid

A drug used to reduce redness, swelling, and pain, but also to kill cancer cells.

supportive care

Treatment for the symptoms or health conditions caused by cancer or cancer treatment. Also called palliative care.

surgery

An operation to remove or repair a part of the body.

surveillance

Follow-up testing that is done after treatment ends to look for new tumors.

symptom

A physical sign or patient report of a health condition.

systemic therapy

Drugs that are used to treat cancer cells throughout the body.

targeted therapy

Drugs that stop the growth process that is specific to cancer cells.

thyroglobulin (Tg)

A protein made by the thyroid that can be measured after treatment (surgery) and during follow-up care.

thyroidectomy

Surgery to remove the whole thyroid gland.

thyroid gland

A gland located in the throat, just beneath the voice box.

thyroid isthmus

Thin part of thyroid gland that connects the left and right lobe.

thyroid replacement hormone therapy

Therapy given to replace the thyroid hormone. It is no longer being made by the thyroid gland since it has been removed.

thyroid stimulating hormone (TSH)

A hormone made by the pituitary gland. It tells the thyroid to make thyroid hormones.

treatment plan

A written course of action through cancer treatment and beyond.

tumor

An abnormal mass of cells.

ultrasound

A test that uses sound waves to take pictures of the inside of the body.

undifferentiated cells

Cells that look very different from normal cells under a microscope.

x-ray

Use of small amounts of radiation to make pictures of the insides of the body.

Acronyms

NCCN®

National Comprehensive Cancer Network®

AUS

atypia of undetermined significance

CAM

complementary and alternative medicine

CBC

complete blood count

CEA

carcinoembryonic antigen

CNS

central nervous system

CT

computed tomography

DNA

deoxyribonucleic acid

EBRT

external beam radiation therapy

FAP

familial adenomatous polyposis

FDG

18F-fluorodeoxyglucose

FLUS

follicular lesion of undetermined significance

FNA

fine-needle aspiration

IMRT

intensity-modulated radiation therapy

MEN

multiple endocrine neoplasia

MRI

magnetic resonance imaging

NIFTP

noninvasive follicular thyroid neoplasm with papillary-like nuclear features

PET

positron emission tomography

PET/CT

positron emission tomography/computed tomography

PPARs

peroxisome proliferator-activated receptors

RAI

radioactive iodine

RFA

radiofrequency ablation

rhTSH

recombinant human TSH

FVPTC

follicular variant of papillary thyroid carcinoma

SBRT

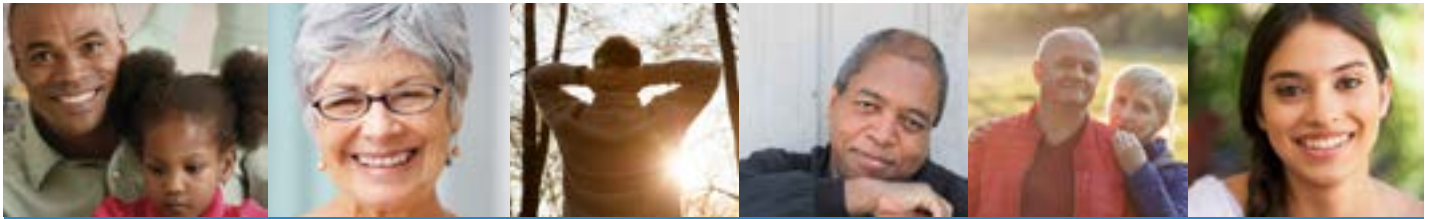
stereotactic body radiation therapy

Tg

thyroglobulin

TSH

thyroid-stimulating hormone



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Brain Cancer – Gliomas
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 Stage III Breast Cancer
 Stage IV Breast Cancer
Chronic Lymphocytic Leukemia
Chronic Myelogenous Leukemia
Colon Cancer
Distress (Supportive Care Series)
Esophageal Cancer
Hodgkin Lymphoma

Kidney Cancer
Lung Cancer (Non-Small Cell Lung Cancer)
Lung Cancer Screening
Malignant Pleural Mesothelioma
Melanoma
Multiple Myeloma
Myelodysplastic Syndromes
Nausea and Vomiting (Supportive Care Series)
Non-Hodgkin's Lymphomas
 Diffuse Large B-cell Lymphoma
 Follicular Lymphoma
 Mantle Cell Lymphoma
 Mycosis Fungoides
 Peripheral T-cell Lymphoma

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MARYLAND: A copy of the NCCN Foundation financial report is available by calling NCCN Foundation at 215-690-0300 or writing to 275 Commerce Drive, Suite 300, Fort Washington, PA 19034. For the cost of copying and postage, documents and information filed under the Maryland charitable organizations law can be obtained from the Secretary of State, Charitable Division, State House, Annapolis, MD 21401, 1-410-974-5534.

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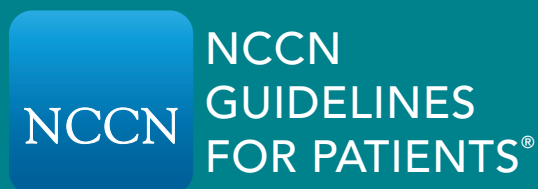
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yalecancercenter.org

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