

Melanoma: Stages and Treatment

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Objectives

Upon completion of this course, the learner will be able to

1. Define melanoma
2. Discuss the various risk factors associated with the development of melanoma
3. Explain the clinical features, diagnosis and treatment options for the different stages of melanoma
4. Discuss the prognosis of melanoma
5. Explain stages of cutaneous melanoma
6. Discuss the various treatment options available for cutaneous melanoma

General Information About Melanoma

Key Points for this Section

- Melanoma is a disease in which malignant (cancer) cells form in the skin cells called melanocytes (cells that color the skin).
- Melanoma can occur anywhere on the body.
- Unusual moles, exposure to sunlight, and health history can affect the risk of developing melanoma.
- Possible signs of melanoma include a change in the appearance of a mole or pigmented area.
- Tests that examine the skin are used to detect (find) and diagnose melanoma.
- Certain factors affect prognosis (chance of recovery) and treatment options.

Melanoma is a disease in which malignant (cancer) cells form in the skin cells called melanocytes (cells that color the skin).

Melanocytes are found throughout the lower part of the epidermis. They produce melanin, the pigment that gives skin its natural color. When skin is exposed to the sun, melanocytes produce more pigment, causing the skin to tan, or darken.

The skin is the body's largest organ. It protects against heat, sunlight, injury, and infection. The skin has 2 main layers: the epidermis (upper or outer layer) and the dermis (lower or inner layer).

When melanoma starts in the skin, the disease is called cutaneous melanoma. This PDQ summary is about cutaneous (skin) melanoma. Melanoma may also occur in the eye and is called intraocular or ocular melanoma.

There are 3 types of skin cancer:

- Melanoma.
- Basal cell skin cancer.
- Squamous cell skin cancer.

Melanoma is more aggressive than basal cell skin cancer or squamous cell skin cancer.

Melanoma can occur anywhere on the body.

In men, melanoma is often found on the trunk (the area from the shoulders to the hips) or the head and neck. In women, melanoma often develops on the arms and legs. Melanoma usually occurs in adults, but it is sometimes found in children and adolescents.

Unusual moles, exposure to sunlight, and health history can affect the risk of developing melanoma.

Risk factors include the following:

- Unusual moles.
- Exposure to natural sunlight.
- Exposure to artificial ultraviolet light (tanning booth).
- Family or personal history of melanoma.
- Being white and older than 20 years.
- Red or blond hair.
- White or light-colored skin and freckles.
- Blue eyes.

Possible signs of melanoma include a change in the appearance of a mole or pigmented area.

These and other symptoms may be caused by melanoma or by other conditions. A doctor should be consulted if any of the following problems occur:

- A mole that:
 - changes in size, shape, or color.
 - has irregular edges or borders.
 - is more than 1 color.
 - is asymmetrical (if the mole is divided in half, the 2 halves are different in size or shape).
 - itches.
 - oozes, bleeds, or is ulcerated (a hole forms in the skin when the top layer of cells breaks down and the underlying tissue shows through).
- Change in pigmented (colored) skin.
- Satellite moles (new moles that grow near an existing mole).

Tests that examine the skin are used to detect (find) and diagnose melanoma.

If a mole or pigmented area of the skin changes or looks abnormal, the following tests and procedures can help detect and diagnose melanoma:

- Skin examination: A doctor or nurse examines the skin to look for moles, birthmarks, or other pigmented areas that look abnormal in color, size, shape, or texture.
- Biopsy: A local excision is done to remove as much of the suspicious mole or lesion as possible. A pathologist then looks at the tissue under a microscope to check for cancer cells. Because melanoma can be hard to diagnose, patients should consider having their biopsy sample checked by a second pathologist.

Suspicious areas should not be shaved off or cauterized (destroyed with a hot instrument, an electrical current, or a caustic substance).

Certain factors affect prognosis (chance of recovery) and treatment options.

The prognosis (chance of recovery) and treatment options depend on the following:

- The stage of melanoma (whether cancer is found in the outer layer of skin only, or has spread to the lymph nodes, or to other places in the body).
- Whether there was bleeding or ulceration at the primary site.
- The location and size of the tumor.
- The patient's general health.

Although many people are successfully treated, melanoma can recur (come back).

