

National Cancer Institute

What You Need
To Know About™

Melanoma and Other Skin Cancers

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES

National Institutes of Health

National Cancer Institute Services

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

You may want more information for yourself, your family, and your doctor.

NCI offers comprehensive research-based information for patients and their families, health professionals, cancer researchers, advocates, and the public.

- **Call** NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)**
- **Visit** us at **<http://www.cancer.gov>** or **<http://www.cancer.gov/espanol>**
- **Chat** using **LiveHelp**, NCI's instant messaging service, at **<http://www.cancer.gov/livehelp>**
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About This Booklet

This National Cancer Institute (NCI) booklet is for people diagnosed with the most common types of skin cancer:*

- *Melanoma*
- *Basal cell* skin cancer
- *Squamous cell* skin cancer

Skin cancer is the most common type of cancer in the United States. Each year, more than 68,000 Americans are diagnosed with melanoma, and another 48,000 are diagnosed with an early form of the disease that involves only the top layer of skin. Also, more than 2 million people are treated for basal cell or squamous cell skin cancer each year. Basal cell skin cancer is several times more common than squamous cell skin cancer.

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

- Diagnosis and staging
- Treatment
- Follow-up care
- How to prevent another skin cancer from forming
- How to do a skin self-exam

This booklet has lists of questions that you may want to ask your doctor. Many people find it helpful to take a list of questions to a doctor visit. To help remember what your doctor says, you can take notes.

*Words in *italics* are in the Dictionary on page 40. The Dictionary explains these terms. It also shows how to pronounce them.

You may also want to have a family member or friend go with you when you talk with the doctor—to take notes, ask questions, or just listen.

For the latest information about skin cancer, please visit our Web site at **<http://www.cancer.gov/cancertopics/types/skin>**. For information about melanoma, go to **<http://www.cancer.gov/cancertopics/types/melanoma>**.

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

This booklet does not describe rare types of skin cancer, such as *Merkel cell carcinoma*. Also, this booklet does not discuss melanoma that begins in the eye, the digestive tract, or other areas of the body. NCI's Cancer Information Service can provide information about rare skin cancers and melanoma that begins in areas other than the skin.

The Skin

Your skin protects your body from heat, injury, and *infection*. It also protects your body from damage caused by *ultraviolet (UV) radiation* (such as from the sun or sunlamps).

Your skin stores water and fat. It helps control body heat. Also, your skin makes *vitamin D*.

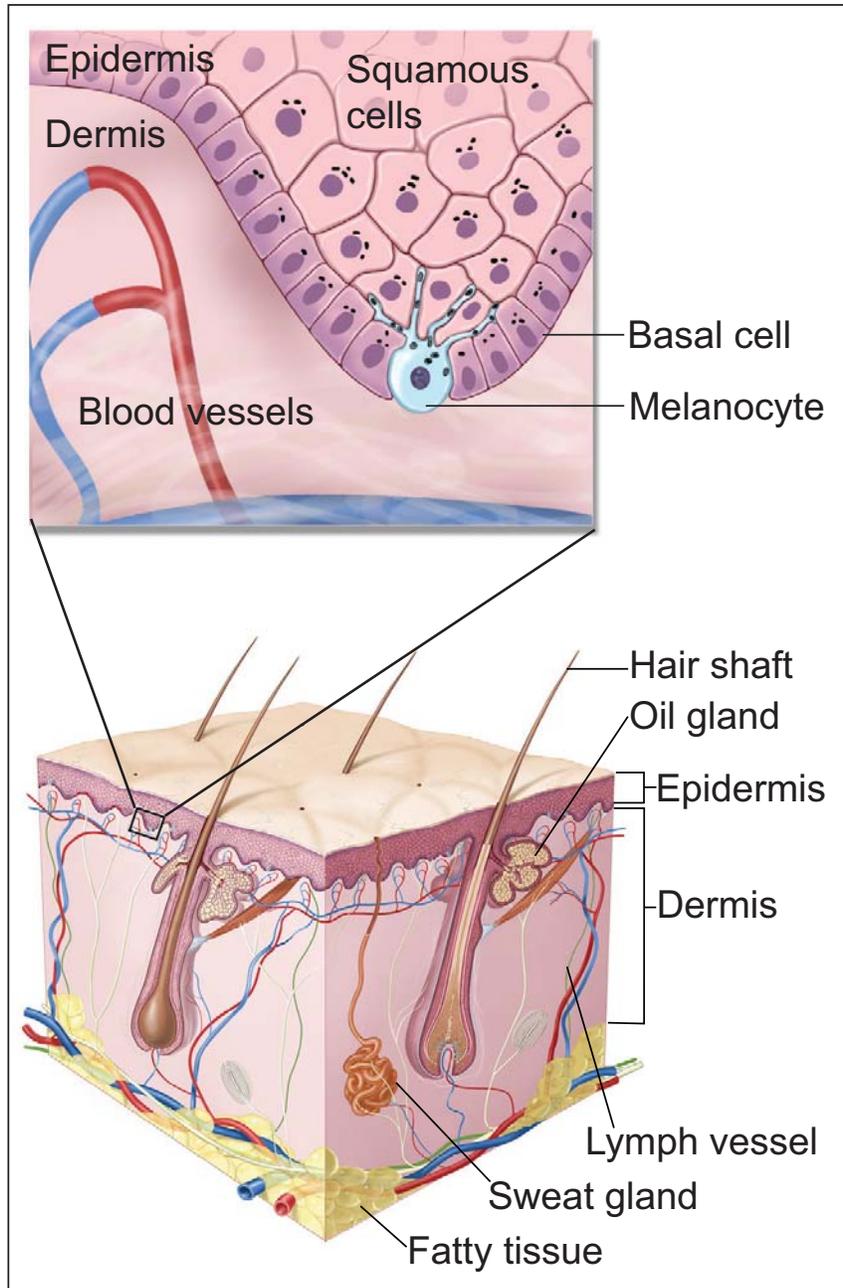
The picture on the next page shows the two main layers of the skin:

- ***Epidermis***: The epidermis is the top layer of your skin. It's mostly made of flat *cells* called **squamous cells**.

Below the squamous cells deeper in the epidermis are round cells called **basal cells**.

Cells called ***melanocytes*** are scattered among the basal cells. They are in the deepest part of the epidermis. Melanocytes make the pigment (color) found in skin. When skin is exposed to UV radiation, melanocytes make more pigment, causing the skin to darken, or tan.

- ***Dermis***: The dermis is the layer under the epidermis. The dermis contains many types of cells and structures, such as *blood vessels*, *lymph vessels*, and *glands*. Some of these glands make sweat, which helps cool your body. Other glands make sebum. Sebum is an oily substance that helps keep your skin from drying out. Sweat and sebum reach the surface of your skin through tiny openings called pores.



