

# **Nonmelanoma Skin Cancer**

## **What Is Cancer?**

Cancer develops when cells in a part of the body begin to grow out of control. Although there are many kinds of cancer, they all start because of out-of-control growth of abnormal cells.

Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide more rapidly until the person becomes an adult. After that, cells in most parts of the body divide only to replace worn-out or dying cells and to repair injuries.

Because cancer cells continue to grow and divide, they are different from normal cells. Instead of dying, they outlive normal cells and continue to form new abnormal cells.

Cancer cells often travel to other parts of the body where they begin to grow and replace normal tissue. This process, called metastasis, occurs as the cancer cells get into the bloodstream or lymph vessels of our body. When cells from a cancer like breast cancer spread to another organ like the liver, the cancer is still called breast cancer, not liver cancer.

Cancer cells develop because of damage to DNA. This substance is in every cell and directs all its activities. Most of the time when DNA becomes damaged the body is able to repair it. In cancer cells, the damaged DNA is not repaired. People can inherit damaged DNA, which accounts for inherited cancers. Many times though, a person's DNA becomes damaged by exposure to something in the environment, like smoking. Scientists still do not understand what damages person's DNA becomes damaged and leads to cancer.

Cancer usually forms as a tumor. Some cancers, like leukemia, do not form tumors. Instead, these cancer cells involve the blood and blood-forming organs, and circulate through other tissues where they grow.

Remember that not all tumors are cancerous. Benign (noncancerous) tumors do not spread to other parts of the body (metastasize) and, with very rare exceptions, are not life-threatening.

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their particular kind cancer.

## **What Is Nonmelanoma Skin Cancer?**

### **About normal skin**

The skin is the largest organ in your body. It covers the internal organs and protects them from injury, serves as a barrier between microbes such as bacteria and internal organs, and prevents the loss of too much water and other fluids. The skin regulates body temperature and helps rid your body of excess water and salts. Certain cells in your skin communicate with your brain and allow for temperature, touch, and pain sensations.

The skin has 3 layers called the epidermis, dermis, and subcutis. The top layer is the epidermis. The epidermis is very thin, averaging only 0.2 mm (about one hundredth of an inch). It protects the deeper layers of skin and the organs of the body from the environment.

The outermost part of the epidermis is called the stratum corneum, or horny layer. It is composed of dead keratinocytes (the main type of cell of the epidermis) that are continually shed. Below the stratum corneum are layers of living keratinocytes, also called squamous cells. These cells form an important protein called keratin. Keratin contributes to the skin's ability to protect the rest of the body.

The lowest part of the epidermis, the basal layer, is formed by basal cells. These cells continually divide to form new keratinocytes, which replace older keratinocytes that wear off of the skin surface. The basement membrane separates the epidermis from the deeper layers of skin. Melanocytes are also present in the epidermis. These skin cells produce the protective pigment called melanin. Melanin gives a tan or brown color to the skin and helps protect the deeper layers of the skin from the harmful effects of the sun.

The middle layer of the skin is called the dermis. The dermis is much thicker than the epidermis. It contains hair follicles, sweat glands, blood vessels, and nerves that are held in place by a protein called collagen. Collagen, which is made by skin cells called fibroblasts, gives the skin its resilience and strength.

The last and deepest layer of the skin is called the subcutis. The subcutis and the lowest part of the dermis form a network of collagen and fat cells. The subcutis conserves heat and has a shock-absorbing effect that helps protect the body's organs from injury.

### **Types of nonmelanoma skin cancer**

Nonmelanoma skin cancers are the most common cancers of the skin. They are called nonmelanoma because this group of cancers includes all skin cancers except one -- malignant melanoma. Cancers that develop from melanocytes, the pigment-producing cells of the skin, are called melanoma. Melanocytes can also form benign growths called moles. Melanoma and benign moles are discussed in a separate document called "Melanoma Skin Cancer." [\[Link\]](#)

There are many types of nonmelanoma skin cancers, but two types are most common -- basal cell carcinoma and squamous cell carcinoma.

**Basal cell carcinoma:** Basal cell carcinoma begins in the lowest layer of the epidermis called the basal cell layer. About 75% of all skin cancers are basal cell carcinomas. They usually develop on sun-exposed areas, especially the head and neck. Basal cell carcinoma was once found almost exclusively in middle-aged or older people. Now it is also being seen in younger people, probably because they are spending more time in the sun with inadequate sun protection.

Basal cell carcinoma is slow-growing. It is highly unusual for a basal cell cancer to spread to lymph nodes or to distant parts of the body. However, if a basal cell cancer is left untreated, it can grow into nearby areas and invade the bone or other tissues beneath the skin.

After treatment, basal cell carcinoma can recur (come back) in the same place on the skin. Also, new basal cell cancers can start elsewhere on the skin. Thirty-five to fifty percent of people diagnosed with one basal cell cancer will develop a new skin cancer within 5 years of the first diagnosis.

**Squamous cell carcinoma:** Squamous cell carcinomas develop in higher levels of the epidermis and account for about 20% of all skin cancers. They commonly appear on sun-exposed areas of the body such as the face, ear, neck, lip, and back of the hands. They can also develop within scars or skin ulcers elsewhere. Less often, they form in the skin of the genital area.

Squamous cell carcinomas tend to be more aggressive than basal cell cancers. They are more likely to invade tissues beneath the skin, and slightly more likely to spread to lymph nodes and/or distant parts of the body.

**Less common types of nonmelanoma skin cancer:** Other nonmelanoma skin cancers include:

- Kaposi's sarcoma
- Cutaneous lymphoma
- Skin adnexal tumors
- Various types of sarcomas
- Merkel cell carcinoma.

Together, these types account for less than 1% of nonmelanoma skin cancers.

Kaposi's sarcoma usually starts within the dermis, but can also form in internal organs. Before the mid-1980s, this cancer was extremely rare and found mostly in elderly people of Mediterranean descent. Since then, Kaposi's sarcoma cancer has become more common, because it tends to develop in people with human immunodeficiency virus (HIV) infection and the acquired immunodeficiency syndrome (AIDS).

