



Melanoma Skin Cancer Overview

What is melanoma skin cancer?

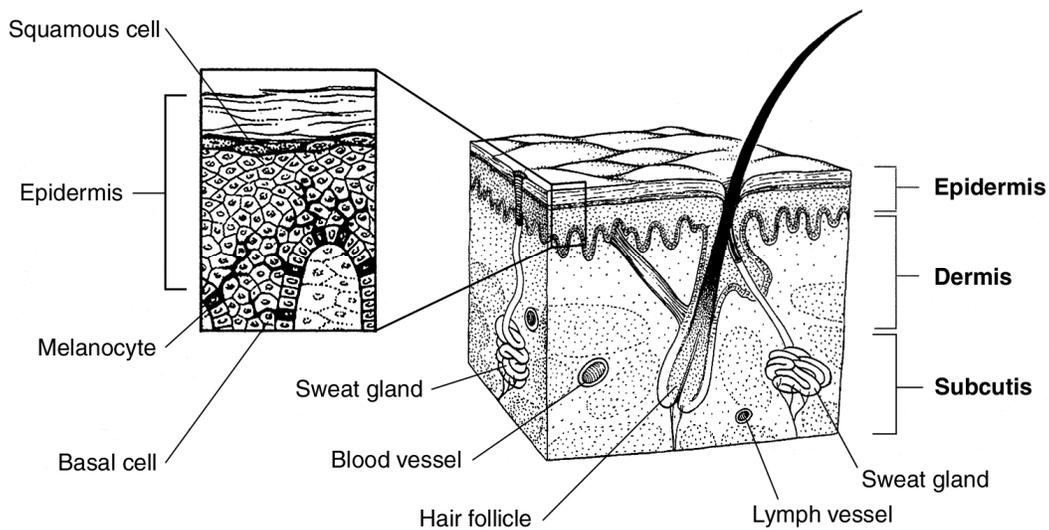
Cancer starts when cells in a part of the body start to grow out of control. Cells in nearly any part of the body can become cancer. To learn more about how cancer starts and spreads, go to *What Is Cancer?*

Melanoma is a cancer that starts in a certain type of skin cell. To understand melanoma, it helps to know a little about the skin.

Normal skin

The skin has 3 layers. From the outside in, they are:

- **Epidermis:** This top layer of the skin is very thin. The flat cells at the top of this layer are called *squamous cells*. Below this are cells called *basal cells*. Cells called *melanocytes* are also in the epidermis. These cells make the brown pigment melanin, which gives the skin its tan or brown color. Melanocytes are the cells that can become melanoma.
- **Dermis:** This middle layer of the skin is much thicker than the epidermis. It contains hair shafts, sweat glands, blood vessels, and nerves.
- **Subcutis:** This deepest layer of the skin contains proteins and fat, which help keep in body heat and act as a shock absorber to help protect the body's organs from injury.



Skin tumors that are not cancer

Most skin tumors are not cancer (they are benign). These rarely, if ever, turn into cancer. Some of them include:

- Mole (also called a *nevus*): a benign skin tumor that starts from melanocytes. Almost everyone has some moles. Nearly all of them are harmless, but some types can raise your risk of melanoma.
- Spitz nevus: a kind of mole that sometimes looks a lot like melanoma
- Seborrheic keratosis: a tan, brown, or black raised spot with a “waxy” texture
- Hemangioma: a benign blood vessel growth, often called a *strawberry spot*
- Lipoma: a soft growth made up of fat cells
- Wart: a rough-surfaced growth caused by some types of human papilloma virus (HPV)

Melanoma skin cancers

Melanoma is a cancer that begins in the melanocytes. Most of these cells still make melanin, so melanoma tumors are often brown or black. But melanomas can also appear pink, tan, or even white.

Melanoma most often starts on the trunk (chest or back) in men and on the legs of women, but it can start in other places, too. Having dark skin lowers the risk of melanoma, but a person with dark skin can still get melanoma.

Melanoma can almost always be cured in its early stages. But it is likely to spread to other parts of the body if it is not caught early.

Other skin cancers

Other types of skin cancers are sometimes grouped together as *non-melanoma skin cancers*.

Basal cell and squamous cell cancers are much more common than melanoma. Because they rarely spread to other parts of the body, these cancers are often less worrisome and are treated differently from melanoma. They are discussed in *Skin Cancer: Basal and Squamous Cell*.

Less common skin cancers

Other types of non-melanoma skin cancer are much less common than basal and squamous cell cancers and are treated differently. They include:

- Merkel cell carcinoma
- Kaposi sarcoma
- Skin lymphoma
- Skin adnexal tumors (tumors that start in hair follicles or skin glands)
- Various types of sarcomas

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

What are the risk factors for melanoma skin cancer?

A risk factor is anything that affects your chance of getting a disease. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But having a risk factor, or even several risk factors, does not mean that you will get the disease. And some people who get the disease may have few or no known risk factors.

Risk factors for melanoma

Ultraviolet (UV) light: Too much exposure to UV rays is a major risk factor for most melanomas. The main source of UV rays is the sun. Tanning lamps and beds are also sources of UV rays. To learn more about the effects of UV rays on the skin and what you can do to protect yourself, see *Skin Cancer Prevention and Early Detection*.

Some types of moles: A mole is a benign (not cancer) skin tumor. The chance of any single mole turning into cancer is very low. But certain types of moles increase a person's chance of getting melanoma. For example, people who have many abnormal moles are more likely to develop melanoma.

Light-colored skin, freckles, and light hair: The risk of melanoma is much higher for whites than for African Americans. Whites with red or blond hair, blue or green eyes, or fair skin that freckles or burns easily are at increased risk.

Family history of melanoma: Your risk of melanoma is higher if you have a close relative (parent, brother, sister, or child) who has had the disease.

Having had melanoma or another skin cancer in the past: A person who has already had skin cancer has a higher risk of getting melanoma.

