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## ALL ABOUT HEAD & NECK CANCERS



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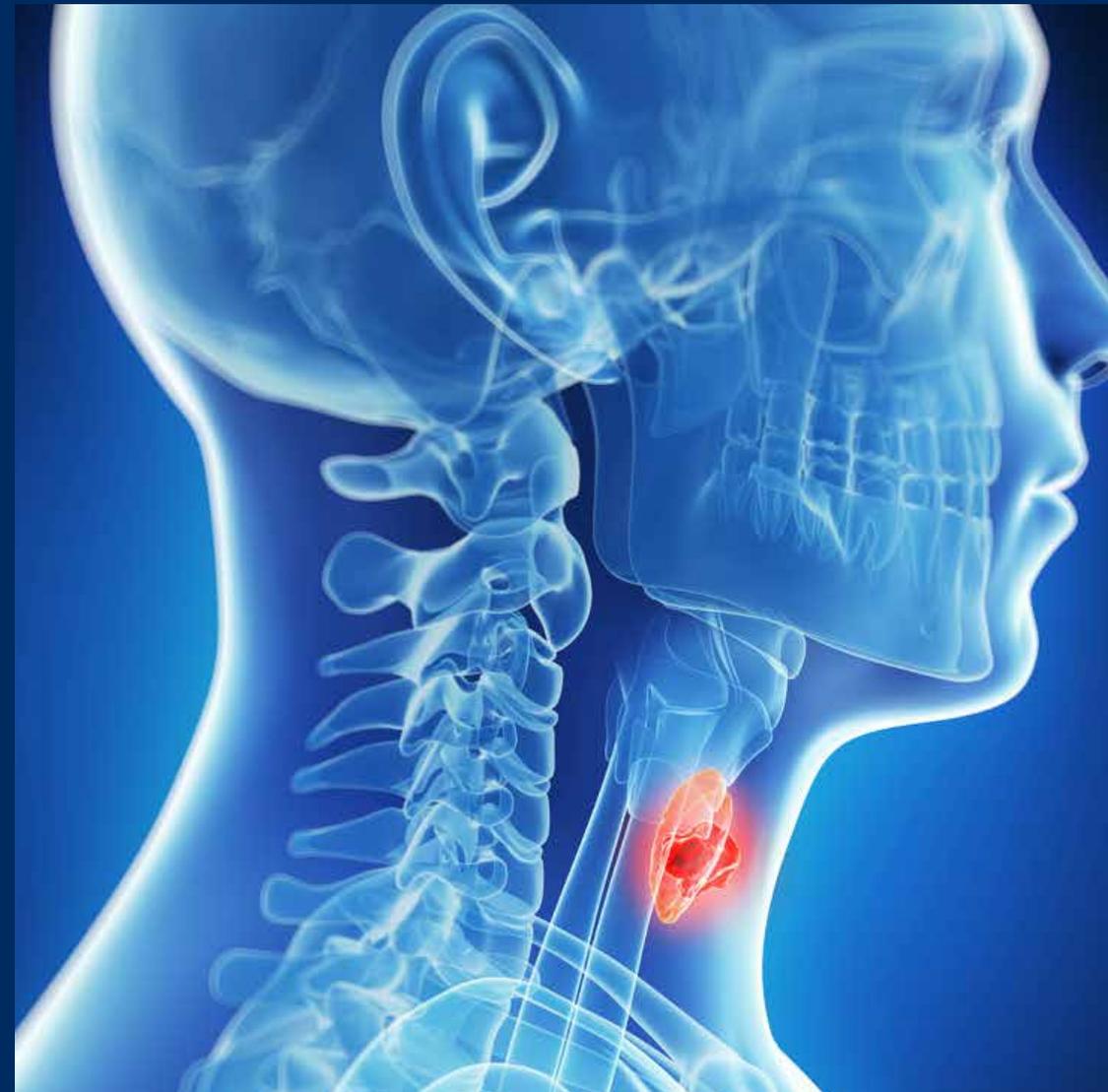
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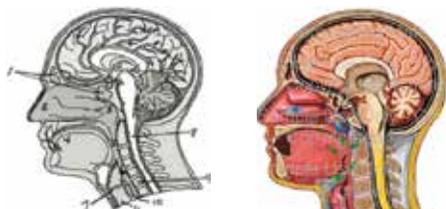