Stages of Melanoma

Key Points for this Section

- After melanoma has been diagnosed, tests are done to find out if cancer cells have spread within the skin or to other parts of the body.
- The following stages are used for melanoma:
 - Stage 0
 - Stage I
 - Stage II
 - Stage III
 - Stage IV

After melanoma has been diagnosed, tests are done to find out if cancer cells have spread within the skin or to other parts of the body.

The process used to find out whether cancer has spread within the skin or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment.

The following tests and procedures may be used in the staging process:

- Wide local excision: A surgical procedure to remove some of the normal tissue surrounding the area where melanoma was found, to check for cancer cells.
- Lymph node mapping and sentinel lymph node biopsy: Procedures in which a radioactive substance and/or blue dye is injected near the tumor. The substance or dye flows through lymph ducts to the sentinel node or nodes (the first lymph node or nodes where cancer cells are likely to have spread). The surgeon removes only the nodes with the radioactive substance or dye. A pathologist then checks the sentinel lymph nodes for cancer cells. If no cancer cells are detected, it may not be necessary to remove additional nodes.
- Chest x-ray: An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- CT scan (CAT scan): A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography. For melanoma, pictures may be taken of the chest, abdomen, and pelvis.
- MRI (magnetic resonance imaging): A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI).
- PET scan (positron emission tomography scan): A procedure to find malignant tumor cells in the body. A small amount of radionuclide glucose (sugar) is injected into a vein. The PET scanner rotates around the body and makes a picture of where

glucose is being used in the body. Malignant tumor cells show up brighter in the picture because they are more active and take up more glucose than normal cells.

- Laboratory tests: Medical procedures that test samples of tissue, blood, urine, or other substances in the body. These tests help to diagnose disease, plan and check treatment, or monitor the disease over time.

The results of these tests are viewed together with the results of the tumor biopsy to determine the melanoma stage.

The following stages are used for melanoma:

Stage 0

In stage 0, melanoma is found only in the epidermis (outer layer of the skin). Stage 0 is also called melanoma in situ.

Stage I

Stage I is divided into stages IA and IB.

- Stage IA: In stage IA, the tumor is not more than 1 millimeter thick, with no ulceration. The tumor is in the epidermis and upper layer of the dermis.
- Stage IB: In stage IB, the tumor is either:
 - not more than 1 millimeter thick, with ulceration, and may have spread into the dermis or the tissues below the skin; or
 - 1 to 2 millimeters thick, with no ulceration.

Stage II

Stage II is divided into stages IIA, IIB, and IIC.

- Stage IIA: In stage IIA, the tumor is either:
 - 1 to 2 millimeters thick, with ulceration; or
 - 2 to 4 millimeters thick, with no ulceration.
- Stage IIB: In stage IIB, the tumor is either:
 - 2 to 4 millimeters thick, with ulceration; or
 - more than 4 millimeters thick, with no ulceration.
- Stage IIC: In stage IIC, the tumor is more than 4 millimeters thick, with ulceration.

Stage III

In stage III, the tumor may be any thickness, with or without ulceration, and:

- has spread to 1 or more lymph nodes; or
- has spread into the nearby lymph system but not into nearby lymph nodes; or

- has spread to lymph nodes that are matted (not moveable); or
- satellite tumors (additional tumor growths within 2 centimeters of the original tumor) are present and nearby lymph nodes are involved.

Stage IV

In stage IV, the tumor may be any thickness, with or without ulceration, may have spread to 1 or more nearby lymph nodes, and has spread to other places in the body.

Recurrent Melanoma

Recurrent melanoma is cancer that has recurred (come back) after it has been treated. The cancer may come back in the original site or in other parts of the body, such as the lungs or liver.

Treatment Option Overview

Key Points for this Section

- There are different types of treatment for patients with melanoma.
- Four types of standard treatment are used:
 - Surgery
 - Chemotherapy
 - Radiation therapy
 - Biologic therapy
- Other types of treatment are being tested in clinical trials. These include the following:
 - Chemoimmunotherapy

There are different types of treatment for patients with melanoma.

Different types of treatment are available for patients with melanoma. Some treatments are standard (the currently used treatment), and some are being tested in clinical trials. Before starting treatment, patients may want to think about taking part in a clinical trial. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment.

Choosing the most appropriate cancer treatment is a decision that ideally involves the patient, family, and health care team.

