



# Skin Cancer: Basal and Squamous Cell

## What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide faster to allow the person to grow. After the person becomes an adult, most cells divide only to replace worn-out or dying cells or to repair injuries.

Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of out-of-control growth of abnormal cells.

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new, abnormal cells. Cancer cells can also invade (grow into) other tissues, something that normal cells cannot do. Growing out of control and invading other tissues are what makes a cell a cancer cell.

Cells become cancer cells because of damage to DNA. DNA is in every cell and directs all its actions. In a normal cell, when DNA gets damaged the cell either repairs the damage or the cell dies. In cancer cells, the damaged DNA is not repaired, but the cell doesn't die like it should. Instead, this cell goes on making new cells that the body does not need. These new cells will all have the same damaged DNA as the first cell does.

People can inherit damaged DNA, but most DNA damage is caused by mistakes that happen while the normal cell is reproducing or by something in our environment. Sometimes the cause of the DNA damage is something obvious, like cigarette smoking. But often no clear cause is found.

In most cases the cancer cells form a tumor. Some cancers, like leukemia, rarely form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Cancer cells often travel to other parts of the body, where they begin to grow and form new tumors that replace normal tissue. This process is called metastasis. It happens when the cancer cells get into the bloodstream or lymph vessels of our body.

No matter where a cancer may spread, it is always named for the place where it started. For example, breast cancer that has spread to the liver is still called breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bone is metastatic prostate cancer, not bone cancer.

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 of cancer.

Not all tumors are cancerous. Tumors that aren't cancer are called benign. Benign tumors can cause problems – they can grow very large and press on healthy organs and tissues. But they cannot grow into (invade) other tissues. Because they can't invade, they also can't spread to other parts of the body (metastasize). These tumors are almost never life threatening.

## **What are basal and squamous cell skin cancers?**

To understand basal and squamous cell skin cancers, it helps to know about the normal structure and function of the skin.

### **Normal skin**

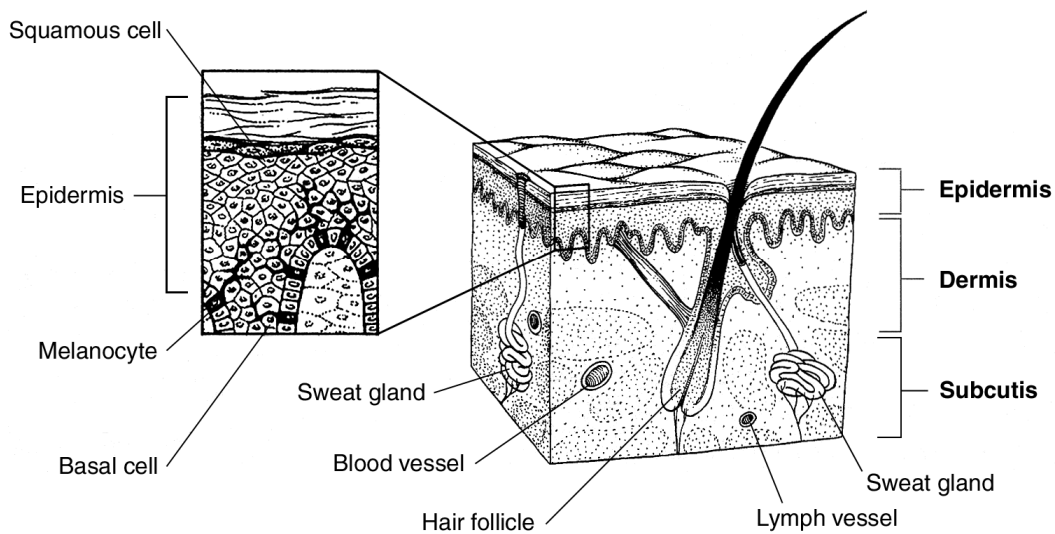
The skin is the largest organ in your body. It does several different things:

- Covers the internal organs and protects them from injury
- Serves as a barrier to germs such as bacteria
- Prevents the loss of too much water and other fluids
- Helps control body temperature
- Protects the rest of the body from ultraviolet (UV) rays
- Helps the body make vitamin D

The skin has 3 layers: the epidermis, the dermis, and the subcutis (see picture).

### **Epidermis**

The top layer of skin is the epidermis. The epidermis is thin, averaging only 0.2 millimeters thick (about 1/100 of an inch). It protects the deeper layers of skin and the organs of the body from the environment.



*Keratinocytes* are the main cell type of the epidermis. These cells make an important protein called keratin. Keratin helps the skin protect the rest of the body.

The outermost part of the epidermis is called the *stratum corneum*, or horny layer. It is composed of dead keratinocytes that are continually shed as new ones form. The cells in this layer are called *squamous cells* because of their flat shape.

Living squamous cells are found just below the stratum corneum. These cells have moved here from the lowest part of the epidermis, the basal layer. The cells of the basal layer, called *basal cells*, continually divide to form new keratinocytes. These replace the older keratinocytes that wear off the skin's surface.

Cells called *melanocytes* are also found in the epidermis. These skin cells make the brown pigment called *melanin*. Melanin is what gives the skin its tan or brown color. It protects the deeper layers of the skin from some of the harmful effects of the sun. When skin is exposed to the sun, melanocytes make more of the pigment, causing the skin to tan or darken.

The epidermis is separated from the deeper layers of skin by the *basement membrane*. The basement membrane is an important structure because when a skin cancer becomes more advanced, it generally grows through this barrier.

## **Dermis**

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, made by cells called fibroblasts, gives the skin its resilience and strength.

## **Subcutis**

The 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 helps the body conserve heat and has a shock-absorbing effect that helps protect the body's organs from injury.

## **Types of skin cancer**

### **Melanomas**

Cancers that develop from melanocytes, the pigment-making cells of the skin, are called *melanomas*. Melanocytes can also form benign growths called *moles*. Melanoma and moles are discussed in our document called *Melanoma Skin Cancer*.

Skin cancers that are not melanoma are sometimes grouped together as non-melanoma skin cancers because they tend to act very differently from melanomas.

### **Keratinocyte cancers**

These are by far the most common non-melanoma skin cancers. They are called *keratinocyte carcinomas* or *keratinocyte cancers* because when seen under a microscope, their cells share some features of keratinocytes, the most abundant cell type of normal skin. The most common types of keratinocyte cancer are basal cell carcinoma and squamous cell carcinoma.

#### **Basal cell carcinoma**

When seen under a microscope, these cancers share features with the cells in the lowest layer of the epidermis, called the basal cell layer.

About 8 out of 10 skin cancers are basal cell carcinomas (also called *basal cell cancers*). 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 their skin exposed.

Basal cell carcinoma tends to be slow growing. It is very rare for a basal cell cancer to spread to nearby lymph nodes or to distant parts of the body. But 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. People who have had basal cell cancers are also more likely to get new ones elsewhere on the skin. As many as half of the people who are diagnosed with one basal cell cancer will develop a new skin cancer within 5 years.

#### **Squamous cell carcinoma**

About 2 out of 10 skin cancers are squamous cell carcinomas (also called *squamous cell cancers*). They commonly appear on sun-exposed areas of the body such as the face, ears, neck, lips, and backs of the hands. They can also develop in scars or skin ulcers elsewhere. They sometimes start in actinic keratoses (described below). 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 fatty tissues just beneath the skin, and are more likely to spread to lymph nodes and/or distant parts of the body, although this is still uncommon.

**Keratoacanthomas** are growths that are found on sun-exposed skin. They may start out growing quickly, but their growth usually slows down. Many keratoacanthomas shrink or even go away on their own over time without any treatment. But some continue to grow, and a few may even spread to other parts of the body. Their growth is often hard to predict, and many skin specialists consider them a type of squamous cell skin cancer.

### **Less common types of skin cancer**

Along with melanoma and keratinocyte cancers, there are some other much less common types of skin cancer. These cancers are also non-melanoma skin cancers, but they are quite different from keratinocyte cancers and are treated differently.

Other non-melanoma skin cancers include:

- Merkel cell carcinoma
- Kaposi sarcoma
- Cutaneous (skin) lymphoma
- Skin adnexal tumors
- Various types of sarcomas

Together, these types account for less than 1% of non-melanoma skin cancers.

#### **Merkel cell carcinoma**

This uncommon type of skin cancer develops from neuroendocrine cells (hormone-making cells that resemble nerve cells in some ways) in the skin. They are most often found on the head, neck, and arms but can start anywhere.

These cancers are thought to be caused in part by sun exposure and in part by Merkel cell polyomavirus (MCV). About 8 out of 10 Merkel cell carcinomas are thought to be related to MCV infection. MCV is a common virus. Many people are infected with MCV, but it usually causes no symptoms. In a small percentage of people with this infection, changes in the virus' DNA can lead to this form of cancer.