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This picture shows the layers of the skin—the epidermis and dermis. At the top, the close-up shows a squamous cell, basal cell, and melanocyte.

Cancer Cells

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

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

But sometimes this process goes wrong. New cells form when the body doesn't need them, and old or damaged cells don't die as they should. The buildup of extra cells often forms a mass of tissue called a growth or *tumor*.

Growths on the skin can be *benign* (not cancer) or *malignant* (cancer). Benign growths are not as harmful as malignant growths.

- **Benign growths** (such as *moles*):
 - Are rarely a threat to life
 - Generally can be removed and usually don't grow back
 - Don't invade the tissues around them
 - Don't spread to other parts of the body
- **Malignant growths** (such as melanoma, basal cell cancer, or squamous cell cancer):
 - May be a threat to life
 - Often can be removed but sometimes grow back
 - May invade and damage nearby organs and tissues
 - May spread to other parts of the body

Types of Skin Cancer

Skin cancers are named for the type of cells that become malignant (cancer). The three most common types are:

- **Melanoma:** Melanoma begins in melanocytes (pigment cells). Most melanocytes are in the skin. See the picture on page 4 of a melanocyte and other skin cells.

Melanoma can occur on any skin surface. In men, it's often found on the skin on the head, on the neck, or between the shoulders and the hips. In women, it's often found on the skin on the lower legs or between the shoulders and the hips.

Melanoma is rare in people with dark skin. When it does develop in people with dark skin, it's usually found under the fingernails, under the toenails, on the palms of the hands, or on the soles of the feet.

- **Basal cell skin cancer:** Basal cell skin cancer begins in the basal cell layer of the skin. It usually occurs in places that have been in the sun. For example, the face is the most common place to find basal cell skin cancer.

In people with fair skin, basal cell skin cancer is the most common type of skin cancer.

- **Squamous cell skin cancer:** Squamous cell skin cancer begins in squamous cells. In people with dark skin, squamous cell skin cancer is the most common type of skin cancer, and it's usually found in places that are not in the sun, such as the legs or feet.

However, in people with fair skin, squamous cell skin cancer usually occurs on parts of the skin that have been in the sun, such as the head, face, ears, and neck.

Unlike moles, skin cancer can invade the normal tissue nearby. Also, skin cancer can spread throughout the body. Melanoma is more likely than other skin cancers to spread to other parts of the body. Squamous cell skin cancer sometimes spreads to other parts of the body, but basal cell skin cancer rarely does.

When skin cancer cells do spread, they break away from the original growth and enter blood vessels or lymph vessels. The cancer cells may be found in nearby *lymph nodes*. The cancer cells can also spread to other tissues and attach there to form new tumors that may damage those tissues.

The spread of cancer is called *metastasis*. See the Staging section on page 17 for information about skin cancer that has spread.

Risk Factors

When you're told that you have skin cancer, it's natural to wonder what may have caused the disease. The main *risk factor* for skin cancer is exposure to sunlight (UV radiation), but there are also other risk factors. A risk factor is something that may increase the chance of getting a disease.

People with certain risk factors are more likely than others to develop skin cancer. Some risk factors vary for the different types of skin cancer.

Risks for Any Type of Skin Cancer

Studies have shown that the following are risk factors for the three most common types of skin cancer:

- **Sunlight:** Sunlight is a source of **UV radiation**. It's the most important risk factor for any type of skin cancer. The sun's rays cause skin damage that can lead to cancer.
 - **Severe, blistering sunburns:** People who have had at least one severe, blistering sunburn are at increased risk of skin cancer. Although people who burn easily are more likely to have had sunburns as a child, sunburns during adulthood also increase the risk of skin cancer.
 - **Lifetime sun exposure:** The total amount of sun exposure over a lifetime is a risk factor for skin cancer.
 - **Tanning:** Although a tan slightly lowers the risk of sunburn, even people who tan well without sunburning have a higher risk of skin cancer because of more lifetime sun exposure.

Sunlight can be reflected by sand, water, snow, ice, and pavement. The sun's rays can get through clouds, windshields, windows, and light clothing.

In the United States, skin cancer is more common where the sun is strong. For example, more people in Texas than Minnesota get skin cancer. Also, the sun is stronger at higher elevations, such as in the mountains.

Doctors encourage people to limit their exposure to sunlight. See the Prevention section on page 36 for ways to protect your skin from the sun.

- **Sunlamps and tanning booths:** Artificial sources of UV radiation, such as sunlamps and tanning booths, can cause skin damage and skin cancer. Health care providers strongly encourage people, especially young people, to avoid using sunlamps and tanning booths. The risk of skin cancer is greatly increased by using sunlamps and tanning booths before age 30.
- **Personal history:** People who have had melanoma have an increased risk of developing other melanomas. Also, people who have had basal cell or squamous cell skin cancer have an increased risk of developing another skin cancer of any type.
- **Family history:** Melanoma sometimes runs in families. Having two or more close relatives (mother, father, sister, brother, or child) who have had this disease is a risk factor for developing melanoma. Other types of skin cancer also sometimes run in families. Rarely, members of a family will have an inherited disorder, such as *xeroderma pigmentosum* or *nevoid basal cell carcinoma syndrome*, that makes the skin more sensitive to the sun and increases the risk of skin cancer.
- **Skin that burns easily:** Having fair (pale) skin that burns in the sun easily, blue or gray eyes, red or blond hair, or many freckles increases the risk of skin cancer.
- **Certain medical conditions or medicines:** Medical conditions or medicines (such as some antibiotics, hormones, or antidepressants) that make your skin more sensitive to the sun increase the risk of skin cancer. Also, medical conditions or medicines that suppress the *immune system* increase the risk of skin cancer.

Other Risk Factors for Melanoma

The following risk factors increase the risk of melanoma:

- ***Dysplastic nevus:*** A dysplastic nevus is a type of mole that looks different from a common mole. A dysplastic nevus may be bigger than a common mole, and its color, surface, and border may be different. It's usually wider than a pea and may be longer than a peanut. A dysplastic nevus can have a mixture of several colors, from pink to dark brown. Usually, it's flat with a smooth, slightly scaly or pebbly surface, and it has an irregular edge that may fade into the surrounding skin.

A dysplastic nevus is more likely than a common mole to turn into cancer. However, most do not change into melanoma. A doctor will remove a dysplastic nevus if it looks like it might have changed into melanoma.

- **More than 50 common moles:** Usually, a common mole is smaller than a pea, has an even color (pink, tan, or brown), and is round or oval with a smooth surface. Having many common moles increases the risk of developing melanoma.