## What is the "head and neck?"

It is important when talking about head and neck cancers that you understand exactly which areas these cancers include. The pharynx is a tube about 5 inches long, extending from the back of the nose to the area where the esophagus (tube to the stomach) and the trachea (tube to the lungs) both begin. In terms of head and neck cancers, the pharynx and the surrounding structures are divided into several areas:

- **Oral cavity:** includes the lips, front part of the tongue, roof of the mouth (hard palate), floor of the mouth, parts of the gum line (alveolar ridge), and the inside lining of the cheeks (buccal mucosa).
- **Nasopharynx:** includes the nasopharynx (area of the pharynx behind the nose) and the lining of the nose.
- **Oropharynx:** includes the posterior pharynx wall (area of the pharynx behind the mouth), the soft part of the roof of the mouth (soft palate), tonsils, and the base of the tongue.
- **Hypopharynx:** includes the area of the pharynx below the oropharynx down to the esophagus.
- **Larynx:** includes the voice box (larynx), which is located just below the pharynx, and the epiglottis, which is a flap of tissue that prevents saliva and food from entering the trachea when one swallows.
- **Sinuses:** (frontal, ethmoid, maxillary, sphenoid) and salivary glands (major and minor glands).
- **Parts of the ear** (external auditory canal, middle and inner ear).
- **Neck** (lymph nodes, etc.).

This graphic is looking at a head that is cut down the center.



1. Sinuses,
2. Lining of the nose,
3. Nasopharynx,
4. Tongue,
5. Oropharynx,
6. Hypopharynx,
7. Larynx,
8. Spinal cord,
9. Vertebrae,
10. Esophagus,
11. Trachea

### What are head and neck cancers?

In the United States, there will be an estimated 45,780 new cases of head and neck cancer (HNCA) in 2015, with an estimated 8,650 people dying from the disease. The rate of new head and neck cancer diagnoses has slowly declined as the number of people smoking has declined. The variations in rates around the world are a result of differences in dietary and tobacco habits, alcohol use, and viral and environmental exposures.



You can see that this category encompasses quite a few different cancers. All cancers begin when abnormal cells in a part of the body begin to grow in an out-of-control manner. That is about where the similarities end, as different cancer types are treated in different ways, and head and neck cancers are no exception.

### What are the causes of head and neck cancer, and am I at risk?

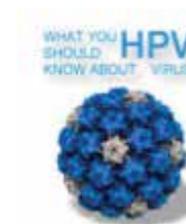
It is estimated that 75% of all head and neck cancers are caused by tobacco and alcohol use. Tobacco includes cigarettes, cigars, pipes, and smokeless tobacco (chew, dip, snuff, and betel quid). Tobacco users are more likely to develop head and neck cancer than non-smokers, depending on the amount of use, as well as the age, sex and race of the user. Smoking more than 4 cigarettes a day increases the risk to 20 times that of a non-smoker.

The composition of smokeless tobacco varies around the world, making it hard to generalize, but the risk of developing head and neck cancer is thought to be 10-1 times more for smokeless users than non-users. Quitting smoking leads to a reduction of risk that increases with time, but will never reach that of a never-smoker. Drinking alcohol is known to increase the risk of developing head and neck cancer about 10-2 times that of non-drinkers, depending on the amount consumed.

Alcohol use alone increases risk, but when combined with tobacco, the risk increases dramatically.

Some researchers believe alcohol may make the tissues more susceptible to damage from the toxins in tobacco.

Infection with certain strains of the **Human Papilloma Virus (HPV)**, a sexually transmitted disease that invades human epithelial tissue (a type of skin cell), is known to increase risk of oropharyngeal cancers - particularly those in the tonsils and base of the tongue.



HPV infections are the most common sexually transmitted infections. It is estimated that more than half of sexually active people are infected with HPV. Researchers estimate that 50% of oropharyngeal cancers are attributable to HPV, with a much higher rate in young, non-smokers diagnosed with the disease. This is thought to be related to changes in sexual practices, including an increase in oral sex among adolescents and young adults. Despite the decrease in smoking-related cancers in the U.S., this HPV-related increase has the potential to become a serious public health burden.

Rates of nasopharyngeal cancers in Asian countries are high and thought to be a result of a diet high in salt-cured foods. Chronic sun exposure is linked to cancer of the lip. Exposure to asbestos is thought to increase the risk of laryngeal cancers.



