

National Cancer Institute

What You Need
To Know About™

Thyroid Cancer

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
National Institutes of Health

National Cancer Institute Services

This is only one of many free booklets for people with cancer.

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About This Booklet

This National Cancer Institute (NCI) booklet is for you—someone who has just been diagnosed with **cancer** of the **thyroid**.

This booklet shows words that may be new to you in **bold**. See the **Words to Know** section to learn what a new word means and how to pronounce it.

In 2012, more than 43,000 women and 13,000 men will be diagnosed with thyroid cancer in the United States. Most will be older than 45.

Learning about medical care for thyroid cancer can help you take an active part in making choices about your care. This booklet tells about...

- **Diagnosis and staging**
- **Treatment**
- **Follow-up care**
- **Taking part in research studies**

You can read this booklet from front to back. Or you can read only the sections you need right now.

This booklet has lists of questions that you may want to ask your doctor. Many people find it helpful to take a list of questions to a doctor visit. To help remember what your doctor says, you can take notes. You may also want to have a family member or friend go with you when you talk with the doctor—to take notes, ask questions, or just listen.

For the latest information about thyroid cancer, please visit NCI's website at <http://www.cancer.gov/cancertopics/types/thyroid>.

Also, NCI's Cancer Information Service can answer your questions about cancer. We can also send you NCI booklets and fact sheets. Call **1-800-4-CANCER (1-800-422-6237)**. Or, chat using **LiveHelp**, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>.

The Thyroid

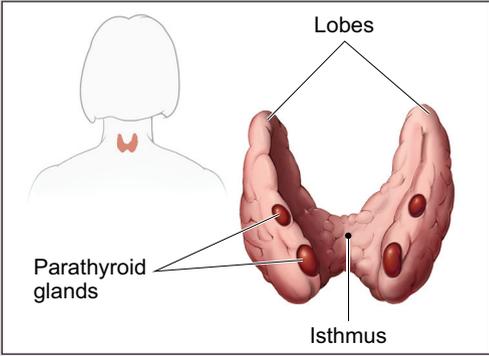
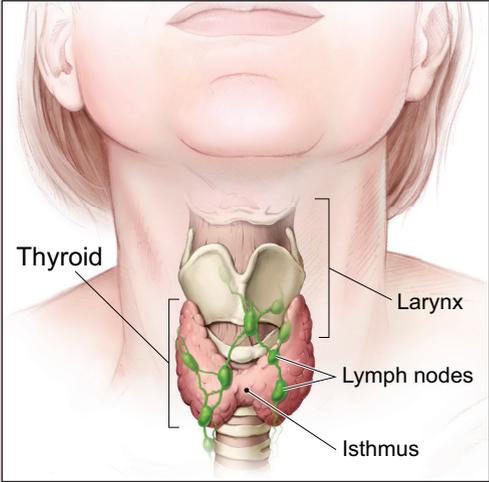
The thyroid is a **gland** at the front of your neck beneath your voice box (**larynx**). A healthy thyroid is a little larger than a quarter. It usually can't be felt through the skin.

The thyroid has two parts (lobes). A thin piece of **tissue** (the **isthmus**) connects the two lobes.

The thyroid makes **hormones**:

- **Thyroid hormone:** The **thyroid follicular cells** make **thyroid hormone**. This hormone affects heart rate, blood pressure, body temperature, and weight. For example, too much thyroid hormone makes your heart race, and too little makes you feel very tired.
- **Calcitonin:** The **C cells** in the thyroid make **calcitonin**. This hormone plays a small role in keeping a healthy level of **calcium** in the body.

Four or more tiny **parathyroid glands** are on the back of the thyroid. These glands make **parathyroid hormone**. This hormone plays a big role in helping the body maintain a healthy level of calcium.



The pictures show the front and back of the thyroid.

Cancer Cells

Cancer begins in **cells**, the building blocks that make up tissues. Tissues make up the thyroid and other **organs** of the body.

Normal thyroid cells grow and divide to form new cells as the body needs them. When normal cells grow old or get damaged, they die, and new cells take their place.

Sometimes, this process goes wrong. New cells form when the body does not need them, and old or damaged cells do not die as they should. The buildup of extra cells often forms a mass of tissue called a **nodule**. It may also be called a growth or **tumor**.

Most thyroid nodules are **benign**. Benign nodules are not cancer (**malignant**):

■ **Benign nodules:**

- Are usually not harmful
- Don't invade the tissues around them
- Don't spread to other parts of the body
- Usually don't need to be removed

■ **Malignant nodules** (thyroid cancer):

- May sometimes be a threat to life
- Can invade nearby tissues and organs
- Can spread to other parts of the body
- Often can be removed or destroyed, but sometimes thyroid cancer returns

Thyroid cancer cells can spread by breaking away from the thyroid tumor. They can travel through **lymph vessels** to nearby **lymph nodes**. They can also spread through **blood vessels** to the lungs, liver, or bones. After spreading, cancer cells may attach to other tissues and grow to form new tumors that may damage those tissues.

See the **Staging** section on page 10 for information about thyroid cancer that has spread.

Types of Thyroid Cancer

There are several types of thyroid cancer:

- **Papillary:** In the United States, **papillary thyroid cancer** is the most common type. About 86 of every 100 people with thyroid cancer have this type. It begins in follicular cells and usually grows slowly. If diagnosed early, most people with papillary thyroid cancer can be cured.
- **Follicular:** The second most common type is **follicular thyroid cancer**. A little more than 9 of every 100 people with thyroid cancer have this type. It begins in follicular cells and usually grows slowly. If diagnosed early, most people with follicular thyroid cancer can be treated successfully.
- **Medullary:** **Medullary thyroid cancer** is not common. About 2 of every 100 people with thyroid cancer have this type. It begins in C cells and can make abnormally high levels of calcitonin. Medullary thyroid cancer tends to grow slowly. It can be easier to control if it's found and treated before it spreads to other parts of the body.