Having a weakened immune system: People who have weak immune systems, such as organ transplant patients and people infected with HIV, have an increased risk of melanoma.

Older age: Melanoma is more common in older people, but it is also found in younger people. In fact, it is one of the most common cancers in people under 30.

Male gender: In the United States, melanoma is generally more common in men than in women, but this varies by age. Before age 45, the risk is higher for women; after age 45 the risk is higher in men.

Xeroderma pigmentosum (XP): People with this rare, inherited condition have a high risk of getting melanoma and other skin cancers at a young age.

Can melanoma skin cancer be prevented?

Not all melanomas can be prevented, but there are things you can do that might reduce your risk.

Limit your exposure to ultraviolet (UV) rays

The best way to lower the risk of melanoma is to practice sun safety when you are outdoors to limit your exposure to strong sunlight and other sources of UV light.

Seek shade

Simply staying in the shade is one of the best ways to limit being exposed to UV rays.

“Slip! Slop! Slap!® ... and Wrap”

This catchphrase can remind you of some of the key steps you can take to protect yourself from UV rays. If you are going to be in the sun:

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

Avoid tanning beds and sunlamps

Many people believe the UV rays of tanning beds are harmless. This is not true. Tanning lamps give out UV rays, which are linked to skin cancer. Tanning bed use has been linked with an increased risk of melanoma, especially if it's started before the age of 30. Most skin doctors and health groups advise against 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. Children need to be taught about the dangers of too much sun exposure as they become more independent.

To learn more about sun safety

To find out more about how to protect yourself and your family from UV rays, see *Skin Cancer Prevention and Early Detection*.

Check for abnormal moles

Checking your skin regularly may help you spot any new or abnormal moles or other growths and show them to your doctor before they even have a chance to turn into skin cancer.

If you have many moles or abnormal moles, your doctor may want to watch them closely with regular exams and may advise you to do monthly skin self-exams. (See the section

“How is melanoma skin cancer found?”). The doctor may want to remove some of them if they have certain features that suggest they might change into a melanoma.

If you find a new, unusual, or changing mole, you should have it checked by your doctor.

How is melanoma skin cancer found?

Melanoma can often be found early. There are things everyone can do to find this cancer early, when it is most likely to be cured.

Skin self-exams

It's important to check your own skin about once a month. You should know the pattern of moles, freckles, and other marks on your skin so that you'll notice any changes.

Skin self-exams are best done in front of a full-length mirror. A hand-held mirror can be used for places that are hard to see. Look at all areas, such as your palms and soles, scalp, ears, nails, and your back. A family member can check those hard-to-see areas like your scalp and back.

For a more on how to do a skin self-exam, see *Skin Cancer Prevention and Early Detection*, or visit our Skin Self-exam Image Gallery.

What to look for

Unusual moles, sores, lumps, blemishes, or changes in the way an area of the skin looks or feels may be a sign of melanoma or another type of skin cancer, or a warning that it might occur.

Normal moles

A normal mole is most often an evenly colored brown, tan, or black spot on the skin. It can be either flat or raised. It can be round or oval. Moles are usually less than $\frac{1}{4}$ inch across, or about the width of a pencil eraser. Some moles can be present at birth, but most appear later.

Once a mole has developed, it most often stays the same size, shape, and color for many years. Some moles may fade away over time.

Most people have moles, and almost all moles are harmless. But it is important to notice changes in a mole that suggest a melanoma may be starting.

Possible signs and symptoms of melanoma

The most important warning sign for melanoma is a new spot on the skin or a spot that is changing in size, shape, or color. A spot that looks different from all of the other spots on

your skin can also be a warning. If you have any of these warning signs, have your skin checked by a doctor. If you can't see your doctor right away, you might want to take good close-up photos of the area so your doctor can see if the area is changing when you do get an appointment.

The **ABCDE rule** can help you tell if a mole should be checked by a doctor. ABCDE stands for the following:

- **A is for Asymmetry:** One half of a mole or birthmark does not match the other.
- **B is for Border:** The edges are irregular, ragged, notched, or blurred.
- **C is for Color:** The color is not the same all over and may include shades of brown or black, or even pink, red, white, or blue.
- **D is for Diameter:** The spot is larger than about $\frac{1}{4}$ inch across (the size of a pencil eraser), but melanomas can be smaller than this.
- **E is for Evolving:** The mole is changing in size, shape, or color.

Some melanomas don't fit the rules above. Other warning signs are:

- A sore that does not heal
- Spread of color from the border of a spot into the skin around it
- Redness or a new swelling beyond the border
- Itchiness, tenderness, or pain
- Change in the surface of a mole – scaliness, oozing, bleeding, or a new bump or nodule

Be sure to show your doctor any areas that concern you and ask your doctor to look at areas that may be hard for you to see. It can be hard to tell the difference between melanoma and an ordinary mole, so it's important to show your doctor any mole that you are unsure of.

To see some examples of normal moles and melanomas, visit our [Skin Cancer Image Gallery](#).

Exam by a health professional

Part of a routine cancer check-up should include a skin exam by a doctor or trained health professional. Regular skin exams are especially important for people who have a higher risk of melanoma, such as people with a strong family history or who have had melanoma before.

If there is any reason to suspect that you have a melanoma, your doctor will do more exams and tests to find out if it is melanoma or something else. You might also be referred to a doctor who is an expert in skin diseases (called a *dermatologist*) for some of these tests.

Medical history and physical exam

The doctor will likely ask about your symptoms and risk factors. This will include when you first saw the mark on your skin, if it has changed in size or the way it looks, and if it is causing any symptoms (pain, itching, bleeding, etc.).

During the exam, the doctor will note the size, shape, color, and texture of the area of concern, and whether it is bleeding or oozing. The rest of your body may be checked for moles and other spots. The doctor may also feel nearby lymph nodes under the skin, like those in the groin, underarm, or neck. If the lymph nodes are enlarged, it might mean the melanoma has spread.

