Melanoma
What you need to know
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About this booklet

The purpose of this booklet is to help people newly diagnosed with melanoma to learn about this skin cancer and how it is treated. This booklet includes treatment for all stages of melanoma. Not all treatment options apply to every person with melanoma.

The more you know, the more you can be active in making choices about your own care. Being part of your care helps you feel more in control. Working with your treatment team may also help you be more satisfied with your treatment.

It is a good idea to read the whole booklet first. Then focus on the sections that apply to your phase of care. This booklet includes information about these topics:

- The skin
- Melanoma
- Evaluating melanoma
- Diagnosing melanoma
- Staging melanoma
- Other tests
- Treating melanoma
- Following up
- Preventing another melanoma

This booklet also includes examples of questions you may want to ask your doctor at different stages of your treatment. Asking questions can help you learn about the disease and be active in treatment decisions. Any time you visit your doctor or the treatment clinic you may want to take notes about your condition and your treatment. So take a notebook and pen to each appointment. It is also a good idea to take a friend or family member to appointments — to take notes, listen, or ask questions.

This booklet does not discuss other types of skin cancer or melanoma that develops in parts of the body other than the skin.
The skin

Importance of the skin

Your skin plays an important role in your body. In fact, your skin is the largest organ of your body, covering its entire surface. Skin is a protective layer that performs many tasks:

- Skin provides the first line of defence against injury and infection. It is the largest immune organ and can multitask to provide a balanced immune system. Healthy skin helps prevent infection, recognize allergens and can repair damage as it occurs.
- Skin prevents the body from losing water and drying out. This is important as your body is largely made up of water.
- Skin protects you from heat. Sweat glands release a watery fluid, cooling the skin.
- Skin makes vitamin D.
- Skin protects you from damage that can be caused by ultraviolet (UV) light. The sun and sunlamps produce UV light.

Layers of the skin

The skin is made up of two main layers, the epidermis and the dermis.

The epidermis is the thin top layer of skin you can see. Several cell types make up the epidermis. Cells are the microscopic building blocks that make up tissues, such as skin. Melanocytes are found in the deepest part of the epidermis. Melanocytes produce melanin, the pigment that gives skin its colour. When skin is exposed to UV light, melanocytes make more melanin. Increased melanin gives people who have been in the sun a tanned look.
Melanoma is a cancer of melanocytes, the pigment cells of the skin. Melanoma can occur anywhere on the skin. In men, melanoma may often be found on the head, neck, and back. In women, melanoma may often be found on the back or lower legs. Melanoma is less common in people with dark skin. In dark-skinned people, melanoma may be found under the nails of the fingers or toes, on the palms of the hands, or soles of the feet.

Melanoma forms in the epidermis and can grow down into the dermis. Melanoma is a dangerous type of tumour because it can metastasize, or spread to other parts of the body. Once it reaches the dermis, melanoma can easily spread through the blood and lymph vessels. It is important to find and remove melanomas early.
Melanoma is increasing rapidly in incidence as people spend more time in the sun. In fact, ultraviolet (UV) light from the sun or tanning beds is considered to be the leading cause of melanoma. In Canada every year, about 6,000 people are diagnosed with melanoma and about 1,000 people die from melanoma.

**Types of melanoma**

Doctors classify melanoma into four different types. Classification is based on their colour, shape, location, and how they grow.

**Superficial spreading melanoma**

*Superficial spreading melanoma* usually looks like a dark brown or black stain spreading from an existing or a new mole. This type of melanoma is more commonly seen in areas of skin that have been exposed to UV light, especially areas of previous sunburn. It is the most common type, making up 70% of melanomas. Superficial spreading melanoma tends to follow the ABCDE rules (see next page). In most situations the early changes are purely visual ones and it is the later stages that may result in symptoms (itching or bleeding). In addition to the skin surfaces, melanoma can also present in mucosal surfaces such as the mouth or genital mucosa.

**Nodular melanoma**

*Nodular melanoma* is a firm, domed bump. It grows quickly down through the epidermis into the dermis. Once there, it can **metastasize**, or spread to other parts of the body. Nodular melanoma makes up about 10% of all melanomas. Nodular melanoma is typically dark brown or black, may crust or ulcerate. As in all subtypes of melanoma, rarely a melanoma can be without any colour, a pink, red or skin toned colour (amelanotic), especially in people with very fair complexions.

**Lentigo maligna melanoma**

*Lentigo maligna melanoma* looks like a dark stain which may have looked initially like a large or irregular freckle. It has an uneven border and irregular colour. It is usually seen on the face or arms of middle aged and older people. It has a pattern of slow growth in the early stages when it is known as Lentigo Maligna.
Acral lentiginous melanoma

_Acral lentiginous melanoma_ can look like a dark spot or a bruise that does not get better. It can be found anywhere on the body. It can occur on the palms of the hands and soles of the feet. Acral lentiginous melanoma under a nail may look like a dark stripe. Like other flat forms of early melanoma, it may recognized by the ABCDE rules, but may also be amelanotic (non-pigmented, usually red in colour). People of African and Asian races most often develop this melanoma, but it may occur in any skin type. Acral lentiginous melanoma is uncommon.

Desmoplastic Melanoma

This is a rare variant of melanoma, occurring on sun damaged skin, commonly in older individuals. It presents as a rounded or irregular slowly growing lump within the skin. It may be variable in colour and tends to be firm and scar-like. It may be mistaken for a cyst or keloid scar.

Signs of melanoma

The first sign of melanoma may be a change in a mole – a small pigment spot on the skin. This change may affect the shape, colour, size, surface, or texture of the mole. Melanoma may also develop as a new mole. _ABCDE_ summarizes the signs of melanoma.

- **A – Asymmetry**: The two halves of the mole have different shapes.
- **B – Border**: The edge of the mole is irregular. It may look blurred, ragged, or notched. Pigment may spread into the skin around the mole.
- **C – Colour**: The colour of the mole is uneven. The mole may have different shades of tan, brown, and black, sometimes with blue, gray, red, pink, or white.
- **D – Diameter**: The mole has grown in size. Melanomas may be very small, but most are larger than a pea (about ¼”).
- **E – Evolving**: The mole has changed in the past few weeks or months. It may be itchy, scaling or bleeding.