Lymphocytes are a type of immune system cell found in the bone marrow (the soft inner part of some bones), lymph nodes (bean-sized collections of lymphocytes and other immune system cells), the bloodstream and some internal organs. The dermis also contains a significant number of lymphocytes. When the lymphocytes become malignant, they form a type of cancer known as lymphoma.

Although most lymphomas start in lymph nodes or internal organs, there are certain types of lymphoma that appear to begin mostly or entirely in the skin. Primary cutaneous lymphoma is the medical term meaning "a lymphoma that started in the skin." The most common type of primary cutaneous lymphoma is cutaneous T-cell lymphoma, also called mycosis fungoides.

Adnexal tumors start in the hair follicles or sweat glands. They are extremely rare tumors that are usually benign, but some malignant forms also occur.

Sarcomas develop from connective tissue cells, usually in tissues deep beneath the skin. Much less often, they may develop in the skin's dermis and subcutis. There are several types of sarcoma that can develop in the skin, including dermatofibrosarcoma protuberans (often abbreviated DFSP) and angiosarcoma (a blood vessel cancer).

Merkel cell carcinoma is another rare skin cancer that develops from neuroendocrine cells (hormone-producing cells that resemble nerve cells in some ways) in the skin. Unlike basal cell and squamous cell carcinomas, Merkel cell carcinomas often come back after treatment and spread to nearby lymph nodes. They can also spread to internal organs, something that is extremely rare for squamous cell carcinomas and almost unheard of for basal cell carcinomas.

### **Benign skin tumors**

Most tumors of the skin are not cancerous and rarely if ever turn into cancers. These tumors include most types of moles (see the document called "Melanoma Skin Cancer" for information on moles), seborrheic keratoses (tan, brown, or black raised spots with a "waxy" texture, or rough surface), hemangiomas (benign blood vessel growths often called strawberry spots or port wine stains), lipomas (soft growths of benign fat cells), and warts (rough-surfaced growths caused by a virus).

### **Precancerous and pervasive skin conditions**

**Actinic keratosis:** Actinic keratosis, also known as solar keratosis, is a precancerous skin condition caused by overexposure to the sun. Actinic keratoses are small (usually less than ¼ inch) rough spots that may be pink-red or flesh-colored. Usually they develop on the face, ears, back of the hands, and arms of middle-aged or older people with fair skin, although they can arise on other sun-exposed areas of the skin. People with one actinic keratosis will usually develop many more.

Actinic keratoses are slow-growing. They usually do not cause any symptoms or signs other than patches on the skin. It is possible, but not common, for actinic keratoses to turn into squamous cell cancer. They also frequently go away on their own but may come back.

Even though most actinic keratoses do not become cancers, they are a warning that the skin has been damaged by the sun and that you should check your skin regularly. Some actinic keratoses and other skin conditions that could become cancers may have to be removed, while your doctor should regularly check others for changes that could indicate cancer.

**Squamous cell carcinoma in situ:** Squamous cell carcinoma in situ, also called Bowen's disease, is the earliest form of squamous cell skin cancer. The cells of these cancers are entirely within the epidermis, and have not invaded the dermis.

Bowen's disease appears as reddish patches. Compared with actinic keratoses, Bowen's disease patches tend to be larger (often over ½ inch), redder, more scaly, and crusted.

Like invasive squamous cell skin cancers, the major risk factor is overexposure to the sun. Bowen's disease of the anal and genital skin is often related to sexually transmitted infection with human papillomaviruses (the viruses that can also cause genital warts).

## **What Are the Key Statistics About Nonmelanoma Skin Cancer?**

Cancer of the skin (including melanoma and nonmelanoma skin cancer) is the most common of all cancers, accounting for more than 40% of all cancers. About 1.3 million cases of nonmelanoma skin cancer are diagnosed in this country each year.

The number of people who develop nonmelanoma skin cancers each year is not known as accurately as the number that develop most other types of cancer because doctors are not required to report cases of nonmelanoma skin cancer to cancer registries. The American Cancer Society predicts that there will be about 2,000 deaths from nonmelanoma skin cancer during 2001.

The relative 5-year survival rate for patients with basal cell carcinoma is more than 99%. Less than one-tenth of a percent of basal cell carcinomas spread to lymph nodes or distant organs. However, patients whose basal cell carcinoma has spread to lymph nodes or distant organs have a 5-year survival rate of about 10%.

The overall 5-year survival rate for patients with squamous cell carcinoma of the skin is more than 95%. The likelihood of squamous cell skin cancer spreading to lymph nodes depends on the cancer's size and location, but is estimated to occur in a small percentage of cases. The 5-year survival rate for squamous cell carcinoma of the skin that has spread to lymph nodes or distant organs is about 25%.

The 5-year survival rate refers to the percent of patients who live at least 5 years after their cancer is diagnosed. Many of these patients live much longer than 5 years after diagnosis, and 5-year rates are used to produce a standard way of discussing prognosis. Five-year relative survival rates exclude from the calculations patients dying of other diseases, and are considered to be a more accurate way to describe the prognosis for patients with a particular type and stage of cancer. Of course, 5-year survival rates are based on patients diagnosed and initially treated more than 5 years ago. Improvements in treatment often result in a more favorable outlook for recently diagnosed patients.

## **What Are the Risk Factors for Nonmelanoma Skin Cancer?**

A risk factor is anything that increases a person's chance of getting a disease such as cancer. Different cancers have different risk factors. Smoking is a risk factor for cancers of the lung, mouth, larynx, bladder, kidney, and several other organs. But having a risk factor, or even several, does not mean that a person will get the disease.

### **Excessive exposure to ultraviolet (UV) radiation**

The main source of UV radiation is sunlight. People who are often exposed to strong sunlight without protection have a greater risk of nonmelanoma skin cancer. The amount of UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected.

