

# Melanoma

## Why is Melanoma an Emerging Public Health Issue?

Melanoma is a form of skin cancer that can be fatal. It commonly affects individuals who are young and at the most productive years of their life, therefore, constituting a major public health problem.

Melanoma begins in the pigment producing cells of the skin, which are known as melanocytes. It is more severe than other forms of skin cancer and is the cause of 80% of deaths resulting from skin cancer. In the Western population, melanoma has the fastest increasing incidence of all cancers. It has been estimated that 51,400 new cases will develop in the United States in the year 2001 and that 7,800 people will die yearly due to melanoma.

It is important to remember that when diagnosed early, treatment is often successful in eliminating melanoma. It is also crucial to understand the methods of prevention that are effective in reducing one's risk of developing melanoma. By following preventive methods and encouraging early detection, not only are lives saved, but there is also a significant reduction in medical needs and costs.

Suggested reading: Bruce AJ, *et al* (2000) Overview of Skin Cancer Detection and Prevention for Primary Care Physician. [May Clinic Proceedings 75\(5\): 491-500.](#)

## What is Melanoma?

[Melanoma](#) is a form of skin [cancer](#). The skin is made up of two layers, the [dermis](#) and the [epidermis](#). The epidermis is the uppermost layer of skin that covers the body. The lower portion of the epidermis contains the [melanocytes](#). Melanocytes are cells that produce the [pigment](#), or [melanin](#), for the skin. Melanocytes can cause both cancerous ([malignant](#)) and non-cancerous ([benign](#)) growths on the skin.

Moles are common, benign growths that are caused by clusters of melanocytes. Moles come in various appearances; they can be brown, tan, pink, or flesh-colored, flat or raised, round or oval. It is normal to have anywhere from 10-40 moles on one's body throughout life.

Cancer occurs when cells lose their ability to regulate growth and reproduction. This loss of regulation causes tumors to develop. Tumors are masses of [tissue](#) that can be benign or malignant. In melanoma, the melanocytes are malignant, meaning that the cells are growing in an abnormal, uncontrolled manner. Melanoma most often begins in the skin, which is termed [cutaneous](#) melanoma. However, it can also begin in the eye, digestive tract, and [lymph nodes](#), which are small structures throughout the body that produce infection-fighting cells. If the cancerous tissue reaches the lymph nodes, some of the malignant cells can break off and be transported throughout the body by means of the lymphatic system. These cancerous cells can then cause new tumors anywhere in the body.

When a melanoma is diagnosed, a stage number is determined. Staging serves as a classification of the severity and extent of cancerous growth and helps to determine the course of treatment needed. There are four stages:

Stage	Description of Cancer	Tumor Size
<b>I</b>	isolated to the epidermis and/or the upper layer of the dermis	less than 1.5 mm thick
<b>II</b>	spread to the entire dermis layer	1.5 – 4 mm thick
<b>III</b>	tumor has spread to tissue below the skin (or) there are new tumors within one inch of the original tumor (or) the tumor has spread to lymph nodes in the area	greater than 4 mm thick
<b>IV</b>	spread to organs or lymph nodes far away from the original melanoma site	N/A

Melanoma can also be classified as recurrent, meaning that the cancer has reappeared after being previously treated.

What are the symptoms of Melanoma?

Although moles are usually benign, it is important to realize that existing moles or newly formed moles are often the sites for detection of melanoma. For this reason, any change in size, shape, color, or feel of an existing mole should be reported to a doctor. A common tool to help remember symptoms of melanoma is “ABCDE:”

**A**symmetry – the two halves of the mole do not look alike  
**B**order – the edges of the mole are irregular and not well defined  
**C**olor – the mole contains more than one color  
**D**iameter – the mole increases in size, usually larger than 5mm  
**E**levation – the mole is elevated or has a bump in it

It is not necessary for a growth to have all of these features to be a melanoma. Other symptoms include fine scales, itching, and change of texture, such as becoming hard or lumpy. Pain is not a frequent symptom of a melanoma

The following figure provides an example of a melanoma. Notice the asymmetrical shape, irregular border, and uneven coloration.



**Figure 1:** Example of Melanoma  
 Provided by [The National Cancer Institute](https://www.nccih.gov/)

Melanomas can have a variety of appearances, so it is important for an individual to consult a [dermatologist](#), a physician who specializes in the skin, if they suspect they have a melanoma. The [American Academy of Dermatology](#) provides a service for free skin cancer screenings throughout the country.