Four types of standard treatment are used:

Surgery

Surgery to remove the tumor is the primary treatment of all stages of melanoma. The doctor may remove the tumor using the following operations:

- Local excision: Taking out the melanoma and some of the normal tissue around it.
- Wide local excision with or without removal of lymph nodes.
- Lymphadenectomy: A surgical procedure in which the lymph nodes are removed and examined to see whether they contain cancer.
- Sentinel lymph node biopsy: The removal of the sentinel lymph node (the first lymph node the cancer is likely to spread to from the tumor) during surgery. A radioactive substance and/or blue dye is injected near the tumor. The substance or dye flows through the lymph ducts to the lymph nodes. The first lymph node to receive the substance or dye is removed for biopsy. A pathologist views the tissue under a microscope to look for cancer cells. If cancer cells are not found, it may not be necessary to remove more lymph nodes.

Skin grafting (taking skin from another part of the body to replace the skin that is removed) may be done to cover the wound caused by surgery.

Even if the doctor removes all the melanoma that can be seen at the time of the operation, some patients may be offered chemotherapy after surgery to kill any cancer cells that are left. Chemotherapy given after surgery, to increase the chances of a cure, is called adjuvant therapy.

Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping the cells from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy). When chemotherapy is placed directly into the spinal column, an organ, or a body cavity such as the abdomen, the drugs mainly affect cancer cells in those areas (regional chemotherapy).

In treating melanoma, chemotherapy drugs may be given as a hyperthermic isolated limb perfusion. This technique sends anticancer drugs directly to the arm or leg in which the cancer is located. The flow of blood to and from the limb is temporarily stopped with a tourniquet, and a warm solution containing anticancer drugs is put directly into the blood of the limb. This allows the patient to receive a high dose of drugs in the area where the cancer occurred.

The way the chemotherapy is given depends on the type and stage of the cancer being treated.

Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells. There are two types of radiation therapy. External radiation therapy uses a machine outside the body to send radiation toward the cancer. Internal radiation therapy uses a radioactive substance sealed in needles, seeds, wires, or catheters that are placed directly into or near the cancer. The way the radiation therapy is given depends on the type and stage of the cancer being treated.

Biologic therapy

Biologic therapy is a treatment that uses the patient's immune system to fight cancer. Substances made by the body or made in a laboratory are used to boost, direct, or restore the body's natural defenses against cancer. This type of cancer treatment is also called biotherapy or immunotherapy.

Other types of treatment are being tested in clinical trials. These include the following:

Chemoimmunotherapy

Chemoimmunotherapy is the use of anticancer drugs combined with biologic therapy to boost the immune system to kill cancer cells.

Treatment Options by Stage

Stage 0 Melanoma

Treatment of stage 0 melanoma is usually surgery to remove the tumor and a small amount of normal tissue around it.

Stage I Melanoma

Treatment of stage I melanoma may include the following:

- Surgery to remove the tumor and some of the normal tissue around it.
- A clinical trial of surgery to remove the tumor and some of the normal tissue around it, with or without lymph node mapping and selective lymphadenectomy.
- A clinical trial of new techniques to detect cancer cells in the lymph nodes.
- A clinical trial of lymphadenectomy with or without adjuvant therapy.

Stage II Melanoma

Treatment of stage II melanoma may include the following:

- Surgery to remove the tumor and some of the normal tissue around it, followed by removal of nearby lymph nodes.
- Lymph node mapping and sentinel lymph node biopsy, followed by surgery to remove the tumor and some of the normal tissue around it. If cancer is found in the sentinel lymph node, a second surgical procedure can be performed to remove additional nearby lymph nodes.
- Surgery followed by high-dose biologic therapy.
- A clinical trial of adjuvant chemotherapy and/or biologic therapy, or immunotherapy.
- A clinical trial of new techniques to detect cancer cells in the lymph nodes.

Stage III Melanoma

Treatment of stage III melanoma may include the following:

- Surgery to remove the tumor and some of the normal tissue around it.
- Surgery to remove the tumor with skin grafting to cover the wound caused by surgery.
- Surgery followed by biologic therapy.
- A clinical trial of surgery followed by chemotherapy and/or biologic therapy.
- A clinical trial of biologic therapy.
- A clinical trial comparing surgery alone to surgery with biologic therapy.
- A clinical trial of chemoimmunotherapy or biologic therapy.
- A clinical trial of hyperthermic isolated limb perfusion using chemotherapy and biologic therapy.
- A clinical trial of biologic therapy and radiation therapy.