Medullary Thyroid Cancer Sometimes Runs in Families

A change in a **gene** called *RET* can be passed from parent to child. Nearly everyone with a changed *RET* gene develops medullary thyroid cancer. The disease occurs alone, as **familial medullary thyroid cancer**, or with other cancers, as **multiple endocrine neoplasia (MEN) syndrome**.

A blood test can usually detect a changed *RET* gene. If it's found in a person with medullary thyroid cancer, the doctor may suggest that family members also be tested. For those who have a changed gene, the doctor may recommend frequent lab tests or **surgery** to remove the thyroid before cancer develops.

- **Anaplastic:** The least common type is **anaplastic thyroid cancer**. About 1 of every 100 people with thyroid cancer has this type. Most people with anaplastic thyroid cancer are older than 60. The cancer begins in follicular cells of the thyroid. The cancer cells tend to grow and spread very quickly. Anaplastic thyroid cancer is very hard to control.

Tests and treatment options depend on the type of thyroid cancer.

Diagnosis

If your doctor thinks that you may have thyroid cancer, you'll have one or more of the following tests:

- **Physical exam:** Your doctor feels your thyroid for lumps (nodules). Your doctor also checks your neck and nearby lymph nodes for growths or swelling.
- **Blood tests:** Your doctor may check for abnormal levels of **thyroid-stimulating hormone** (TSH) in the blood. Too much or too little TSH means the thyroid is not working well. If your doctor thinks that you may have medullary thyroid cancer, you'll be checked for a high level of calcitonin and have other blood tests.
- **Ultrasound:** An **ultrasound** device uses sound waves that can't be heard by humans. The sound waves make a pattern of echoes as they bounce off organs inside your neck. The echoes create a picture of your thyroid and nearby tissues. The picture can show thyroid nodules that are too small to be felt. Your doctor uses the picture to learn the size and shape of each nodule and whether the nodules are solid or filled with fluid. Nodules that are filled with fluid are usually not cancer. Nodules that are solid may be cancer.
- **Thyroid scan:** Your doctor may order a scan of your thyroid. You swallow a small amount of a **radioactive** substance (such as **radioactive iodine**), and it travels through the bloodstream. Thyroid cells that absorb the radioactive substance can be seen on a scan. Nodules that take up more of the substance than the thyroid tissue around them are called "hot" nodules. Hot nodules are usually not cancer. Nodules that take up less

substance than the thyroid tissue around them are called “cold” nodules. Cold nodules may be cancer.

- **Biopsy:** A **biopsy** is the only sure way to diagnose thyroid cancer. A **pathologist** checks a sample of thyroid tissue for cancer cells using a microscope.

Your doctor may take tissue for a biopsy in one of two ways:

- **With a thin needle:** Your doctor removes a sample of tissue from a thyroid nodule with a thin needle. An ultrasound device can help your doctor see where to place the needle. Most people have this type of biopsy.
- **With surgery:** If a diagnosis can't be made from tissue removed with a needle, a **surgeon** removes a lobe or the entire thyroid. For example, if the doctor suspects follicular thyroid cancer, the lobe that contains the nodule may be removed for diagnosis.

You may want to ask the doctor these questions before having a biopsy:

- Will I have to go to the hospital?
- How long will it take? Will I be awake? Will it hurt?
- Are there any risks? What is the chance of infection or bleeding afterward?
- Will I have a scar on my neck?
- How soon will I know the results? Who will explain them to me?
- If I do have cancer, who will talk to me about the next steps? When?

Staging

If the biopsy shows that you have cancer, your doctor will need to learn the extent (stage) of the disease to help you choose the best treatment.

The stage is based on the size of the nodule and whether the cancer has invaded nearby tissues or spread to other parts of the body. Thyroid cancer spreads most often to nearby tissues in the neck or to lymph nodes. It may also spread to the lungs and bones.

When cancer spreads from its original place to another part of the body, the new tumor has the same kind of cancer cells and the same name as the original tumor. For example, if thyroid cancer spreads to the lungs, the cancer cells in the lungs are actually thyroid cancer cells. The disease is **metastatic** thyroid cancer, not lung cancer. It's treated as thyroid cancer, not as lung cancer. Doctors sometimes call the new tumor in the lung “distant” disease.

Staging may involve one or more of these tests:

- **Ultrasound:** An ultrasound exam of your neck may show whether cancer has spread to lymph nodes or other tissues near your thyroid.
- **CT scan:** An **x-ray** machine linked to a computer takes a series of detailed pictures of your neck and chest area. A **CT scan** may show whether cancer has spread to lymph nodes, other areas in your neck, or your chest.
- **MRI:** **MRI** uses a powerful magnet linked to a computer. It makes detailed pictures of your neck and chest area. MRI may show whether cancer has spread to lymph nodes or other areas.

- **Chest x-ray:** An x-ray of the chest can often show whether cancer has spread to the lungs.
- **Whole body scan:** You may have a whole body scan to see if cancer has spread from the thyroid to other parts of the body. You get a small amount of a radioactive substance (such as radioactive iodine). The substance travels through the bloodstream. Thyroid cancer cells in other organs or the bones take up the substance. Thyroid cancer that has spread may show up on a whole body scan.