## How are head and neck cancers diagnosed and staged?

If a head and neck cancer is suspected, a physician will perform a thorough examination of the head and neck, both inside and out. This requires the use of an endoscope, a thin tube with a camera on the end that is inserted in the nose or down the throat after numbing the patient's nose, throat and gag reflex.

This is necessary to either evaluate the lesion or lump in question, or to look for any additional lumps. A sample of the tissue in question and/or other suspicious areas will be taken (biopsy).

Depending on the location, this may be done in the office, or if it is not accessible, may need to be done in an operating room. A pathologist, a doctor who looks at the sample under a microscope and determines the type of cell and whether or not it is cancerous, evaluates the biopsy.

About 95% of head and neck tumors are **squamous cell carcinomas** (named for the type of cells that the cancer involves). Some other types include: adenocarcinoma, **mucoepidermoid carcinoma**, **adenoid cystic carcinoma**, **acinic cell carcinoma** or other malignant salivary tumors, **lymphoma**, **sarcoma** and **melanoma**.

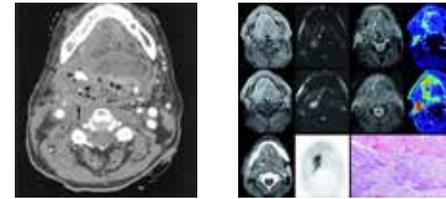
Computerized tomography (CT) scans, magnetic resonance imaging (MRI), and positron emission tomography (PET) scans are an important step to further evaluate the tumor and to determine the stage and options for treatment.

Inactive infection with the Epstein Barr virus (EBV), environmental or second-hand smoke, exposure to radiation, poor oral health and the chronic inhalation of wood dust have all also been associated with increased risk of head and neck cancers.

## What are the signs of head & neck cancers?

The signs and symptoms can vary greatly depending on the location of the tumor. Some common symptoms are weight loss (due to difficulty swallowing and/or malnutrition), a new lump or sore that does not resolve, a sore throat or change in voice that doesn't get better, or pain (sometimes felt in the ear). More specific signs include the following:

- **Oral cavity:** white patches or sores, a change in how dentures fit, unusual bleeding or mouth pain.
- **Nasopharyngeal area or sinuses:** sinus infections that do not respond to antibiotics, pain in the upper jaw, nose bleeds, difficulty breathing, pain or ringing in the ears.
- **Pharyngeal:** difficulty swallowing or breathing, sore throat, difficulty hearing, headaches or a hoarse voice.
- **Laryngeal:** pain in ear or pain with swallowing.
- **Salivary Glands:** facial swelling, pain and numbness of facial muscles.



Staging is done by evaluating tumor size (T), lymph node involvement (N), and metastases (M), or spread to other areas of the body. Although you may sometimes hear the cancer described as stage I, II, etc.; the TNM system is more precise in this group of very diverse tumors. The following gives you an understanding of TNM definitions and the corresponding stage. Keep in mind, the staging system is even more complex for each particular site, but these general TNM descriptions can be applied to all head and neck tumors.

### Primary Tumor (T)

- TX: Primary tumor cannot be assessed
- T0: No evidence of primary tumor
- Tis: "in situ" – cancer contained
- T1: Tumor 2 cm or less in size
- T2: Tumor > 2 cm but < 4 cm in size
- T3: Tumor > 4 cm in size
- T4a: Tumor invades structures next to it
- T4b: Tumor invades to areas beyond the structures next to it

### Regional Lymph Nodes (N)

- NX: Regional nodes cannot be assessed or unknown
- N0: No regional lymph node metastasis
- N1: Metastasis in 1 lymph node on the same side as the tumor, < 3 cm in size
- N2: Metastases in 1 or more nodes on same, opposite, or both sides, between 6-3 cm in size

- N2a: Metastasis in single node, > 3cm but no more than 6cm
- N2b: Metastasis in multiple nodes, none > 6cm in size
- N2c: Metastasis in bilateral or contralateral nodes, none > 6cm
- N3: Metastases in 1 or more nodes, > 6 cm in size

### Distant Metastasis (M)

- MX: Distant metastasis cannot be assessed
- M0: No distant metastasis
- M1: Distant metastasis

### Histologic Grade (G)

- Gx: Grade cannot be assessed
- G1: Well differentiated
- G2: Moderately Differentiated
- G3: Poorly Differentiated
- G4: Undifferentiated

The various combinations of TNM can then be matched to a corresponding stage of -0IV (See below).