Stage IV Melanoma

Treatment of stage IV melanoma may include the following:

- Surgery or radiation therapy as palliative therapy to relieve symptoms and improve quality of life.
- Chemotherapy and/or biologic therapy.
- A clinical trial of new chemotherapy and/or biologic therapy, or vaccine therapy.
- A clinical trial of radiation therapy as palliative therapy to relieve symptoms and improve quality of life.
- A clinical trial of surgery to remove all known cancer.

Treatment Options for Recurrent Melanoma

Treatment of recurrent melanoma may include the following:

- Surgery to remove the tumor.
- Radiation therapy as palliative therapy to relieve symptoms and improve quality of life.
- Palliative treatment with biologic therapy.
- Hyperthermic isolated limb perfusion.
- A clinical trial of biologic therapy and/or chemotherapy as palliative therapy to relieve symptoms and improve quality of life.

Glossary Terms

abdomen (AB-doh-men)

The area of the body that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs.

abnormal

Not normal. An abnormal lesion or growth may be cancerous, premalignant (likely to become cancer), or benign.

adjuvant therapy (A-joo-vant THAYR-uh-pee)

Treatment given after the primary treatment to increase the chances of a cure. Adjuvant therapy may include chemotherapy, radiation therapy, hormone therapy, or biological therapy.

aggressive

A quickly growing cancer.

basal cell carcinoma (BAY-sal sel KAR-sih-NOH-muh)

A type of skin cancer that arises from the basal cells, small round cells found in the lower part (or base) of the epidermis, the outer layer of the skin.

biological therapy (BY-oh-LAH-jih-kul THAYR-uh-pee)

Treatment to stimulate or restore the ability of the immune system to fight cancer, infections, and other diseases. Also used to lessen certain side effects that may be caused by some cancer treatments. Also called immunotherapy, biotherapy, biological response modifier therapy, and BRM therapy.

biopsy (BY-op-see)

The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue. When

only a sample of tissue is removed, the procedure is called an incisional biopsy. When an entire lump or suspicious area is removed, the procedure is called an excisional biopsy. When a sample of tissue or fluid is removed with a needle, the procedure is called a needle biopsy, core biopsy, or fine-needle aspiration.

biotherapy (BY-oh-THAYR-uh-pee)

Treatment to stimulate or restore the ability of the immune system to fight cancer, infections, and other diseases. Also used to lessen certain side effects that may be caused by cancer treatment. Also called biological therapy, immunotherapy, biological response modifier therapy, and BRM therapy.

blood

A tissue with red blood cells, white blood cells, platelets, and other substances suspended in fluid called plasma. Blood takes oxygen and nutrients to the tissues, and carries away wastes.

cancer

A term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic system to other parts of the body. There are several main types of cancer. Carcinoma is cancer that begins in the skin or in tissues that line or cover internal organs. Sarcoma is cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue. Leukemia is cancer that starts in blood-forming tissue such as the bone marrow, and causes large numbers of abnormal blood cells to be produced and enter the bloodstream. Lymphoma and multiple myeloma are cancers that begin in the cells of the immune system.

catheter (KATH-i-ter)

A flexible tube used to deliver fluids into or withdraw fluids from the body.

cauterization (KAW-ter-ih-ZAY-shun)

The destruction of tissue with a hot instrument, an electrical current, or a caustic substance.

cell

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

centimeter (SEN-tih-MEE-ter)

A measure of length in the metric system. A centimeter is one hundredth of a meter. There are 2½ centimeters in an inch.

chemoimmunotherapy (KEE-moh-IH-myoo-noh-THAYR-uh-pee)

Chemotherapy combined with immunotherapy. Chemotherapy uses different drugs to kill or slow the growth of cancer cells; immunotherapy uses treatments to stimulate or restore the ability of the immune system to fight cancer.

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

chest x-ray

An x-ray of the structures inside the chest. An x-ray is a type of high-energy radiation that can go through the body and onto film, making pictures of areas inside the chest, which can be used to diagnose disease.

clinical trial

A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called a clinical study.

