

Thyroid cancer is the most common endocrine-related cancer; however, it is rare compared to other cancers. In the United States there are only about 20,000 new patients annually. Even though the diagnosis of cancer is terrifying, the outlook for patients with thyroid cancer is usually excellent. First, most thyroid cancer is easily curable with surgery. Second, thyroid cancer rarely causes pain or disability. Third, effective and well-tolerated treatment is available for the most common forms of thyroid cancer.

## ADDITIONAL PATIENT RESOURCES [WWW.THYROID.ORG](http://WWW.THYROID.ORG)

For further details on this and other thyroid-related topics, please visit the patient resources section on the American Thyroid Association website at [www.thyroid.org](http://www.thyroid.org)

## 1 SYMPTOMS

### What are the symptoms of thyroid cancer?

The key sign of thyroid cancer is a lump (nodule) in the thyroid, and most thyroid cancers do not cause any symptoms (see [Thyroid Nodule brochure](#)). Instead, your doctor may discover the nodule during a routine physical examination or you may notice a lump in your neck while looking in a mirror. A few patients with thyroid cancer complain of pain in the neck, jaw or ear. If the cancer is large enough, it may cause difficulty swallowing or cause a “tickle in the throat” or shortness of breath if it is pressing on the windpipe. Rarely, hoarseness can be caused if the cancer irritates a nerve to the voice box.

## 2 CAUSES

### What causes thyroid cancer?

Thyroid cancer is more common in people who have a history of exposure of the thyroid gland to radiation, have a family history of thyroid cancer, and are older than 40 years of age. However, for most patients, we do not know the specific reason why they develop thyroid cancer.

Exposure of the thyroid to radiation causes thyroid cancer in susceptible patients, especially if the exposure occurred as a child. Many years ago (ie, in the 1940s and 1950s), radiation exposure included X-ray treatments for acne, inflamed tonsils, adenoids, lymph nodes, or an enlarged thymus gland. X-rays also were used to measure foot sizes in shoe stores. Currently, X-ray exposure is usually limited to treatment of serious cancers such as Hodgkin’s disease (cancer of the lymph nodes). Routine X-ray exposure (eg, dental X-rays, chest X-rays, mammograms) does not cause thyroid cancer.

Thyroid cancer can be caused by absorbing radioactive iodine released during a nuclear power plant emergency, such as the 1986 nuclear accident at the Chernobyl power plant in Russia. Children who were exposed were the most affected, and cancers were seen within a few years of that disaster. You can be protected from developing thyroid cancer due to a nuclear power plant emergency by taking potassium iodide, which blocks your thyroid from absorbing radioactive iodine. The United States government is currently developing guidelines to distribute potassium iodide to people living near nuclear power plants.

## 3 DIAGNOSIS

### How is thyroid cancer diagnosed?

A diagnosis of thyroid cancer is made on the basis of a biopsy of a thyroid nodule or after the nodule is removed during surgery (see [Thyroid Nodule brochure](#)). Although thyroid nodules are very common, less than 1 in 10 harbor a thyroid cancer.

### What are the types of thyroid cancer?

**Papillary thyroid cancer.** *Papillary* thyroid cancer is the most common type, making up about 70% to 80% of all thyroid cancers. Papillary thyroid cancer can occur at any age. There are only about 12,000 new cases of papillary cancer in the United States each year, but because these patients have such a long life expectancy, we estimate that 1 in a 1000 people in the United States have or have had this form of cancer. Papillary cancer tends to grow slowly and to spread first to lymph glands in the neck. Unlike some other tumors, the generally excellent outlook for papillary cancer is usually not affected by spread of the cancer to the lymph nodes.

**Follicular thyroid cancer.** *Follicular* thyroid cancer, which makes up about 10% to 15% of all thyroid cancers in the United States, tends to occur in somewhat older patients than does papillary cancer. As with papillary cancer, follicular cancer first can grow into lymph nodes in the neck. Follicular cancer is also more likely than papillary cancer to grow into blood vessels and from there to spread to distant areas, particularly the lungs and bones.

**Medullary thyroid cancer.** *Medullary* thyroid cancer, which accounts for 5% to 10% of all thyroid cancers, is more likely to run in families and be associated with other endocrine problems. In fact, medullary thyroid cancer is the only thyroid cancer that can be diagnosed by genetic testing of the blood cells. In family members of an affected person, a positive test for the *RET proto-oncogene* can lead to an early diagnosis of medullary thyroid cancer and, subsequently, curative surgery to remove it.