Unlike basal cell and squamous cell carcinomas, Merkel cell carcinomas often spread to nearby lymph nodes and internal organs. They also tend to come back after treatment. Treatment of Merkel cell carcinoma is described in the section called “Treating Merkel cell carcinoma.”

## **Kaposi sarcoma**

This cancer usually starts within the dermis but can also form in internal organs. It is related to infection with Kaposi sarcoma herpesvirus (KSHV), also known as human herpesvirus 8 (HHV8). Before the mid-1980s, this cancer was rare and found mostly in elderly people of Mediterranean descent. Kaposi sarcoma has become more common because it is more likely to develop in people with human immunodeficiency virus (HIV) infection and the acquired immunodeficiency syndrome (AIDS). It is discussed in our document called *Kaposi Sarcoma*.

## **Skin lymphomas**

Lymphomas are cancers that start in lymphocytes, a type of immune system cell found throughout the body in the bone marrow (the soft inner part of some bones), lymph nodes (bean-sized collections of immune system cells), the bloodstream, and some internal organs. The skin also contains a large number of lymphocytes.

Most lymphomas start in lymph nodes or internal organs, but there are certain types of lymphoma that appear to begin mostly or entirely in the skin. *Primary cutaneous lymphoma* is the medical term for lymphomas that start in the skin. The most common type of primary cutaneous lymphoma is *cutaneous T-cell lymphoma* (most of these are called *mycosis fungoides*). Cutaneous lymphomas are discussed in our document called *Lymphoma of the Skin*.

## **Adnexal tumors**

These tumors start in the hair follicles or glands (such as sweat glands) of the skin. Benign (non-cancerous) adnexal tumors are common, but malignant (cancerous) ones, such as sebaceous adenocarcinoma and sweat gland adenocarcinoma, are rare.

## **Sarcomas**

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. Several types of sarcoma can develop in the skin, including *dermatofibrosarcoma protuberans* (DFSP) and *angiosarcoma* (a blood vessel cancer). Sarcomas are discussed in our document called *Sarcoma – Adult Soft Tissue Cancer*.

## **Pre-cancerous and pre-invasive skin conditions**

These conditions may develop into skin cancer or may be very early stages in the development of skin cancer.

### **Actinic keratosis (solar keratosis)**

Actinic keratosis, also known as solar keratosis, is a pre-cancerous skin condition caused by overexposure to the sun. Actinic keratoses are usually small (less than 1/4 inch across), 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. People with one actinic keratosis usually develop many more.

Actinic keratoses are slow growing. They usually do not cause any symptoms. In some cases actinic keratoses may turn into keratinocyte cancers. They often go away on their own, but they may come back.

Even though most actinic keratoses do not become cancers, they are a warning that your skin has suffered sun damage. Some actinic keratoses and other skin conditions that could become cancers may have to be removed. Your doctor should regularly check any that are not removed for changes that could indicate cancer.

### **Squamous cell carcinoma in situ (Bowen disease)**

Squamous cell carcinoma in situ, also called Bowen disease, is the earliest form of squamous cell skin cancer. "In situ" means that the cells of these cancers are still entirely within the epidermis and have not invaded the dermis.

Bowen disease appears as reddish patches. Compared with actinic keratoses, Bowen disease patches tend to be larger (sometimes over 1/2 inch across), redder, scaly, and sometimes crusted.

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

### **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 our 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
- Warts: rough-surfaced growths caused by a virus

# What are the key statistics about basal and squamous cell skin cancers?

Cancer of the skin (including melanoma and basal and squamous cell skin cancers) is by far the most common of all types of cancer. About 3.5 million basal and squamous cell skin cancers are diagnosed each year. Most of these are basal cell cancers. Squamous cell cancers occur less often.

The number of people who develop basal and squamous cell skin cancers each year is not known for certain. Statistics of most other cancers are known because they are reported to cancer registries, but basal and squamous cell skin cancers are not reported.

The number of these cancers has been increasing for many years. This is probably due to a combination of increased detection, more sun exposure, and people living longer.

Death from these cancers is uncommon. It is thought that about 3,000 people die each year from non-melanoma skin cancers, and this rate has been dropping in recent years. Most people who die are elderly. Other people more likely to die of skin cancer are those whose immune system is suppressed, such as those who have received organ transplants.

# What are the risk factors for basal and squamous cell skin cancers?

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. For example, smoking is a risk factor for cancers of the lung, mouth, throat, kidneys, bladder, and several other organs.

But risk factors don't tell us everything. Having a risk factor, or even several risk factors, does not mean that you will get the disease. And many people who get the disease may not have had any known risk factors. Even if a person with basal or squamous cell skin cancer has a risk factor, it is often very hard to know how much that risk factor may have contributed to the cancer.

The following are known risk factors for basal cell and squamous cell carcinomas. (These factors don't necessarily apply to other forms of non-melanoma skin cancer, such as Kaposi sarcoma and cutaneous lymphoma.)

## Ultraviolet (UV) light exposure

Ultraviolet (UV) radiation is thought to be the major risk factor for most skin cancers. Sunlight is the main source of UV rays, which can damage the genes in your skin cells. Tanning lamps and beds are another source of UV radiation. People with high levels of exposure to light from these sources are at greater risk for skin cancer.

Ultraviolet radiation is divided into 3 wavelength ranges:

- *UVA rays* cause cells to age and can cause some damage to cells' DNA. They are mainly linked to long-term skin damage such as wrinkles, but are also thought to play a role in some skin cancers.
- *UVB rays* can cause direct damage to the DNA, and are the main rays that cause sunburns. They are also thought to cause most skin cancers.
- *UVC rays* don't get through our atmosphere and therefore are not present in sunlight. They are not normally a cause of skin cancer.

While UVA and UVB rays make up only a very small portion of the sun's wavelengths, they are the main cause of the damaging effects of the sun on the skin. UV radiation damages the DNA of skin cells. Skin cancers begin when this damage affects the DNA of genes that control skin cell growth. Both UVA and UVB rays damage skin and cause skin cancer. UVB rays are a more potent cause of at least some skin cancers, but based on what is known today, there are *no* safe UV rays.

The amount of UV exposure depends on the strength of the rays, the length of time the skin is exposed, and whether the skin is protected with clothing or sunscreen.

People who live in areas with year-round, bright sunlight have a higher risk. For example, the risk of skin cancer is twice as high in Arizona compared to Minnesota. The highest rate of skin cancer in the world is in Australia. Spending a lot of time outdoors for work or recreation without protective clothing and sunscreen increases your risk.

Many studies also point to exposure at a young age (for example, frequent sunburns during childhood) as an added risk factor.

## **Having fair skin**

The risk of skin cancer is much higher for whites than for African Americans or Hispanics. This is due to the protective effect of melanin (skin pigment) in people with darker skin. Whites with fair (light-colored) skin that freckles or burns easily are at especially high risk. This is another reason for the high skin cancer rate in Australia, where much of the population descends from fair-skinned immigrants from the British Isles.

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.

## **Older age**

The risk of basal and squamous cell skin cancers goes up as people get older. This is probably because of accumulated sun exposure over time. These cancers are now being seen in younger people as well, probably because they are spending more time in the sun with their skin exposed.

## **Male gender**

Men are about 2 times as likely as women to have basal cell cancers and about 3 times as likely to have squamous cell cancers of the skin. This is thought to be due mainly to higher levels of sun exposure.

## **Exposure to certain chemicals**

Exposure to large amounts of arsenic increases the risk of developing skin cancer. Arsenic is a heavy metal found naturally in well water in some areas. It is also used in making some pesticides.

Workers exposed to industrial tar, coal, paraffin, and certain types of oil may also have an increased risk for non-melanoma skin cancer.

## **Radiation exposure**

People who have had radiation treatment have a higher risk of developing skin cancer in the area that received the treatment. This is particularly a concern in children who have had radiation treatment for cancer.

## **Previous skin cancer**

Anyone who has had a keratinocyte cancer has a much higher chance of developing another one.

## **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 keratinocyte skin cancers, although this risk is generally small.

## **Psoriasis treatment**

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

## **Xeroderma pigmentosum (XP)**

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

## **Basal cell nevus syndrome (Gorlin syndrome)**

In this rare congenital (present at birth) condition, people develop many basal cell cancers over their lifetimes. Most, but not all, cases are inherited. Affected people may also have abnormalities of the jaw and other bones, eyes, and nervous tissue. In families with this syndrome, those affected often begin developing basal cell cancers when they are young (under age 20).