People who live in areas with year-round, bright sunlight have a higher risk. For example, the risk of nonmelanoma skin cancer is twice as high in Arizona compared with Minnesota. Spending a lot of time outdoors for work or recreation without protective clothing and sunscreen increases your risk. Tanning lamps and tanning booths are other sources of UV radiation that may produce a greater risk of nonmelanoma skin cancer.

### **Fair skin**

The risk of skin cancer is more than 20 times higher for whites than for dark-skinned African Americans. This is due to the protective effect of melanin (skin pigment). Whites with fair (light-colored) skin that freckles or burns easily are at especially high risk. Albinism is a congenital (present at birth) absence of skin pigment. People with this condition may have pink-white skin and white hair. They have a high risk of getting skin cancer unless they are careful to protect their skin.

### **Male gender**

Men are twice as likely as women to have basal cell cancers and three times as likely to have squamous cell cancers of the skin.

### **Chemical exposure**

Exposure to arsenic, a heavy metal used in making some insecticides, increases the risk of developing nonmelanoma skin cancer. Workers exposed to industrial tar, coal, paraffin, and certain types of oil may also have an increased risk for nonmelanoma skin cancer.

### **Radiation exposure**

People who have had radiation treatment have a higher risk of developing nonmelanoma skin cancer in the area that received the treatment.

### **Long-term or severe skin inflammation or injury**

Scars from severe burns, areas of skin over severe bone infections, and skin damaged by some severe inflammatory skin diseases are more likely to develop nonmelanoma skin cancers, although this risk is generally small.

### **Treatment of psoriasis**

Psoralen and ultraviolet light treatments (PUVA) given to some patients with psoriasis can increase the risk of developing squamous cell skin cancer, and probably other skin cancers also.

### **Xeroderma pigmentosum**

This very rare inherited condition reduces the skin's ability to repair damage to DNA caused by sun exposure. People with this disorder develop many skin cancers, sometimes beginning in childhood.

### **Basal cell nevus syndrome**

This rare congenital (present at birth) condition causes multiple basal cell cancers. Most, but not all, cases are inherited. Affected people may also have abnormalities of the jaw and other bones, eyes, and nervous tissue.

### **Reduced immunity**

The immune system is important in helping the body fight cancers of the skin and other organs. People with weakened immune systems are more likely to develop nonmelanoma skin cancer. Organ transplant patients are usually given medications that weaken their immune system, to prevent their body from rejecting the new organ. This may increase their risk of developing skin cancer.

### **Human papillomavirus**

A small number of nonmelanoma skin cancers appear to result from a type of human papillomavirus (HPV). Human papillomaviruses are a group of more than 70 viruses that can cause papillomas or warts. The types of warts that people commonly get on their hands and feet appear to be unrelated to any form of cancer. But some of the types that people get in their genital and perianal area appear to be related to skin cancers in these areas.

## **Do We Know What Causes Nonmelanoma Skin Cancer?**

Most nonmelanoma skin cancers are caused by unprotected ultraviolet radiation exposure to the area of skin that develops the cancer. Most of this radiation comes from sunlight, but some may come from artificial sources, such as tanning booths. Some of this exposure may have occurred within the few years before the beginning of the cancer, particularly for squamous cell carcinoma. However, much of it may be due to exposures that happened many years earlier.

Children and young adults often receive a lot of intense sun exposure that may not result in an actual cancer for many years or decades.

DNA is the genetic material in our cells. It passes along genetic information to the next generation that makes children resemble their parents. In addition to information about our outward appearance, DNA also contains information that tells the cells of our body how to grow and how to perform all the metabolic activities needed for life.

Damage to DNA can be caused by ultraviolet radiation (from sunlight or tanning lamps), by ionizing radiation (a form of radiation that includes x-rays), and by certain chemicals. This damage makes the DNA less able to control how and when cells grow and divide. In some situations, this results in formation of a cancer.

This theory explains at least in part the connection between sunlight and skin cancer. It also explains why people with xeroderma pigmentosum (XP) have such a high risk for skin cancer. XP is a rare, inherited condition resulting from a defect in an enzyme that repairs damage to DNA. Because people with XP are less able to repair DNA damage caused by sunlight, they develop many cancers on sun-exposed areas of their skin.

Scientists are studying some other connections between DNA and skin cancer. They have found the DNA of certain genes is often damaged in skin cancer cells. Most of these DNA changes are the result of damage caused by sunlight. In the future, better understanding of how damaged DNA leads to skin cancer might be used in designing treatments to overcome or repair that damage.

The association between nonmelanoma skin cancer and human papillomavirus infection also involves DNA and genes. These viruses contain genes that instruct infected cells to produce certain proteins that interact with the growth-regulating proteins of normal skin cells. These viral proteins can cause skin cells to grow too much and can also interfere with processes that normally destroy cells with irreparable DNA damage.

## **Can Nonmelanoma Skin Cancer be prevented?**

The most important ways to lower the risk of non-melanoma skin cancer are to avoid being outdoors in intense sunlight too long, and to practice sun safety when you are outdoors. You can maintain your level of physical activity and practice sun safety at the same time. Practicing sun safety includes:

### **Seeking shade**

The simplest and most effective way to limit exposure to ultraviolet light is to avoid being outdoors in sunlight too long. This is particularly important in the middle of the day when ultraviolet light is most intense.

## **Protecting your skin with clothing**

You can protect most of your skin with clothing, including a long-sleeved shirt and a hat with a broad brim. Fabric with a tight weave generally provides the best sun protection.

## **Using sunscreen**

You should always use sunscreens with a SPF factor of 15 or more on areas of skin exposed to the sun, particularly when the sunlight is strong. Always follow directions when applying sunscreen. For it to work best, you should apply sunscreen before you go outside, use it thickly on all sun-exposed skin, and reapply it every 2 hours. A 1-ounce application (a palmful of sunscreen) is recommended. Many sunscreens wear off with sweating and swimming and must be reapplied for maximum effectiveness. Use sunscreen even on hazy days or days with light or broken cloud cover because the UV light still comes through the clouds.