Other Risk Factors for Both Basal Cell and Squamous Cell Skin Cancers

The following risk factors increase the risk of basal cell and squamous cell skin cancers:

- **Old scars, burns, ulcers, or areas of *inflammation*** on the skin
- **Exposure to arsenic** at work
- ***Radiation therapy***

Other Risk Factors for Squamous Cell Cancer

The risk of squamous cell skin cancer is increased by the following:

- ***Actinic keratosis***: Actinic keratosis is a type of flat, scaly growth on the skin. It is most often found on areas exposed to the sun, especially the face and the backs of the hands. The growth may appear as a rough red or brown patch on the skin. It may also appear as cracking or peeling of the lower lip that does not heal. Without treatment, this scaly growth may turn into squamous cell skin cancer.
- **HPV (*human papillomavirus*)**: Certain types of HPV can infect the skin and may increase the risk of squamous cell skin cancer. These HPVs are different from the HPV types that cause cervical cancer and other cancers in the female and male genital areas.

Symptoms

Symptoms of Melanoma

Often the first sign of melanoma is a change in the shape, color, size, or feel of an existing mole.

Melanoma may also appear as a new mole. Thinking of “ABCDE” can help you remember what to look for:

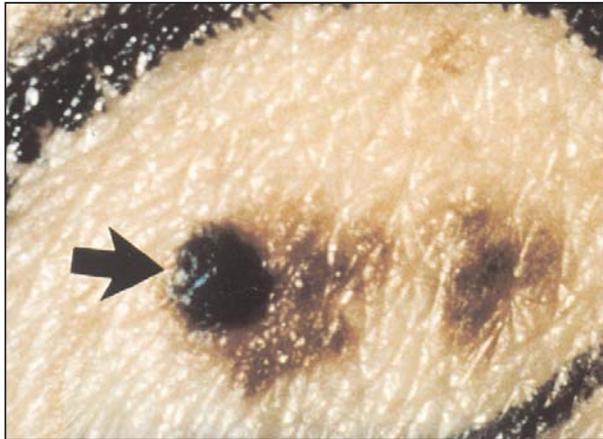
- **Asymmetry:** The shape of one half does not match the other half.
- **Border that is irregular:** The edges are often ragged, notched, or blurred in outline. The pigment may spread into the surrounding skin.
- **Color that is uneven:** Shades of black, brown, and tan may be present. Areas of white, gray, red, pink, or blue may also be seen.
- **Diameter:** There is a change in size, usually an increase. Melanomas can be tiny, but most are larger than the size of a pea (larger than 6 millimeters or about 1/4 inch).
- **Evolving:** The mole has changed over the past few weeks or months.

Melanomas can vary greatly in how they look. Many show all of the ABCDE features. However, some may show changes or abnormal areas in only one or two of the ABCDE features.

In more advanced melanoma, the texture of the mole may change. The skin on the surface may break down and look scraped. It may become hard or lumpy. The surface may ooze or bleed. Sometimes the melanoma is itchy, tender, or painful.



This photo shows an asymmetric melanoma with irregular and scalloped borders. The color varies from gray to brown to black. The melanoma is about 1.2 centimeters.



This photo shows a dysplastic nevus with an arrow pointing to a new black bump that was not there 18 months earlier. The black bump is a melanoma that is about 3 millimeters.

Symptoms of Basal Cell and Squamous Cell Skin Cancers

A change on the skin is the most common sign of skin cancer. This may be a new growth, a sore that doesn't heal, or a change in an old growth. Not all skin cancers look the same. Usually, skin cancer is not painful.

Common symptoms of basal cell or squamous cell skin cancer include:



- A lump that is small, smooth, shiny, pale, or waxy



- A lump that is firm and red



- A sore or lump that bleeds or develops a crust or a scab



- A flat red spot that is rough, dry, or scaly and may become itchy or tender



- A red or brown patch that is rough and scaly

Diagnosis

If you have a change on your skin, your doctor must find out whether or not the problem is from cancer. You may need to see a *dermatologist*, a doctor who has special training in the diagnosis and treatment of skin problems.

Your doctor will check the skin all over your body to see if other unusual growths are present.

If your doctor suspects that a spot on the skin is cancer, you may need a *biopsy*. For a biopsy, your doctor may remove all or part of the skin that does not look normal. The sample goes to a lab. A *pathologist* checks the sample under a microscope. Sometimes it's helpful for more than one pathologist to check the tissue for cancer cells.

You may have the biopsy in a doctor's office or as an outpatient in a clinic or hospital. You'll probably have *local anesthesia*.

There are four common types of skin biopsies:

- ***Shave biopsy***: The doctor uses a thin, sharp blade to shave off the abnormal growth.
- ***Punch biopsy***: The doctor uses a sharp, hollow tool to remove a circle of tissue from the abnormal area.
- ***Incisional biopsy***: The doctor uses a *scalpel* to remove part of the growth.
- ***Excisional biopsy***: The doctor uses a scalpel to remove the entire growth and some tissue around it. This type of biopsy is most commonly used for growths that appear to be melanoma.

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

- Which type of biopsy do you suggest for me?
- How will the biopsy be done?
- Will I have to go to the hospital?
- How long will it take? Will I be awake? Will it hurt?
- Will the entire growth be removed?
- Are there any risks? What are the chances of infection or bleeding after the biopsy?
- Will there be a scar? If so, what will it look like?
- How soon will I know the results?
- If I do have cancer, who will talk with me about treatment?

Staging

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

The stage is based on:

- The size (width) of the growth
- How deeply it has grown beneath the top layer of skin
- Whether cancer cells have spread to nearby lymph nodes or to other parts of the body

When skin cancer spreads from its original place to another part of the body, the new tumor has the same kind of abnormal cells and the same name as the primary (original) tumor. For example, if skin cancer spreads to the lung, the cancer cells in the lung are actually skin cancer cells. The disease is *metastatic* skin cancer, not lung cancer. For that reason, it's treated as skin cancer, not as lung cancer. Doctors sometimes call the new tumor "distant" disease.

Blood tests and an imaging test such as a chest *x-ray*, a *CT scan*, an *MRI*, or a *PET scan* may be used to check for the spread of skin cancer. For example, if a melanoma growth is thick, your doctor may order blood tests and an imaging test.

For squamous cell skin cancer or melanoma, the doctor will also check the lymph nodes near the cancer on the skin. If one or more lymph nodes near the skin cancer are enlarged (or if the lymph node looks enlarged on an imaging test), your doctor may use a thin needle to remove a sample of cells from the lymph node (*fine-needle aspiration biopsy*). A pathologist will check the sample for cancer cells.

Even if the nearby lymph nodes are not enlarged, the nodes may contain cancer cells. The stage is sometimes not known until after *surgery* to remove the growth and one or more nearby lymph nodes. For thick melanoma, *surgeons* may use a method called *sentinel lymph node biopsy* to remove the lymph node most likely to have cancer cells. Cancer cells may appear first in the sentinel node before spreading to other lymph nodes and other places in the body.