Source: Skin Cancer Foundation; Canadian Dermatology Association – www.dermatology.ca
Melanomas can look very different from each other. Some melanomas may have all the ABCDE signs. Others may have only one or two of the ABCDE features. Advanced melanomas may have changes in their texture or feel. The melanoma may become hard or bumpy. The surface of the melanoma may ulcerate (appear scraped or raw, and it may ooze or bleed). The melanoma may be itchy, sore, or even painful.

**Risk factors for melanoma**

Scientists have identified many factors that increase the risk of developing melanoma.

- **Sun exposure**: Exposure to UV light from the sun is the most important risk factor for melanoma.
  - **Sunburn with blistering**: Even one severe, blistering sunburn increases the risk of melanoma.
  - **Lifetime sun exposure**: The total amount of sun exposure is a risk factor.
  - **Tanning**: Even people who tan without burning have an increased risk of melanoma because of increased total sun exposure.

- **Artificial sources of UV radiation**: Sunlamps and tanning beds produce UV light. Therefore they increase the risk of melanoma. Using these artificial sources of UV light before the age of 30 greatly increases the risk of melanoma, but the danger exists for all ages.

- **Personal history of melanoma**: People who have had melanoma have an increased risk of another melanoma.

- **Family history of melanoma**: Having at least two close relatives with melanoma is a risk factor for melanoma. Close relatives include parents, siblings, and children. Melanoma can run in families.

- **Fair skin and light hair**: People with pale skin, who burn easily, have an increased risk of melanoma. These people may have blond or red hair, blue or gray eyes, or numerous freckles.

- **More than 50 moles**: Normal moles are smaller than a pea (¼") and have an even colour. They can be pink, tan, or brown. They are round or oval and smooth. Having many moles increases the risk of skin cancer.

- **Dysplastic nevus**: Nevus is the medical term for mole. A dysplastic nevus is a mole that looks different. It may be bigger than a normal mole, or have a different colour, surface, or shape. It may contain several colours, and it may have an irregular edge. Most often, a dysplastic nevus is flat with an irregular or scaly surface. A dysplastic nevus has a greater chance than a normal mole of turning into melanoma, although the risk is low.
Medical history

Your doctor will ask about any medical conditions you have had and your current symptoms. He or she also asks about your skin, moles, any other marks on your skin, any history of melanoma or other skin cancers, and risk factors for melanoma. Questions are also asked about your immediate family and any skin cancers family members may have had.

Physical examination

The doctor inspects your skin for any lesions, or abnormalities. A dermatologist or a doctor will do a thorough skin check, including the scalp, between the toes and fingers, even around the genitals. The doctor may also check other parts of your body for signs of cancer.

Skin biopsy

Your doctor may find a suspicious mole. A biopsy, or removal of tissue for examination under a microscope, is taken of suspicious moles. The doctor first numbs the skin with an injection of a local anaesthetic. There are several types of biopsy. The entire lesion and a border of normal skin around it should be removed.

• Excisional biopsy: The doctor uses a scalpel to remove the entire growth and some tissue around it. This is the most common type of biopsy when melanoma is suspected.

Evaluating melanoma

If your doctor suspects you may have melanoma, you may be referred to a dermatologist, a doctor who specializes in diseases of the skin.

Age: People with a family history of melanoma may develop the disease at a young age. However, about half of melanomas develop in people older than 50 years.

Medications: Some medications, like antibiotics, hormones, or antidepressants, increase sensitivity to the sun. These medications can also increase the risk of melanoma.

Immune suppression: The immune system fights infection and removes damaged cells. Some diseases and some medications weaken the immune system. This increases the risk of melanoma.

“You gain strength, courage and confidence by every experience in which you really stop to look fear in the face.”

– Eleanor Roosevelt
A pathologist is a doctor who evaluates cells and tissues to diagnose disease. The pathologist examines the biopsy sample under the microscope to diagnose melanoma. In the pathology laboratory, the biopsy specimen is prepared for examination. The sample is embedded in wax, sliced very thinly, and stained with dyes. The stain helps the doctor see the cells clearly. Preparing the sample in the laboratory usually takes one to two weeks. Sometimes a dermatopathologist, a doctor who specializes in diagnosis of diseases of the skin, also examines the biopsy sample. This may take extra time.

The doctor’s findings are included in a pathology report. The report states whether cancer was found, and if so, what type of cancer. The report contains other information, such as the following:

- How thick the melanoma is (Breslow index)
- Presence of any skin ulceration (ulceration status)
- How deep the melanoma has grown (Clark level)

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

- What type of biopsy do you suggest for me?
- How will you perform the biopsy?
- Where will the biopsy be done? In your office?
- How long does a biopsy take?
- Will the biopsy hurt?
- Will you remove the entire growth?
- What are the risks of a biopsy? What about infection or bleeding?
- Will the biopsy leave a scar? What will it look like?
- When will I find out the results?
- If I have cancer, who will talk to me about treatment?
• How fast the melanoma cells are growing and dividing (mitotic rate)
• Presence or absence of melanoma cells in the normal tissue around the lesion (peripheral margin status)
• Presence or absence of melanoma cells in the normal tissue under the lesion (deep margin status)
• Presence of tiny tumours near the primary melanoma (microsatellitosis)
• Location of the melanoma (tumour location)
• Size of the melanoma (tumour size)
• Decrease in tumour size (tumour regression)
• Presence of white blood cells in the melanoma (tumour-infiltrating lymphocytes)
• Growth of the melanoma down into the skin (vertical growth phase)
• Growth of melanoma around nerves (perineural invasion)
• Melanoma type based on features of the cells present (histologic subtype)
• Presence or absence of dense connective tissue (pure desmoplasia)

It is a good idea to ask for a copy of the pathology report. Many of the terms used to describe a melanoma are defined above. If there is anything you do not understand, ask your doctor. It is important for you to understand what the pathology report says about your melanoma. Pathology results help determine treatment options.

**Staging melanoma**

The stage of a specific melanoma identifies tumour types that have a similar prognosis, or likely outcome of the disease and treatment. The melanoma stage determines appropriate treatment options and prognosis. A preliminary clinical stage is assigned after the physical examination and biopsy. The pathology report determines the pathologic stage. The pathologic stage may change the clinical stage.