Sunscreen should not be used to gain extra time in the sun. Sunscreen will not prevent skin cancer, it just reduces the amount of UV light exposure. Researchers have found that many people will use sunscreens to let them stay out in the sun longer. This results in the same amount of UV light exposure as if they hadn't used sunscreen at all and doesn't reduce their risk. All excessive sun exposure is unhealthy. Sunscreen should only be used to protect against normal sun exposure.

## **Wearing sunglasses**

Wrap-around sunglasses with 99%-100% UV absorption provide the best protection for the eyes and the skin area around the eyes.

## **Avoiding other sources of UV light**

The use of tanning beds and sun lamps is hazardous because the ultraviolet radiation they deliver can be damaging to the skin. Therefore, you shouldn't use them. There is growing evidence that they may increase your risk of developing non-melanoma skin cancer.

## **Being especially careful about sun protection for children**

Children require special attention. Parents should protect them from excess sun exposure by using the measures described above. Older children need to be cautioned about sun exposure as they become more independent. It is important, particularly in high sun exposure parts of the world, to develop the habit of covering up skin with clothing, a hat, and sunscreen whenever you go outdoors and may be exposed to large amounts of sunlight.

## **Public education**

Learn more about skin cancer prevention. Many organizations conduct skin cancer prevention activities in schools and recreational areas. Others distribute informational brochures and public service announcements. For more information, refer to the section on "Additional Resources."

## Can Nonmelanoma Skin Cancer be Found Early?

Nonmelanoma skin cancer can be found early. Everyone can play an important role in finding skin cancer early. As part of a routine cancer-related checkup, your health care professional will check your skin carefully. They should be willing to discuss any reservations patients might have about this examination. The American Cancer Society recommends a cancer-related checkup, including skin examination, every 3 years for people between 20 and 40 years old and every year for anyone age 40 and older.

It's also important to check your own skin, preferably once per month. Learn the pattern of moles, blemishes, freckles, and other marks on your skin so that you'll notice any changes. Self-examination is best done in front of a full-length mirror. A hand-held mirror can be used for areas that are hard to see. A spouse or other partner may be able to help you with these examinations, especially for those hard to see areas like the low back, or the back of your thighs. All areas should be examined, including the palms and soles, the low back and the back of the legs. Be sure to show your doctor any area that concerns you. Friends and family members can also help by telling one another about abnormal-appearing areas of skin.

- Nonmelanoma skin cancers can look like a variety of marks on the skin. The key warning signs are a new growth, a spot or bump that's getting larger (over a few months or 1-2 years), or a sore that doesn't heal within 3 months.
- Basal cell carcinomas often appear as flat, firm, pale areas or small, raised, pink or red, translucent, shiny, waxy areas that may bleed following minor injury. They may have one or more visible irregular blood vessels, may have a depressed area in their center, and may have blue, brown, or black areas. Large basal cell carcinomas may have oozing or crusted areas.
- Squamous cell carcinomas may appear as growing lumps, often with a rough surface, or as flat reddish patches in the skin that grow slowly.

Both of these types of nonmelanoma skin cancer may develop as a flat area showing only slight changes from normal skin.

The nonmelanoma skin cancers that begin in the dermis usually look different from basal cell and squamous cell cancers, which form in the epidermis.

- Kaposi's sarcoma generally starts as small bruise-like areas that develop into tumors.
- Mycosis fungoides (a type of lymphoma that starts in the skin) usually begins as a rash, often on the buttocks, hips, or lower abdomen. It can look similar to skin allergies and other types of skin irritations.
- Adnexal tumors appear as bumps within the skin.
- Skin sarcomas appear as large masses under the skin surface.
- Merkel cell tumors are usually red-purple nodules or ulcers (sores) found on the face or, less often, the arms or legs.

## How Is Nonmelanoma Skin Cancer Diagnosed?

If your doctor suspects you might have skin cancer, he or she will use one or more methods to find out if the disease is really present.

### History and physical examination

Usually the first step is to take your medical history (ask questions about symptoms and risk factors). The doctor probably will ask about your age, when the mark on the skin first appeared and whether it has changed in size or appearance. You may also be asked about past exposures to known causes of skin cancer, and whether anyone in your family has had skin cancer.

The doctor will note the size, shape, color, and texture of the area in question, and whether there is bleeding or scaling. The rest of your body will be checked for spots and moles that may be related to skin cancer. The doctor will also check nearby lymph nodes (bean-sized collections of immune system cells that fight infections). Skin cancers may spread to lymph nodes. When such spread occurs, the lymph nodes become larger and firmer than usual.

### Skin biopsy

If the doctor thinks that an area might be nonmelanoma skin cancer, he or she will take a sample of skin from the suspicious area for examination under a microscope. This is called a skin biopsy. Different methods can be used for a skin biopsy. The choice depends on the type of nonmelanoma skin cancer, where it is on the body, and the size of the affected area. Any biopsy is likely to leave a scar. Since different methods produce different scars, you should ask the doctor about biopsies and scarring before the biopsy is done.

All skin biopsy samples are examined under a microscope. The skin sample is sent to a pathologist, a doctor who has been specially trained in the microscopic examination and diagnosis of tissue samples. Often, the skin sample is sent to a dermatopathologist, a dermatologist or a pathologist who has additional training in making diagnoses from skin samples and may be more experienced with certain skin cancers than a general pathologist.

**Shave biopsy:** A shave biopsy is one way to take a skin biopsy. After numbing the area with a local anesthetic, the doctor "shaves" off the top layers of the skin (the epidermis and the most superficial part of the dermis) with a surgical blade.

**Punch biopsy:** A punch biopsy removes a deeper sample of skin. The doctor uses a punch biopsy tool that looks like a tiny round cookie cutter. Once the skin is numbed with a local anesthetic, the doctor rotates the punch biopsy tool on the surface of the skin until it cuts through all the layers of the skin, including the dermis, epidermis, and the upper parts of the subcutis.