Stages of Melanoma

These are the stages of melanoma:

- **Stage 0:** The melanoma involves only the top layer of skin. It is called *melanoma in situ*.
- **Stage I:** The tumor is no more than 1 millimeter thick (about the width of the tip of a sharpened pencil.) The surface may appear broken down. Or, the tumor is between 1 and 2 millimeters thick, and the surface is not broken down.
- **Stage II:** The tumor is between 1 and 2 millimeters thick, and the surface appears broken down. Or, the thickness of the tumor is more than 2 millimeters, and the surface may appear broken down.
- **Stage III:** The melanoma cells have spread to at least one nearby lymph node. Or, the melanoma cells have spread from the original tumor to tissues nearby.
- **Stage IV:** Cancer cells have spread to the lung or other organs, skin areas, or lymph nodes far away from the original growth. Melanoma commonly spreads to other parts of the skin, tissue under the skin, lymph nodes, and lungs. It can also spread to the liver, brain, bones, and other organs.

Stages of Other Skin Cancers

These are the stages of basal cell and squamous cell skin cancers:

- **Stage 0:** The cancer involves only the top layer of skin. It is called *carcinoma in situ*.

Bowen disease is an early form of squamous cell skin cancer. It usually looks like a reddish, scaly or thickened patch on the skin. If not treated, the cancer may grow deeper into the skin.

- **Stage I:** The growth is as large as 2 centimeters wide (more than three-quarters of an inch or about the size of a peanut).
- **Stage II:** The growth is larger than 2 centimeters wide.
- **Stage III:** The cancer has invaded below the skin to *cartilage*, muscle, or bone. Or, cancer cells have spread to nearby lymph nodes. Cancer cells have not spread to other places in the body.
- **Stage IV:** The cancer has spread to other places in the body. Basal cell cancer rarely spreads to other parts of the body, but squamous cell cancer sometimes spreads to lymph nodes and other organs.



Treatment

Treatment for skin cancer depends on the type and stage of the disease, the size and place of the tumor, and your general health and medical history. In most cases, the goal of treatment is to remove or destroy the cancer completely. Most skin cancers can be cured if found and treated early.

Sometimes all of the skin cancer is removed during the biopsy. In such cases, no more treatment is needed.

If you do need more treatment, your doctor can describe your treatment choices and what to expect. You and your doctor can work together to develop a treatment plan that meets your needs.

Surgery is the usual treatment for people with skin cancer. In some cases, the doctor may suggest *chemotherapy*, *photodynamic therapy*, or *radiation therapy*. People with melanoma may also have *biological therapy*.

You may have a team of specialists to help plan your treatment. Your doctor may refer you to a specialist, or you may ask for a referral. Specialists who treat skin cancer include dermatologists and surgeons. Some people may also need a *reconstructive* or *plastic surgeon*.

People with advanced skin cancer may be referred to a *medical oncologist* or *radiation oncologist*. Your health care team may also include an *oncology nurse*, a *social worker*, and a *registered dietitian*.

Because skin cancer treatment may damage healthy cells and tissues, unwanted *side effects* sometimes occur. Side effects depend mainly on the type and extent of the treatment. Side effects may not be the same for each person. Before treatment starts, your health care team will tell you about possible side effects and suggest ways to help you manage them.

Many skin cancers can be removed quickly and easily. But some people may need *supportive care* to control pain and other symptoms, to relieve the side effects of treatment, and to help them cope with the feelings that a diagnosis of cancer can bring. Information about such care is available on NCI's Web site at **<http://www.cancer.gov/cancertopics/coping>** and from NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** or at **LiveHelp**.

You may want to talk with your doctor about taking part in a *clinical trial*, a research study of new treatment methods. See the Taking Part in Cancer Research section on page 34.

You may want to ask your doctor these questions before you begin treatment:

- What is the stage of the disease? Has the cancer spread? Do any lymph nodes or other organs show signs of cancer?
- What are my treatment choices? Which do you suggest for me? Why?
- What are the expected benefits of each kind of treatment?
- What can I do to prepare for treatment?
- Will I need to stay in the hospital? If so, for how long?
- What are the risks and possible side effects of each treatment? How can side effects be managed?
- Will there be a scar? Will I need a skin graft or plastic surgery?
- What is the treatment likely to cost? Will my insurance cover it?
- How will treatment affect my normal activities?
- Would a research study (clinical trial) be a good choice for me?
- How often should I have checkups?

Surgery

In general, the surgeon will remove the cancerous growth and some normal tissue around it. This reduces the chance that cancer cells will be left in the area.

There are several methods of surgery for skin cancer. The method your doctor uses depends mainly on the type of skin cancer, the size of the cancer, and where it was found on your body.

Your doctor can further describe these methods of surgery:

- ***Excisional skin surgery***: This is a common treatment to remove any type of skin cancer. After numbing the area of skin, the surgeon removes the growth (tumor) with a scalpel. The surgeon also removes a border (a *margin*) of normal skin around the growth. The margin of skin is examined under a microscope to be certain that all the cancer cells have been removed. The thickness of the margin depends on the size of the tumor.
- ***Mohs surgery*** (also called Mohs micrographic surgery): This method is often used for basal cell and squamous cell skin cancers. After numbing the area of skin, a specially trained surgeon shaves away thin layers of the tumor. Each layer is examined under a microscope. The surgeon continues to shave away tissue until no cancer cells can be seen under the microscope. In this way, the surgeon can remove all the cancer and only a small bit of healthy tissue. Some people will have radiation therapy after Mohs surgery to make sure all of the cancer cells are destroyed.

- ***Electrodesiccation and curettage:*** This method is often used to remove a small basal cell or squamous cell skin cancer. After the doctor numbs the area to be treated, the cancer is removed with a sharp tool shaped like a spoon (called a *curette*). The doctor then uses a needle-shaped electrode to send an electric current into the treated area to control bleeding and kill any cancer cells that may be left. This method is usually fast and simple. It may be performed up to three times to remove all of the cancer.
- ***Cryosurgery:*** This method is an option for an early-stage or a very thin basal cell or squamous cell skin cancer. Cryosurgery is often used for people who are not able to have other types of surgery. The doctor applies liquid nitrogen (which is extremely cold) directly to the skin growth to freeze and kill the cancer cells. This treatment may cause swelling. It also may damage nerves, which can cause a loss of feeling in the damaged area. The NCI fact sheet *Cryosurgery in Cancer Treatment* has more information.

For people with cancer that has spread to the lymph nodes, the surgeon may remove some or all of the nearby lymph nodes. Additional treatment may be needed after surgery. See the Staging section on page 17 for information about finding cancer in lymph nodes.

If a large area of tissue is removed, the surgeon may do a skin *graft*. The doctor uses skin from another part of the body to replace the skin that was removed. After numbing the area, the surgeon removes a patch of healthy skin from another part of the body, such as the upper thigh. The patch is then used to cover the area where skin cancer was removed. If you have a skin graft, you may have to take special care of the area until it heals.