Treatment

Treatment options for people with thyroid cancer are...

- **Surgery**
- **Thyroid hormone treatment**
- **Radioactive iodine therapy**
- **External radiation therapy**
- **Chemotherapy**

You'll probably receive more than one type of treatment. For example, the usual treatment for papillary thyroid cancer is surgery, thyroid hormone treatment, and radioactive iodine therapy. **External radiation therapy** and **chemotherapy** are not often used for people with papillary thyroid cancer.

The treatment that's right for you depends mainly on the type of thyroid cancer (papillary, follicular, medullary, or anaplastic). It also depends on the size of the nodule, your age, and whether the cancer has spread. You and your doctor can work together to develop a treatment plan that meets your needs.

Your doctor may refer you to a specialist who has experience treating thyroid cancer, or you may ask for a referral. You may have a team of specialists:

- **Endocrinologist:** An **endocrinologist** is a doctor who specializes in treating people who have hormone disorders.
- **Thyroidologist:** A **thyroidologist** is an endocrinologist who specializes in treating diseases of the thyroid.
- **Surgeon:** This type of doctor can perform surgery.
- **Nuclear medicine doctor:** A **nuclear medicine** doctor specializes in using radioactive substances to diagnose and treat cancer and other diseases.
- **Medical oncologist:** A **medical oncologist** is a doctor who specializes in treating cancer with drugs.
- **Radiation oncologist:** A **radiation oncologist** is a doctor who specializes in treating cancer with **radiation therapy**.

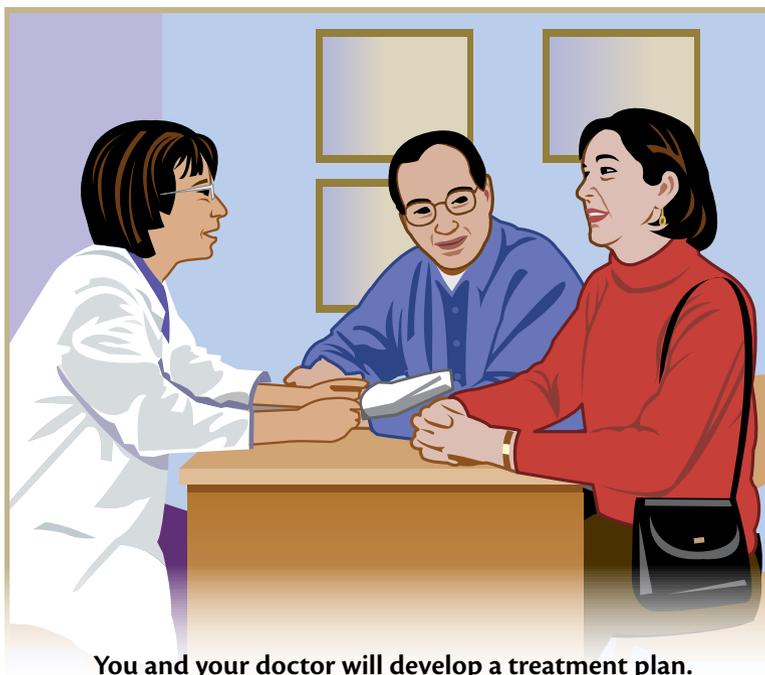
An **oncology nurse** and a **registered dietitian** may also be part of your team.

Your health care team can describe your treatment choices, the expected results of each treatment, and the possible **side effects**. Because cancer treatments often damage healthy cells and tissues, side effects are common. These side effects depend on many factors, including the type of treatment. Side effects may not be the same for each person, and they may even change from one treatment session to the next. Before treatment starts, ask your health care team about possible side effects and how treatment may change your normal activities.

At any stage of the disease, **supportive care** is available to control pain and other symptoms, to relieve the side effects of treatment, and to ease emotional concerns. You can get information about coping on NCI's website at <http://www.cancer.gov/cancertopics/coping>.

Also, you can get information about supportive care from NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)**. Or, chat using **LiveHelp**, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>.

You may want to talk with your doctor about taking part in a **clinical trial**. Clinical trials are research studies testing new treatments. They are an important option for people with all stages of thyroid cancer. See the section on **Taking Part in Cancer Research** on page 30.



You and your doctor will develop a treatment plan.

You may want to ask the doctor these questions before treatment begins:

- What type of thyroid cancer do I have? May I have a copy of the report from the pathologist?
- What is the stage of my disease? Has the cancer spread? If so, where?
- What are my treatment choices? Which do you recommend for me? Will I have more than one kind of treatment?
- What are the expected benefits of each kind of treatment?
- What are the risks and possible side effects of each treatment? What can we do to control the side effects?
- What can I do to prepare for treatment?
- Will I have to stay in the hospital? If so, for how long?
- What is the treatment likely to cost? Will my insurance cover the cost?
- How will treatment affect my normal activities?
- What is my chance of a full recovery?
- Would a research study (clinical trial) be right for me?

Surgery

Most people with thyroid cancer have surgery. The surgeon removes all or part of the thyroid.

You and your surgeon can talk about the types of surgery and which may be right for you:

- **Removing all of the thyroid:** This surgery can be used for all types of thyroid cancer. The surgeon removes the thyroid through an incision in the neck. If some of the thyroid tissue can't be removed, it can be destroyed later by radioactive iodine therapy. See the **Radioactive Iodine Therapy** section on page 19.

The surgeon may also remove nearby lymph nodes. If cancer has invaded tissue within the neck, the surgeon may remove as much of that tissue as possible. If cancer has spread outside the neck, treatment of those areas may involve surgery, radioactive iodine therapy, and external radiation therapy.