The doctor might use a special magnifying lens and light source held near the skin. Sometimes a thin layer of oil is put on the skin. A picture of the spot may be taken.

Skin biopsy

If the doctor thinks a spot might be a melanoma, a sample of the skin will be taken and sent to a lab to be looked at with a microscope. This is called a *biopsy*. There are different ways to biopsy the skin. The choice depends on the size of the area of concern and where it is on the body.

The skin around the area of the biopsy will be numbed before the biopsy. You will feel a little stinging as the medicine goes in, but you should not feel any pain during the biopsy.

Shave biopsy: For this type of biopsy, the doctor shaves off the top layers of the skin. Bleeding from the biopsy site is then stopped by applying an ointment, a chemical that stops bleeding, or a small electric current to cauterize the wound.

A shave biopsy is useful for sampling moles when the risk of melanoma is very low. But it is not usually done if the doctor strongly suspects melanoma unless the biopsy blade goes deep enough to get below the area in question.

Punch biopsy: In a punch biopsy, the doctor uses a tool that looks like a tiny round cookie cutter to remove a deeper sample of skin. The edges of the skin are often stitched together.

Incisional and excisional biopsies: If a tumor might have grown into deeper layers of the skin, an incisional or excisional biopsy will be done. A surgical knife is used to cut through the full thickness of skin. A wedge of skin is removed, and the edges of the cut are usually sewn together.

An incisional biopsy removes only part of the tumor. If the whole tumor is removed, it is called an excisional biopsy. Excisional biopsy is most often used when it can be done.

Biopsies of melanoma that might have spread

If melanoma has already been found on the skin, nearby lymph nodes or other areas may be biopsied to see if the cancer has spread.

Rarely, some melanomas spread so fast that a person could have cancer in the lymph nodes, lungs, brain, or other places before a spot on the skin is found. In other cases they may be found long after a skin melanoma has been removed, so it's not clear whether it is the same cancer. Melanoma can also start in internal organs, but this is very rare.

Melanoma in an internal organ might be confused with another type of cancer starting in that organ. For example, melanoma that has spread to the lung might be confused with a cancer that *starts* in the lung. Special tests can be done on biopsy samples to tell whether it is a melanoma or some other kind of cancer. This is important because different treatments are used for different cancers.

Fine needle aspiration biopsy (FNA): This kind of biopsy is not used on suspicious moles, but it can sometimes be used if the doctor thinks the melanoma has spread to nearby lymph nodes or to organs like the lung or liver. A thin, hollow needle is used to remove very small tissue samples from the tumor. The test rarely causes much discomfort and does not leave a scar. But it may not always collect enough of a sample to tell if melanoma is present.

Surgical (excisional) lymph node biopsy: For this type of biopsy a swollen lymph node is removed through a small cut (incision). It is often done if a lymph node's size suggests the melanoma has spread there but either an FNA was not done or it did not show any cancer cells. Numbing medicine is often put on the skin if the lymph node is near the surface of the body. But if the lymph node is deeper in the body, you may need to be made drowsy or even put into a deep sleep (using general anesthesia).

Sentinel lymph node biopsy: If melanoma has been diagnosed and has any concerning features (such as being at least a certain thickness), a sentinel lymph node biopsy is often done to find out if the cancer has spread to nearby lymph nodes. This test can find the lymph nodes that drain lymph fluid from the area of the skin where the melanoma started. These *sentinel lymph nodes* are likely to be the first place the melanoma would go if it spreads.

To find the sentinel lymph nodes, the doctor injects a radioactive liquid (and sometimes a blue dye) into the area of the melanoma. The lymph nodes are then checked for radioactivity. A small cut is made in the identified lymph node area. The lymph nodes are then checked to find which one(s) absorbed radiation and turned blue. When these lymph nodes are found, they are taken out and sent to a lab to be looked at with a microscope. If

cancer cells are found, the rest of the lymph nodes in this area are removed, too. If the sentinel nodes do not contain cancer cells, further lymph node surgery is not needed.

If a lymph node near a melanoma is very large, this test probably won't be needed. The enlarged node is simply biopsied.

Lab tests of biopsy samples

After a biopsy, the samples are sent to a lab to be looked at with a microscope. If the doctor can't tell for sure if the sample contains melanoma cells just by looking at it, special tests may be done on the cells to try to confirm the diagnosis.

If the samples do contain melanoma, the doctor will look at certain features such as the tumor thickness and the portion of cells that are actively dividing. These features help define the stage of the melanoma (see the section "How is melanoma of the skin staged?"), which in turn affects treatment options and the outlook (prognosis) for the patient.

Tests may be done on advanced melanomas to see if the cancer cells have changes in genes such as the *BRAF* gene. This could help decide which treatments might work. (See the section "Targeted therapy for melanoma skin cancer.")

Imaging tests

Imaging tests are done to create pictures of the inside of the body. They are used to look for the spread of melanoma. They are not needed for people with very early melanoma, which is not likely to have spread. These tests may also be done to help find out how well treatment is working or to look for signs that the cancer has come back after treatment.

Chest x-ray: This test may be done to see if the cancer has spread to the lungs.

CT (computed tomography) scan: A CT scan uses x-rays to make detailed pictures of the inside of your body. This test can help show if any lymph nodes are enlarged or if organs such as the lungs or liver have spots that might be from the spread of melanoma.

CT scans can also be used to guide a needle during a biopsy. For this, you stay on the CT scanning table while a biopsy needle is moved through the skin and toward the mass.

MRI (magnetic resonance imaging): This is like a CT scan except that it uses radio waves and strong magnets to make a picture of your insides. MRI scans are very helpful in looking at the brain and spinal cord.