Melanoma stages are based on several factors. The thickness of the melanoma, whether it has spread to the lymph nodes, and how far it has spread within the body are all important. Staging uses the TNM system.

- **T** describes the thickness of the melanoma.
- **N** describes how many lymph nodes are affected.
- **M** describes spread to distant organs of the body.

Each letter is assigned a numerical value. The results of this analysis are grouped into five stages (0, 1, 2, 3, and 4).
• Early melanoma is defined as stage 1 and stage 2 disease.
• Advanced melanoma is defined as stage 3 and stage 4 disease.
About 85% of cases in Canada are early melanoma, and about 15% are advanced.

Stage 0
Stage 0 is also called melanoma in situ. This is the most frequently seen melanoma stage. The melanoma is limited to the epidermis. It has not spread. No other tests are needed after diagnosis. Surgery to remove the melanoma and a border of normal skin completes treatment. The prognosis is excellent.

Stage 1
Stage 1 is a very early melanoma. Stage 1 is divided into two subcategories. Stage 1A describes a melanoma that is very thin (less than 1 mm), dividing slowly, and not ulcerated. Stage 1B describes a melanoma that is very thin (less than 1 mm in thickness) but dividing more quickly or ulcerated. It also includes melanomas that are a little thicker (less than 2 mm). Depending on your situation, a sentinel lymph node biopsy (see page 12) may be suggested. Treatment of stage 1 includes a second surgery to remove a wider border of normal skin around the biopsy site.

Stage 2
In stage 2, the melanoma is thicker than 2mm. Stage 2 is divided into A, B, and C subcategories. A sentinel lymph node biopsy is usually suggested. Treatment of stage 2 includes a second surgery to remove a wider border of normal skin around the biopsy site. Surgery may be the only treatment required. The risk of recurrence, or return of the melanoma, or spread to another part of the body, is moderate in stage 2A. Some people, with larger tumours (stage 2B or 2C), have a higher risk of recurrence and may benefit from additional treatments.

Stage 3
Stage 3 is advanced melanoma. This stage is divided into A, B and C subcategories. Treatment of stage 3 may include a second surgery to remove lymph nodes in the area and a wider border of normal skin around the biopsy site. Possibility of additional treatment should be discussed with your oncologist.
In recurrent melanoma, Stage 3 also includes in-transit disease where recurrence is 2cm or more from the original site.

Stage 4
Stage 4 is advanced melanoma. 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. Treatment of Stage 4 involves a discussion with your oncologist for available treatments and possibility of participating in clinical trials.
Other tests

Once the presence of melanoma is confirmed, your doctor may wish to perform other tests, especially if you have symptoms. Other tests may also be recommended if your doctor is concerned the melanoma has spread.

**Sentinel lymph node biopsy**

The *sentinel lymph node* is the first lymph node to which cancer is likely to spread from a primary tumor. A *sentinel lymph node* biopsy is performed to confirm there are no signs of spread. A radioactive tracer dye is injected and followed to the sentinel lymph node, which is generally located in one of the major lymph node basins – inguinal, etc. Surgery is then conducted under general anesthetic to remove the sentinel node and generally one or two other nodes around the sentinel node. A sentinel lymph node biopsy is done when there is no evidence of distant metastases.

If there are signs of melanoma spread, such as an increase in size of the lymph nodes in the area, a *fine-needle aspiration* or an *excisional lymph node biopsy* may be performed instead. Fine-needle aspiration removes tiny pieces of a lymph node. An excisional biopsy removes enlarged lymph nodes through a small incision. An injection of a local anaesthetic numbs the area before the biopsy.

**Blood tests**

*Lactate dehydrogenase (LDH)* is a blood test. An abnormally high LDH level may indicate metastases. If your LDH level is increased, your doctor may perform additional tests to search for metastases. LDH levels provide information about the prognosis of melanoma.

**Imaging**

Different forms of imaging allow doctors to see internal tissues and organs. This helps determine if the melanoma has spread anywhere in the body. Imaging is not used for people with stage 0 melanoma or low-risk stage 1 disease. For intermediate-risk stage 1 disease and stage 2 disease, imaging is used mostly to evaluate specific symptoms, such as pain. Imaging is not a routine test in early melanoma. For stage 3 and stage 4 disease, imaging is used to evaluate specific symptoms. It is also used to assess the degree of spread of the melanoma. The type of imaging depends on symptoms and the likely location of melanoma spread.

- *Chest x-ray*: A chest x-ray may be performed for some stage 1 and 2 melanomas. It is often performed for stage 3 and 4 melanomas.
• **Computed tomography (CT) scan**: A CT scan takes multiple x-rays of part of the body from different angles. This produces a three-dimensional image. Injection of a contrast agent helps highlight the area of concern. A CT scan is the best type of imaging to detect melanoma in the lung.

• **Magnetic resonance imaging (MRI)**: An MRI uses radio waves and magnets to take pictures of organs and other parts of the body. An MRI is the best type of imaging to find melanoma in the brain.

• **Positron emission tomography (PET) scan**: An injection of radioactive glucose, or sugar, is given before this test. The scan identifies areas with the most glucose, especially cancer cells, which collect glucose.

You may want to ask your doctor these questions about tests for melanoma:

- What tests do you suggest for me?
- Where will the tests take place? Do I need to go to the hospital?
- How long do the tests take?
- Will it hurt? Will I be given a local anesthetic?
- What happens if I’m pregnant?
- Do I need to prepare for tests?
- Do I need to bring a list of my medications?
- Can I bring someone with me?
- How long does it take to recover? Do I need any medication after the tests?
- When will I know the results? Who will explain them to me?
- If a biopsy is done, will I get a copy of the pathology report?
- If I have cancer, who will talk with me about the next steps? When?
Treating melanoma

The main factors affecting treatment options are: depth, presence of ulceration and lymph node involvement. Deeper melanomas are more likely to have spread. They are also more likely to recur, or come back after treatment. Melanomas less than 1 mm in thickness are unlikely to spread.

Treatment for melanoma can include the following:

- Surgery
- Chemotherapy, or treatment with drugs that kill cancer cells
- Radiation, or treatment that uses a high-energy beam to kill cancer cells
- Immunotherapy, or treatment that stimulates the immune system to fight disease
- Targeted therapy, or treatment for people whose melanoma possesses specific genetic changes.