- **Removing a lobe:** Some people with follicular or papillary thyroid cancer may have a small tumor removed from only part of the thyroid. The surgeon will remove one lobe and the isthmus. See page 4 for a picture of the thyroid lobes and isthmus.

Some people who have a lobe removed have a second surgery later on to remove the rest of the thyroid. Less often, the remaining thyroid tissue is destroyed by radioactive iodine therapy.

It's common to feel tired or weak for a while after surgery for thyroid cancer. The time it takes to heal is different for each person.

You may have pain or discomfort for the first few days. Medicine can help control your pain. Before surgery, you should discuss the plan for pain relief with your health care team. After surgery, they can adjust the plan if you need more pain control.

Surgery for thyroid cancer removes the cells that make thyroid hormone. After surgery, most people need to take pills to replace the natural thyroid hormone. You'll probably need to take thyroid hormone pills for the rest of your life. See the **Thyroid Hormone Treatment** section on page 18.

If the surgeon removes the parathyroid glands, you may need to take calcium and vitamin D pills for the rest of your life.

In a few people, surgery may damage certain nerves or muscles. If this happens, a person may have voice problems or one shoulder may be lower than the other.

You may want to ask the doctor these questions before having surgery:

- Which type of surgery do you suggest for me?
- Do I need any lymph nodes removed? Will the parathyroid glands or other tissues be removed? Why?
- What are the risks of surgery?
- How many surgeries for thyroid cancer have you done?
- How will I feel after surgery? If I have pain, how will it be controlled?
- How long will I have to be in the hospital?
- What will my scar look like?
- Will I have any lasting side effects?
- Will I need to take thyroid hormone pills? If so, how soon will I start taking them? Will I need to take them for the rest of my life?
- When can I get back to my normal activities?

Thyroid Hormone Treatment

After surgery to remove part or all of the thyroid, most people need to take pills to replace the natural thyroid hormone. However, thyroid hormone pills are also used as part of the treatment for papillary or follicular thyroid cancer. Thyroid hormone slows the growth of thyroid cancer cells left in the body after surgery.

Although thyroid hormone pills seldom cause side effects, too much thyroid hormone may cause you to lose weight and to feel hot and sweaty. Too much thyroid hormone may also cause a fast heart rate, chest pain, cramps, and diarrhea. Too little thyroid hormone may cause you to gain weight, feel cold and tired, and have dry skin and hair. If you have side effects, tell your doctor. Your doctor can give you a blood test to make sure you're getting the right dose of thyroid hormone.

You may want to ask the doctor these questions before taking thyroid hormone:

- Why do I need this treatment?
- What will it do?
- How long will I be on this treatment?

Radioactive Iodine Therapy

Radioactive iodine therapy with I-131 is a treatment for papillary or follicular thyroid cancer. It kills thyroid cancer cells and normal thyroid cells that remain in the body after surgery.

People with medullary or anaplastic thyroid cancer usually do not receive I-131 therapy. These types of thyroid cancer rarely respond to I-131 therapy.

For one or two weeks before treatment, you will need to be on a special diet. Avoid fish (especially shellfish), seaweed, iodized salt, milk, yogurt, ice cream, bacon, ham, and other foods with iodine. Do not take vitamin pills or drugs that have iodine.

Because some imaging tests (such as CT scans) use iodine in the **contrast material**, tell your doctor if you had a CT scan or other imaging test in the past 6 months.

For the treatment, you will swallow one or more capsules or a liquid that contains I-131. Even people who are allergic to iodine can take I-131 therapy safely. I-131 goes into the bloodstream and travels to thyroid cancer cells throughout the body. When thyroid cancer cells take in enough I-131, they die.

Many people get I-131 therapy in a clinic or in the outpatient area of a hospital and can go home afterward. Other people have to stay in the hospital for one day or longer.

Most **radiation** from I-131 is gone in about one week. Within three weeks, only traces of radiation remain in the body.

During treatment, you can help protect your bladder and other healthy tissues by drinking a lot of fluids. Drinking fluids helps I-131 pass out of the body faster.

Some people have mild nausea the first day of I-131 therapy. A few people have swelling and pain in the neck where thyroid cells remain. If thyroid cancer cells have spread outside the neck, those areas may be painful too.

You may have a dry mouth or lose your sense of taste or smell for a short time after I-131 therapy. Gum or hard candy may help.

A rare side effect in men who receive a high dose of I-131 is loss of **fertility**. In women, I-131 may not cause loss of fertility, but some doctors advise women to avoid getting pregnant for one year after a high dose of I-131.

Researchers have reported that a very small number of patients may develop a second cancer years after treatment with a high dose of I-131. See the **Follow-up Care** section on page 27 for information about checkups after treatment.

Because a high dose of I-131 also kills normal thyroid cells, you'll need to take thyroid hormone pills after this treatment to replace the natural hormone.

You may want to ask the doctor these questions before having I-131 therapy:

- Why do I need this treatment?
- What will it do?
- How do I prepare for this treatment? Which foods and drugs should I avoid? For how long?
- Will I need to stay in the hospital for this treatment? If so, for how long?
- How do I protect my family members and others from the radiation? For how many days?
- Will I-131 therapy cause side effects? What can I do about them?
- What is the chance that I will be given I-131 therapy again in the future?

External Radiation Therapy

External radiation therapy is a treatment for any type of thyroid cancer that can't be treated with surgery or I-131 therapy. It's also sometimes used for cancer that returns after treatment or to relieve bone pain from cancer that has spread.