PET (positron emission tomography) scan: In this test, a special kind of radioactive sugar is put into a vein. The sugar collects in areas that have cancer, and a scanner can spot these areas. This test can be useful to see if the cancer has spread to lymph nodes or other parts of the body. It can also help when the doctor thinks the cancer has spread but

doesn't know where. Doctors find it most useful in people with advanced stages of melanoma. Some newer machines do PET scans and CT scans at the same time.

To learn more about these imaging tests, see *Imaging (Radiology) Tests*.

Blood tests

Blood tests aren't used to find melanoma, but some tests may be done before or during treatment, especially for more advanced melanomas.

Doctors often test blood for lactate dehydrogenase (LDH) before treatment. If the melanoma has spread to distant parts of the body, a higher than normal level of LDH is a sign that the cancer may be harder to treat. This affects how the cancer is staged.

Some other tests of blood cell counts and blood chemistry levels may be done in a person who has advanced melanoma to see how well the bone marrow (where new blood cells are made), liver, and kidneys are working during treatment.

How is melanoma skin cancer staged?

The stage of a melanoma is a description of how widespread it is. The tests described in the "How is melanoma found?" section are used to help decide the stage of the melanoma. The stage is very important because it affects the treatment and the outlook for recovery.

Stages are labeled using 0 and the Roman numerals I through IV (1-4), often followed by letters. The lower the number, the less the cancer has spread. A higher number, such as stage IV (4), means a more advanced cancer. The stage is based mainly on 3 key pieces of information:

- How far the main **tumor** has grown within the skin and other factors (see below).
- Whether the cancer has spread to nearby **lymph nodes**.
- Whether the cancer has **metastasized** (spread) to distant organs.

After looking at your test results, the doctor will tell you the stage of your cancer. Be sure to ask your doctor to explain your stage in a way you understand. This will help you decide on the best treatment for you.

Important factors for early-stage melanomas

For melanomas that have not spread, certain factors affect a person's outlook and are therefore part of the staging.

- The **thickness** of the melanoma is measured from the skin biopsy sample.

- The **mitotic rate** is the portion of melanoma cells that are in the process of dividing (making more cells).
- **Ulceration** is a breakdown of the skin over the melanoma.

How is melanoma skin cancer treated?

About treatment

Once melanoma has been found and staged, your cancer care team will discuss your treatment options with you. Depending on your situation, you could have different types of doctors on your treatment team. These doctors may include:

- A **dermatologist**: a doctor who treats diseases of the skin
- A **surgical oncologist**: a doctor who uses surgery to treat cancer
- A **medical oncologist**: a doctor who treats cancer with medicines
- A **radiation oncologist**: a doctor who treats cancer with radiation

Other specialists might be part of your treatment team as well, including physician assistants (PAs), nurse practitioners (NPs), nurses, nutrition specialists, social workers, and other health professionals. To learn more about who could be on your cancer care team, see [*Health Professionals Associated With Cancer Care*](#).

It's important to discuss all of your treatment options and their side effects with your treatment team to help decide what's best for you. If anything isn't clear, ask to have it explained. (See the section "What are some questions I can ask my doctor about melanoma skin cancer?" for some questions to ask.)

Based on the stage of the cancer and other factors, your treatment options might include:

- Surgery
- Immunotherapy

- Targeted therapy
- Chemotherapy
- Radiation therapy

Early-stage melanomas can often be treated with surgery alone, but more advanced cancers often need other treatments. Sometimes more than one type of treatment is used.

When there is time, getting a second opinion is often a good idea. It can give you more information and help you feel good about the treatment plan you choose.

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service at 1-800-303-5691 for a list of studies that meet your medical needs, or see *Clinical Trials* to learn more.

Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be dangerous.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision. See *Complementary and Alternative Medicine* to learn more.

Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are

an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, support groups, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists on call 24 hours a day, every day.

The treatment information given here is not official policy of the American Cancer 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.

Surgery for melanoma skin cancer

Surgery is the main treatment for most melanomas. It can often cure early-stage melanomas.

Wide excision

If melanoma was diagnosed with a skin biopsy, the area will probably need to be excised (removed) again to help make sure all of the cancer has been removed. This fairly minor surgery will cure most thin melanomas.

After the skin is numbed, more skin will be cut away from the area around the melanoma, and the wound is then stitched closed. This will leave a scar.

Mohs surgery: This method may be used in some cases to remove a smaller amount of tissue. In this approach the cancer is removed in very thin layers until a layer shows no signs of cancer. But not all doctors agree on the use of Mohs surgery for melanoma.

Amputation: If the melanoma is on a finger or toe and has grown deeply, the treatment may require that part or all of that digit be removed.

Lymph node dissection

In the past, a lymph node dissection was sometimes done to see if the melanoma had spread to nearby lymph nodes. Today, a sentinel lymph node biopsy (see “How is melanoma of the skin found?”) is often done first because it is a smaller surgery that is less likely to cause side effects such as lymphedema (see below).

If the sentinel lymph node biopsy (or another type of lymph node biopsy) finds cancer, then a *lymph node dissection* will likely be done to remove the other nodes in that area. It

is not clear if a lymph node dissection can cure melanomas that have spread to the nodes. This is still being studied.

Removing lymph nodes can cause some long-term side effects, including *lymphedema*. Lymph nodes help drain fluid from the arms and legs. If they are removed, fluid can build up, leading to limb swelling. This side effect, along with the discomfort of the surgery itself, is the reason lymph nodes are not removed unless the doctor thinks it's necessary. For more on lymphedema, see *Understanding Lymphedema (for Cancers Other Than Breast Cancer)*.

Surgery for melanoma that has spread

When melanoma has spread from the skin to distant organs (such as the lungs or brain), it is very unlikely to be cured by surgery. Even so, surgery is sometimes done because removing even a few areas of spread could help some people to live longer or have a better quality of life. If you have metastatic melanoma and your doctor recommends surgery, be sure you understand what the goal of the surgery would be.