Cancer treatment involves a team of healthcare professionals. Your treatment team may include the following:

- A dermatologist
- A surgeon
- A radiation oncologist, a doctor who uses radiation to treat cancer
- A medical oncologist, a doctor who uses drug therapy to kill cancer cells that have spread from the primary melanoma.

You may wish to ask your doctor these questions about melanoma treatment:

- What stage is my melanoma?
- What treatments are recommended for my stage of melanoma?
- Do my age, health, and other medical conditions affect my treatment options?
- What are the risks and benefits of each treatment for melanoma?
- Where will I be treated? Do I need to stay in hospital or can I go home after each treatment?
- What should I do to prepare for treatment?
- When can I start treatment?
- What is my chance of being free of melanoma after treatment?
- What side effects should I watch for during treatment?
- When can I resume my normal activities?
- What is the chance my cancer will return or spread?
- What do I do after treatment is finished?
Participating in your care

The most important thing for people with cancer is receiving effective treatment. But managing cancer involves much more than effective treatment. Any cancer diagnosis comes with physical and emotional challenges and profound life changes. At first, it may be difficult to realize exactly how big a change cancer may bring. As a result, people diagnosed with cancer may have difficulty adjusting.

Consider becoming an active member of your treatment team. Participating in your care can help you understand your disease better, feel more in control, and be more satisfied with the decisions you make.

- Becoming a cancer patient is your new job. Being treated for cancer takes time and energy. You may have trouble adjusting to this life change.
- Learn about your disease and treatment options. This can help you understand the tests you undergo and the treatments that are recommended.
- Pay attention to how you feel emotionally and how you are coping. Professional help and support are available to you if you run into difficulties. Just talk to your treatment team and ask about the different support services available at the centre, for example, social worker, psychology, etc.
- Ask questions. Don’t be afraid to ask your treatment team if you don’t understand something.
- Ask for help. Ask your spouse, a sibling, a friend, or all three to help you if you cannot keep up with all your responsibilities during treatment.
- Talk to your friends and family about how the diagnosis and treatment are affecting you. The more they understand, the better they are able to help you.
- Consider joining a support group. No one understands what you are going through the way another person with cancer understands.

Second opinion

A second opinion from another doctor about your diagnosis and suggested treatment can be a good idea. Getting a second opinion can reassure you that you are doing everything you can do to manage your disease. The second doctor may agree with the proposed treatment plan. He or she may suggest a different approach. In either case, you will have learned more. You will also be more confident that you know the treatment options. This helps you make the best decision. It may take a few weeks to see a second doctor. The possible delay generally does not affect the treatment outcome. You may want to ask your doctor whether your treatment needs to start immediately.
Treatment plan

A treatment plan is a useful tool to help you understand your therapy and feel in control. A treatment plan includes information about the melanoma, the planned treatment and possible side effects. It may also include information about any physical and emotional problems and your treatment goals. Your treatment plan may also include general health measures, such as quitting smoking or limiting alcohol. A treatment plan helps anyone with melanoma. It is, however, even more important for anyone with advanced disease. A treatment plan helps you and your treatment team be clear about your goals and wishes. Ask your treatment team for a written treatment plan.

Treatment options

Early melanoma that has not spread beyond the skin is treated with surgery. Treatment of more advanced disease may also include surgery. Advanced disease may also be treated with radiation and/or systemic therapy, which is therapy that treats the entire body.

Treatment side effects

Every treatment has side effects, or unwanted physical or emotional symptoms. Several side effects may occur with a particular treatment. Everyone reacts differently. Some people experience fewer or milder side effects than other people. Understanding possible side effects helps you make decisions about treatment. You will also know what to expect with different treatments. Finally, you will be better able to manage side effects with the help of your treatment team.

Surgery

Melanoma surgery removes the cancer and a border of normal tissue around it. You may require a second procedure to remove more normal skin around the area of the tumour. This depends on the size and stage of the melanoma and the amount of normal tissue removed at biopsy.

If the melanoma has spread to lymph nodes, surgery may remove some or all of the lymph nodes in the area of the tumour. If a large amount of skin is removed, there may not be enough skin to close the incision. In this situation, the surgeon may use a graft, or patch of skin from another area of your body, to cover the area.
You may wish to ask your doctor these questions about surgery:
• What surgery do you recommend for me? Why?
• What is involved in the surgery?
• Do I need to stay in the hospital?
• Will I have pain after the surgery? How will you manage my pain?
• Am I likely to need antibiotics to prevent infection?
• What problems do I need to watch for after surgery?
• Will there be a scar?
• Are there any long-term side effects?

**Surgery side effects**

Surgery may result in pain and swelling. These symptoms usually go away within a few weeks. Scars are permanent side effects of surgery. They generally fade with time. If lymph nodes are removed, lymph fluid may collect and cause swelling. This swelling is called *lymphedema*. Lymphedema may occur soon after surgery or much later. Talk to your treatment team if you are having bothersome side effects after surgery, or in certain cases, to effectively manage or reduce issues of lymphedema.

**Radiation**

*Radiation therapy* uses a high-energy beam to kill cancer cells. Radiation, when recommended, is usually used after surgery to kill any remaining cancer cells. To minimize damage to normal tissue, many beams of radiation may be aimed from different angles to meet at the tumour. This delivers more radiation to the tumour than to healthy cells around it. Postoperative radiation is considered in the following situations:
• The melanoma has spread from the lymph nodes.
• Disease remains after surgery.
• A great deal of melanoma is present in lymph nodes, and surgery is unlikely to remove all the cancerous cells.
• The lymph nodes are greatly enlarged.

Radiation may be used to achieve local control of the melanoma if surgery is not possible. Radiation may also be used to treat melanoma that recurs. In addition, radiation may be used to help treat pain or other symptoms of melanoma.
You may wish to ask your doctor these questions about radiation:
• How long does treatment last?
• How often will I have radiation?
• Will I feel any pain?
• What are the side effects of radiation?
• What problems do I need to watch for after radiation?
• Are there any long-term side effects?
• Will I have a scar?