External radiation therapy uses high-energy rays to kill cancer cells. A large machine directs radiation at the neck or other tissues where cancer has spread.

The treatment usually is given in a hospital or clinic. You may receive external radiation therapy 5 days a week for several weeks. Each treatment takes only a few minutes.

Although radiation therapy is painless, it may cause side effects. The side effects depend mainly on how much radiation is given and which part of your body is treated. Radiation to the neck may cause a sore throat and trouble swallowing. Also, the skin on your neck may become red, dry, and tender.

You are likely to become tired during radiation therapy, especially in the later weeks of treatment. Resting is important, but doctors usually advise patients to try to stay as active as they can.

Although the side effects of radiation therapy can be upsetting, they can usually be treated or controlled. Talk with your doctor or nurse about ways to relieve discomfort. Most side effects go away when treatment ends.

You may find it helpful to read the NCI booklet *Radiation Therapy and You*.

You may want to ask the doctor these questions before having radiation therapy:

- What is the goal of this treatment?
- Will I need to stay in the hospital? If so, for how long?
- When will the treatments begin? How often will I have them? When will they end?
- How will I feel during treatment? What are the side effects?
- How will we know if the radiation therapy is working?
- Will I be able to continue my normal activities during treatment?
- Are there lasting side effects?

Chemotherapy

Chemotherapy is a treatment for medullary and anaplastic thyroid cancer. It's sometimes used to relieve symptoms of other thyroid cancers.

Chemotherapy uses drugs to kill cancer cells. Most drugs for thyroid cancer are given directly into a vein (**intravenously**) through a thin needle, but a new drug for medullary thyroid cancer can be taken by mouth.

You may receive chemotherapy in a clinic, at the doctor's office, or at home. Some people need to stay in the hospital during treatment.

The side effects depend mainly on which drugs are given and how much. For drugs given directly into a vein, the most common side effects include mouth sores, nausea, vomiting, loss of appetite, and hair loss. For the drug given by mouth, side effects include diarrhea, high blood pressure, coughing, and a rash.

Your health care team can suggest ways to control many of these problems. Most go away when treatment ends.

You may want to read the NCI booklet *Chemotherapy and You*.

You may want to ask the doctor these questions before having chemotherapy:

- What is the goal of treatment?
- What are the risks and possible side effects of treatment? What can we do about them?
- When will treatment start? When will it end?
- How will treatment affect my normal activities?

Second Opinion

Before starting treatment, you might want a second opinion about your diagnosis and treatment plan. Some people worry that the doctor will be offended if they ask for a second opinion. Usually the opposite is true. Most doctors welcome a second opinion. And many health insurance companies will pay for a second opinion if you or your doctor requests it. Some companies require a second opinion.

If you get a second opinion, the second doctor may agree with your first doctor's diagnosis and treatment plan. Or the second doctor may suggest another approach. Either way, you have more information and perhaps a greater sense of control. You can feel more confident about the decisions you make, knowing that you've looked at all of your options.

It may take some time and effort to gather your medical records and see another doctor. In most cases, it's not a problem to take several weeks to get a second opinion. The

delay in starting treatment usually will not make treatment less effective. To make sure, you should discuss this delay with your doctor.

There are many ways to find a doctor for a second opinion. You can ask your doctor, a local or state medical society, or a nearby hospital or medical school for names of specialists.

Also, you can get information about treatment centers near you from NCI's Cancer Information Service.

Call **1-800-4-CANCER (1-800-422-6237)**. Or, chat using **LiveHelp**, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>.

Other sources can be found in the NCI fact sheet *How To Find a Doctor or Treatment Facility If You Have Cancer*.



Ask your doctor how often you'll need checkups.

Follow-up Care

You'll need regular checkups (such as every year) after treatment for thyroid cancer. Checkups help ensure that any changes in your health are noted and treated if needed. If you have any health problems between checkups, you should contact your doctor.

Thyroid cancer may come back after treatment. Your doctor will check for the return of cancer.

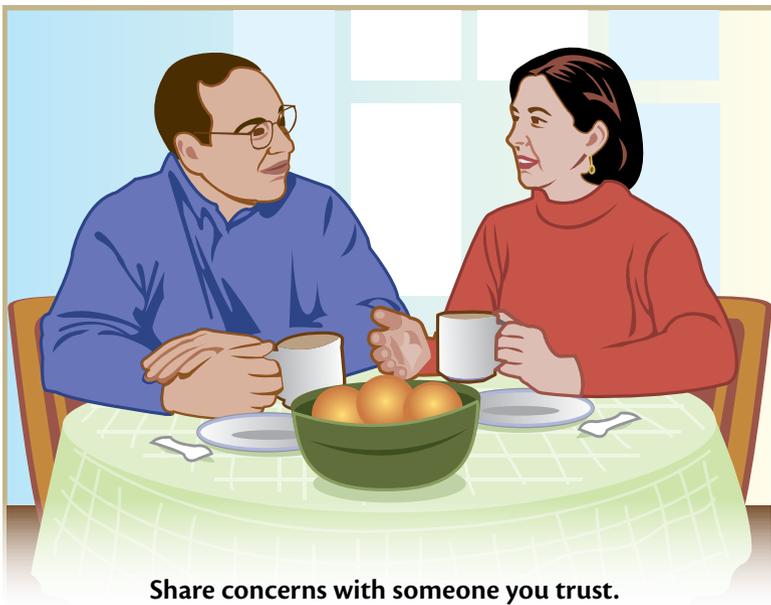
Checkups may include blood tests and imaging tests, such as neck ultrasound. The tests depend on what type of thyroid cancer you have:

- **Papillary or Follicular:** After treatment for papillary or follicular thyroid cancer, people have an ultrasound exam of the neck, a whole body scan, or blood tests to check the levels of TSH and **thyroglobulin**. If the whole thyroid was removed, very little or no thyroglobulin should be in the blood. A high level of thyroglobulin may mean that thyroid cancer has returned. Before a thyroglobulin test or whole body scan, you'll need to get a shot of TSH or stop taking your thyroid hormone pill for about six weeks.
- **Medullary:** After treatment for medullary thyroid cancer, people have blood tests to check the level of calcitonin and other substances. Checkups may also include an ultrasound exam of the neck, a CT scan, an MRI, or another imaging test.
- **Anaplastic:** After treatment for anaplastic thyroid cancer, people may have imaging tests, such as a chest x-ray or CT scan.