## **Reduced immunity**

The immune system helps the body fight cancers of the skin and other organs. People with weakened immune systems (due to certain diseases or medical treatments) are more likely to develop non-melanoma skin cancer, including squamous cell cancer and less common types such as Kaposi sarcoma and Merkel cell carcinoma.

For example, organ transplant patients are usually given medicines that weaken their immune system to prevent their body from rejecting the new organ. This increases their risk of developing skin cancer. The rate of skin cancer in people who have had transplants can be as high as 70% within 20 years after the transplant. Skin cancers in people with weakened immune systems tend to grow faster and are more likely to be fatal.

Treatment with large doses of corticosteroid drugs can also depress the immune system. This may also increase a person's risk of skin cancer.

## **Human papilloma virus (HPV) infection**

Human papilloma viruses (HPVs) are a group of more than 100 viruses that can cause papillomas, or warts. The warts that people commonly get on their hands and feet appear to be unrelated to any form of cancer. But some of the HPV types, especially those that people get in their genital and anal area, appear to be related to skin cancers in these areas.

## **Smoking**

People who smoke are more likely to develop squamous cell skin cancer, especially on the lips. Smoking is not a known risk factor for basal cell cancer.

# **Do we know what causes basal and squamous cell skin cancers?**

Most basal cell and squamous cell skin cancers are caused by unprotected exposure of the skin to ultraviolet (UV) rays. This radiation comes from sunlight, as well as from man-made sources such as tanning beds.

Repeated and unprotected sun exposure over many years increases a person's risk of skin cancer. Most skin cancers are probably caused by exposures that happened many years earlier. The pattern of exposure may also be important. For example, frequent sunburns in childhood may increase the risk for basal cell cancer many years or even decades later.

DNA is the chemical in each of our cells that makes up our genes – the instructions for how our cells function. We usually look like our parents because they are the source of our DNA. However, DNA affects more than just how we look. Some genes contain instructions for controlling when our cells grow, divide, and die.

UV radiation (from sunlight or tanning lamps) can damage DNA. Sometimes this damage affects certain genes that control how and when cells grow and divide. Usually the cells can repair the damage, but in some cases this results in abnormal DNA, which may be the first step on the path to cancer.

Researchers don't yet know all of the DNA changes that result in skin cancer, but they have found that many skin cancers have changes in *tumor suppressor genes*. These genes normally function to help keep cells from growing out of control.

The gene most often found to be altered in squamous cell cancers is called *p53*. This gene normally causes damaged cells to die. When this gene is altered, these abnormal cells may live longer and perhaps go on to become cancerous.

A gene commonly found to be mutated in basal cell cancers is the "patched" (PTCH) gene. This tumor suppressor gene normally helps keep cell growth in check, so changes in this gene can allow cells to grow out of control. People who have basal cell nevus syndrome, which is often inherited from a parent and results in many basal cell cancers, have an altered PTCH gene in all the cells of their body.

These are not the only gene changes that may play a role in the development of skin cancer. There are likely to be many others as well.

People with xeroderma pigmentosum (XP) have 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 huge numbers of cancers on sun-exposed areas of their skin.

The link between squamous cell skin cancer and human papilloma virus (HPV) infection also involves DNA and genes. These viruses contain genes that instruct infected cells to make certain proteins that affect the growth-regulating proteins of normal skin cells. This can cause skin cells to grow too much and to not die when they're supposed to.

Scientists are studying other links between DNA changes and skin cancer. In the future, better understanding of how damaged DNA leads to skin cancer might be used to design treatments to overcome or repair that damage.

# Can basal and squamous cell skin cancers be prevented?

Not all basal and squamous cell skin cancers can be prevented, but there are things you can do that may reduce your risk of getting skin cancer.

## Limit ultraviolet (UV) exposure

The most important way to lower your risk of basal and squamous cell skin cancers is to limit your exposure to UV radiation. Practice sun safety when you are outdoors. "Slip! Slop! Slap!... and Wrap" is a catch phrase that can help you remember the 4 key steps you can take to protect yourself from UV rays:

- Slip on a shirt.
- Slop on sunscreen.
- Slap on a hat.
- Wrap on sunglasses to protect the eyes and sensitive skin around them.

## Protect your skin with clothing

Clothes provide different levels of UV protection, depending on many factors. Long-sleeved shirts, long pants, or long skirts are the most protective. Dark colors generally provide more protection than light colors. A tightly woven fabric protects better than loosely woven clothing. Dry fabric is generally more protective than wet fabric.

Be aware that covering up doesn't block out all UV rays. If you can see light through a fabric, UV rays can get through too.

Some companies in the United States now make clothing that is lightweight, comfortable, and protects against UV exposure even when wet. These sun-protective clothes may have a label listing the ultraviolet protection factor (UPF) value – the level of protection the garment provides from the sun's UV rays (on a scale from 15 to 50+). The higher the UPF, the higher the protection from UV rays.

Newer products, which are used in the washing machine like laundry detergents, can increase the UPF value of clothes you already own. They add a layer of UV protection to your clothes without changing the color or texture.

## Wear a hat

A hat with at least a 2- to 3-inch brim all around is ideal because it protects areas often exposed to intense sun, such as the ears, eyes, forehead, nose, and scalp. A shade cap (which looks like a baseball cap with about 7 inches of fabric draping down the sides and

back) also is good, and will provide more protection for the neck. These are often sold in sports and outdoor supply stores.

A baseball cap can protect the front and top of the head but not the neck or the ears, where skin cancers commonly develop. Straw hats are not as protective as ones made of tightly woven fabric.

## **Use sunscreen**

Use sunscreens and lip balms on areas of skin exposed to the sun, especially when the sunlight is strong (for example, between the hours of 10 am and 4 pm). Many groups, including the American Academy of Dermatology, recommend using products with a sun protection factor (SPF) of 30 or more. Use sunscreen even on hazy days or days with light or broken cloud cover because the UV light still comes through.

Always follow directions when applying sunscreen. Ideally, a 1-ounce application (a palmful of sunscreen) is recommended to cover the arms, legs, neck, and face of the average adult. Protection is greatest when sunscreen is used thickly on all sun-exposed skin. To ensure continued protection, sunscreens should be reapplied. It is often recommended to do so every 2 hours. Many sunscreens wash off when you sweat or swim and then wipe off with a towel, so they must be reapplied for maximum effectiveness. And don't forget your lips; lip balm with sunscreen is also available.

Some people use sunscreen because they want to stay out in the sun for long periods of time without getting sunburned. Sunscreen should not be used to spend more time in the sun than you otherwise would, as you will still end up with damage to your skin.

Sunscreen can reduce your chance of actinic keratoses and squamous cell cancer. But there is no guarantee, and if you stay in the sun a long time, you are at risk of developing skin cancer even if you have applied sunscreen.

If you want a tan, one option is using a sunless tanning lotion. These can provide the look, without the danger. Sunless tanning lotions contain a substance called dihydroxyacetone (DHA). DHA works by interacting with proteins on the surface of the skin to produce color. You do not have to go out in the sun for these to work. The color tends to wear off after a few days. Most sunless tanning lotions provide very little protection from UV rays, so if you use one, you should still use sunscreen and wear protective clothing when going outside.

## **Wear sunglasses**

Wrap-around sunglasses with at least 99% UV absorption provide the best protection for the eyes and the skin area around the eyes. Look for sunglasses labeled as blocking UVA and UVB light. Labels that say "UV absorption up to 400 nm" or "Meets ANSI UV Requirements" mean the glasses block at least 99% of UV rays. If there is no label, don't assume the sunglasses provide any protection.

## **Seek shade**

Another way to limit exposure to UV light is to avoid being outdoors in direct sunlight too long. This is particularly important in the middle of the day between the hours of 10 am and 4 pm, when UV light is strongest. If you are unsure about the sun's intensity, use the shadow test: if your shadow is shorter than you are, the sun's rays are the strongest, and it is important to protect yourself..

When you are outdoors, protect your skin. Keep in mind that sunlight (and UV rays) can come through light clouds, can reflect off water, sand, concrete, and snow, and can reach below the water's surface.

**The UV Index:** The amount of UV light reaching the ground in any given place depends on a number of factors, including the time of day, time of year, elevation, and cloud cover. To help people better understand the intensity of UV light in their area on a given day, the National Weather Service and the US Environmental Protection Agency have developed the UV Index. It gives people an idea of how strong the UV light is in their area, on a scale from 1 to 11+. A higher number means a higher chance of sunburn, skin damage, and ultimately skin cancers of all kinds. Your local UV Index should be available daily in your local newspaper, on TV weather reports, and online ([www.epa.gov/sunwise/uvindex.html](http://www.epa.gov/sunwise/uvindex.html)).