The time it takes to heal after surgery is different for each person. You may have pain for the first few days. Medicine can help control your pain. Before surgery, you should discuss the plan for pain relief with your doctor or nurse. After surgery, your doctor can adjust the plan if you need more pain relief.

Surgery nearly always leaves some type of scar. The size and color of the scar depend on the size of the cancer, the type of surgery, the color of your skin, and how your skin heals.

For any type of surgery, including skin grafts or *reconstructive surgery*, follow your doctor's advice on bathing, shaving, exercise, or other activities.

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

- What kind of surgery do you recommend for me? Why?
- Will you remove lymph nodes? Why?
- Will I need a skin graft?
- What will the scar look like? Can anything be done to help reduce the scar? Will I need plastic surgery or reconstructive surgery?
- How will I feel after surgery?
- If I have pain, how will you control it?
- Will I need to stay in the hospital? If so, for how long?
- Am I likely to have infection, swelling, blistering, or bleeding, or to get a scab where the cancer was removed?
- Will I have any long-term side effects?

Chemotherapy

Chemotherapy uses drugs to kill cancer cells. Drugs for skin cancer can be given in many ways.

Put directly on the skin

A cream or lotion form of chemotherapy may be used to treat very thin, early-stage basal cell or squamous cell skin cancer (Bowen disease). It may also be used if there are several small skin cancers. The doctor will show you how to apply the cream or lotion to the skin one or two times a day for several weeks.

The cream or lotion contains a drug that kills cancer cells only in the top layer of the skin:

- ***Fluorouracil*** (another name is 5-FU): This drug is used to treat early-stage basal cell and squamous cell cancers.
- ***Imiquimod***: This drug is used to treat early-stage basal cell cancer.

These drugs may cause your skin to turn red or swell. Your skin also may itch, ooze, or develop a rash. Your skin may be sore or sensitive to the sun after treatment. These skin changes usually go away after treatment is over.

A cream or lotion form of chemotherapy usually does not leave a scar. If healthy skin becomes too red or raw when the skin cancer is treated, your doctor may stop treatment.

Swallowed or injected

People with melanoma may receive chemotherapy by mouth or through a vein (*intravenous*). You may receive one or more drugs. The drugs enter the bloodstream and travel throughout the body.

If you have melanoma on an arm or leg, you may receive drugs directly into the bloodstream of that limb. The flow of blood to and from the limb is stopped for a while. This allows a high dose of drugs in the area with the melanoma. Most of the chemotherapy remains in that limb.

You may receive chemotherapy in an outpatient part of the hospital, at the doctor's office, or at home. Some people need to stay in the hospital during treatment.

The side effects depend mainly on which drugs are given and how much. Chemotherapy kills fast-growing cancer cells, but the drugs can also harm normal cells that divide rapidly:

- **Blood cells:** When drugs lower the levels of healthy blood cells, you're more likely to get infections, bruise or bleed easily, and feel very weak and tired. Your health care team will check for low levels of blood cells. If your levels are low, your health care team may stop the chemotherapy for a while or reduce the dose of the drug. There are also medicines that can help your body make new blood cells.
- **Cells in hair roots:** Chemotherapy may cause hair loss. If you lose your hair, it will grow back after treatment, but the color and texture may be changed.
- **Cells that line the digestive tract:** Chemotherapy can cause a poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores. Your health care team can give you medicines and suggest other ways to help with these problems. They usually go away when treatment ends.

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

You may want to ask your doctor these questions about chemotherapy:

- Why do I need this treatment?
- Which drug or drugs will I have?
- How do the drugs work?
- Do I need to take special care when I put chemotherapy on my skin? What do I need to do? Will I be sensitive to the sun?
- When will treatment start? When will it end?
- Will I have any long-term side effects?

Photodynamic Therapy

Photodynamic therapy (PDT) uses a drug along with a special light source, such as a laser light, to kill cancer cells. PDT may be used to treat very thin, early-stage basal cell or squamous cell skin cancer (Bowen disease).

The drug is either rubbed into the skin or injected intravenously. The drug is absorbed by cancer cells. It stays in cancer cells longer than in normal cells. Several hours or days later, a special light is focused on the cancer. The drug becomes active and destroys the cancer cells.

The side effects of PDT are usually not serious. PDT may cause burning or stinging pain. It also may cause burns, swelling, or redness. It may scar healthy tissue near the growth. If you have PDT, you will need to avoid direct sunlight and bright indoor light for at least 6 weeks after treatment.

The NCI fact sheet *Photodynamic Therapy for Cancer* has more information.

You may want to ask your doctor these questions about PDT:

- Will I need to stay in the hospital while the drug is in my body?
- Will I need to have the treatment more than once?

Biological Therapy

Some people with advanced melanoma receive a drug called biological therapy. Biological therapy for melanoma is treatment that may improve the body's natural defense (immune system response) against cancer.

One drug for melanoma is *interferon*. It's injected intravenously (usually at a hospital or clinic) or injected under the skin (at home or in a doctor's office). Interferon can slow the growth of melanoma cells.

Another drug used for melanoma is *interleukin-2*. It's given intravenously. It can help the body destroy cancer cells. Interleukin-2 is usually given at the hospital.

Other drugs may be given at the same time to prevent side effects. The side effects differ with the drug used, and from person to person. Biological therapies commonly cause a rash or swelling. You may feel very tired during treatment. These drugs may also cause a headache, muscle aches, a fever, or weakness.

You may find it helpful to read the NCI booklet *Biological Therapy*. You may also wish to read the NCI fact sheet *Biological Therapies for Cancer*.

You may want to ask your doctor these questions about biological therapy:

- What is the goal of treatment?
- When will treatment start? When will it end?
- Will I need to stay in the hospital for treatment? If so, how long will I be in the hospital?

Radiation Therapy

Radiation therapy uses high-energy rays to kill cancer cells. The *radiation* comes from a large machine outside the body. It affects cells only in the treated area. You will go to a hospital or clinic several times for this treatment.

Radiation therapy is not a common treatment for skin cancer. But it may be used for skin cancer in areas where surgery could be difficult or leave a bad scar. For example, you may have radiation therapy if you have a growth on your eyelid, ear, or nose. Radiation therapy may also be used after surgery for squamous cell carcinoma that can't be completely removed or that has spread to the lymph nodes. And it may be used for melanoma that has spread to the lymph nodes, brain, bones, or other parts of the body.

Although radiation therapy is painless, it may cause other side effects. The side effects depend mainly on the dose of radiation and the part of your body that is treated. It's common for the skin in the treated area to become red, dry, tender, and itchy. Your health care team can suggest ways to relieve the side effects of radiation therapy.

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

You may want to ask your doctor these questions about radiation therapy:

- How will I feel after treatment?
- Am I likely to have infection, swelling, blistering, or bleeding after radiation therapy?
- Will I get a scar on the treated area?
- How should I take care of the treated area?