**Incisional and excisional biopsies:** If the doctor has to examine a tumor involving deeper layers of the skin, he or she will use an incisional or excisional biopsy technique. A surgical knife is used to cut through the full thickness of skin. A wedge or ellipse of skin is removed for further examination, and the edges of the wound are sewn together. Incisional biopsy involves removing

only a portion of the tumor. Removal of the entire tumor is called an excisional biopsy. These biopsies can be done using local anesthesia.

### **Lymph node biopsy**

If your doctor feels lymph nodes that are too large and/or too firm, a lymph node biopsy will be done to determine whether cancer has spread from the skin to one or more lymph nodes.

**Fine needle aspiration biopsy:** A fine needle aspiration (FNA) biopsy uses a syringe with a thin needle to remove very small tissue fragments from a tumor. The needle is smaller than the needle used for a blood test. A local anesthetic is sometimes used to numb the area. This test rarely causes much discomfort and does not leave a scar. It is not used for diagnosis of a suspicious skin tumor, but may be used to biopsy large lymph nodes near a skin cancer to find out if the cancer has metastasized (spread).

**Surgical lymph node biopsy:** If the doctor suspects spread of cancer to a lymph node but the FNA result is negative or is not clear, the lymph node should be removed by a surgeon. This can usually be done using local anesthesia in a doctor's office or outpatient surgical center and will leave a small scar.

## **How Is Nonmelanoma Skin Cancer Staged?**

Staging is a process of finding out how widespread a cancer is. Because basal cell cancer so rarely spreads to other organs, it is seldom staged unless the cancer is very large. Squamous cell cancers have a somewhat greater (although still quite small) risk of spreading, so staging is done slightly more often. A staging system is a way for members of the cancer care team to summarize the extent of a cancer's spread, which enables them to plan appropriate treatment and determine a patient's prognosis (the outlook for chances of survival).

The most common system used to describe the stage of nonmelanoma skin cancer is the **TNM** system. T stands for **tumor** (its size and how far it has spread within the skin and to nearby tissues). N stands for **spread to lymph nodes** (small bean-shaped collections of immune system cells that help the body fight infections and cancers). M is for **metastasis** (spread to distant organs). To assign a stage, information about the tumor and whether or not it has spread to lymph nodes and other organs in the body is combined, according to a process called stage grouping. The stages are described using the number 0 and Roman numerals from I to IV. In general, patients with lower stage cancer have a better prognosis for a cure or long-term survival.

### **Stage 0**

Squamous cell carcinoma in situ, also called Bowen's disease, is the earliest stage of squamous cell skin carcinoma. The cancer involves only the epidermis and has not spread to the dermis. In contrast, Stage II, III, and IV cancers always involve the epidermis and dermis.

## **Stage I**

The cancer is not larger than 2 centimeters (between 3/4 and 7/8 inch). It has not spread to lymph nodes or other organs.

## **Stage II**

The cancer is larger than 2 cm (centimeters) but it has not spread to lymph nodes or other organs.

## **Stage III**

The cancer has spread to tissues beneath the skin (such as muscle, bone, or cartilage) and/or it has spread to regional (nearby) lymph nodes. In this stage, the cancer has not spread to other organs such as the lungs or brain.

## **Stage IV**

The cancer can be any size. It has spread to other organs such as the lungs or brain.

## **How Is Nonmelanoma Skin Cancer Treated?**

The treatments described in this section apply to actinic keratosis, squamous cell carcinoma, basal cell carcinoma, and Merkel cell carcinoma. Cutaneous lymphoma, Kaposi's sarcoma, and other sarcomas are treated differently. These cancers are discussed in separate American Cancer Society documents.

### **Surgery**

Fortunately, most basal cell and squamous cell carcinomas can be completely cured by fairly minor surgery. There are many different kinds of surgery for these cancers. The type of treatment chosen depends on how large the cancer is, where it is found on the body, and the specific type of nonmelanoma skin cancer. For certain squamous cell cancers with a high risk of spreading, surgery may sometimes be followed by radiation or chemotherapy.

**Simple excision:** The tumor is cut out with a surgical knife, along with some surrounding normal skin, and the remaining skin is carefully stitched back together. This will leave a scar. This is the same as an excisional biopsy.

**Curettage and electrodesiccation:** This treatment removes the cancer by scraping it with a curette (a long, thin instrument with a scraping edge, similar in appearance to a vegetable peeler), then treating the area where the tumor was located with an electric needle (electrodes) to destroy any remaining cancer cells. This process is repeated 1 to 3 times. Curettage and electrodesiccation is a good treatment for small basal cell and squamous cell cancers. It will leave a scar.

**Cryosurgery:** This treatment uses liquid nitrogen to freeze and kill abnormal cells. After the dead tissue thaws, blistering and crusting may occur. The wound may take several weeks to heal and will leave a scar. The treated area may have less color after treatment. Cryosurgery is often used for precancerous conditions such as actinic keratosis and for small basal cell and squamous cell carcinomas.

**Mohs surgery (microscopically controlled surgery):** Using the Mohs technique, the surgeon removes a layer of the skin which the tumor may have invaded and then carefully maps its location. The surgeon checks the sample under a microscope immediately. If it is malignant, more pieces of the tumor will be removed and examined until the skin samples are found to be free of cancerous cells. This process is slow, but it means that normal skin next to the tumor can be saved. This creates a better appearance after surgery. This is a highly specialized technique that should be used only by doctors who have been trained in this specific type of surgery.

**Laser surgery:** This relatively new approach uses a beam of laser light to vaporize cancer cells. It is useful for squamous cell carcinoma in situ (involving only the epidermis) and for very superficial basal cell carcinomas. We do not know if this type of treatment will be as effective as standard methods of treatment.

**Lymph node surgery:** If lymph nodes near a nonmelanoma skin cancer (especially a squamous cell or Merkel cell carcinoma) are growing larger, doctors will be concerned that the cancer may have spread to these lymph nodes. The nodes will be removed by an operation called a lymph node dissection and examined for cancerous cells under a microscope.