## **Avoid tanning beds and sunlamps**

Many people believe the UV rays of tanning beds are harmless. This is not true. Tanning lamps give out UVA and usually UVB rays as well, both of which can cause long-term skin damage and can contribute to skin cancer. Most skin doctors and health organizations recommend not using tanning beds and sun lamps.

## **Protect children from the sun**

Children need special attention, since they tend to spend more time outdoors and can burn more easily. Parents and other caregivers should protect children from excess sun exposure by using the steps above. Older children need to be cautioned about sun exposure as they become more independent. It is important, particularly in parts of the world where it is sunnier, to cover your children as fully as is reasonable. You should develop the habit of using sunscreen on exposed skin for yourself and your children whenever you go outdoors and may be exposed to large amounts of sunlight.

Babies younger than 6 months should be kept out of direct sunlight and protected from the sun using hats and protective clothing. Sunscreen may be used on small areas of exposed skin only if adequate clothing and shade are not available.

## **A word about sun exposure and vitamin D**

Doctors are learning that vitamin D has many health benefits. It may even help to lower the risk for some cancers. Vitamin D is made naturally by your skin when you are in the

sun. How much vitamin D you make depends on many things, including how old you are, how dark your skin is, and how intensely the sun shines where you live.

At this time, doctors aren't sure what the optimal level of vitamin D is. A lot of research is being done in this area. Whenever possible, it is better to get vitamin D from your diet or vitamin supplements rather than from sun exposure, because dietary sources and vitamin supplements do not increase risk for skin cancer, and are typically more reliable ways to get the amount you need.

For more information on how to protect yourself and your family from UV exposure, see our document called *Skin Cancer: Prevention and Early Detection*.

## Avoid harmful chemicals

Exposure to certain chemicals, such as arsenic, can increase a person's risk of skin cancer. People can be exposed to arsenic from well water in some areas, pesticides and herbicides, some medicines (such as arsenic trioxide) and herbal remedies (arsenic has been found in some traditional herbal remedies imported from China), and in certain occupations (such as mining and smelting).

## Learn more about skin cancer prevention

Many organizations conduct skin cancer prevention activities in schools and recreational areas. Others develop brochures and public service announcements. For more information, refer to the "Additional resources" section of this document.

## Can basal and squamous cell skin cancers be found early?

Basal cell and squamous cell skin cancers can be found early. As part of a routine cancer-related checkup, your health care professional should check your skin carefully. He or she should be willing to discuss any doubts or concerns you might have about this exam.

You can also play an important role in finding skin cancer early. It's important to check all over your skin, preferably once a month. Learn the patterns of moles, blemishes, freckles, and other marks on your skin so that you'll notice any changes. Self-exams are best done in a well-lit room in front of a full-length mirror. A hand-held mirror can be used for areas that are hard to see.

All areas should be examined, including your palms and soles, scalp, ears, nails, and your back. (For a more thorough description of a skin self-exam, see our document called *Skin Cancer: Prevention and Early Detection* and the booklet "*Why You Should Know About Melanoma*.") Friends and family members can also help you with these exams, especially for those hard-to-see areas, such as the lower back or the back of your thighs. Be sure to show your doctor any area that concerns you.

Spots on the skin that are new or changing in size, shape, or color should be seen by a doctor promptly. Any unusual sore, lump, blemish, marking, or change in the way an area of the skin looks or feels may be a sign of skin cancer or a warning that it might occur. The skin might become scaly or crusty or begin oozing or bleeding. It may feel itchy, tender, or painful. Redness and swelling may develop.

Basal cell and squamous cell 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 to 2 years), or a sore that doesn't heal within 2 months. (See the next section, "How are basal and squamous cell skin cancers diagnosed?" for a more detailed description of what to look for.)

## **How are basal and squamous cell skin cancers diagnosed?**

If an abnormal area of skin raises the possibility of skin cancer, certain medical exams and tests such as a biopsy may be used to find out if it is cancer or some other skin condition. If there is a chance the skin cancer may have spread to other areas of the body, other tests may be done as well.

## **Signs and symptoms of basal and squamous cell skin cancers**

Skin cancers rarely cause bothersome symptoms until they become quite large. Then they may bleed or even hurt. But typically they can be seen or felt long before they reach this point.

Basal cell carcinomas often appear as flat, firm, pale areas or small, raised, pink or red, translucent, shiny, waxy areas that may bleed after a minor injury. They may have one or more abnormal blood vessels, a lower area in their center, and/or blue, brown, or black areas. Large basal cell carcinomas may have oozing or crusted areas. They usually develop on areas exposed to the sun, especially the head and neck, but they can occur anywhere on the body.

Squamous cell carcinomas may appear as growing lumps, often with a rough, scaly, or crusted surface. They may also look like flat reddish patches in the skin that grow slowly. They commonly occur on sun-exposed areas of the body such as the face, ear, neck, lip, and back of the hands. Less often, they form in the skin of the genital area. They can also develop in scars or skin sores elsewhere.

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

Skin cancers other than melanoma, basal cell carcinoma, and squamous cell carcinoma are much less common, and may look different.

- *Kaposi sarcoma* generally starts as small bruise-like areas that develop into reddish or purplish tumors under the skin.
- *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 like 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 firm, pink, red, or purple nodules or ulcers (sores) found on the face or, less often, the arms or legs.

If your doctor suspects you might have skin cancer, he or she will use one or more of the following tests or exams.

## Medical history and physical exam

Usually the doctor's first step is to take your medical history (asking questions about symptoms and risk factors). The doctor will ask 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 possible causes of skin cancer (including past sunburns and tanning practices) and whether you or anyone in your family has had skin cancer.

During the physical exam, the doctor will note the size, shape, color, and texture of the area(s) in question, and whether there is bleeding or scaling. The rest of your body may be checked for spots and moles that may be related to skin cancer.

The doctor may also check nearby lymph nodes, which are bean-sized collections of immune system cells that can be felt under the skin in certain areas. Some skin cancers may spread to lymph nodes. When this happens, the lymph nodes may become larger and firmer than usual.

If you are being seen by your primary doctor and skin cancer is suspected, you may be referred to a dermatologist (a doctor who specializes in skin diseases), who will look at the area more closely.

Along with a standard physical exam, some dermatologists use a technique called *dermatoscopy* (also known as *dermoscopy*, *epiluminescence microscopy [ELM]* or *surface microscopy*) to see spots on the skin more clearly. The doctor uses a dermatoscope, which is a special magnifying lens and light source held near the skin. Sometimes a thin layer of oil is used with this instrument. A digital or photographic image of the spot may be taken.

When used by an experienced dermatologist, this test can improve the accuracy of finding skin cancers early. It can also often help reassure you that a lesion is likely benign (non-cancerous) without the need for a biopsy.

## Skin biopsy

If the doctor thinks that a suspicious area might be skin cancer, he or she will take a sample of skin from the area to be looked at under a microscope. This is called a *skin biopsy*. If the biopsy removes the entire tumor, it is often enough to cure basal and squamous cell skin cancers without further treatment.

Different methods can be used for a skin biopsy. The choice depends on the suspected type of skin cancer, where it is on your body, the size of the affected area, and other factors. Any biopsy is likely to leave at least a small scar. Different methods produce different scars, so if you are concerned ask your doctor about possible scarring before the biopsy is done.

Skin biopsies are done using a local anesthetic (numbing medicine), which is injected into the area with a very small needle. You will likely feel a small prick and a little stinging as the medicine is injected, but you should not feel any pain during the biopsy.

### 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 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

To examine a tumor that may have grown into deeper layers of the skin, the doctor may use an incisional or excisional biopsy technique. After numbing the area with a local anesthetic, a surgical knife is used to cut through the full thickness of skin. A wedge or sliver of skin is removed for examination, and the edges of the wound are stitched together.

An incisional biopsy removes only a portion of the tumor. An excisional biopsy removes the entire tumor.

### Examining the biopsy samples

All skin biopsy samples are looked at under a microscope by a pathologist, a doctor trained in the examination and diagnosis of tissue samples. Often, the sample is sent to a dermatopathologist, a doctor who has special training in making diagnoses from skin samples.

## Lymph node biopsy

In uncommon cases where skin cancer spreads, it usually goes first to nearby lymph nodes, which are small, bean-shaped collections of immune cells. If your doctor feels lymph nodes near the tumor that are too large and/or too firm, a lymph node biopsy may be done to determine whether cancer has spread to them.

### **Fine needle aspiration biopsy**

A fine needle aspiration (FNA) biopsy uses a syringe with a thin, hollow needle to remove very small tissue fragments. The needle is smaller than the needle used for a blood test. A local anesthetic is sometimes used to numb the area first. This test rarely causes much discomfort and does not leave a scar.