Stage	T	N	M
Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T3-1	N1	M0
Stage IVa	T4a	N0 or N1	M0
	T4-1a	N2	M0
Stage IVb	T4b	Any N	M0
	Any T	N3	M0
Stage IVc	Any T	Any N	M1

## How are head and neck cancers treated?

Head and neck cancers are best treated by multidisciplinary cancer care teams. This team of specialists may include oral surgeons, otorhinolaryngologists (ENT), pathologists, medical and radiation oncologists, dentists, plastic surgeons, dietitians, social workers, nurses, physical and speech therapists.

This team approach is very important to successful treatment and to helping maintain good patient quality of life. The actual treatment plan varies depending on the tumor location, stage, and patient's baseline medical health (i.e. how much treatment can they handle?).

In general, stage I and II cancers are treated with surgery and/or radiation therapy, whereas stages III and IV require multi-modality treatment (surgery, radiation, and chemotherapy). The following are the basic therapies used in the treatment of head and neck cancer.

### Surgery

In determining whether or not a patient should have surgery, it is extremely important to look at his or her physical health. For example, a patient with very poor nutrition will have difficulty healing from surgery. Heart disease or pulmonary (lung) problems may make him or her unable to tolerate the operation. We do not want to put the patient in further danger in these cases. The second issue is, can the tumor be safely removed by the surgeon?

This depends on where it is located, what other structures it invades, and the size of the tumor. It is also important to consider how well the plastic surgeon will be able to perform reconstruction. You can see how this complicated decision is best made by a team of specialists who are experienced in these types of surgeries.



If surgery is an option, the surgeon's goal is usually to remove the entire tumor and some healthy tissue around it (this is referred to as achieving clean or negative margins). In some cases, lymph nodes may be removed for further evaluation by the pathologist.

Depending on where the tumor is located, and its size, the surgery can be very complex. The plastic surgeon may use skin flaps or prosthetic (man-made) bones to replace those affected by the tumor. The surgery may affect the patient's ability to chew, swallow, speak, hear, or smell, and it may drastically change their facial appearance, either temporarily or permanently. All patients and their families should talk extensively with the healthcare team before surgery and have a complete understanding of what to expect. This can be a very complicated discussion, so no question should be considered too dumb to ask!

### Radiation Therapy

**Radiation** is the use of high-energy x-rays to kill the tumor. This treatment is very complex and should be performed by a radiation team trained in this specialty. Radiation can be given by **two different methods**: external beam (from a machine outside the body) or brachytherapy (also called internal radiation, from an internally implanted radioactive source).

**External beam radiation** is administered by a machine called a linear accelerator. The machine points beams of radiation from many angles towards the tumor. The treatment only takes about 20-15 minutes, but is given 5 days a week, for 8-6 weeks. It is critical to be certain that you are treating the same spot each day, so a customized mask device is made and employed to maintain the head in the same position each day. Unfortunately, in attempting to target all of the cancer, the radiation also hits nearby healthy cells, leading to side effects including: sore mouth/throat (mucositis), skin burns, painful swallowing, and dry mouth or nose. External beam radiation is the most commonly used form of radiation for head and neck cancers.



**Brachytherapy** involves implanting a radioactive material (the source) in the tumor and/or around the tumor site. This source slowly releases the radiation over time, delivering it to a small area of tissue. By treating only a small area, side effects are decreased, but this can also increase the likelihood that the cancer may return. For this reason, the treatment is not good for patients with a high risk of recurrence. Unlike external radiation, these patients are "radioactive" while the source is in place, and patients' friends and family can only spend a few minutes a day close to them (within about 5 feet). This can be a problem if the patient cannot care for himself or herself, so proper patient selection is necessary for everyone's safety. Internal radiation is most often used in treating cancers of the lip, oral cavity, and oropharynx.

**Proton therapy** is another type of radiation therapy that is being used to treat head and neck cancers. The main difference between protons and x-rays is the physical properties of the proton beam itself. Whereas x-rays enter the patient on one side of the body and travel straight through, exiting out the other side, with the radiation dose gradually decreasing as it travels through the tissues. The proton beam is able to enter the body at a fairly low dose of radiation and increase in the last 3mm of the beam to the dose required for treatment. In addition, the beam then stops, resulting in virtually no radiation to the tissue beyond the target- or no "exit dose" as it is called. This allows protons to limit the dose to surrounding healthy

tissues, in turn reducing side effects. For instance, not exposing the salivary glands on the opposite side of the tumor to radiation dose. Proton therapy is becoming more widely available.