Immunotherapy for melanoma skin cancer

Immunotherapy helps boost a person's immune system to better attack the cancer. Many types of immunotherapy are used for people with melanoma.

Immune checkpoint inhibitors for advanced melanoma

These drugs can help the immune system to better "see" melanoma cells and attack them:

- Pembrolizumab (Keytruda)
- Nivolumab (Opdivo)
- Ipilimumab (Yervoy)

These drugs are given as IV (intravenous) infusions in patients with melanomas that can't be removed by surgery or that have spread to other parts of the body. Doctors are also looking at using these drugs for earlier stage melanomas.

Common side effects from these drugs can include feeling tired, nausea, diarrhea, joint pain, skin rash, and itching. These drugs sometimes cause the immune system to attack other parts of the body, which can cause serious problems. If problems do arise, treatment may need to be stopped and you may get drugs to suppress your immune system.

Cytokines for advanced melanoma

Cytokines are proteins in the body that “turn on” the immune system. Man-made versions of cytokines, such as interferon-alfa and interleukin-2 (IL-2), are sometimes used to help shrink advanced melanomas. They are given as intravenous (IV) infusions or as injections under the skin.

Side effects can include flu-like symptoms like fever, chills, aches, and severe tiredness. IL-2 in high doses can cause fluid to build up in the body so that the person swells up and can feel quite sick. It is given only in centers experienced with this type of treatment.

Interferon-alfa as adjuvant therapy

Patients with thicker melanomas often have cancer cells that have spread to other parts of the body. Even if it looks as if all the cancer has been removed, some of these cells may be left behind. Interferon-alfa can be used as an added (adjuvant) therapy after surgery to try to prevent these cells from spreading and growing. This might help keep the melanoma from coming back for a time, but it is not yet clear if it improves survival.

High doses of interferon must be used for this. Many patients can't take the side effects of these high doses, such as fever, chills, aches, severe tiredness, and effects on the heart and liver. Patients having this treatment should be closely watched by a cancer doctor who has experience with this treatment.

Virus therapy

Viruses are germs that can infect and kill cells. Some viruses can be altered in the lab so that they infect and kill mainly cancer cells. Along with killing the cancer cells, the viruses can also alert the immune system to attack the cells.

Talimogene laherparepvec (Imlygic) is a virus that can be used to treat melanomas in the skin or lymph nodes that can't be removed with surgery. The virus is injected right into the tumors, usually every 2 weeks. This treatment can sometimes shrink these tumors, but it has not been shown to shrink tumors in other parts of the body. It's also not clear if this treatment can help people live longer. Side effects can include flu-like symptoms and pain at the injection site.

BCG (Bacille Calmette-Guerin) vaccine

BCG is a germ related to the one that causes tuberculosis (TB). BCG does not cause serious disease in humans, but it does “turn on” the immune system. It can be used to help treat some melanomas by injecting it right into the tumors.

Imiquimod cream

Imiquimod (Zyclara) is a drug that is applied as a cream. It causes an immune response against skin cancer cells. Some doctors may use imiquimod for very early-stage melanomas in sensitive areas on the face that might be scarred by surgery. Some people have serious skin reactions to this drug.

Not all doctors agree on whether imiquimod should be used for melanoma. It is not used for more advanced melanomas.

Newer treatments

Some newer types of immunotherapy have shown promise in treating melanoma in early studies. (See “What’s new in research and treatment of melanoma skin cancer?”)

To learn more about this type of treatment, see *Cancer Immunotherapy*.

Targeted therapy for melanoma skin cancer

As doctors have found some of the gene changes that make melanoma cells different from normal cells, they have created drugs that attack these changes. These targeted drugs work differently from standard chemo drugs. Sometimes, they work when chemo doesn’t. They can also have different side effects.

Drugs that target cells *BRAF* gene changes

About half of all melanomas have changes (mutations) in the *BRAF* gene. These changes cause the gene to make more of the BRAF protein, which tells the melanoma cells to grow and divide quickly. Drugs that target this and related proteins can be used in patients with advanced melanoma that has a *BRAF* mutation. These drugs are not likely to work in patients whose melanomas have a normal *BRAF* gene.

Some drugs attack the BRAF protein directly:

- Vemurafenib (Zelboraf)
- Dabrafenib (Tafinlar)

These drugs are taken as pills. Common side effects can include skin thickening, headache, fever, joint pain, fatigue, hair loss, and rash. Less common but more serious side effects can also occur. Some people treated with these drugs get new skin cancers called *squamous cell carcinomas*, which can be treated by removing them.

Some drugs target the MEK protein, which is related to the BRAF protein:

- Trametinib (Mekinist)

- Cobimetinib (Cotellic)

These drugs are also taken as pills. They do not seem to shrink as many melanomas as the BRAF drugs, but combining the 2 types of drugs seems to work better than using either type alone. Some side effects (such as getting other skin cancers) are actually *less* common with the combination. Common side effects of MEK inhibitors can include rash, diarrhea, nausea, swelling, and sensitivity to sunlight. Rare but serious side effects can also occur.

Drugs that target cells with *C-KIT* gene changes

A small portion of melanomas have changes in the *C-KIT* gene that help them grow. These changes are more common in melanomas that start in certain parts of the body:

- On the palms of the hands, soles of the feet, or under the nails (known as *acral melanomas*)
- Inside the mouth or other mucosal (wet) areas
- In parts of the body that get a lot of sun

Some targeted drugs, such as imatinib (Gleevec) and nilotinib (Tasigna), can affect cells with changes in *C-KIT*. If you have a melanoma that started in one of these places, your doctor may test your melanoma cells for changes in the *C-KIT* gene, which might mean that one of these drugs could be helpful.

Drugs that target other changes are now being studied as well (see “What’s new in melanoma skin cancer research?”)

Chemotherapy for melanoma skin cancer

Chemotherapy (chemo) is the use of drugs to kill cancer cells. Usually the drugs are given into a vein or by mouth as a pill. Once the drugs enter the blood, they spread throughout the body.