**Skin grafting and reconstructive surgery:** After removal of very large nonmelanoma skin cancers it may not be possible to stretch the nearby skin enough to sew the edges of the wound together. In these cases, skin grafts or other reconstructive surgical procedures can help the wound heal and replace tissue, restoring the appearance of the affected area.

## **Chemotherapy**

**Topical chemotherapy:** Chemotherapy uses drugs that kill cancer cells. Topical chemotherapy means that an anticancer medication is placed directly onto the skin rather than being given by mouth or injected into a vein. The drug most often used in topical treatment of nonmelanoma skin cancer is fluorouracil (5-FU).

When applied directly onto the skin in the form of topical cream, fluorouracil reaches cancer cells near the skin surface but does not reach cancer cells which have invaded deeply into the skin or spread to other organs. For this reason, treatment with fluorouracil generally is used only for premalignant conditions such as actinic keratosis. One of its main advantages is that the drug does not spread throughout the body. Therefore, the side effects to other organs that can occur with systemic chemotherapy (treatment that affects the whole body) do not occur with topical chemotherapy.

Treatment with fluorouracil cream causes the treated skin to be red and sensitive for a few weeks. Use of other topical medications can help relieve these side effects. Fluorouracil

increases the skin's sensitivity to the sunlight, so treated areas must be protected from the sun to prevent sunburn for a few weeks after use of this medication.

**Systemic Chemotherapy:** Systemic chemotherapy uses anticancer drugs that are injected into a vein or given by mouth. These drugs travel through the bloodstream to all parts of the body. In contrast to topical chemotherapy, systemic chemotherapy can attack cancer cells that have spread beyond the skin to lymph nodes and other organs.

One or more chemotherapy drugs may be used to treat squamous cell carcinoma or Merkel cell carcinoma that has metastasized (spread) to other organs. Some chemotherapy drugs such as cisplatin, doxorubicin, fluorouracil (5-FU), or mitomycin can temporarily delay the spread of these cancers and relieve some symptoms. However, systemic chemotherapy (alone or together with radiation therapy) is not able to cure metastatic nonmelanoma skin cancer.

Chemotherapy drugs kill cancer cells but also kill some normal cells. Therefore, careful attention is given to avoiding or minimizing side effects, which depend on the type of drugs, the amount taken, and the length of treatment. Temporary side effects of systemic chemotherapy might include nausea and vomiting, loss of appetite, loss of hair, and mouth sores.

Because chemotherapy can kill normal blood cells (like the blood-producing cells of the bone marrow, the cells lining the gastrointestinal tract, and hair), patients may have low blood cell counts, nausea, vomiting, mouth sores, or hair loss. Low blood cell counts result in:

- An increased chance of infection (due to a shortage of white blood cells)
- Bleeding or bruising after minor cuts or injuries (due to a shortage of blood platelets)
- Fatigue (due to low red blood cell counts).

Most side effects disappear once treatment is stopped. There are remedies for many of the temporary side effects of chemotherapy. For example, antiemetic drugs to prevent or reduce nausea and vomiting can be given.

## **Radiation therapy**

Radiation therapy uses high-energy rays (such as x-rays) and particles (such as photons, electrons, or protons) to kill cancer cells. External beam radiation therapy focuses radiation from outside the body on the skin tumor.

If a tumor is very large or is located on an area of the skin that makes surgery difficult, radiation may be used as the primary (main) treatment instead of surgery. Primary radiation therapy is often useful for some elderly patients who, because of poor general health, cannot tolerate surgery. Primary radiation therapy can cure small nonmelanoma skin cancers and can delay the growth of more advanced cancers.

In some cases, radiation can be used after surgery as adjuvant (additional) therapy to kill small deposits of cancer cells that may not be visible during surgery. This lowers the risk of cancer coming back after surgery. Radiation may also be used to treat nonmelanoma skin cancer that has spread to lymph nodes or other organs.

Side effects of radiation include skin irritation, redness and drying. With longer treatments, these side effects may get worse. After many years, new skin cancers may arise in areas previously treated by radiation. For that reason, radiation is not usually used to treat skin cancer in young people. Radiation is also not recommended for people with inherited conditions (such as xeroderma pigmentosum) that make their cells more susceptible to the cancer-causing effect of radiation.

## **Clinical trials**

**The purpose of clinical trials:** Studies of promising new or experimental treatments in patients are known as clinical trials. A clinical trial is only done when there is some reason to believe that the treatment being studied may be valuable to the patient. Treatments used in clinical trials are often found to have real benefits. Researchers conduct studies of new treatments to answer the following questions:

- Is the treatment helpful?
- How does this new type of treatment work?
- Does it work better than other treatments already available?
- What side effects does the treatment cause?
- Are the side effects greater or less than the standard treatment?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

**Types of clinical trials:** There are three phases of clinical trials in which a treatment is studied before it is eligible for approval by the FDA (Food and Drug Administration).

**Phase I clinical trials:** The purpose of a Phase I study is to find the best way to give a new treatment and how much of it can be given safely. Physicians watch patients carefully for any harmful side effects. The treatment has been well tested in laboratory and animal studies, but the side effects in patients are not completely known. Doctors conducting the clinical trial will start by giving very low doses of the drug to the first patients and increasing the dose for later groups of patients until side effects appear. Although doctors are hoping to help patients, the main purpose of a phase I study is to test the safety of the drug.

**Phase II clinical trials:** These are designed to see if the drug works. Patients are given the highest dose that doesn't cause severe side effects (determined from the phase I study) and closely observed for an effect on the cancer. The doctors will also look for side effects.

**Phase III clinical trials:** These Phase III studies involve large numbers of patients. Some clinical trials may enroll thousands of patients. One group (the control group) will receive the standard (most accepted) treatment. The other groups will receive the new treatment. Usually doctors study only 1 new treatment to see if it works better than the standard treatment, but sometimes they will test 2 or 3. All patients in Phase III studies are closely watched. The study will be stopped if the side effects of the new treatment are too severe or if one group has had much better result than the others.

If you are in a clinical trial, you will receive excellent care. You will have a team of experts looking at you and monitoring your progress very carefully. The study is especially designed to pay close attention to you.