An FNA biopsy is not used to diagnose a suspicious skin tumor, but it may be used to biopsy large lymph nodes near a skin cancer to find out if the cancer has spread to them. FNA biopsies are not as invasive as some other types of biopsies, but they may not always provide enough of a sample to find cancer cells.

### **Surgical (excisional) lymph node biopsy**

If the doctor still suspects spread of cancer to a lymph node after an FNA does not find cancer, the lymph node will be removed by surgery and examined. This can often be done in a doctor's office or outpatient surgical center using local anesthesia and will leave a small scar.

## How are basal and squamous cell skin cancers staged?

Staging is a process of finding out how widespread a cancer is. Because basal cell cancer is almost always cured before it 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 may sometimes be done, particularly in people who have a high risk of spread. This includes people with suppressed immune systems, such as those who have had organ transplants and people infected with HIV, the virus that causes AIDS.

The tests and exams described in the section called “How are basal and squamous cell skin cancers diagnosed?” are the main ones used to help determine the stage of the cancer. In rare cases, imaging tests such as x-rays, CT scans, or MRI scans may be used as well.

# The American Joint Committee on Cancer (AJCC) TNM system

A staging system is a way to summarize how far a cancer has spread. This helps members of the cancer care team determine a patient's prognosis (outlook) as well as the best treatment options.

The system most often used to stage basal and squamous cell skin cancers is the American Joint Commission on Cancer (AJCC) TNM system. (*Merkel cell carcinoma has a separate AJCC staging system, which is not described here.*)

Physical exams and other tests may be used to assign T, N, and M categories and a grouped stage. The TNM system for staging contains 3 key pieces of information:

- **T** stands for **tumor** (its size, location, and how far it has spread within the skin and to nearby tissues).
- **N** stands for spread to nearby lymph **nodes** (small bean-shaped collections of immune system cells, to which cancers often spread first).
- **M** is for **metastasis** (spread to distant organs).

## T categories

The possible values for T are:

**TX:** Primary tumor cannot be assessed.

**T0:** No evidence of primary tumor.

**Tis:** Carcinoma in situ (tumor is still confined to the epidermis).

**T1:** The tumor is 2 centimeters (cm) across (about 4/5 inch) or smaller and has no or only 1 high-risk feature (see below).

**T2:** Tumor is larger than 2 cm across, or is any size with 2 or more high-risk features.

**T3:** Tumor invades into facial bones, such as the jaw bones or bones around the eye.

**T4:** Tumor invades into other bones in the body or into the base of the skull.

**High-risk features:** These features are used to distinguish between some T1 and T2 tumors.

- Tumor is thicker than 2 millimeters (mm).
- Tumor has invaded down into the lower dermis or subcutis (Clark level IV or V).
- Tumor has invaded into tiny nerves in the skin (perineural invasion).
- Tumor started on an ear or on hair-bearing lip.

- Tumor cells look very abnormal (poorly differentiated or undifferentiated) when viewed under a microscope.

## **N categories**

The possible values for N are:

**NX:** Nearby lymph nodes cannot be assessed.

**N0:** No spread to nearby lymph nodes.

**N1:** Spread to 1 nearby lymph node which is on the same side of the body as the main tumor and is 3 centimeters (cm) or less across.

**N2a:** Spread to 1 nearby lymph node which is on the same side of the body as the main tumor and is larger than 3 cm but not larger than 6 cm across.

**N2b:** Spread to more than 1 nearby lymph node on the same side of the body as the main tumor, none of which are larger than 6 cm across.

**N2c:** Spread to nearby lymph node(s) on the other side of the body from the main tumor, none of which are larger than 6 cm across.

**N3:** Spread to any nearby lymph node that is larger than 6 cm across.

## **M categories**

The M values are:

**M0:** No spread to distant organs.

**M1:** Spread to distant organs.

## **Stage grouping**

To assign a stage, information about the tumor and whether it has spread to lymph nodes and other organs in the body is combined in 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 cancers tend to have a better prognosis for a cure or long-term survival.

<b>Stage 0</b>	Tis, N0, M0
<b>Stage I</b>	T1, N0, M0
<b>Stage II</b>	T2, N0, M0
<b>Stage III</b>	T3, N0, M0 T1 to T3, N1, M0
<b>Stage IV</b>	T1 to T3, N2, M0

Any T, N3, M0  
T4, any N, M0  
Any T, any N, M1

## How are basal and squamous cell skin cancers treated?

*This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.*

*The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor.*

*Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

### General treatment information

The next few sections describe the types of treatments used for non-melanoma skin cancers. This is followed by a discussion of the typical treatment options based on the type of skin cancer.

The treatments described in these sections are those used for actinic keratosis, squamous cell carcinoma, basal cell carcinoma, and/or Merkel cell carcinoma. Other skin cancers, such as melanoma, lymphoma of the skin, Kaposi sarcoma, and other sarcomas are treated differently and are discussed in separate documents.

Fortunately, most basal cell and squamous cell carcinomas can be cured with fairly minor surgery or other types of local treatments.

### Surgery for basal and squamous cell skin cancers

There are many different kinds of surgery for basal cell and squamous cell skin cancers. The options for surgery depend on how large the cancer is, where it is on the body, and the specific type of skin cancer. In most cases the surgery can be done in a doctor's office or hospital clinic. For certain skin cancers with a high risk of spreading, surgery may sometimes be followed by other treatments, such as radiation or chemotherapy.

#### Simple excision

This is similar to an excisional biopsy (described in the section called "How are basal and squamous cell skin cancers diagnosed?"), but in this case the diagnosis is already known. For this procedure, the skin is first numbed with a local anesthetic. The tumor is then cut out with a surgical knife, along with some surrounding normal skin. The remaining skin is carefully stitched back together, leaving a small scar.

## **Curettage and electrodesiccation**

This treatment removes the cancer by scraping it with a curette (a long, thin instrument with a sharp edge on one end), then treating the area where the tumor was located with an electric needle (electrode) to destroy any remaining cancer cells. This process is often repeated. Curettage and electrodesiccation is a good treatment for small basal cell and squamous cell cancers. It will leave a small scar.

## **Mohs surgery (microscopically-controlled surgery)**

Using the Mohs technique, the surgeon removes a thin layer of the skin that the tumor may have invaded and then checks the sample under a microscope. If cancer cells are seen, the next layer is removed and examined. This is repeated until the skin samples are found to be free of cancer cells. This process is slow, but it means that more normal skin near 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 its use.

## **Lymph node surgery**

If lymph nodes near a non-melanoma 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 may be biopsied (see the section, “How are basal and squamous cell skin cancers diagnosed?”) or removed by an operation called a *lymph node dissection* and looked at under a microscope for signs of cancer. This operation is more involved than surgery on the skin, and usually requires general anesthesia (where you are asleep).

Lymphedema, a complication where excess fluid collects in the legs or arms, is a possible long-term side effect of a lymph node dissection. Lymph nodes in the groin or under the arm normally help drain fluid from the legs and arms. If the lymph nodes are removed, fluid may build up, leading to swelling in these limbs. If severe enough, it can cause skin problems and an increased risk of infections in the limb. Elastic stockings or compression sleeves can help some people with this condition. For more information, see our document, *Understanding Lymphedema (For Cancers Other Than Breast Cancer)*.

## **Skin grafting and reconstructive surgery**

After removing large non-melanoma skin cancers, it may not be possible to stretch the nearby skin enough to sew the edges of the wound together. In these cases, healthy skin may be taken from another part of the body and grafted over the wound to help it heal and to restore the appearance of the affected area. Other reconstructive surgical procedures can also be helpful in some cases.

## Other forms of local therapy for basal and squamous cell skin cancers

Several other techniques can be used to treat basal and squamous cell skin cancers that have not spread to lymph nodes or other parts of the body. Some of these treatments are described as types of surgery since they destroy a targeted area of body tissue. But these techniques don't involve using scalpels or cutting into the skin.

### **Cryosurgery (cryotherapy)**

For this treatment, liquid nitrogen is applied to the tumor to freeze and kill abnormal cells. After the dead area of skin thaws, it may swell, blister and crust over. The wound may take a month or 2 to heal and will leave a scar. The treated area may have less color after treatment.

Cryosurgery is often used for pre-cancerous conditions such as actinic keratosis and for small basal cell and squamous cell carcinomas.

### **Photodynamic therapy (PDT)**

This treatment uses a special drug that is either applied to the skin or injected into the blood. It collects in the tumor cells over the course of several hours or days and makes the cells sensitive to certain types/colors of light. A light source is then focused on the tumor(s), which causes the cells to die. A possible side effect of PDT is that it can make a person's skin very sensitive to sunlight for a period of time (often several weeks), so precautions may be needed to avoid severe burns.