Chemo does not usually work as well for melanoma as it does for some other types of cancer, but it may relieve symptoms or help people with advanced disease live longer. Chemo is not often used as the first treatment since newer forms of immunotherapy and targeted drugs have become available.

Doctors give chemo in cycles, with each period of treatment followed by a pause for the body to rest. Each cycle usually lasts a few weeks.

Some chemo drugs are given alone, while others are often combined. Using chemo drugs with one or more immunotherapy drugs may work better than using just one drug, but it’s not clear if this helps people live longer.

Isolated limb perfusion is a type of chemo sometimes used for treating melanomas on an arm or leg. This treatment separates the blood flow of the limb with cancer from the rest of the body for a short time. High doses of chemo are then put into the limb. This allows high doses to be given to the area of the tumor without exposing the whole body to it, which would cause severe side effects.

Possible side effects of chemotherapy

Chemo drugs kill cancer cells, but they also damage some normal cells. This can lead to side effects. These side effects depend on the type of drugs used, the amount taken, and the length of treatment. Short-term side effects might be:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea or constipation
- Increased chance of infection (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Tiredness (from having too few red blood cells)

Some chemo drugs can have other side effects. Most side effects go away once treatment is over. There are ways to lessen many of the side effects, so be sure to tell your doctor or nurse if you are having any of these problems.

For more about chemo, see the Chemotherapy section of our website, or *A Guide to Chemotherapy*.

Radiation therapy for melanoma skin cancer

Radiation therapy is treatment with high-energy rays (such as x-rays) to kill cancer cells. The treatment is much like getting an x-ray, but the radiation is stronger. The treatment itself is painless. Each treatment lasts only a few minutes, but the setup time – getting you into place for treatment – usually takes longer.

Radiation is not often used to treat the main tumor on the skin. But it may be used on nearby lymph node areas after surgery to try to keep the cancer from coming back. It may also be used to treat cancer that has come back after surgery, either in the skin or lymph nodes if the cancer can't all be removed by surgery.

Radiation can also be used to relieve symptoms of cancer that has spread, such as to the brain or the bones. Radiation used this way is not meant to cure the cancer, but it may help shrink or slow its growth for a time to control some of the symptoms.

Possible side effects of radiation therapy

Side effects of radiation treatment depend on where it is aimed and can include:

- Sunburn-like skin problems
- Hair loss where the radiation enters the body
- Fatigue
- Nausea
- Loss of appetite and weight loss

Often these go away after treatment.

Radiation to the brain can sometimes cause memory loss, headaches, trouble thinking, or reduced sexual desire. Usually these symptoms are minor compared with those caused by a tumor in the brain, but they can still affect your quality of life.

To learn more about radiation, see the Radiation Therapy section of our website or *Understanding Radiation Therapy: A Guide for Patients and Families*.

What are some questions I can ask my doctor about melanoma skin cancer?

It's important to have honest, open talks with your doctor. Ask any question, no matter how small it might seem. Here are some questions you might want to ask:

- Would you please write down the exact type of skin cancer I have?
- How far has my melanoma spread within or beneath my skin?
- How thick is the melanoma?
- Do I need other tests before we can decide on treatment?
- Do I need to see any other doctors?
- How much experience do you have treating this type of cancer?
- What treatment choices do I have? What do you recommend and why?

- What is the goal of the treatment?
- How quickly do we need to decide on treatment?
- What should I do to be ready for treatment?
- What are the risks and benefits of treatment?
- How long will treatment last? What will it be like? Where will it be done?
- How will treatment affect my daily activities?
- What type of side effects might I expect?
- Will I have a scar after my treatment?
- What are the chances of my cancer coming back with the treatment you suggest? What would we do if this happens?
- Should I take special care to avoid sun exposure?
- What type of follow-up will I need after treatment?
- Are my family members at risk for skin cancer? Should my family members be screened?

Along with these sample questions, be sure to write down some of your own. For instance, you might want to know more about recovery times so you can plan your work or activity schedule. Or you might want to ask about getting a second opinion or about clinical trials.

Keep in mind that doctors aren't the only ones who can give you information. Other health care professionals, such as nurses and social workers, may have the answers to some of your questions. For more information about speaking with your cancer care team, see *Talking With Your Doctor*.

Moving on after treatment for melanoma skin cancer

For many people with melanoma, treatment can remove or destroy the cancer. Finishing 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 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. *Living With Uncertainty: The Fear of Cancer Recurrence* covers more about this.

For others, the melanoma may never go away completely. These people may get regular treatment with immunotherapy, targeted therapy, chemotherapy, or other treatments to try to help keep the cancer in check. Learning to live with cancer that doesn't go away can be hard and very stressful. It has its own type of uncertainty. *When Cancer Doesn't Go Away* has more information about this.

Follow-up care

Even if you have completed treatment, your doctors will still want to watch you closely. Follow-up is needed to watch for treatment side effects and to check for signs the cancer has come back or spread. This is a good time for you to ask your health care team any questions you need answered and to discuss any concerns you have.

Your follow-up should include regular skin and lymph node exams by yourself and by your doctor. Along with these exams, imaging tests such as x-rays or CT scans may be recommended for some patients.

A person who has had one melanoma is still at risk for having another melanoma or another type of skin cancer. It's very important for melanoma survivors to regularly examine their skin and avoid too much sun. See your doctor if you find any new lump or change in your skin. You should also tell your doctor about any new symptoms that do not go away (for instance, pain, cough, tiredness, loss of appetite). Melanoma can sometimes come back many years after it was first treated.

If melanoma does come back, treatment will depend on where the cancer is, what treatments you've had before, and your overall health. For more information on how recurrent cancer is treated, see our document *Melanoma Skin Cancer*. For more details on dealing with a recurrence in general you might also want to read *When Your Cancer Comes Back: Cancer Recurrence*.