**Radiation side effects**
Radiation therapy is painless. Other side effects may occur. Side effects depend on how much radiation you receive and the part of the body treated. Skin treated with radiation may be red, dry, tender, and itchy. Hair loss may occur in the treated area. Changes in the skin usually disappear within six to 12 months. Fatigue often occurs during radiation therapy. Energy levels generally return to normal after radiation. Rarely, radiation may lead to the development of a different tumour. Your treatment team can help you manage radiation side effects.

**Systemic therapy**
Melanoma cells can spread from the primary tumour anywhere in the body. Systemic therapy, which treats the entire body, is used to kill any melanoma cells in the body. Systemic therapy may be used after surgery to prevent the melanoma from returning or to treat metastatic disease that cannot be surgically treated.

There are three major types of systemic therapy: *chemotherapy*, *biological therapy*, and *targeted therapy*. Systemic therapy may be used when melanoma has spread beyond the skin or there is a risk that it has spread. A single type of treatment or a combination of treatments may be given. Combination regimens are complex and usually given in specialized centres. A second systemic therapy (*second-line therapy*) may be given if the first one was ineffective or if it has stopped working and you are able to tolerate it.

**Chemotherapy**
*Chemotherapy* uses powerful drugs to kill cancer cells. Chemotherapy may be given as a single drug or a *regimen*, or combination. These drugs may be given as pills or by injection or infusion into a vein. Chemotherapy is usually given in cycles, lasting between two and four weeks.

If the spread of the melanoma is thought to be limited to an arm or a leg, chemotherapy may be concentrated in that limb in a technique known as *isolated limb perfusion*. This technique prevents the blood in the arm or leg from travelling through the body for a short time. This allows the drugs to act on the tumour.
Isolated limb infusion is another form of treatment which uses chemotherapy to treat cancer which is confined to a limb. *Isolated limb infusion (ILI)* is a minimally invasive procedure used to deliver high doses of chemotherapy to recurrent melanomas or sarcomas in the arms or legs. ILI is an alternative to isolated limb perfusion (ILP).

Chemotherapy is not used alone very often. It is not very effective in treating melanoma. It may be effective to treat symptoms or extend life. Chemotherapy drugs include carboplatin, paclitaxel, and dacarbazine.

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

- Why do you recommend chemotherapy for me?
- Which medications do you recommend and why?
- What do I need to know about the medication?
- How long will treatment last?
- What side effects does my chemotherapy have?
- Are there any long-term side effects?

**Chemotherapy side effects**

Side effects of chemotherapy depend on the specific agent. Chemotherapy kills rapidly dividing cells, like cancer cells. It also damages normal cells that divide quickly. Cancer cells cannot recover from chemotherapy, but normal cells can repair the damage. Chemotherapy may cause the following side effects:

- **Red blood cells:** Your blood contains red blood cells, which carry oxygen. If their production decreases, you may feel weak and tired. Red blood cell transfusions may be used to increase your red blood cell level. Injections of a hormone to stimulate red blood cell production may also be used. Your treatment team will check red blood cell levels before your next chemotherapy cycle. They will then determine if a transfusion or other treatment is needed.

- **White blood cells:** Your blood also contains white blood cells, which fight infection. Chemotherapy often decreases the number of white blood cells. This makes infection more likely. Your treatment team will check white blood cell levels before your next chemotherapy cycle. If your white blood cells are very low, you may be given a medication to stimulate your body to make new white blood cells. Your next chemotherapy cycle may be delayed until your white blood cell levels recover.

- **Platelets:** Your blood also contains small cells called platelets. These cells help blood clot when you cut or bruise yourself. Chemotherapy may decrease platelet levels. This makes bruising more likely. Your gums may also bleed when you brush your teeth. Your treatment team will check platelet levels before your next chemotherapy cycle. If your platelets are very low, you may receive a platelet transfusion.
Hair: The cells in your hair roots also divide quickly. Some types of chemotherapy may damage these cells. This may cause temporary hair loss. Hair grows back after chemotherapy. The colour and texture may change after chemotherapy.

Digestive tract: Cells lining the entire length of the digestive tract divide and multiply quickly. Chemotherapy often affects the digestive tract. This may cause mouth sores, nausea and vomiting, diarrhea, and loss of appetite. Medications can help prevent nausea and vomiting and manage other digestive tract symptoms. Your treatment team will provide the information you need to minimize these problems.

Biological therapy

Biological therapy stimulates your immune system to help it fight the cancer. Biological therapy is sometimes called immunotherapy. Biological medications are the same as, or similar to, natural immune chemicals your body produces. Available biological therapies include interferon alpha, interleukin-2, and Yervoy™.

- Interferon alpha: Interferon alpha stimulates the immune system to attack the melanoma. Interferon alpha may be injected into a vein, usually at the hospital or a clinic. It may also be injected under the skin, usually at home or in the doctor’s office. Interferon alpha is usually given for one year and usually to people in whom the melanoma has been removed to prevent it coming back. Interferon alpha is also available in a long-acting version, called peginterferon alpha. This version is usually given for five years.

- Interleukin-2: Interleukin-2 is given into a vein, usually at the hospital. A maximum of 14 doses are given, every eight hours, over several days. Interleukin-2 may be given to some people with metastatic melanoma (stage 4), if their health is good enough to tolerate it. Interleukin-2 can produce complete durable remission, or disappearance of melanoma for some time. Interleukin-2 may be given as an initial therapy.

- Yervoy™ (ipilimumab): This immunotherapy helps the body’s immune system recognize and destroy melanoma cells. Yervoy™ is usually given to people whose disease has not responded to usual therapy. It may also be given if side effects were severe enough for treatment to be discontinued. Yervoy™ is given as an infusion into a vein. One dose is given every three weeks for four doses. Yervoy™ can lengthen life in people with advanced disease.

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

- Why do you recommend biological therapy for me?
- How long will treatment last?
- Do I need to go to the hospital?
- What side effects could I experience? How will they be managed?
- Are there any long-term side effects?
**Biological therapy side effects**

Common side effects of biological therapies are generally similar to flu symptoms. These include fever, chills, fatigue, headache, and muscle aches. Biological therapy may also cause rash or swelling where the injection is given. Symptoms may differ, depending on the person and the therapy. Medications may be given to prevent side effects of biological therapy. Side effects usually stop when treatment is finished.

Interferon alpha may affect the bone marrow or the liver. Interleukin-2 can cause a drop in blood pressure and a build-up of fluid in your body. Yervoy™ (ipilimumab) may cause immune system side effects. All biological therapies should be used with caution based on their potential toxicities.