However, there are some risks. No one involved in the study knows in advance whether the treatment will work or exactly what side effects will occur. That is what the study is designed to discover. While most side effects will disappear in time, some can be permanent or even life threatening. Keep in mind, though, that even standard treatments have side effects. Depending on many factors, you may decide to enroll in a clinical trial.

**Deciding to enter a clinical trial:** Enrollment in any clinical trial is completely up to you. Your doctors and nurses will explain the study to you in detail and will give you a form to read and sign indicating your desire to take part. This process is known as giving your informed consent. Even after signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason. Taking part in the study will not prevent you from getting other medical care you may need.

To find out more about clinical trials, ask your cancer care team. Among the questions you should ask are:

- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do?
- What is likely to happen in my case with, or without, this new research treatment?
- What are my other choices and their advantages and disadvantages?
- How could the study affect my daily life?
- What side effects can I expect from the study? Can the side effects be controlled?
- Will I have to be hospitalized? If so, how often and for how long?
- Will the study cost me anything? Will any of the treatment be free?
- If I am harmed as a result of the research, what treatment would I be entitled to?
- What type of long-term follow-up care is part of the study?
- Has the treatment been used to treat other types of cancers?

You can get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll free at 1-800-4-CANCER or visiting the NCI clinical trials Web sites for patients ([cancertrials.nci.nih.gov](http://cancertrials.nci.nih.gov)) or health care professionals ([cancernet.nci.nih.gov/prot/protsrch.shtml](http://cancernet.nci.nih.gov/prot/protsrch.shtml)).

## **Treatment of basal cell carcinoma**

**Electrodesiccation and curettage:** Electrodesiccation and curettage is the treatment most often used for basal cell carcinomas. Following this treatment for tumors smaller than 5 millimeters (slightly less than ¼ inch), about 5% will come back. About half of tumors larger than 3 centimeters (slightly less than 1¼ inches) will come back within 5 years.

**Simple excision:** Simple excision is often used to remove basal cell carcinomas, along with a margin of normal skin. The recurrence rate is about 12% for tumors smaller than 1.5 centimeters

(slightly less than ¾ inch) and about 23% for tumors larger than 3 centimeters (slightly less than 1¼ inches).

**Mohs surgery:** Mohs surgery has the best cure rate for basal cell carcinoma. It is useful in treating tumors on or near the nose, eyes, ears, forehead, scalp, fingers, and genital area. Mohs surgery is especially useful in treating large tumors, tumors in certain critical locations, and those that have come back after other treatments.

The cure rate for basal cell carcinomas that have recurred after other treatments is about 96% when Mohs surgery is used and about 50% for most other types of treatment.

**Radiation therapy:** Radiation therapy is a good option for treating older patients with large tumors and tumors involving skin areas such as the eyelids, nose or ears, areas that are difficult to treat surgically.

**Laser surgery or topical chemotherapy:** Laser surgery or topical chemotherapy are sometimes considered options for treating very superficial tumors (tumors that have not extended too deeply under the skin surface). Very close follow-up is necessary because these treatments do not destroy any cancer cells that are deep under the skin surface.

**Cryosurgery:** Cryosurgery is used for some small basal cell carcinomas but is not recommended for larger tumors or those in certain parts of the nose, ears, eyelids, scalp or legs.

### **Treatment of squamous cell carcinoma**

**Simple excision:** Simple excision is often used to treat squamous cell carcinomas.

**electrodessication and curettage:** Electrodesiccation and curettage is useful in treating very small squamous cell carcinomas, but is not recommended for larger tumors.

**Cryosurgery:** Cryosurgery is used for some cases of squamous cell carcinoma, but is not recommended for larger invasive tumors or those on certain parts of the nose, ears, eyelids, scalp, or legs.

**Mohs surgery:** Mohs surgery has the highest cure rate. It is especially useful for squamous cell carcinomas larger than 2cm (slightly larger than ¾ inch), for tumors that have come back after other treatments, for cancers that are spreading along nerves under the skin, and for cancers on certain areas of the face or genital area.

**Radiation therapy:** Radiation therapy is a good option for treating older patients with large cancers especially when they affect areas where surgery is difficult (eyelids, ears, nose). Radiation is also used to treat cancers that have come back after surgical treatment and have become too large or deeply invasive to be removed surgically.

**Lymph node removal:** The removal of regional (nearby) lymph nodes is recommended for some squamous cell carcinomas that are very large or deeply invasive and in cases where the

lymph nodes feel enlarged and/or hard. After the lymph nodes have been removed, they are examined to see if they contain cancerous cells.

**Systemic chemotherapy:** Systemic chemotherapy is an option for patients with squamous cell skin carcinoma that has spread to lymph nodes or distant organs.

### **Treatment of actinic keratosis**

Actinic keratosis is commonly treated with either liquid nitrogen cryosurgery or topical fluorouracil (5-FU). Liquid nitrogen cryotherapy and topical fluorouracil destroy the affected area of the epidermis, the outermost layer of the skin. Blood vessels and lymphatic vessels, which can serve as transports for cancer cells throughout the body, are not present in this layer, so simply destroying the affected parts of the epidermis usually cures actinic keratosis.

### **Treatment of bowen's disease**

Bowen's disease is usually treated by simple excision. Electrodesiccation and curettage or cryosurgery are other options. Laser surgery or topical chemotherapy may be considered in selected situations.

### **Treatment of merkel cell carcinoma**

Merkel cell carcinomas are removed by wide local excision (removal of the cancer and a wide margin of normal skin) or by Mohs surgery. Some doctors recommend radiation therapy to the affected area after surgery to reduce the risk of cancer coming back.

Over half of Merkel cell carcinomas eventually spread to lymph nodes and about 1/3 spread to other organs. If nearby lymph nodes are enlarged (suggesting cancer has spread there), they will be surgically removed and examined for cancerous cells. Systemic chemotherapy and/or radiation therapy may relieve symptoms or temporarily shrink these cancers, but generally cannot cure Merkel cell carcinoma that has spread beyond the skin. The 5-year survival rate for patients with Merkel cell carcinoma is about 50%.