PDT can be used to treat actinic keratoses. But its exact role in treating non-melanoma skin cancers, if any, still needs to be determined. For more information on this technique, see our document called *Photodynamic Therapy*.

### **Topical chemotherapy**

Chemotherapy uses drugs that kill cancer cells. Topical chemotherapy means that an anti-cancer medicine is placed directly on the skin (usually in a cream or ointment) rather than being given by mouth or injected into a vein. The drug most often used in topical treatment of basal and squamous cell skin cancers is 5-fluorouracil (5-FU).

When applied directly on the skin in the form of a cream, 5-FU reaches cancer cells near the skin surface, but it cannot reach cancer cells that may have invaded deeply into the skin or spread to other organs. For this reason, treatment with 5-FU generally is used only for pre-cancerous conditions such as actinic keratosis and for some very superficial skin cancers.

Because it is only applied to the skin, the drug does not spread throughout the body, so it doesn't cause the same side effects that can occur with systemic chemotherapy (treatment that affects the whole body). But it can cause the treated skin to become red and very sensitive for a few weeks, which can be quite bothersome for some people. Other topical

medicines can be used to help relieve this. Fluorouracil also increases the skin's sensitivity to sunlight, so treated areas must be protected from the sun for a few weeks after use of this cream to prevent sunburn.

A gel containing the drug diclofenac is sometimes used to treat actinic keratoses. This drug belongs to the non-steroidal anti-inflammatory drugs (NSAIDs), a group that includes pain relievers such as aspirin and ibuprofen.

### **Immune response modifiers**

Certain drugs can boost the body's immune system response against the cancer, causing it to shrink and go away.

*Imiquimod* is a cream that can be applied to actinic keratoses and some basal cell cancers. It is not a chemotherapy drug. Instead, it causes the immune system to react to the skin lesion and cause its destruction.

*Interferon* is a man-made version of an immune system protein. It can be injected directly into the tumor to boost the immune response against it. It may be used occasionally when surgery is not possible, but it may not be as effective as other treatments.

### **Laser surgery**

This relatively new approach uses a beam of laser light to vaporize cancer cells. It is sometimes used for squamous cell carcinoma in situ (involving only the epidermis) and for very superficial basal cell carcinomas (those only on the surface of the skin). It is not yet known if this type of treatment is as effective as standard methods of treatment, and it is not widely used.

## **Radiation therapy for basal and squamous cell skin cancers**

Radiation therapy uses high-energy rays (such as x-rays) or 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. The treatment is much like getting an x-ray, but the radiation is more intense. The procedure itself is painless. Each treatment lasts only a few minutes, although the setup time – getting you into place for treatment – takes longer.

If a tumor is very large or is 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. Radiation therapy can cure small non-melanoma skin cancers and can delay the growth of more advanced cancers. Radiation is also useful in combination with other therapies. It is particularly useful for Merkel cell carcinoma.

In some cases, radiation can be used after surgery as adjuvant (additional) therapy to kill any small deposits of remaining cancer cells that may not have been visible during surgery. This lowers the risk of cancer coming back after surgery. Radiation may also be

used to help treat non-melanoma skin cancer that has spread to lymph nodes or other organs.

Side effects of radiation can include skin irritation, redness, drying, and hair loss in the area being treated. With longer treatments, these side effects may get worse. After many years, new skin cancers sometimes arise in areas previously treated by radiation. For this reason, radiation usually is not used to treat skin cancer in young people. Radiation is also not recommended for people with certain inherited conditions (such as basal cell nevus syndrome or xeroderma pigmentosum), who may be at higher risk for new cancers, or for people with connective tissue diseases (such as lupus or scleroderma), which radiation might make worse.

For more general information about radiation therapy, please see our document called *Understanding Radiation Therapy: A Guide for Patients and Families*.

## Systemic chemotherapy for basal and squamous cell skin cancers

Systemic chemotherapy uses anti-cancer 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 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 spread to other organs. Chemotherapy drugs such as cisplatin, doxorubicin, 5-fluorouracil (5-FU), topotecan, and etoposide are given intravenously (into a vein), usually once every few weeks. They can often delay the spread of these cancers and relieve some symptoms. In some cases, they may shrink tumors enough so that other treatments such as surgery or radiation therapy can be used.

Chemotherapy drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow, the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemotherapy, which can lead to side effects.

The side effects of chemotherapy depend on the type and dose of drugs given and the length of time they are taken. These side effects may include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea
- Increased risk of infection (due to low white blood cell counts)

- Easy bruising or bleeding (due to low blood platelets)
- Fatigue (due to low red blood cells)

These side effects are usually short-term and go away once treatment is finished. Some drugs may have specific effects that are not listed above, so be sure to talk with your cancer care team about what you might expect in terms of side effects.

There are often ways to lessen these side effects. For example, drugs can be given to help prevent or reduce nausea and vomiting. Do not hesitate to discuss any questions about side effects with the cancer care team.

You should tell your medical team about any side effects or changes you notice while getting chemotherapy so that they can be treated promptly.

For more general information about chemotherapy, please see our document called *Understanding Chemotherapy: A Guide for Patients and Families*.

## Clinical trials for basal and squamous cell skin cancers

You may have had to make a lot of decisions since you've been told you have cancer. One of the most important decisions you will make is choosing which treatment is best for you. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you.

Clinical trials are carefully controlled research studies that are done with patients who volunteer for them. They are done to get a closer look at promising new treatments or procedures.

If you would like to take part in a clinical trial, you should start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service for a list of clinical trials that meet your medical needs. You can reach this service at 1-800-303-5691 or on our Web site at [www.cancer.org/clinicaltrials](http://www.cancer.org/clinicaltrials). You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials Web site at [www.cancer.gov/clinicaltrials](http://www.cancer.gov/clinicaltrials).

There are requirements you must meet to take part in any clinical trial. If you do qualify for a clinical trial, it is up to you whether or not to enter (enroll in) it.

Clinical trials are one way to get state-of-the-art cancer treatment. They are the only way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

You can get a lot more information on clinical trials in our document called *Clinical Trials: What You Need to Know*. You can read it on our Web site or call our toll-free number (1-800-227-2345) and have it sent to you.

# Complementary and alternative therapies for basal and squamous cell skin cancers

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that your doctor hasn't mentioned. Everyone from friends and family to Internet groups and Web sites may offer ideas for what might help you. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

## What exactly are complementary and alternative therapies?

Not everyone uses these terms the same way, and they are used to refer to many different methods, so it can be confusing. We use *complementary* to refer to treatments that are used *along with* your regular medical care. *Alternative* treatments are used *instead of* a doctor's medical treatment.

**Complementary methods:** Most complementary treatment methods are not offered as cures for cancer. Mainly, they are used to help you feel better. Some methods that are used along with regular treatment are meditation to reduce stress, acupuncture to help relieve pain, or peppermint tea to relieve nausea. Some complementary methods are known to help, while others have not been tested. Some have been proven not to be helpful, and a few have even been found harmful.

**Alternative treatments:** Alternative treatments may be offered as cancer cures. These treatments have not been proven safe and effective in clinical trials. Some of these methods may pose danger, or have life-threatening side effects. But the biggest danger in most cases is that you may lose the chance to be helped by standard medical treatment. Delays or interruptions in your medical treatments may give the cancer more time to grow and make it less likely that treatment will help.

## Finding out more

It is easy to see why people with cancer think about alternative methods. You want to do all you can to fight the cancer, and the idea of a treatment with few or no side effects sounds great. Sometimes medical treatments like chemotherapy can be hard to take, or they may no longer be working. But the truth is that most of these alternative methods have not been tested and proven to work in treating cancer.

As you consider your options, here are 3 important steps you can take:

- Look for "red flags" that suggest fraud. Does the method promise to cure all or most cancers? Are you told not to have regular medical treatments? Is the treatment a "secret" that requires you to visit certain providers or travel to another country?
- Talk to your doctor or nurse about any method you are thinking about using.
- Contact us at 1-800-227-2345 to learn more about complementary and alternative methods in general and to find out about the specific methods you are looking at.

## **The choice is yours**

Decisions about how to treat or manage your cancer are always yours to make. If you want to use a non-standard treatment, learn all you can about the method and talk to your doctor about it. With good information and the support of your health care team, you may be able to safely use the methods that can help you while avoiding those that could be harmful.