Seeing a new doctor

At some point after your treatment, you may be seeing a new doctor. It's important that you be able to give your new doctor the details of your diagnosis and treatment. Gathering these details during and soon after treatment may be easier than trying to get them at some point in the future. Make sure you have this information handy (and always keep copies for yourself):

- A copy of your pathology report from any biopsy or surgery

- Copies of imaging tests (CT or MRI scans, etc.), which can usually be stored digitally (on a DVD, etc.)
- If you had surgery, a copy of your operative report
- If you stayed in the hospital, a copy of the discharge summary that the doctor wrote when you were sent home
- If you had radiation treatment, a summary of the type and dose of radiation and when and where it was given
- If you had immunotherapy, targeted therapy, or chemotherapy, a list of your drugs, drug doses, and when you took them
- Contact information for doctors who have treated your cancer

It is also very important to keep 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 after melanoma

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, finding out they have cancer helps them focus on their health in ways they may not have given much thought in the past. Are there things you could do that might make you healthier? Maybe you could try to eat better or get more exercise. Maybe you could cut down on 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 the 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.

Eating better

Eating right can be hard for anyone, but it can get even tougher during and after some types of cancer treatment. Treatment may change your sense of taste. Nausea can be a problem. You may not feel like eating and lose weight when you don't want to. Or you

might have gained weight that you can't seem to lose. All of these things can be very frustrating.

If treatment causes weight changes or eating or taste problems, do the best you can and keep in mind that these problems usually get better over time. You may find it helps to eat small meals every 2 to 3 hours until you feel better. You may also want to ask your cancer team about seeing a dietitian, an expert in nutrition who can give you ideas on how to deal with side effects of these treatments.

One of the best things you can do after cancer treatment is start healthy eating habits. You may be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Getting to and staying at a healthy weight, eating a healthy diet, and limiting your alcohol intake may lower your risk for a number of types of cancer, as well as having many other health benefits.

To learn more, read *Nutrition and Physical Activity During and After Cancer Treatment: Answers to Common Questions*.

Rest, fatigue, and exercise

Feeling tired (fatigue) is a very common problem during and after cancer treatment. This is not a normal type of tiredness but a bone-weary exhaustion that often doesn't get better with rest. For some people, fatigue lasts a long time after treatment and can keep them from staying active. But exercise can actually help reduce fatigue and the sense of depression that sometimes comes with feeling so tired.

If you are very tired, though, you will need to balance activity with rest. It's OK to rest when you need to. To learn more about fatigue, see *Fatigue in People With Cancer*.

If you were very ill or weren't able to do much during treatment, it is normal that your fitness, staying power, and muscle strength declined. You need to find an activity plan that fits your own needs. Talk with your health care team before starting. Get their input on your plans. Then try to get an exercise buddy so that you're not doing it alone.

Exercise can improve your physical and emotional health.

- It improves your heart fitness.
- Along with a good diet, it can help you get to and stay at a healthy weight.
- It makes your muscles stronger.
- It reduces fatigue.
- It can help lower anxiety and depression.
- It can make you feel happier.

- It helps you feel better about yourself.

Getting regular physical activity also plays a role in helping to lower the risk of some cancers, as well as having other health benefits.

Can I lower my risk of the melanoma growing or coming back?

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

At this time, not enough is known about melanoma to say for sure if there are things you can do that will be helpful. We do know that people who have had melanoma are at higher risk for getting another melanoma or other type of skin cancer. Because of this, it's very important to limit your exposure to UV rays (from the sun or tanning beds) and to examine your skin every month for signs of melanoma coming back or any new skin cancers.

Healthy behaviors such as not smoking, eating well, being active, and staying at a healthy weight may also help, but no one knows for sure. But we do know that these types of changes can have health effects that can extend beyond your risk of cancer.

How about your emotional health after melanoma skin cancer?

During and after treatment, you may be surprised by the flood of emotions you go through. This happens to a lot of people. You may find that you think about the effect of your cancer on things like your family, friends, and career. Money may be a concern as the medical bills pile up. Unexpected issues may also cause concern. For instance, as you get better and need fewer doctor visits, you will see your cancer care team less often. This can be hard for some people.

This is a good time to look for emotional and social support. You need people you can turn to. Support can come in many forms: family, friends, cancer support groups, religious or spiritual groups, online support communities, or private counselors.

The cancer journey can feel very lonely. You don't need to go it alone. Your friends and family may feel shut out if you decide not to include them. Let them in, and let in anyone else you feel may help. If you aren't sure who can help, call your American Cancer Society at 1-800-227-2345 and we can put you in touch with a group or resource that may work for you. You can also read *Distress in People With Cancer* or see the Emotional Side Effects section of our website for more information.

If treatment for melanoma skin cancer stops working

When a person has had many different treatments and the cancer has not been cured, over time the cancer tends to resist all treatment. At this time you may have to weigh the possible benefits of a new treatment against the downsides, like treatment side effects and clinic visits.

This is likely to be the hardest time in your battle with cancer, when you have tried everything within reason and it's just not working anymore. Your doctor might offer you a new treatment, but you will need to talk about how likely the treatment is to improve your health or change your outlook for survival.

Palliative care

No matter what you decide to do, it is important for you to feel as good as possible. Make sure you are asking for and getting treatment for pain, nausea, or any other problems you may have. This type of treatment is called *palliative treatment*. It helps relieve symptoms but is not meant to cure the cancer.

Hospice care

At some point you might need to think about hospice care. Your cancer may be causing symptoms or problems that need to be treated. Hospice focuses on your comfort. Most of the time, hospice care is given at home. While getting hospice care often means the end of treatments such as chemo and radiation, having hospice care doesn't mean you can't have treatment for the problems caused by the cancer or other health issues. It just means that the purpose of your care is to help you live life as fully as possible and to feel as well as you can. You can learn more about this in *Hospice Care*.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends – times that are filled with joy and meaning. Pausing at this time in your cancer treatment gives you a chance to focus on the most important things in your life. Now is the time to do some things you've always wanted to do and to stop doing the things you no longer want to do. Though the cancer may be beyond your control, there are still choices you can make.