**Targeted therapy**

Targeted therapy can be used for melanomas with a damaged BRAF gene. Testing the tumour can determine if the BRAF gene is normal or damaged. Zelboraf™ (vemurafenib) is an oral targeted therapy for people with advanced melanoma with a damaged BRAF gene. This treatment can be given as an initial therapy for people with extensive melanoma.

**Targeted therapy side effects**

Side effects of Zelboraf™ include extreme sun sensitivity, joint pain and swelling, and skin cancer. If you receive Zelboraf™, you will need to have regular skin examinations and see a dermatologist if you develop symptoms.

**Clinical trials**

Clinical trials are studies of new therapies to determine whether a medication is safe and effective. Generally, clinical trials compare new treatment with current therapies. Clinical trials may assess new medications and new combinations of treatments. This may include combinations of medications, and combinations of radiation, biological therapy, chemotherapy, and targeted therapy.

Clinical trial participation is often offered to people with high-risk stage 2, stage 3, or stage 4 melanoma. People with persistent or recurrent melanoma may also be offered clinical trial participation. There may be clinical trials in melanoma available in your area. Talk to your doctor if you are interested in being part of a clinical trial. The Cancer View Canada website at www.cancerview.ca has a list of clinical trials in Canada.
You may wish to ask your doctor these questions about clinical trials:

- Are any clinical trials available that I could take part in?
- What is the study purpose?
- What tests and treatments are part of the study?
- What does the treatment do?
- Has the study treatment been tested before? For what types of cancer?
- Will I know which treatment I receive?
- What is likely to happen to me with, or without, this new treatment?
- What are my other options? What are their benefits and risks?
- What does taking part in the study mean to my daily life?
- Can I expect side effects during the study? Can they be prevented or treated?
- Does the study involve a hospital stay? If so, how often and for how long?
- Will taking part in the study increase my chance of recovery?
- Does the study include follow-up care?

Managing life with melanoma

Whatever the stage of your melanoma, it is important that you look after your physical health. That means eating a healthy diet, getting enough rest, and being as physically active as you can be. It is also important to care for your emotional health by spending time with family and friends and planning activities you enjoy. Friends and family can be a very important resource for people with cancer. Ask them for help if you need a ride to appointments or shopping. Invite them to visit so that you do not become isolated. Most people are happy to help. Some may not know how to respond to your diagnosis. So tell your friends when you need help or would like company.

Symptoms

You may experience symptoms, such as fatigue, pain, depression and anxiety. These disease-related symptoms can be managed. Several treatments are available.

“Toughness is in the soul and spirit, not in muscles.”
– Alex Karras
Depression and anxiety

Anxiety and depression are common among people with cancer. You may be anxious before you have a biopsy and when you are waiting for results. You may become depressed when you learn you have cancer. You may also feel anxious about recurrence when your treatment is completed. These feelings may be mild. They may also be severe and long-lasting.

Effective help is available. You may benefit from talking to a counsellor or from taking medication. A support group may help you cope with the changes in your life. Contact the Melanoma Network of Canada (www.melanomanetwork.ca) for information on supportive options or your treatment team at the hospital. Relaxation techniques and meditation are helpful for many people. If you are having problems with depression or anxiety, talk to your treatment team.

Fatigue

Fatigue is very common among people with cancer. Fatigue may be due to the disease or the treatment. Cancer-related fatigue is different from being tired. Fatigue can happen suddenly, and sleep does not improve it. Researchers have found exercise helps with this type of fatigue. Your treatment team can recommend an exercise program to help you. It is also a good idea to be aware of your energy levels and conserve your energy. Plan to do your most important tasks first. That way, if you run out of energy, you will have accomplished what is most important to you. Remember there are many leisure activities that don’t require a lot of energy. You may enjoy visiting with friends, reading, or watching movies. Plan activities you can do that make you feel good. If you are having problems with fatigue, talk to your treatment team.

Pain

Pain is the symptom people with cancer fear the most. It is important to know that the right pain medication, taken at the right dose, can be effective in treating pain associated with metastases. In some cases, surgery to remove tumours or radiation or systemic therapy to kill cancer cells may help treat pain.
Complementary and alternative medicines

Complementary and alternative medicine (CAM) includes vitamins, herbal preparations, nutritional supplements, and stress reduction. CAMs have not been studied as treatments in cancer. It is important to tell your treatment team about any CAMs you are taking. Some CAMs may interact with some cancer therapies. Complementary therapies that have been studied are acupuncture, which can provide pain relief in some conditions, and yoga, which can be effective for relaxation. These therapies may make you feel better. Your treatment team can advise you about which complementary therapies may help.

Persistent or recurrent disease

Melanoma can return after treatment.

- **Persistent melanoma** is a tumour that was not completely removed by treatment. It is found in the surgical scar. Persistent melanoma has not penetrated beneath the epidermis.

- **Recurrent melanoma** may be of several types. Local recurrence is reappearance of the melanoma in the vicinity of a previously removed melanoma or en route to the regional lymph node basin (in-transit metastasis).
  - **Regional recurrence** is melanoma in the lymph nodes near the first melanoma.
  - **Distant recurrence** is spread beyond the regional lymph nodes.

Investigation of persistent and recurrent melanoma begins with a biopsy. After that, additional tests depend on the stage of the disease, as described previously. The stage of the recurrence also determines the type of treatment given and the follow-up schedule. Clinical trial participation is generally offered for recurrence.

Following up

Your follow-up plan depends on the stage of the melanoma. Follow-up tests allow your doctor to monitor for possible recurrence of the melanoma. The follow-up plans below are for people with treated disease who have no current symptoms.