Second Opinion

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

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

It may take some time and effort to gather your medical records and see another doctor. Usually it's not a problem if it takes you several weeks to get a second opinion. In most cases, the delay in starting treatment will not make treatment less effective. To make sure,

you should discuss this possible delay with your doctor. Some people with skin cancer need treatment right away.

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

Also, you can get information about treatment centers near you from NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** or at **LiveHelp** (<http://www.cancer.gov/livehelp>).

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



Taking Part in Cancer Research

Doctors all over the country are conducting many types of clinical trials (research studies in which people volunteer to take part). Clinical trials are designed to find out whether new treatments are safe and effective.

Doctors are trying to find better ways to care for people with skin cancer. They are studying many types of treatment, such as surgery, chemotherapy, biological therapy, and combinations of treatment. For example, doctors are studying the use of a cancer treatment *vaccine* after surgery for people with advanced melanoma. For more information about cancer vaccines, you may want to read the NCI fact sheet *Cancer Vaccines*.

Even if the people in a trial do not benefit directly, they may still make an important contribution by helping doctors learn more about skin cancer and how to control it. Although clinical trials may pose some risks, doctors do all they can to protect their patients.

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

NCI's Web site includes a section on clinical trials at **<http://www.cancer.gov/clinicaltrials>**. It has general information about clinical trials as well as detailed information about specific ongoing studies of skin cancer. Information specialists at **1-800-4-CANCER (1-800-422-6237)** or at **LiveHelp** at **<http://www.cancer.gov/livehelp>** can answer questions and provide information about clinical trials.

Follow-up Care

After treatment for skin cancer, you'll need regular checkups (such as every 3 to 6 months for the first year or two). Your doctor will monitor your recovery and check for any new skin cancers. Regular checkups help ensure that any changes in your health are noted and treated if needed.

During a checkup, you'll have a physical exam. People with melanoma may have x-rays, blood tests, and scans of the chest, liver, bones, and brain.

People who have had melanoma have an increased risk of developing a new melanoma, and people with basal or squamous cell skin cancers have a risk of developing another skin cancer of any type. It's a good idea to get in a routine for checking your skin for new growths or other changes. Keep in mind that changes are not a sure sign of skin cancer. Still, you should tell your doctor about any changes right away. You'll find a guide for checking your skin on page 37.

Follow your doctor's advice about how to reduce your risk of developing skin cancer again.

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

Prevention

People with skin cancer are at risk of developing another skin cancer. Limit your time in the sun and stay away from sunlamps and tanning booths. Keep in mind that getting a tan may increase your risk of developing another skin cancer.

The best way to prevent skin cancer is to protect yourself from the sun:

- Avoid outdoor activities during the middle of the day. The sun's rays are the strongest between 10 a.m. and 4 p.m. When you must be outdoors, seek shade when you can.
- Protect yourself from the sun's rays reflected by sand, water, snow, ice, and pavement. The sun's rays can go through light clothing, windshields, windows, and clouds.
- Wear long sleeves and long pants. Tightly woven fabrics are best.
- Wear a hat with a wide brim all around that shades your face, neck, and ears. Keep in mind that baseball caps and some sun visors protect only parts of your skin.
- Wear sunglasses that absorb UV radiation to protect the skin around your eyes.
- Use sunscreen lotions with a sun protection factor (SPF) of at least 15. (Some doctors will suggest using a lotion with an SPF of at least 30.) Apply the product's recommended amount to uncovered skin 30 minutes before going outside, and apply again every two hours or after swimming or sweating.

Sunscreen lotions may help prevent some skin cancers. It's important to use a broad-spectrum sunscreen lotion that filters both *UVB* and *UVA radiation*. But you still need to avoid the sun during the middle of the day and wear clothing to protect your skin.

How To Check Your Skin

Your doctor or nurse may suggest that you do a regular skin self-exam to check for the development of a new skin cancer.

The best time to do this exam is after a shower or bath. Check your skin in a room with plenty of light. Use a full-length mirror and a hand-held mirror.

It's best to begin by learning where your birthmarks, moles, and other marks are and their usual look and feel.

Check for anything new:

- A new mole (that looks different from your other moles)
- A new red or darker color flaky patch that may be a little raised
- A new flesh-colored firm bump
- A change in the size, shape, color, or feel of a mole
- A sore that doesn't heal

Check yourself from head to toe:

- Look at your face, neck, ears, and scalp. You may want to use a comb or a blow dryer to move your hair so that you can see better. You also may want to have a relative or friend check through your hair. It may be hard to check your scalp by yourself.

- Look at the front and back of your body in the mirror. Then, raise your arms and look at your left and right sides.
- Bend your elbows. Look carefully at your fingernails, palms, forearms (including the undersides), and upper arms.
- Examine the back, front, and sides of your legs. Also look around your genital area and between your buttocks.
- Sit and closely examine your feet, including your toenails, your soles, and the spaces between your toes.

By checking your skin regularly, you'll learn what is normal for you. It may be helpful to record the dates of your skin exams and to write notes about the way your skin looks. If your doctor has taken photos of your skin, you can compare your skin to the photos to help check for changes. If you find anything unusual, see your doctor.

Sources of Support

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

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

Here's where you can go for support:

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

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

Dictionary

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

Actinic keratosis (ak-TIH-nik KAYR-uh-TOH-sis): A thick, scaly patch of skin that may become cancer. Also called senile keratosis and solar keratosis.

Basal cell (BAY-sul SEL): A small, round cell found in the lower part (or base) of the epidermis, the outer layer of the skin.

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

Biological therapy (BY-oh-LAH-jih-kul THAYR-uh-pee): Treatment to boost or restore the ability of the immune system to fight cancer, infections, and other diseases. Also used to lessen certain side effects that may be caused by some cancer treatments. Agents used in biological therapy include monoclonal antibodies, growth factors, and vaccines. These agents may also have a direct antitumor effect. Also called biological response modifier therapy, biotherapy, BRM therapy, and immunotherapy.

Biopsy (BY-op-see): The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue. There are many different types of biopsy procedures. The most common types include: (1) incisional biopsy, in which only a sample of tissue is removed; (2) excisional biopsy, in which an entire lump or suspicious area is removed; and (3) needle biopsy, in which a sample of tissue or fluid is removed with a needle. When a wide needle is used,

the procedure is called a core biopsy. When a thin needle is used, the procedure is called a fine-needle aspiration biopsy.

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

Bowen disease (BOH-en dih-ZEEZ): A skin disease marked by scaly or thickened patches on the skin and often caused by prolonged exposure to arsenic. The patches often occur on sun-exposed areas of the skin and in older white men. These patches may become malignant (cancer). Also called precancerous dermatitis and precancerous dermatosis.