### **What causes Melanoma?**

The definite cause of melanoma is not clearly understood. As with all cancers, the immediate cause is the loss of cell regulation, which leads to uncontrolled cell growth. There are many risk factors associated with melanoma. These risk factors have been determined by researching which factors are more common in individuals who have developed melanoma in comparison to those who have not developed melanoma. It is not yet understood whether the malignant growth is caused by one risk factor or a combination of risk factors since patients with melanomas have been found to have anywhere from several risk factors to none at all. Having one or more of these risk factors does not predict that one will develop melanoma and not having any of these risk factors does not guarantee that one will not develop melanoma. The risk factors are simply a means of helping to evaluate the possibility of developing melanoma. The risk factors are as follows:

#### **Personal Risks**

- Presence of large moles, unusual looking moles, or more than 50 normal moles
- Close relatives who have had melanoma - [genetic](#) risk factor
- A personal previous occurrence of melanoma
- Caucasian ancestry and fair skin (however, melanoma can occur in any racial group or skin color)
- A weakened immune system due to cancer treatments, certain drug treatments, and AIDS

#### **Environmental Risks**

- History of one or more severe sunburns before 18 years of age
- Ultraviolet radiation due to intense sun exposure
- Ultraviolet radiation due to artificial means, such as tanning booths or sun lamps
- Geographic location - the sun exhibits stronger radiation over certain areas of the globe

A current area of study is the genetic basis of melanoma. Several findings have been discovered, such as [gene](#) regions located on [chromosomes](#) 1, 6, and 9 that could influence one's risk for developing melanoma. This research is supported by the fact that 10% of patients with melanoma have a parent, sibling, or child that have also developed melanoma. One of the most compelling findings of a genetic change associated with familial occurrence of melanoma is the genetic [linkage](#) to chromosome 9p21 in [hereditary](#) cases and the identification of a gene named p16 (or multiple [tumor suppressor](#) 1, MTS1) that frequently is [mutated](#), or changed, in patients with hereditary melanoma. At this time, however, there is neither a defined understanding of the hereditary risk of melanoma, nor a genetic test to determine one's risk.

## How is Melanoma treated?

The type of treatment used depends on the stage of the melanoma and the patient's age and health. The four types of treatment used are surgery, chemotherapy, biological therapy, and radiation therapy.

- **Surgery** is the most common treatment used for all stages of melanoma and requires removing both the cancerous skin tissue and the normal tissue surrounding it. If the melanoma is diagnosed and treated before it spreads to other parts of the body, surgery alone is usually sufficient. However, if the cancer has started to spread, such as in stages III and IV, one of the other treatments or a combination of treatments will be used to eliminate cancer cells that remain in the body.
- [Chemotherapy](#) involves using anti-cancer drugs to kill the cancer cells. These drugs can be taken in either pill form or by injection. They are then spread throughout the body by means of the blood stream.
- [Biological therapy](#) involves using the body's natural defense system to eliminate the cancer cells.
- [Radiation therapy](#) involves using high level x-rays to eliminate cancer cells.

For further information, the [National Cancer Institute's CancerNet website](#) has detailed information on the process and possible side effects of each melanoma treatment.

## Prevention

Although there is no definite method for preventing melanoma, it is believed that protection against [ultraviolet radiation](#) from the sun is the best method for reducing one's risk of melanoma. However, it is important to remember that unlike other forms of skin cancer, melanoma can arise on areas of the skin that are not exposed to sunlight. The following are tips to help reduce harmful ultraviolet exposure.

- Avoid excessive sun exposure between 11am and 3pm (period of time when the sun's rays are most intense)
- Wear protective clothing and a wide brim hat
- Use sunscreen with an SPF 15 or higher (higher SPF is recommended for children)
- Follow sun protection guidelines on cloudy days (ultraviolet radiation passes through the clouds)
- Do not use tanning booths

## Early Diagnosis and Self-Exam Procedure

Early detection of melanoma is extremely important. If a cancerous growth is detected before it spreads throughout the body, there is a better chance that treatment will eliminate the cancer completely. It is estimated that if caught early and removed, melanoma is approximately 95% curable. One of the easiest and most thorough methods for early detection is performing a skin self-exam.

When performing a self-exam, one should utilize a well-lit room with a full-length mirror and a hand-held mirror. The entire surface of the skin should be inspected, including the back, scalp, buttocks, and genital region. Regular inspection of one's skin and moles provides the best chance of early detection of an abnormal growth or change. Any change should be brought to a physician's attention immediately. An excellent description of a self-exam procedure, including figures, has been constructed by [The American Academy of Dermatology](#).

### **Information and Support Resources**

- [MelanomaNet – The American Academy of Dermatology](#)
- [The National Cancer Institute](#)
- [“Genetic Test for Melanoma Developed at UCSF”](#)