## **What Should You Ask Your Doctor About Nonmelanoma Skin Cancer?**

It is important for you to have honest, open discussions with your cancer care team. They want to answer all of your questions, no matter how trivial you might think they are.

Some questions to consider:

- What type of skin cancer do I have?
- Can you explain the different types of skin cancer?
- Has my cancer spread beneath the skin? Has it spread to lymph nodes or other organs?
- What are my treatment options? What do you recommend? Why?
- Will I be okay if the cancer is just removed with no follow up treatment?
- What are the risks or side effects that I should expect?

- Will a scar remain after treatment?
- What are the chances of my cancer coming back with the treatment programs we have discussed?
- What should I do to be ready for treatment?
- What is my expected prognosis, based on my cancer as you view it?
- What are my chances of developing another skin cancer?
- Should I take special precautions to avoid sun exposure? What are the most important steps I can take to protect myself from the sun?
- Are any of my family members at risk of nonmelanoma skin cancer? What should I tell them to do? Should I tell my children's pediatricians that I have been diagnosed with a skin cancer?

In addition to these sample questions, be sure to write down some of your own questions. For instance, you might want more information about recovery times so you can plan your work schedule. Or, you may want to ask about second opinions or about clinical trials for which you may qualify.

## **What Will Happen After Treatment for Nonmelanoma Skin Cancer?**

Even when a skin cancer has been completely removed and is thought to be cured, follow-up examinations are needed to see if the cancer has recurred (come back). Recurrence is most likely to happen in the first 5 years after treatment. In addition, a person who has had one skin cancer is at high risk for developing another one in a different location.

After treatment, you should examine your skin once a month, have follow-up examinations as advised (usually every 6 to 12 months), and protect themselves from the sun. Family members and friends can also be asked to watch for new lesions in areas that are difficult to see.

## **What's New in Research and Treatment Of Nonmelanoma Skin Cancer?**

### **Immunotherapy**

Scientists are looking into ways of treating skin cancers with immunotherapy. Immunotherapy uses treatments that boost the patient's immune system to kill cancer cells. Interferon is an immunotherapy drug used to treat certain types of nonmelanoma skin cancers. The drug is primarily used to treat Kaposi's sarcoma, a type of nonmelanoma skin cancer. Interferon often causes side effects such as fever, chills, nausea, vomiting, tiredness, and itching. This method of treatment is not widely used at this time.

### **Photodynamic therapy**

A new type of treatment that is now being studied is photodynamic therapy. This involves giving patients a chemical that is absorbed by the tumor cells. This makes the cells very sensitive to certain types/colors of laser light. The laser light is focused on the cancer. After exposure to the laser light, the cells begin to die. In early studies, photodynamic therapy has successfully treated

some superficial basal cell and squamous cell skin cancers. However, the exact role of this treatment, if any, remains to be established.

## **Retinoids**

Retinoids are a class of drugs chemically related to vitamin A. Some studies show that taking these medicines by mouth or applying them directly to the skin may be useful in treating some nonmelanoma skin cancers and precancerous lesions. In people who have already had many skin cancers, retinoids may help prevent new cancers from forming. However, they do have side effects. Systemic retinoids cannot be given to women who could become pregnant because they can cause severe birth defects. The exact role of this treatment is not yet known.

## **Basic skin cancer research**

Scientists have made considerable progress during the past few years in understanding how ultraviolet light damages DNA and how changes in DNA cause normal skin cells to become cancerous. Researchers are continually working to apply this new information to new strategies for treating skin cancers.

## **Public education**

It is important to remember that most skin cancer is preventable. The greatest reduction in the number of skin cancer cases, as well as in the pain and loss of life from this disease, will come from preventive strategies. This involves educating the public about skin cancer risk factors, prevention, and detection. It is important for health care professionals and skin cancer survivors to remind others about the dangers of excessive unprotected sun exposure and about how easily you can protect your skin from ultraviolet radiation.

The American Academy of Dermatology (AAD) sponsors annual free skin cancer screenings throughout the country. Many ACS offices work closely with AAD to provide volunteers for registration, coordination, and education efforts related to these free screenings. Look for information locally about these screenings or call the American Academy of Dermatology for more information. Their telephone number and Internet address are listed in the section "Additional Resources."

## **Additional Resources**

### **National Organizations and Web Sites**

American Academy of Dermatology  
Telephone: 1-888-462-DERM (888-462-3376)  
Internet Address: [www.aad.org](http://www.aad.org)

Centers for Disease Control and Prevention  
Telephone: 1-800-232-1311  
Internet Address: [www.cdc.gov/cancer](http://www.cdc.gov/cancer)

National Cancer Institute  
Telephone: 1-800-4-CANCER  
Internet Addresses: [www.nci.nih.gov](http://www.nci.nih.gov) and [cancernet.nci.nih.gov](http://cancernet.nci.nih.gov)

Skin Cancer Foundation  
Telephone 1-800-754-6490  
Internet Address: [www.skincancer.org](http://www.skincancer.org) (website currently under construction)

\*Inclusion on this list does not imply endorsement by the American Cancer Society

### **Additional American Cancer Society Information**

After Diagnosis: A Guide for Patients and Families (Booklet; Code#9440.00)

Facts on Skin Cancer (Pamphlet; Code#2049.00)

It's Your Skin. Wear It Well! (Information Card; Code#2085.01)

It's Your Skin. Wear It Well! (Information Card; Spanish-Code#2087.00)

Outside/Inside Parents (Pamphlet; Code#2012.04)

Sun Basics (Pamphlet; Code #2012.00) - Information for Children

### **Other Publications\***

Dollinger, Malin, Ernest H. Rosenbaum, and Greg Cable. *Everyone's Guide to Cancer Therapy*. Kansas City, Missouri: Somerville House Books. 1994.

Morra, Marion and Eve Potts. *Choices*. New York: Avon Books. 1994.

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