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

Carcinoma in situ (KAR-sih-NOH-muh in SY-too): A group of abnormal cells that remain in the place where they first formed. They have not spread. These abnormal cells may become cancer and spread into nearby normal tissue. Also called stage 0 disease.

Cartilage (KAR-tih-lij): A tough, flexible tissue that lines joints and gives structure to the nose, ears, larynx, and other parts of the body.

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

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

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

Cryosurgery (KRY-oh-SER-juh-ree): A procedure in which tissue is frozen to destroy abnormal cells. This is usually done with a special instrument that contains liquid nitrogen or liquid carbon dioxide. Also called cryoablation and cryosurgical ablation.

CT scan: A series of detailed pictures of areas inside the body taken from different angles. The pictures are created by a computer linked to an x-ray machine. Also called CAT scan, computed tomography scan, computerized axial tomography scan, and computerized tomography.

Curettage (kyoo-reh-TAHZH): Removal of tissue with a curette (a spoon-shaped instrument with a sharp edge).

Curette (kyoo-RET): A spoon-shaped instrument with a sharp edge.

Dermatologist (der-muh-TAH-loh-jist): A doctor who has special training to diagnose and treat skin problems.

Dermis (DER-mis): The inner layer of the two main layers of the skin. The dermis has connective tissue, blood vessels, oil and sweat glands, nerves, hair follicles, and other structures.

Dysplastic nevus (dis-PLAS-tik NEE-vus): A type of nevus (mole) that looks different from a common mole. A dysplastic nevus is often larger with borders that are not easy to see. Its color is usually uneven and can range from pink to dark brown. Parts of the mole may be raised above the skin surface. A dysplastic nevus may develop into melanoma (a type of skin cancer).

Electrodesiccation (ee-LEK-troh-deh-sih-KAY-shun): The drying of tissue by a high-frequency electric current applied with a needle-shaped electrode.

Epidermis (EH-pih-DER-mis): The outer layer of the two main layers of the skin.

Excisional biopsy (ek-SIH-zhun-al BY-op-see): A surgical procedure in which an entire lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

Excisional skin surgery (ek-SIH-zhun-al SER-juh-ree): A surgical procedure used to remove moles, cysts, skin cancer, and other skin growths using local anesthesia. To treat skin cancer, the doctor uses a scalpel to remove the entire tumor and some of the healthy tissue around it.

Fine-needle aspiration biopsy (AS-pih-RAY-shun BY-op-see): The removal of tissue or fluid with a thin needle for examination under a microscope. Also called FNA biopsy.

Fluorouracil (floor-oh-YOOR-uh-sil): A drug used to treat symptoms of cancer of the colon, breast, stomach, and pancreas. It is also used in a cream to treat certain skin conditions. Also called 5-fluorouracil and 5-FU.

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

Graft: Healthy skin, bone, or other tissue taken from one part of the body and used to replace diseased or injured tissue removed from another part of the body.

Human papillomavirus (HYOO-mun PA-pih-LOH-muh-VY-rus): Also called HPV. A type of virus that can cause abnormal tissue growth (for example, warts) and other changes to cells. Infection for a long time with certain types of HPV can cause cervical cancer. HPV may also play a role in some other types of cancer, such as anal, vaginal, vulvar, penile, oropharyngeal, and squamous cell skin cancers.

Imiquimod (ih-MIH-kwee-mod): A drug used to treat early basal cell skin cancer and certain other skin conditions. It is being studied in the treatment of other types of cancer. Also called Aldara.

Immune system (ih-MYOON SIS-tem): The complex group of organs and cells that defends the body against infections and other diseases.

Incisional biopsy (in-SIH-zhun-al BY-op-see): A surgical procedure in which a portion of a lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope to check for signs of disease.

Infection: Invasion and multiplication of germs in the body. Infections can occur in any part of the body and can spread throughout the body. The germs may be bacteria, viruses, yeast, or fungi. They can cause a fever and other problems, depending on where the infection occurs. When the body's natural defense system is strong, it can often fight the germs and prevent infection. Some cancer treatments can weaken the natural defense system.

Inflammation (IN-fluh-MAY-shun): Redness, swelling, pain, and/or a feeling of heat in an area of the body. This is a protective reaction to injury, disease, or irritation of the tissues.

Interferon (in-ter-FEER-on): A biological response modifier (a substance that can improve the body's natural response to infections and other diseases). Interferons interfere with the division of cancer cells and can slow tumor growth. There are several types of interferons, including interferon-alpha, -beta, and -gamma. The body normally produces these substances. They are also made in the laboratory to treat cancer and other diseases.

Interleukin-2 (in-ter-LOO-kin): One of a group of related proteins made by leukocytes (white blood cells) and other cells in the body. Aldesleukin (interleukin-2 made in the laboratory) is being used as a biological response modifier to boost the immune system in cancer therapy. Also called IL-2.

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

Local anesthesia (LOH-kul A-nes-THEE-zhuh): A temporary loss of feeling in one small area of the body caused by special drugs or other substances called anesthetics. The patient stays awake but has no feeling in the area of the body treated with the anesthetic.

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

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

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

Margin:The edge or border of the tissue removed in cancer surgery. The margin is described as negative or clean when the pathologist finds no cancer cells at the edge of the tissue, suggesting that all of the cancer has been removed. The margin is described as positive or involved when the pathologist finds cancer cells at the edge of the tissue, suggesting that all of the cancer has not been removed.

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

gives supportive care and may coordinate treatment given by other specialists.

Melanocyte (mel-AN-o-site): A cell in the skin and eyes that produces and contains the pigment called melanin.

Melanoma (MEH-luh-NOH-muh): A form of cancer that begins in melanocytes (cells that make the pigment melanin). It may begin in a mole (skin melanoma), but can also begin in other pigmented tissues, such as in the eye or in the intestines.

Melanoma in situ (MEH-luh-NOH-muh in SY-too): Abnormal melanocytes (cells that make melanin, the pigment that gives skin its color) are found in the epidermis (outer layer of the skin). These abnormal melanocytes may become cancer and spread into nearby normal tissue. Also called stage 0 melanoma.

Merkel cell carcinoma (MER-kel sel KAR-sih-NOH-muh): A rare type of cancer that forms on or just beneath the skin, usually in parts of the body that have been exposed to the sun. It is most common in older people and in people with weakened immune systems. Also called Merkel cell cancer, neuroendocrine carcinoma of the skin, and trabecular cancer.

Metastasis (meh-TAS-tuh-sis): The spread of cancer from one part of the body to another. A tumor formed by cells that have spread is called a “metastatic tumor” or a “metastasis.” The metastatic tumor contains cells that are like those in the original (primary) tumor. The plural form of metastasis is metastases (meh-TAS-tuh-SEEZ).

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

Mohs surgery (MOZE SER-juh-ree): A surgical procedure used to treat skin cancer. Individual layers of cancer tissue are removed and examined under a microscope one at a time until all cancer tissue has been removed. Also called Mohs micrographic surgery.