You may find it helpful to read the NCI booklet *Facing Forward: Life After Cancer Treatment*. You may also want to read the NCI fact sheet *Follow-up Care After Cancer Treatment*.

You may want to ask your doctor these questions after you have finished treatment:

- How often will I need checkups?
- Which follow-up tests do you suggest for me? Do I need to avoid iodized salt and other sources of iodine before any of these tests?
- Between checkups, what health problems or symptoms should I tell you about?



Share concerns with someone you trust.

Sources of Support

Learning that you have thyroid cancer can change your life and the lives of those close to you. These changes can be hard to handle. It's normal for you, your family, and your friends to need help coping with the feelings that a diagnosis of cancer can bring.

Concerns about treatments and managing side effects, hospital stays, and medical bills are common. You may also worry about caring for your family, keeping your job, or continuing daily activities.

Here's where you can go for support:

- Doctors, nurses, and other members of your health care team can answer questions about treatment, working, or other activities.

- Social workers, counselors, or members of the clergy can be helpful if you want to talk about your feelings or concerns. Often, social workers can suggest resources for financial aid, transportation, home care, or emotional support.
- Support groups also can help. In these groups, patients or their family members meet with other patients or their families to share what they have learned about coping with cancer and the effects of treatment. Groups may offer support in person, over the telephone, or on the Internet. You may want to talk with a member of your health care team about finding a support group.
- NCI's Cancer Information Service can help you locate programs, services, and NCI publications. Call **1-800-4-CANCER (1-800-422-6237)**. Or, chat using **LiveHelp**, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>.

For tips on coping, you may want to read the NCI booklet *Taking Time: Support for People With Cancer*.

Taking Part in Cancer Research

Doctors all over the world are conducting many types of clinical trials (research studies in which people volunteer to take part). Research has already led to advances in the treatment of thyroid cancer.

Doctors continue to search for new and better ways to treat thyroid cancer. They are testing new treatments, especially chemotherapy.

Clinical trials are designed to find out whether new treatments are safe and effective. Even if the people in a

trial don't benefit directly, they may still make an important contribution by helping doctors learn more about thyroid cancer and how to control it. Although clinical trials may pose some risks, researchers do all they can to protect their patients.

If you're interested in being part of a clinical trial, talk with your doctor. You may want to read the NCI booklet *Taking Part in Cancer Treatment Research Studies*. It describes how treatment studies are carried out and explains their possible benefits and risks.

NCI's website includes a section on clinical trials at <http://www.cancer.gov/clinicaltrials>. It has general information about clinical trials as well as detailed information about specific ongoing studies of thyroid cancer.

NCI's Cancer Information Service can answer your questions and provide information about clinical trials. Contact CIS at **1-800-4-CANCER (1-800-422-6237)** or at **LiveHelp** (<http://www.cancer.gov/livehelp>).

Another agency of the Federal Government, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), sponsors research studies for people with thyroid cancer and other thyroid diseases. NIDDK's website is at <http://www.niddk.nih.gov>.

You can find NCI and NIDDK studies described at <http://www.clinicaltrials.gov>. This website provides the latest information about federally and privately supported clinical trials.

Words to Know

Definitions of thousands of terms are on NCI's website in NCI's Dictionary of Cancer Terms. You can access it at <http://www.cancer.gov/dictionary>.

Anaplastic thyroid cancer (A-nuh-PLAS-tik THY-royd KAN-ser): A rare, aggressive type of thyroid cancer in which the malignant (cancer) cells look very different from normal thyroid cells.

Benign (beh-NINE): Not cancerous. Benign tumors may grow larger but do not spread to other parts of the body.

Biopsy (BY-op-see): The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue.

Blood vessel: A tube through which the blood circulates in the body. Blood vessels include a network of arteries, arterioles, capillaries, venules, and veins.

C cell: A type of cell in the thyroid. C cells make calcitonin, a hormone that helps control the calcium level in the blood.

Calcitonin (KAL-sih-TOH-nin): A hormone formed by the C cells of the thyroid gland. It helps maintain a healthy level of calcium in the blood. When the calcium level is too high, calcitonin lowers it.

Calcium (KAL-see-um): A mineral needed for healthy teeth, bones, and other body tissues. It is the most common mineral in the body. A deposit of calcium in body tissues, such as breast tissue, may be a sign of disease.

Cancer (KAN-ser): A term for diseases in which abnormal cells divide without control and can invade nearby tissues. Cancer cells can also spread to other parts of the body through the blood and lymph systems.

Cell: The individual unit that makes up the tissues of the body. All living things are made up of one or more cells.

Chemotherapy (KEE-moh-THAYR-uh-pee): Treatment with drugs that kill cancer cells.

Clinical trial (KLIH-nih-kul TRY-ul): A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease.