**Stage 0**

- Monthly self-examination of the skin and lymph nodes for life
- Complete skin examination by a doctor every year for life
- Imaging for specific symptoms
Stage 1

- Monthly self-examination of the skin and lymph nodes for life
- Complete skin examination by a doctor every year for life
- History and physical examination every three to 12 months for 5 years, then every year as needed
- Imaging for specific symptoms

Stage 2

Stage 2A

- Monthly self-examination of the skin and lymph nodes for life
- Complete skin examination by a doctor every year for life
- History and physical examination every three to 12 months for five years, then every year as needed
- Imaging for specific symptoms

Stage 2B and 2C

- Monthly self-examination of the skin and lymph nodes for life
- Complete skin examination by a doctor every year for life
- History and physical examination every three to six months for two years, then every three to 12 months for three years, then every year as needed
- Imaging for specific symptoms

Stage 3

- Monthly self-examination of the skin and lymph nodes for life
- Complete skin examination by a doctor every year for life
- History and physical examination every three to six months for two years, then every three to 12 months for three years, then every year as needed
- Imaging for specific symptoms

Stage 4

- Follow-up will depend on symptoms and specific treatments that you are receiving
Preventing another melanoma

Practicing sun safety

People with melanoma have an increased risk of developing another melanoma. It is therefore very important to take action to help prevent another melanoma. Remember that the leading cause of melanomas is due to exposure to UV light. It is also important to know that UV light can penetrate windows, car windshields, and light clothing. Clouds do not protect from UV exposure. Follow these important preventive measures:

• Use a broad-spectrum sunscreen with a sun protection factor (SPF) of at least 30 about 30 minutes before going out. Reapply every two hours and after sweating or swimming. Wear sunscreen all year round. Do not use sunscreen to stay out in the sun longer.

• Limit your time in the sun.

• Do not use sunlamps or tanning beds. The risk of melanoma increases 75% after a single use of a tanning bed.

• Avoid tanning.

• Avoid outdoor activities when the sun is strongest, between 10 AM and 4 PM. If you are outdoors then, stay in the shade.

• Protect yourself from sunlight reflected by water, ice, snow, sand, and pavement. UV rays reflecting off snow and ice are eight times stronger than reflection off water.

• Wear clothes made of tightly woven fabrics that cover your arms and legs.

• Wear a hat with a wide brim (not a baseball cap) that shades your face, neck, and ears.

• Wear sunglasses with UV protection to protect your eyes and the skin around them.

Checking your skin

Check your entire skin once a month. A good time is after you shower or bathe. Checking your skin only takes about 10 or 15 minutes. Make sure the room has enough light and a full-length mirror. Use a hand-held mirror too. Learn where your moles, birthmarks, and other skin marks are and how they look and feel. Check for any change. People who check their skin regularly discover 53% of melanomas and family members discover 17% of melanomas. Finding melanoma at an early stage can lead to a 90% cure rate. Research has shown that checking your skin regularly can find melanomas at an early stage and decrease the risk of mortality by 63%.
Look at your face, neck, ears, and scalp. Because it is hard to check your scalp yourself, you may want to have a friend or relative help with this task.

Look at your body from the front and back.

Raise your arms and look at both sides of your body.

Bend your elbows and look at your hands, including the palms and nails, and both arms.

Look at the front, back, and sides of your legs.

Look at your genital area and between your buttocks.

Sit down and look at your feet, including the nails, soles, and between the toes.

Look for the following:

- A new mole that looks different
- A new red or dark flaky patch that may be raised
- A new firm flesh-coloured bump
- A sore that does not heal
- A change in any mole (remember ABCDE)

Tip: The ugly duckling sign

Generally, most moles on a person’s body look the same or similar. Melanomas, however, look different from all other moles. Usually, only one melanoma develops at one time. A mole that looks or feels different from other moles — the ugly duckling sign — needs to be checked by your doctor.

Examining your skin regularly helps you learn the normal appearance of your skin. If you find anything new and unusual, contact your doctor. It is also important to have your doctor examine your skin regularly. If you have many moles, it is helpful to have a dermatologist examine your skin. You also reduce your risk of melanoma by having your doctor remove any suspicious or abnormal moles.
Glossary

**ABCDE**
A memory device for characteristics of moles that might be cancer.

**Acral lentiginous melanoma**
An uncommon type of melanoma that looks like a bruise on the palms or soles or like a dark stripe in a nail.

**Angiolympathic invasion**
Melanoma has invaded lymph or blood vessels.

**Asymmetry**
Asymmetry of a skin spot; one half does not match the other.

**Autoimmune disorders**
Diseases that cause the immune system to attack the body.

**Biological therapy (Biotherapy)**
Treatment to stimulate or restore the ability of the immune (defense) system to fight infection and disease. Biological therapy is thus any form of treatment that uses the body’s natural abilities that constitute the immune system to fight infection and disease or to protect the body from some of the side effects of treatment.

**Biopsy**
A medical procedure that collects tissue.

**Breslow index**
The Depth a melanoma lesion extends below the skin surface measured in millimeters.

**Cancer**
An abnormal growth of cells which tend to proliferate in an uncontrolled way and, in some cases, to metastasize (spread).

**Cell**
The individual unit that makes up all of the tissues of the body.
**Chemotherapy**
Drugs that kill cancer cells.

**Clark level**
A scale of tumour depth with 5 scores based on which layer of skin has been invaded (the larger the level number the deeper into the tissue it extends).

- Clark’s Level I—lesion involves the dermis
- Clark’s Level II—lesion involves the papillary dermis
- Clark’s Level III—lesion invades and fills the papillary dermis
- Clark’s Level IV—lesion invades reticular dermis
- Clark’s Level V—lesion invades sub-cutaneous tissue

(Depending upon where the melanoma is located on the body, the millimeters of depth for each Clark level can vary widely, so one person’s Clark’s III may be 1 mm, while another person’s is 2 mm.)

**Clinical trial**
Research comparing new and current treatments to find out which is better.

**Computed tomography (CT) scan**
Use of x-rays to make pictures of body parts.

**Connective tissue**
Supportive and binding fibers.

**Deep margin**
Normal-looking tissue underneath a tumour.

**Deep margin status**
Presence or absence of cancer cells in the normal-looking tissue under a tumour.

**Dermal mitotic rate**
A measure of how many tumour cells are actually growing.

**Dermatologist**
A doctor who specializes in diseases of the skin.

**Dermatopathologist**
Physician who has special training in diagnosing disease on the basis of microscopic examination of the skin.

**Dermis**
The second layer of skin that is beneath the epidermis.

**Diagnosis**
Identification of a disease.
Dysplastic nevus
A mole that is large or has irregular borders or inconsistent colors; abnormal mole.

Early stage
Cancer that has had little growth in nearby tissues.