## **Treating basal cell carcinoma**

Basal cell carcinoma very rarely spreads to other parts of the body, although it can grow into nearby tissues if not treated. Several methods can be used to remove or destroy these cancers. The choice may depend on factors such as the tumor size and location, and the patient's age, general health, and preferences.

All of the treatment methods listed here can be effective. The recurrence rates range from less than 5% for Mohs surgery to up to 15% or higher for some of the others, but this depends on the size of the tumor. Small tumors are less likely to recur than larger ones.

### **Electrodesiccation and curettage**

Electrodesiccation and curettage is a commonly used treatment for basal cell carcinomas smaller than 1 centimeter (slightly less than a half inch) across.

### **Simple excision**

Simple excision (cutting the tumor out) is often used to remove basal cell carcinomas, along with a margin of normal skin.

### **Mohs surgery**

Mohs surgery has the best cure rate for basal cell carcinoma. It is especially useful in treating large tumors, tumors where the edges are not well-defined, tumors in certain locations (such as on or near the nose, eyes, ears, forehead, scalp, fingers, and genital area), and those that have come back after other treatments. However, it is also more complex, time-consuming, and expensive than other methods.

### **Radiation therapy**

Radiation therapy is often a good option for treating older patients and for tumors on the eyelids, nose or ears – areas that can be hard to treat surgically.

## **Immune response modifiers, photodynamic therapy, or topical chemotherapy**

These treatments are sometimes considered as options for treating very superficial tumors (tumors that have not extended too deeply under the skin surface). Close follow-up is needed because these treatments do not destroy any cancer cells that are deep under the surface.

## **Cryosurgery**

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

## **Treating squamous cell carcinoma**

Most squamous cell skin cancers are found and treated at an early stage, when they can be removed or destroyed with local treatment methods. Small squamous cell cancers can usually be cured with these treatments – the recurrence rate is similar to that for basal cell cancers. Larger squamous cell cancers are harder to treat, and the recurrence rates for aggressive cases of this cancer can be as high as 50% for large, deep tumors.

In rare cases, squamous cell cancers may spread to lymph nodes or distant sites. If this happens, further treatment with radiation therapy and/or chemotherapy may be needed.

## **Simple excision**

Simple excision is often used to treat squamous cell carcinomas.

## **Electrodesiccation and curettage**

Electrodesiccation and curettage is sometimes useful in treating small squamous cell carcinomas, but it is not recommended for larger tumors.

## **Cryosurgery**

Cryosurgery is used for some early squamous cell carcinomas 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 2 cm (about 4/5 inch) across or with poorly defined edges, 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 often a good option for patients with large cancers, especially in areas where surgery is difficult (eyelids, ears, or nose), or for patients who may not be able to tolerate surgery.

Radiation is sometimes used after surgery (simple excision or lymph node dissection) if all of the cancer was not removed (if the surgical margins were positive), or if there is a chance that some cancer may remain.

Radiation can also be used to treat cancers that have come back after surgery and have become too large or deep to be removed surgically.

## **Lymph node dissection**

Removing 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 are removed, they are looked at under a microscope to see if they contain cancerous cells.

## **Systemic chemotherapy**

Systemic chemotherapy is an option for patients with squamous cell cancer that has spread to lymph nodes or distant organs. In some cases it may be combined with surgery or radiation therapy.

## **Treating actinic keratosis**

Actinic keratosis is often treated because of its potential to turn into squamous cell cancer. But because this risk is low, treatments are generally aimed at avoiding scars or other disfiguring marks as much as possible.

Actinic keratosis is commonly treated with either cryosurgery or topical fluorouracil (5-FU). These treatments 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.

Other topical creams such as imiquimod or diclofenac, or other localized treatments (shave excision, electrodesiccation and curettage, photodynamic therapy) are also sometimes used.

## **Treating Bowen disease**

Bowen disease (squamous cell carcinoma in situ) is usually treated by simple excision. Electrodesiccation and curettage, radiation therapy, topical 5-FU, and cryosurgery are other options. Laser surgery or topical therapy may be considered in special situations.

## Treating Merkel cell carcinoma

Merkel cell carcinomas are first treated with wide local excision (removal of the cancer and a wide margin of normal skin) or Mohs surgery.

These cancers have a tendency to spread to the lymph nodes or distant sites. So even if the lymph nodes do not seem enlarged, many doctors recommend a sentinel lymph node biopsy to look for possible spread of cancer to the lymph nodes. For this procedure, the lymph node that would most likely contain cancer if it has spread (known as the sentinel node) is removed and looked at. When possible, this should be done before surgery to the skin. If the sentinel node contains cancer, a full lymph node dissection (removal of all of the nearby nodes) is usually done. In either case, radiation therapy to the affected area after surgery is often used to reduce the risk of cancer coming back. If many lymph nodes were found to contain cancer cells, adjuvant (additional) chemotherapy may be recommended as well.

If nearby lymph nodes are enlarged at the time the cancer is diagnosed, a fine needle aspiration (FNA) biopsy may be done to determine if they contain cancer. If cancer is found, treatment options include a lymph node dissection, radiation therapy to the area, or a combination of the two. Adjuvant treatment with chemotherapy may also be considered.

For cancers that have spread to or recur in distant sites, surgery, radiation therapy, chemotherapy, or some combination of these treatments may be used. These treatments may relieve symptoms or shrink these cancers for a time, but they rarely cure Merkel cell carcinoma that has spread beyond the skin.

Overall, the 5-year survival rate (the percentage of patients who live at least 5 years after diagnosis) for Merkel cell carcinoma is about 60%. It is much higher if the cancer is found early as opposed to having spread to the lymph nodes or distant parts of the body.

## More treatment information for basal and squamous cell skin cancers

For more details on treatment options – including some that may not be addressed in this document – the National Comprehensive Cancer Network (NCCN) and the National Cancer Institute (NCI) are good sources of information.

The NCCN, made up of experts from many of the nation's leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. These are available on the NCCN Web site ([www.nccn.org](http://www.nccn.org)).

The NCI provides treatment guidelines via its telephone information center (1-800-4-CANCER) and its Web site ([www.cancer.gov](http://www.cancer.gov)). Detailed guidelines intended for use by cancer care professionals are also available on [www.cancer.gov](http://www.cancer.gov).

# What should you ask your doctor about basal and squamous cell skin cancers?

As you cope with cancer and cancer treatment, you need to have honest, open discussions with your doctor. You should feel free to ask any question that's on your mind, no matter how small it might seem. Nurses, social workers, and other members of the treatment team may also be able to answer many of your questions. Here are some questions you might want to ask:

- 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?
- Are there other tests that need to be done before we can decide on treatment?
- Are there other doctors I need to see?
- How much experience do you have treating this type of cancer?
- 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 I have a scar after treatment?
- What are the chances of my cancer coming back with the treatment options we have discussed? What would we do if that happens?
- 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 for skin cancer? What should I tell them to do? Should I tell my children's doctor that I have been diagnosed with a skin cancer?

Along with these sample questions, be sure to write down some of your own. For instance, you might want more information about recovery times so you can plan your work or activity 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 basal and squamous cell skin cancers?

For most people with basal or squamous cell skin cancers, treatment will remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer growing or coming back. (When cancer comes back after treatment, it is called *recurrent cancer* or a *recurrence*.) This is a very common concern in people who have had cancer.

It may take a while before your fears lessen. But it may help to know that many cancer survivors have learned to live with this uncertainty and are leading full lives. Our document called *Living With Uncertainty: The Fear of Cancer Recurrence*, gives more detailed information on this.

For small number of people with more advanced cancers, it may never go away completely. These people may get regular treatment with radiation therapy, chemotherapy, or other treatments to try to help keep the cancer in check. Learning to live with cancer that does not go away can be difficult and very stressful. It has its own type of uncertainty.

## Follow-up care

If you have completed treatment, your doctors will still want to watch you closely and will likely recommend that you examine your skin once a month and protect yourself from the sun. Family members and friends can also be asked to watch for new lesions in areas that are hard to see.

If skin cancer does recur, it is most likely to happen in the first 5 years after treatment. People who have had skin cancer are also at higher risk for developing another one in a different location.

You should have follow-up exams as advised by your doctor. Your schedule for follow-up visits will depend on the type of cancer you had and on other factors. Different doctors may recommend different schedules.

- For basal cell cancers, visits are often recommended about every 6 to 12 months.
- For squamous cell cancers, visits are usually more frequent – often every 3 to 6 months for the first few years, followed by longer times between visits.

During your follow-up visits, your doctor will ask about symptoms and examine you for signs of recurrence or new skin cancers. For higher risk cancers, such as squamous cell cancers that had reached the lymph nodes, he or she may also order imaging tests such as CT scans. If skin cancer does recur, treatment options may depend on the size and location of the cancer, what treatments you've had before, and your overall health.