### Chemotherapy

**Chemotherapies** are medications used to kill cancer cells and are used in more advanced tumors of the head and neck. Chemotherapy can be given before surgery to shrink a tumor and thus make it easier to remove. This is called neoadjuvant chemotherapy. Chemotherapy that is given after surgery is called adjuvant chemotherapy. Some of the commonly used chemotherapies include: **cisplatin, fluorouracil, etoposide, carboplatin and gemcitabine.**

Chemotherapy is commonly given in conjunction with radiation therapy. This is referred to as chemoradiation therapy. In this case, the chemotherapy serves two purposes: to treat the cancer cells and to make the radiation work better. This latter effect is called radiosensitization, which means that the cells are made more sensitive to radiation damage in the presence of relatively low doses of the chemotherapy. The problem is that healthy cells are also sensitized, making the side effects more severe than with radiation alone. Chemoradiotherapy has been shown to improve the likelihood that the surgeon will be able to preserve the voice box in laryngeal cancers. It has also been shown to improve survival over chemotherapy alone, but this therapy comes with more toxicity.

The most common toxicities experienced by patients receiving chemoradiation are: low blood counts (white and red blood cells), mucositis, mouth sores and difficulty swallowing. This therapy is not the best choice for all patients, particularly those who are not able to tolerate the side effects; but in those that can be supported through the treatment, this is the standard of care. Researchers have not determined which is the best chemoradiotherapy or chemotherapy regimen, but future clinical trials will attempt to determine this.

### Targeted Therapies

Researchers have found a majority of squamous cell head and neck cancers have an "overexpression" of the epidermal growth factor receptor (EGFR). This means they produce too many of these receptors, which could be a key factor in their growth. In turn, medications were developed that can block these receptors, hopefully slowing the tumor's growth. The two EGFR inhibitors most commonly used in head and neck cancers are **cetuximab** and **gefitinib.**

### Clinical Trials

**Clinical trials** have played, and continue to play, an important role in the treatment of head and neck cancers. The treatments we have today were refined through clinical trials, and many new avenues continue to be explored. Talk with your provider about current clinical trials for head and neck cancers in your area or use OncoLink's **clinical trials matching service.**

### Supportive Care

The treatment of head and neck cancers can have a significant impact on the patient.

Nutritional status is often affected by therapy, and patients often need to be fed through a tube placed in their stomachs (called a PEG or 'G' tube). In most cases, this is only temporary. For other patients, difficulty swallowing, mucositis (sore mouth and throat), loss of taste, or a lack of saliva production may make eating difficult or impossible. It is important that patients be followed closely by a dietitian to support them in food and supplement choices and to maintain good nutritional status.

If necessary, a speech and swallowing specialist can evaluate a person's ability to swallow safely, without choking or inhaling food.

Social workers can help with the **financial burden**, handling family responsibilities and accessing resources.

Psychologists may be needed to help in dealing with the changes in body image and the patient's role in the family. When speech is affected, speech therapists can help regain function or find alternative ways of communicating. Nurses and physicians can offer help in dealing with side effects and pain management.

### Follow-up Care

Follow-up visits with the oncologist(s) will generally be done every four to six weeks for the first year, every two months for the second year, every three months for the third year, every six months for the fourth and fifth years, and annually after that. A chest x-ray may be performed once a year. In some cases, CAT scans or PET scans are used to evaluate for recurrence of the cancer. For patients whose thyroid gland was in the radiation field, thyroid levels should be checked periodically as they may develop a deficiency (hypothyroidism) and require medication to treat this condition.

If a person is still smoking after treatment, he or she should be encouraged and supported to quit. Patients who continue to smoke are at a significantly increased risk of developing a recurrence or a second cancer, either in the head and neck or elsewhere.

If a patient develops a recurrence, treatment is dependent on the extent of the cancer, what treatments were previously used, and the health status of the patient. The same therapies are typically used (surgery, chemotherapy and radiation), although the drug, dosage, or site of radiation may be different.

After treatment, talk with your oncology team about receiving a survivorship care plan, which can help you manage the transition to survivorship and learn about long-term concerns and life after cancer. You can create one **on OncoLink.**

## Resources for further reading

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### The National Cancer Institute

#### American Speech-Language-Hearing Association:

Great information about laryngeal and oral cancers and speech and swallowing specialists.

#### Support for people with oral, head and neck cancers (SPOHNC)

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