You can learn more about the changes that occur when treatment stops working, and about planning ahead for yourself and your family, in [Advance Directives](#) and *Nearing the End of Life*.

What's new in melanoma skin cancer research?

Research into the causes, prevention, and treatment of melanoma is being done in many medical centers around the world.

Causes, prevention, and finding melanoma early

Sunlight and UV rays

Recent studies suggest there could be 2 ways that UV rays causes melanoma.

The first way is linked to a lot of sun exposure and sunburns as a child or teen. This early sun exposure may cause changes in the DNA of skin cells that starts them on a path to becoming melanoma cells many years later. Some doctors think this is why melanomas often start on the legs and trunk, places that aren't often exposed to the sun in adulthood.

The second way is linked to melanomas that start on the arms, neck, and face. These areas are often exposed to sun, particularly in men.

Tanning booths may also help either kind of melanoma start.

Researchers are looking to see if melanomas that start as a result of these types of UV exposure have different gene changes that would mean they should be treated differently.

Public education

Most skin cancers can be prevented. The best way to reduce the number of skin cancer cases is to educate the public, especially parents, about skin cancer risk factors and warning signs.

It is also important to find melanoma early, when it is most likely to be cured. Check your skin every month and be aware of the warning signs of melanoma.

The American Academy of Dermatology (AAD) sponsors free skin cancer screenings around the country every year. Many local American Cancer Society offices work with the AAD to help with these screenings. The phone number and web address for the AAD are listed in the "How can I learn more?" section.

Along with recommending staying in the shade, the American Cancer Society uses the slogan, "Slip! Slop! Slap!® ... and Wrap." It is a catchy way to remind yourself to slip on a shirt, slop on sunscreen, slap on a hat, and wrap on sunglasses when you are going to be outdoors.

Lab tests to help determine prognosis

Most melanomas found at an early stage can be cured with surgery. But a small portion of these cancers eventually spread to other parts of the body, where they can be hard to treat.

A new lab test based on the gene patterns in melanoma cells, known as *DecisionDx-Melanoma*, can help show if early-stage melanomas are likely to spread. This test might help tell if someone with early-stage melanoma should get additional treatment or if they need to be watched more closely after treatment to look for signs of recurrence.

Treatment

Early-stage melanomas can often be cured with surgery, but more advanced melanomas are often much harder to treat. Newer types of treatment are now being tested for more advanced melanomas.

Melanoma vaccines

Vaccines are being developed to try to make the body's immune system kill the cancer cells. But making a vaccine against a tumor like melanoma is harder than making a vaccine to prevent a disease such as polio. Clinical trials are testing the value of treating people who have advanced melanoma with vaccines, sometimes combined with other treatments. The results of these studies have been mixed so far, but newer vaccines may hold more promise.

Other immunotherapies

Other forms of immunotherapy are also being studied. Some early studies have shown that treating patients with high doses of chemotherapy and radiation therapy and then giving them immune system cells found in tumors can shrink melanoma tumors and perhaps prolong life as well.

Another possible approach to treatment is to combine different types of immunotherapy, which may be more effective than any single treatment for advanced melanoma.

Targeted drugs

New drugs that attack gene changes in melanoma cells are being studied.

A gene called *BRAF* is changed in the cells of about half of all melanomas. Drugs that target cells with this gene change, such as vemurafenib (Zelboraf), dabrafenib (Tafinlar), and trametinib (Mekinist), are now used to treat some advanced melanomas.

Certain types of melanomas sometimes have changes in a gene called *C-KIT*. Some targeted drugs are already used to treat other cancers with changes in *C-KIT*. Clinical trials are now looking to see if these drugs might help people with these types of melanoma.

Several other drugs that target other abnormal genes or proteins, such as sorafenib (Nexavar), bevacizumab (Avastin), pazopanib (Votrient), and everolimus (Afinitor), are now being studied in clinical trials as well. Researchers are also looking at combining some of these targeted drugs with other types of treatments, such as chemotherapy or immunotherapy.

To learn more about melanoma skin cancer

From your American Cancer Society

We have a lot more information that you might find helpful. Explore www.cancer.org or call our National Cancer Information Center toll-free number, 1-800-227-2345. We're here to help you any time, day or night.

National organizations and websites*

Along with the American Cancer Society, other sources of information and support include:

American Academy of Dermatology (AAD)

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

Website: www.aad.org

Spot Skin Cancer website www.aad.org/spot-skin-cancer

For information on melanoma, a skin cancer risk assessment, a locator for free skin cancer screenings, and a dermatologist locator

Environmental Protection Agency

Website: www.epa.gov/sunwise/

Has free sun safety information

Melanoma Research Foundation

Toll-free number: 1-877-673-6460

Website: www.melanoma.org

For more on melanoma and chat rooms, patient stories, and bulletin boards – all to support and educate anyone affected by melanoma

National Cancer Institute

Toll-free number: 1-800-422-6237 (1-800-4-CANCER)

Website: www.cancer.gov

Part of the US National Institutes of Health, the NCI offers accurate, up-to-date information about cancer to patients, their families, and the general public

National Comprehensive Cancer Network (NCCN)

Website: www.nccn.org

Made up of experts from many of the nation's leading cancer centers, the NCCN develops guidelines for doctors to use when treating patients. Some of these guidelines, including one on melanoma, are available in versions for patients as well.

Skin Cancer Foundation

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

Website: www.skincancer.org

Has pictures and descriptions of skin cancers, information and educational materials, and newsletters

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

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For additional assistance please contact your American Cancer Society
1-800-227-2345 or www.cancer.org