Epidermis
Outer layer of skin.

Excisional biopsy
Technique in which a lesion is removed from the skin by cutting out the affected area as well as a portion of normal skin surrounding the lesion. This technique is also used to remove larger lesions.

Excisional lymph node biopsy
Surgery to remove the entire, enlarged lymph node(s).

Fair skin and light hair
Light-colored hair, eyes, or skin.

Family history
The family structure and relationships within the family, including information about diseases in family members.

Fine-needle aspiration
Use of a thin needle to remove fluid or tissue from the body.

Glucose
A natural sugar in the body used by cells for energy.

Histologic subtype
Grouping of cancer types based on cancer cell qualities.

Hypodermis
Layer of fat and connective tissue under the dermis.

Imaging tests
Medical tests that take pictures of the inside of the body.

Immune system
The body’s natural defense against disease.

Immunotherapy
Treatment that uses the immune system to fight disease.
In Situ
In its normal place; confined to the site of origin.

Incisional biopsy
Surgery to remove part of a tumour.

Interferon
A drug used to activate the immune system.

Interleukin-2
A type of interleukin, a chemical messenger, a substance that can improve the body’s response to disease. It stimulates the growth of certain disease-fighting blood cells in the immune system. A type of protein molecule produced by lymphocytes that activates other lymphocytes in the immune system.

Lactate dehydrogenase
An enzyme found in the blood and other body tissues.

Lentigo maligna melanoma
A type of melanoma that gets mistaken for a sunspot.

Lesion
Tissue that has been damaged by disease or injury.

Lymph
A clear fluid containing white blood cells.

Lymph node
A collection of immune cells grouped together in a special way.

Lymphedema
Swelling due to buildup of lymph.

Magnetic resonance imaging (MRI)
Use of radio waves and powerful magnets to see into the body.

Malignant
Cancerous; growing out of control.

Medical oncologist
A doctor who specializes in all types of cancer.

Melanin
Pigment in the skin.

Melanocytes
Skin cells of the epidermis.

Melanoma
A cancer of the cells that give skin its brownish color.
Metastasize
The growth of cancer beyond local tissue.

Microsatellitosis
Tiny tumours near the main tumour seen with a microscope.

Mole
A dense area of melanin.

Nevus
Medical term for mole.

Nodular melanoma
A type of melanoma that has a dome shape and quickly grows into the dermis.

Pathologic stage
A cancer stage given by a pathologist based on surgery samples.

Pathologist
A specialist in pathology; one who interprets and diagnoses the changes caused by disease in tissues and body fluids.

Peripheral margin
Normal-looking tissue from around the sides of a tumour.

Peripheral margin status
Presence or absence of cancer cells in the normal-looking tissue around the sides of a tumour.

Persistent disease
Cancer not completely removed or destroyed by treatment.

Pigment
Substance with color.

Platelets
A type of blood cell responsible for blood clotting.

Positron emission tomography (PET)
Use of radioactive material to see the shape and function of body parts.

Primary Tumour
Initial tumour or the body site where it forms.

Prognosis
The likely course and outcome of a disease.

Punch biopsy
Surgery to remove tissue with a round-shaped knife.
**Pure desmoplasia**  
Presence or absence of dense connective tissue.

**Radiation oncologist**  
A doctor who specializes in the treatment of cancer with radiation.

**Radiation therapy (Radiotherapy)**  
The use of high-energy rays to damage cancer cells, stopping them from growing and dividing. Like surgery, radiation therapy is a local treatment that affects cancer cells only in the treated area.

**Radioactive**  
Containing a powerful energy called radiation.

**Recurrence**  
The return of cancer after successful treatment.

**Risk factor**  
Something that increases the chance of getting a disease.

**Screening**  
Regular tests used to detect a disease.

**Second-line therapy**  
The treatment given after the first treatment fails.

**Sentinel lymph node**  
The first node that lymph travels to after leaving the tumour area.

**Sentinel lymph node biopsy**  
A sentinel lymph node biopsy (SLNB) is a procedure in which the sentinel lymph node is identified, removed, and examined to determine whether cancer cells are present.

**Shave biopsy**  
Surgery to remove a thin tissue sample from the top of a tumour.

**Side effect**  
An unplanned physical or emotional response to treatment.

**Stage (of cancer)**  
Measure of the extent of a malignancy, arrived at by examining features of the primary tumour and searching for evidence of metastasis.

**Systemic therapy**  
Drugs used throughout the entire body to kills cancer cells that have spread far.

**Targeted therapy**  
Treatment that stops cancer cell growth by attacking a specific or unique feature of the cancer.
**Tumour**
A tissue mass made from an abnormal growth of cells.

**Tumour location**
The area of the body that contains the tumour.

**Tumour regression**
A decrease in the size of the tumour.

**Ulceration status**
Presence or absence of a tumour’s top skin layer.

**Ultraviolet light**
Light energy with a wavelength shorter than visible light but longer than x-rays.

**Vertical growth phase**
The direction of tumour growth is down into the skin.

**White blood cells**
A type of blood cell that fights disease as part of the immune system.

**Xeroderma pigmentosum**
An inability of the skin to repair damage from ultraviolet light.

**Yervoy™**
Yervoy™ (ipilimumab) is a drug used for the treatment of melanoma, a type of skin cancer. It is a Health Canada approved human monoclonal antibody developed by Bristol-Myers Squibb, and works by activating the immune system.

**Zelboraf™**
Zelboraf™ (vemurafenib) is a B-Raf enzyme inhibitor developed by Plexxikon (a member of the Daiichi Sankyo group) and Hoffmann–La Roche for the treatment of late-stage melanoma. Vemurafenib received Health Canada approval for the treatment of adult patients with BRAF V600 mutation positive unresectable or metastatic melanoma.
References


This publication is developed with input from Annette Cyr, Melanoma Network of Canada; Dr. Anthony Joshua, Medical Oncologist, Princess Margaret Hospital (PMH); Dr. Teresa Petrella, Medical Oncologist, Odette Cancer Centre, Assistant Professor, University of Toronto; and Dr. Judy Wismer, Dermatologist, Ancaster Dermatology Centre. The information contained here is for reference and education only. Please consult your physician for specific information on personal health matters.

This publication has been made available with funding provided by Bristol-Myers Squibb Canada.