Contrast material (KON-trast muh-TEER-ee-ul): A dye or other substance that helps to show abnormal areas inside the body. It is given by injection into a vein, by enema, or by mouth. Contrast material may be used with x-rays, CT scans, MRI, or other imaging tests.

CT scan: A series of detailed pictures of areas inside the body taken from different angles. The pictures are created by a computer linked to an x-ray machine. Also called CAT scan, computed tomography scan (kum-PYOO-ted tuh-MAH-gruh-fee skan), computerized axial tomography scan, and computerized tomography.

Endocrinologist (en-duh-krih-NAH-loh-jist): A doctor who specializes in diagnosing and treating hormone disorders.

External radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): A type of radiation therapy that uses a machine to aim high-energy rays at the cancer from outside of the body. Also called external-beam radiation therapy.

Familial medullary thyroid cancer (fuh-MIH-lee-ul MED-yoo-LAYR-ee THY-royd KAN-ser): An inherited form of medullary thyroid cancer (cancer that forms in the cells of the thyroid that make the hormone calcitonin).

Fertility (fer-TIL-i-tee): The ability to produce children.

Follicular thyroid cancer (fuh-LIH-kyoo-ler THY-royd KAN-ser): Cancer that forms in follicular cells in the thyroid. It grows slowly and is highly treatable.

Gene (JEEN): The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein.

Gland: An organ that makes one or more substances, such as hormones, digestive juices, sweat, tears, saliva, or milk.

Hormone (HOR-mone): One of many chemicals made by glands in the body. Hormones circulate in the bloodstream and control the actions of certain cells or organs. Some hormones can also be made in the laboratory.

Intravenous (IN-truh-VEE-nus): Into or within a vein. Intravenous usually refers to a way of giving a drug or other substance through a needle or tube inserted into a vein. Also called IV.

Isthmus (iz-muhs): A narrow part inside the body that connects two larger structures.

Larynx (LAYR-inx): The area of the throat containing the vocal cords and used for breathing, swallowing, and talking. Also called voice box.

Lymph node (limf): A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph (lymphatic fluid), and they store lymphocytes (white blood cells). They are located along lymphatic vessels. Also called a lymph gland.

Lymph vessel (limf): A thin tube that carries lymph (lymphatic fluid) and white blood cells through the lymphatic system. Also called lymphatic vessel.

Malignant (muh-LIG-nunt): Cancerous. Malignant cells can invade and destroy nearby tissue and spread to other parts of the body.

Medical oncologist (MEH-dih-kul on-KAH-loh-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, and biological therapy. A medical oncologist often is the main health care provider for someone who has cancer. A medical oncologist also gives supportive care and may coordinate treatment given by other specialists.

Medullary thyroid cancer (MED-yoo-LAYR-ee THY-royd KAN-ser): Cancer that develops in C cells of the thyroid. The C cells make a hormone (calcitonin) that helps maintain a healthy level of calcium in the blood.

Metastatic (meh-tuh-STA-tik): Having to do with metastasis, which is the spread of cancer from the primary site (place where it started) to other places in the body.

MRI: A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue. MRI makes

better images of organs and soft tissue than other scanning techniques, such as computed tomography (CT) or x-ray. MRI is especially useful for imaging the brain, the spine, the soft tissue of joints, and the inside of bones. Also called magnetic resonance imaging (mag-NEH-tik REH-zuh-nunts IH-muh-jing).

Multiple endocrine neoplasia syndrome (MUL-tih-pul EN-doh-krin NEE-oh-PLAY-zhuh SIN-drome): An inherited condition that may result in the development of cancers of the endocrine system. There are several types of multiple endocrine neoplasia syndrome, and patients with each type may develop different types of cancer. The altered genes that cause each type can be detected with a blood test. Also called MEN syndrome.

Nodule (NAH-jool): A growth or lump that may be malignant (cancer) or benign (not cancer).

Nuclear medicine (NOO-klee-er MEH-dih-sin): A branch of medicine that uses small amounts of radioactive substances to make pictures of areas inside the body and to treat disease.

Oncology nurse (on-KAH-loh-jee): A nurse who specializes in treating and caring for people who have cancer.

Organ: A part of the body that performs a specific function. For example, the heart is an organ.

Papillary thyroid cancer (PA-pih-LAYR-ee THY-royd KAN-ser): Cancer that forms in follicular cells in the thyroid and grows in small finger-like shapes. It grows slowly, is more common in women than in men, and often occurs before age 45. It is the most common type of thyroid cancer.

Parathyroid gland (PAYR-uh-THY-royd): One of four pea-sized glands found on the surface of the thyroid. The parathyroid hormone made by these glands increases the calcium level in the blood.

Parathyroid hormone (PAYR-uh-THY-royd HOR-mone): A substance made by the parathyroid gland that helps the body store and use calcium. A higher-than-normal amount of parathyroid hormone causes high levels of calcium in the blood and may be a sign of disease.

Pathologist (puh-THAH-loh-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

Radiation (RAY-dee-AY-shun): Energy released in the form of particle or electromagnetic waves. Common sources of radiation include radon gas, cosmic rays from outer space, medical x-rays, and energy given off by a radioisotope (unstable form of a chemical element that releases radiation as it breaks down and becomes more stable).

Radiation oncologist (RAY-dee-AY-shun on-KAH-loh-jist): A doctor who specializes in using radiation to treat cancer.

Radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): The use of high-energy radiation from x-rays, gamma rays, neutrons, protons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called irradiation and radiotherapy.

Radioactive (RAY-dee-oh-AK-tiv): Giving off radiation.