Follow-up is also needed to check for possible side effects of certain treatments. This is the time for you to ask your health care team any questions and to discuss any concerns

you might have. Almost any cancer treatment can have side effects. Some may last for a few weeks to several months, but others can be permanent. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

## Seeing a new doctor

At some point after your cancer diagnosis and treatment, you may find yourself seeing a new doctor who does not know about your medical history. It is important that you be able to give your new doctor the details of your diagnosis and treatment. Make sure you have this information handy:

- A copy of your pathology report(s) from any biopsies or surgeries
- If you had surgery, a copy of your operative report(s)
- If you were in the hospital, a copy of the discharge summary that doctors prepare when patients are sent home
- If you had radiation therapy, a summary of the type and dose of radiation and when and where it was given
- If you had chemotherapy, a list of your drugs, drug doses, and when you took them

It is also important to keep your health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

## Lifestyle changes to consider during and after treatment

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life – making choices to help you stay healthy and feel as well as you can. This can be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even start during cancer treatment.

### **Make healthier choices**

For many people, a diagnosis of cancer helps them focus on their health in ways they may not have thought much about in the past. Are there things you could do that might make you healthier? Maybe you could spend less time in the sun, try to eat better, or get more exercise. Maybe you could cut down on the alcohol, or give up tobacco. Even things like keeping your stress level under control might help. Now is a good time to think about making changes that can have positive effects for the rest of your life. You will feel better and you will also be healthier.

You can start by working on those things that worry you most. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call the American Cancer Society at 1-800-227-2345.

## **Can I lower my risk of cancer coming back or getting new skin cancers?**

Most people want to know if there are specific lifestyle changes they can make to reduce their risk of cancer coming back.

People who have had skin cancer are at higher risk for developing another skin cancer. Because of this, it is important to avoid too much sun exposure (see the section called "Can basal and squamous cell skin cancers be prevented?") and to continue to examine your skin every month for signs of possible new skin cancers. Skin cancers that are found early are typically much easier to treat than those discovered at a later stage.

Adopting healthy behaviors such as not smoking, eating well, and maintaining a healthy weight may also help, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health, including lowering your risk for many other types of cancer, as well as other diseases.

## **What's new in research and treatment of basal and squamous cell skin cancers?**

Research into the causes, prevention, and treatment of non-melanoma skin cancer is under way in many medical centers throughout the world.

### **Basic skin cancer research**

Scientists have made a great deal of progress in recent years in understanding how ultraviolet (UV) light damages DNA, and how this causes normal skin cells to become cancerous. Researchers are always working to apply this new information to strategies for preventing and treating skin cancers.

### **Public education**

Most cases of skin cancer can be prevented. The best way to reduce the number of skin cancer cases and the pain and loss of life from this disease is to educate 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 excess UV exposure (from the sun and from man-made sources such as tanning beds) and about how easily they can protect their skin from UV radiation.

The American Academy of Dermatology (AAD) sponsors annual free skin cancer screenings throughout the country. Many local American Cancer Society offices work closely with AAD to provide volunteers for registration, coordination, and education efforts related to these free screenings. Look for information in your area about these screenings or call the American Academy of Dermatology for more information. Their phone number and Web address are listed in the "Additional resources" section of this document.

## Preventing genital skin cancers

Squamous cell cancers that start in the genital region account for almost half of the deaths from keratinocyte cancers. Many of these cancers may be related to infection with certain types of human papilloma virus (HPV), which can be spread through sexual contact. Limiting the number of sexual partners a person has and using safer sex practices may therefore help lower the risk of some of these cancers.

In recent years, vaccines have been developed to help protect against infection from some types of HPV. The main intent of the vaccines has been to reduce the risk of cervical cancer, but they may also lower the risk of other cancers that might be related to HPV, including some squamous cell cancers.

## Chemoprevention

An area of active research is the field of chemoprevention (using drugs to reduce cancer risk). Chemoprevention is likely to be more useful for people at high risk of skin cancers, such as those with certain congenital conditions (such as basal cell nevus syndrome), a history of skin cancer, or those who have received organ transplants, rather than for people at average risk of skin cancer.

The most widely studied drugs so far are the retinoids, which are drugs related to vitamin A. They have shown some promise in reducing the risk of squamous cell cancers but can have side effects, including the potential to cause birth defects. For this reason they are not widely used at this time, except in some people at very high risk. Further studies of retinoids are under way.

Other compounds are being looked at to reduce the risk of basal cell skin cancers in people at high risk. Drugs called hedgehog pathway inhibitors, which restore the activity of the damaged PTCH gene, may help some people with basal cell nevus syndrome. In early studies, a drug known as vismodegib (GDC-0449), taken daily as a pill, significantly lowered the number of new basal cell cancers and shrank existing tumors in people with this syndrome. The drug does have some side effects, including taste loss and muscle cramps, which might make it hard for some people to take every day. Further research on this and similar drugs is under way.

## Treatment

### Local treatments

Current local treatments are successful for the vast majority of non-melanoma skin cancers. Still, even some small cancers can be hard to treat if they're in certain areas. Newer forms of non-surgical treatment such as imiquimod cream, photodynamic therapy, immune response modifiers, and laser surgery may help reduce scarring and other possible side effects of treatment. Studies are now under way to determine the best way to use these treatments, and to try to improve on their effectiveness.

## Treating advanced disease

Most skin cancers are found and treated at a fairly early stage, but some may spread to other parts of the body. These cancers can often be hard to treat with current therapies such as radiation and chemotherapy.

Several studies are testing newer targeted drugs for advanced squamous cell cancers. Cells from these cancers often have too much of a protein called EGFR on their surfaces, which may help them grow. Drugs that target this protein, such as erlotinib (Tarceva) and gefitinib (Iressa), are now being tested in clinical trials. A drug that targets different cell proteins, known as dasatinib (Sprycel), is also being studied for advanced skin cancers.

It is very rare for basal cell cancers to reach an advanced stage, but when they do, these cancers can be hard to treat. Most basal cell cancers have mutations (abnormal changes) in genes involved in a cell pathway called *Hedgehog*. The Hedgehog pathway is important in many cells and is crucial for development of the embryo and fetus. Vismodegib (Erivedge™, GDC-0449), is a new drug that targets that pathway.

This drug has been studied in patients with basal cell cancers that had spread or had come back after surgery and other local treatments. Vismodegib was given as a pill, taken once a day, and helped shrink tumors in about a third of the patients. Most side effects were mild, such as muscle spasms and joint pain, hair loss, fatigue, problems with taste, poor appetite and weight loss, diarrhea, nausea and vomiting, and constipation. Vismodegib can also cause women to stop having their periods for a time (called *amenorrhea*).

Because the Hedgehog pathway is involved in fetal development, this drug can cause fetal harm if taken by a pregnant woman. It is not known if it could harm the fetus if it is taken by a male partner. This drug should not be taken by anyone pregnant or trying to become pregnant, and anyone on this drug should use reliable birth control during and after treatment

## Additional resources for basal and squamous cell skin cancers

### More information from your American Cancer Society

The following related information may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-227-2345.

A Parent's Guide to Skin Protection (booklet; also available in Spanish)

After Diagnosis: A Guide for Patients and Families (also available in Spanish)

Clinical Trials: What You Need to Know

Lasers in Cancer Treatment

Photodynamic Therapy

Skin Cancer: Prevention and Early Detection

Sun Basics: Skin Protection Made Simple (information for children aged 8 to 14)

Surgery (also available in Spanish)

Understanding Chemotherapy: A Guide for Patients and Their Families (also available in Spanish)

Understanding Radiation Therapy: A Guide for Patients and Their Families (also available in Spanish)

## National organizations and Web sites\*

In addition to the American Cancer Society, other sources of patient information and support include:

### **American Academy of Dermatology**

Toll-free number: 1-888-462-3376 (1-888-462-DERM)

Web site: [www.aad.org](http://www.aad.org)

### **Environmental Protection Agency**

Web site: [www.epa.gov/ebtpages/humasunprotection.html](http://www.epa.gov/ebtpages/humasunprotection.html)

### **National Cancer Institute**

Toll-free number: 1-800-422-6237 (1-800-4-CANCER); TTY: 1-800-332-8615

Web site: [www.cancer.gov](http://www.cancer.gov)

### **Skin Cancer Foundation**

Toll-free number: 1-800-754-6490 (1-800-SKIN-490)

Web site: [www.skincancer.org](http://www.skincancer.org)

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

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at **1-800-227-2345** or visit [www.cancer.org](http://www.cancer.org).

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1 · 800 · ACS-2345 or [www.cancer.org](http://www.cancer.org)