Mole: A benign (not cancer) growth on the skin that is formed by a cluster of melanocytes (cells that make a substance called melanin, which gives color to skin and eyes). A mole is usually dark and may be raised from the skin. Also called nevus.

MRI: A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue. MRI makes better images of organs and soft tissue than other scanning techniques, such as computed tomography (CT) or x-ray. MRI is especially useful for imaging the brain, the spine, the soft tissue of joints, and the inside of bones. Also called magnetic resonance imaging.

Nevoid basal cell carcinoma syndrome (NEE-voyd BAY-sul SEL KAR-sih-NOH-muh SIN-drome): A genetic condition that causes unusual facial features and disorders of the skin, bones, nervous system, eyes, and endocrine glands. People with this syndrome have a higher risk of basal cell carcinoma. Also called basal cell nevus syndrome and Gorlin syndrome.

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

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

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

PET scan: A procedure in which a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body. Also called positron emission tomography scan.

Photodynamic therapy (FOH-toh-dy-NA-mik THAYR-uh-pee): Treatment with drugs that become active when exposed to light. These activated drugs may kill cancer cells.

Plastic surgeon (PLAS-tik SER-jun): A surgeon who specializes in reducing scarring or disfigurement that may occur as a result of accidents, birth defects, or treatment for diseases.

Punch biopsy (BY-op-see): Removal of a small disk-shaped sample of tissue using a sharp, hollow device. The tissue is then examined under a microscope.

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

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

Radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): The use of high-energy radiation from x-rays, gamma rays, neutrons, protons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive

material placed in the body near cancer cells (internal radiation therapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that travels in the blood to tissues throughout the body. Also called irradiation and radiotherapy.

Reconstructive surgeon (REE-kun-STRUK-tiv SER-jun): A doctor who can surgically reshape or rebuild (reconstruct) a part of the body, such as a woman's breast after surgery for breast cancer.

Reconstructive surgery (REE-kun-STRUK-tiv SER-juh-ree): Surgery that is done to reshape or rebuild (reconstruct) a part of the body changed by previous surgery.

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

Risk factor: Something that increases the chance of developing a disease. Some examples of risk factors for cancer are age, a family history of certain cancers, use of tobacco products, being exposed to radiation or certain chemicals, infection with certain viruses or bacteria, and certain genetic changes.

Scalpel (SKAL-pul): A small, thin knife used for surgery.

Sentinel lymph node biopsy (limf node): Removal and examination of the sentinel node(s) (the first lymph node(s) to which cancer cells are likely to spread from a primary tumor). To identify the sentinel lymph node(s), the surgeon injects a radioactive substance, blue dye, or both near the tumor. The surgeon then uses a probe to find the sentinel lymph node(s) containing the radioactive substance or looks

for the lymph node(s) stained with dye. The surgeon then removes the sentinel node(s) to check for the presence of cancer cells.

Shave biopsy (BY-op-see): A procedure in which a skin abnormality and a thin layer of surrounding skin are removed with a small blade for examination under a microscope. Stitches are not needed with this procedure.

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

Social worker: A professional trained to talk with people and their families about emotional or physical needs, and to find them support services.

Squamous cell (SKWAY-mus sel): Flat cell that looks like a fish scale under a microscope. These cells cover inside and outside surfaces of the body. They are found in the tissues that form the surface of the skin, the lining of the hollow organs of the body (such as the bladder, kidney, and uterus), and the passages of the respiratory and digestive tracts.

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

Surgeon: A doctor who removes or repairs a part of the body by operating on the patient.

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

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

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

Ultraviolet radiation (UL-truh-VY-oh-let RAY-dee-AY-shun): Invisible rays that are part of the energy that comes from the sun. Ultraviolet radiation also comes from sun lamps and tanning beds. It can damage the skin and cause melanoma and other types of skin cancer. Ultraviolet radiation that reaches the Earth's surface is made up of two types of rays, called UVA and UVB rays. UVB rays are more likely than UVA rays to cause sunburn, but UVA rays pass deeper into the skin. Scientists have long thought that UVB radiation can cause melanoma and other types of skin cancer. They now think that UVA radiation also may add to skin damage that can lead to skin cancer and cause premature aging. For this reason, skin specialists recommend that people use sunscreens that reflect, absorb, or scatter both kinds of ultraviolet radiation. Also called UV radiation.

UVA radiation (RAY-dee-AY-shun): A type of ultraviolet (UV) radiation. UV rays are invisible rays that are part of the energy that comes from the sun. UVA radiation also comes from sun lamps and tanning beds. Scientists think that UVA radiation may cause skin damage that can lead to skin cancer and premature aging. Also called ultraviolet A radiation.

UVB radiation (RAY-dee-AY-shun): A type of ultraviolet (UV) radiation. UV rays are invisible rays that are part of the energy that comes from the sun. UVB radiation causes sunburn, and scientists have long thought that it can cause melanoma and other types of skin cancer. Also called ultraviolet B radiation.

Vaccine (vak-SEEN): A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. A vaccine can help the body recognize and destroy cancer cells or microorganisms.

Vitamin D (VY-tuh-min): A nutrient that the body needs in small amounts to function and stay healthy. Vitamin D helps the body use calcium and phosphorus to make strong bones and teeth. It is fat-soluble (can dissolve in fats and oils) and is found in fatty fish, egg yolks, and dairy products. Skin exposed to sunshine can also make vitamin D. Not enough vitamin D can cause a bone disease called rickets. It is being studied in the prevention and treatment of some types of cancer. Also called cholecalciferol.

Xeroderma pigmentosum (ZEER-oh-DER-ma pig-men-TOH-sum): A genetic condition marked by an extreme sensitivity to ultraviolet radiation, including sunlight. People with xeroderma pigmentosum are not able to repair skin damage from the sun and other sources of ultraviolet radiation, and have a very high risk of skin cancer.

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

National Cancer Institute Publications

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

You may read publications online and print your own copy. Also, people in the United States and its territories may order NCI publications:

- **By telephone:** People in the United States and its territories may order these and other NCI publications by calling the NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)**.
- **On the Internet:** Many NCI publications may be viewed, downloaded, and ordered from **<http://www.cancer.gov/publications>**. This Web site also explains how people outside the United States can mail or fax their requests for NCI booklets.

Cancer Treatment and Supportive Care

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

Coping with Cancer

- *Taking Time: Support for People with Cancer*

Life After Cancer Treatment

- *Facing Forward: Life After Cancer Treatment* (also in Spanish)
- *Follow-up Care After Cancer Treatment*
- *Facing Forward: Ways You Can Make a Difference in Cancer*

Advanced or Recurrent Cancer

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

Complementary Medicine

- *Thinking about Complementary & Alternative Medicine*

Caregivers

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

Research Studies

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

The National Cancer Institute

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

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