**Anaplastic thyroid cancer.** *Anaplastic* thyroid cancer is the most advanced and aggressive thyroid cancer and is the least likely to respond to treatment. Fortunately, anaplastic thyroid cancer is rare and found in less than 5% of patients with thyroid cancer.

## 4 TREATMENT

### What is the treatment for thyroid cancer?

**Surgery.** The primary therapy for all forms of thyroid cancer is surgery. The generally accepted approach is to remove the entire thyroid gland, or as much of it as can be safely removed. After surgery, patients need to be on thyroid hormone for the rest of their life (see [Thyroid Hormone Treatment brochure](#)). Often the thyroid cancer is cured by surgery alone, especially if the cancer is small. If the cancer is large within the thyroid or if it has spread to lymph nodes or if your doctor feels that you are at high risk for recurrent cancer, radioactive iodine can be used as a “magic bullet” to destroy thyroid cancer cells after removal of the thyroid gland by surgery.

**Radioactive iodine therapy.** A major reason for the usually excellent prognosis for patients with papillary and follicular thyroid cancer is that radioactive iodine can be used as a magic bullet to seek out and destroy thyroid cancer cells with little or no damage to other tissues in the body. Thyroid cells normally concentrate iodine from the bloodstream to use to produce the thyroid hormones. By contrast, thyroid cancer cells usually take up only tiny amounts of iodine. However, high levels of thyroid stimulating hormone (TSH) can arouse thyroid cancer cells to take up significant amounts of iodine.

If your doctor recommends radioactive iodine therapy, high levels of TSH will be produced in your body by making you hypothyroid for a short time—either by not starting thyroid hormone pills after the thyroid gland is removed or by stopping your thyroid hormone pills if you are already on medication. Sometimes, to minimize your symptoms of hypothyroidism, your doctor may prescribe Cytomel™ (T3) to take while you are becoming hypothyroid. Also, you may be asked to go on a low iodine diet before the treatment to increase the effectiveness of the radioactive iodine. Once the TSH level is high enough, a *whole body iodine scan* is done by administering a small dose of radioactive iodine to determine if there are remaining thyroid cells that need to be destroyed. If enough cells show up on the whole-body iodine scan, a large dose of radioactive iodine (<sup>131</sup>I) is given, and then the thyroid pills are re-started. Radioactive iodine therapy has proved to be safe and well-tolerated, and it has even been able to cure cases of thyroid cancer that had already spread to the lungs.

### What is the follow-up for patients with thyroid cancer?

Periodic follow-up examinations are essential for all patients with thyroid cancer because the thyroid cancer can return—sometimes many years after the apparently successful initial treatment. These follow-up visits include a careful history and physical examination, with particular attention to the neck area, as well as blood tests to determine if any changes of your thyroid hormone dose are needed. In particular, blood tests are done to measure the levels of T4 and TSH as well as a thyroid cell protein, *thyroglobulin*, which serves as a thyroid cancer marker. The thyroid hormone dose is adjusted to lower the TSH level into the low range. If the thyroglobulin level is still detectable despite a TSH in the low range, it means that there still are potential thyroid cancer cells functioning in the body. This finding may lead to additional tests and possible further treatment with radioactive iodine and/or surgery. Unfortunately, in some thyroid cancer patients the presence of interfering antibodies in the blood may prevent accurate thyroglobulin measurement.

In addition to routine blood tests, your doctor may want to repeat periodically a whole-body iodine scan to determine if any thyroid cells remain. This can be done after your TSH level is raised, either by stopping your thyroid hormone and your becoming hypothyroid (see above) or by administering Thyrogen™ (synthetic human TSH) injections.

### What is the prognosis of thyroid cancer?

Overall, the prognosis of thyroid cancer is very good. In general, the prognosis is better in younger patients than in those over 40 years of age. Patients with papillary carcinoma who have a primary tumor that is confined to the thyroid gland itself have an excellent outlook: only 1 out of every 100 such patients have died of thyroid cancer by 25 years later. The prognosis is not quite as good in patients over the age of 40, or in patients with tumors larger than 4 centimeters (1½ inches) in diameter. Still, even those patients who are unable to be cured of their thyroid cancer are able to live a long time and feel well despite their cancer.

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