Radioactive iodine (RAY-dee-oh-AK-tiv I-oh-dine): A radioactive form of iodine, often used for imaging tests or to treat an overactive thyroid, thyroid cancer, and certain other cancers. For imaging tests, the patient takes a small dose of radioactive iodine that collects in thyroid cells and certain kinds of tumors and can be detected by a scanner. To treat thyroid cancer, the patient takes a large dose of radioactive iodine, which kills thyroid cells. Radioactive iodine is given by mouth as a liquid or in capsules, by infusion, or sealed in seeds, which are placed in or near the tumor to kill cancer cells.

Registered dietitian (dy-eh-TIH-shun): A health professional with special training in the use of diet and nutrition to keep the body healthy. A registered dietitian may help the medical team improve the nutritional health of a patient.

Side effect: A problem that occurs when treatment affects healthy tissues or organs. Some common side effects of cancer treatment are fatigue, pain, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

Supportive care (suh-POR-tiv): Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease, and psychological, social, and spiritual problems related to a disease or its treatment. Also called comfort care, palliative care, and symptom management.

Surgeon (SER-jun): A doctor who removes or repairs a part of the body by operating on the patient.

Surgery (SER-juh-ree): A procedure to remove or repair a part of the body or to find out whether disease is present. An operation.

Thyroglobulin (THY-roh-GLAH-byoo-lin): The form that thyroid hormone takes when stored in the cells of the thyroid. If the thyroid has been removed, thyroglobulin should not show up on a blood test. Doctors measure thyroglobulin level in blood to detect thyroid cancer cells that remain in the body after treatment.

Thyroid (THY-royd): A gland located beneath the larynx (voice box) that makes thyroid hormone and calcitonin. The thyroid helps regulate growth and metabolism. Also called thyroid gland.

Thyroid follicular cell (THY-royd fuh-LIH-kyoo-ler sel): A type of cell in the thyroid. Thyroid follicular cells make thyroid hormone.

Thyroid hormone (THY-royd HOR-mone): A hormone that affects heart rate, blood pressure, body temperature, and weight. Thyroid hormone is made by the thyroid gland and can also be made in the laboratory.

Thyroid-stimulating hormone (THY-royd STIM-yoo-LAY-ting HOR-mone): A hormone produced by the pituitary gland. Thyroid-stimulating hormone stimulates the release of thyroid hormone from thyroglobulin. It also stimulates the growth of thyroid follicular cells. An abnormal thyroid-stimulating hormone level may mean that the thyroid

hormonal regulation system is out of control, usually as a result of a benign condition (hyperthyroidism or hypothyroidism). Also called TSH.

Thyroidologist (THY-roy-DOL-oh-jist): A medical doctor who specializes in thyroid diseases.

Tissue (TISH-oo): A group or layer of cells that work together to perform a specific function.

Tumor (TOO-mer): An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumors may be benign (not cancer), or malignant (cancer). Also called neoplasm.

Ultrasound (UL-truh-SOWND): A procedure in which high-energy sound waves are bounced off internal tissues or organs and make echoes. The echo patterns are shown on the screen of an ultrasound machine, forming a picture of body tissues called a sonogram. Also called ultrasonography.

X-ray: A type of high-energy radiation. In low doses, x-rays are used to diagnose diseases by making pictures of the inside of the body. In high doses, x-rays are used to treat cancer.

National Cancer Institute Publications

NCI provides publications about cancer, including the booklets and fact sheets mentioned in this booklet. Many are available in both English and Spanish.

You may read NCI publications online and print your own copy. Also, you may order publications:

- **NCI's telephone service:** People in the United States and its territories may order these and other NCI publications by calling NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)**.
- **NCI's website:** Many NCI publications may be viewed, downloaded, and ordered from **<http://www.cancer.gov/publications>**.

Publications by Topic

■ Cancer Treatment and Supportive Care

- *How To Find a Doctor or Treatment Facility If You Have Cancer (also in Spanish)*
- *Radiation Therapy and You (also in Spanish)*
- *Chemotherapy and You (also in Spanish)*
- *Eating Hints (also in Spanish)*
- *Pain Control (also in Spanish)*

■ Research Studies

- *Taking Part in Cancer Treatment Research Studies*
- *Providing Your Tissue for Research: What You Need To Know*

- *Donating Tissue for Cancer Research: Biospecimens and Biorepositories*

■ **Coping With Cancer**

- *Taking Time: Support for People with Cancer*

■ **Life After Cancer Treatment**

- *Facing Forward: Life After Cancer Treatment (also in Spanish)*
- *Follow-up Care After Cancer Treatment*
- *Facing Forward: Making a Difference in Cancer*

■ **Advanced or Recurrent Cancer**

- *Coping With Advanced Cancer*
- *When Cancer Returns*

■ **Complementary Medicine**

- *Thinking about Complementary & Alternative Medicine*

■ **Caregivers**

- *When Someone You Love Is Being Treated for Cancer: Support for Caregivers*
- *When Someone You Love Has Advanced Cancer: Support for Caregivers*
- *Facing Forward: When Someone You Love Has Completed Cancer Treatment*
- *Caring for the Caregiver: Support for Cancer Caregivers*

The National Cancer Institute

The National Cancer Institute (NCI), part of the National Institutes of Health, is the Federal Government's principal agency for cancer research and training. NCI conducts and supports basic and clinical research to find better ways to prevent, diagnose, and treat cancer. The Institute also supports education and training for cancer research and treatment programs. In addition, NCI is responsible for communicating its research findings to the medical community and the public.

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