CT scan

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

cutaneous (kyoo-TAY-nee-us)
Having to do with the skin.

dermis (DER-mis)

The lower or inner layer of the two main layers of tissue that make up the skin.

diagnosis

The process of identifying a disease by the signs and symptoms.

dose

The amount of medicine taken, or radiation given, at one time.

duct (dukt)

In medicine, a tube or vessel of the body through which fluids pass.

epidermis (ep-i-DER-mis)

The upper or outer layer of the two main layers of tissue that make up the skin.

excisional biopsy (ek-SI-zhun-al BY-op-see)

A surgical procedure in which an entire lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

external radiation (ray-dee-AY-shun)

Radiation therapy that uses a machine to aim high-energy rays at the cancer. Also called external-beam radiation.

glucose

A type of sugar; the chief source of energy for living organisms.

hyperthermic perfusion

A procedure in which a warmed solution containing anticancer drugs is used to bathe, or is passed through the blood vessels of, the tissue or organ containing the tumor.

immune system (im-YOON)

The complex group of organs and cells that defends the body against infections and other diseases.

immunotherapy (IH-myoo-noh-THAYR-uh-pee)

Treatment to stimulate or restore the ability of the immune system to fight cancer, infections, and other diseases. Also used to lessen certain side effects that may be caused by cancer treatment. Also called biological therapy, biotherapy, biological response modifier therapy, and BRM therapy.

in situ cancer

Early cancer that has not spread to neighboring tissue.

infection

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

injection

Use of a syringe and needle to push fluids or drugs into the body; often called a "shot."

internal radiation (...RAY-dee-AY-shun)

A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near a tumor. Also called brachytherapy, implant radiation, and interstitial radiation.

intraocular melanoma

A rare cancer of melanocytes (cells that produce the pigment melanin) found in the eye. Also called ocular melanoma.

isolated limb perfusion

A technique that may be used to deliver anticancer drugs directly to an arm or leg. The flow of blood to and from the limb is temporarily stopped with a tourniquet, and anticancer drugs are put directly into the blood of the limb. This allows the person to receive a high dose of drugs in the area where the cancer occurred. Also called limb perfusion.

laboratory test

A medical procedure that involves testing a sample of blood, urine, or other substance from the body. Tests can help determine a diagnosis, plan treatment, check to see if treatment is working, or monitor the disease over time.

lesion (LEE-zhun)

An area of abnormal tissue. A lesion may be benign (noncancerous) or malignant (cancerous).

liver

A large organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile.

lung

One of a pair of organs in the chest that supplies the body with oxygen, and removes carbon dioxide from the body.

lymph (limf)

The clear fluid that travels through the lymphatic system and carries cells that help fight infections and other diseases. Also called lymphatic fluid.

lymph node (limf node)

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

lymph node mapping

The use of dyes and radioactive substances to identify lymph nodes that may contain tumor cells. Also called lymphatic mapping.

lymphadenectomy (LIM-fa-deh-NEK-toh-mee)

A surgical procedure in which the lymph nodes are removed and examined to see whether they contain cancer. For a regional lymphadenectomy, some of the lymph nodes in the tumor area are removed; for a radical lymphadenectomy, most or all of the lymph nodes in the tumor area are removed. Also called lymph node dissection.

lymphatic system (lim-FAT-ik SIS-tem)

The tissues and organs that produce, store, and carry white blood cells that fight infections and other diseases. This system includes the bone marrow, spleen, thymus, lymph nodes, and lymphatic vessels (a network of thin tubes that carry lymph and white blood cells). Lymphatic vessels branch, like blood vessels, into all the tissues of the body.

malignant (muh-LIG-nant)

Cancerous. Malignant tumors can invade and destroy nearby tissue and spread to other parts of the body.

melanin (MEL-a-nin)

The substance that gives color to skin and eyes.

melanocyte (mel-AN-o-site)

A cell in the skin and eyes that produces and contains the pigment called melanin.

melanoma (MEH-luh-NOH-muh)

A form of skin cancer that begins in melanocytes (the cells that make the pigment melanin). Melanoma usually begins in a mole.

millimeter

A measure of length in the metric system. A millimeter is one thousandth of a meter. There are 25 millimeters in an inch.

mole (mohl)

In medicine, a benign growth on the skin that is formed by a cluster of melanocytes (cells that make the pigment melanin). Moles are usually dark, and may be raised from the skin.

MRI

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

organ

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

palliative therapy (PA-lee-uh-tiv...)

Treatment given to relieve the symptoms and reduce the suffering caused by cancer and other life-threatening diseases. Palliative cancer therapies are given together with other cancer treatments, from the time of diagnosis, through treatment, survivorship, recurrent or advanced disease, and at the end of life.

pathologist (puh-THAH-loh-jist)

A doctor who identifies diseases by studying cells and tissues under a microscope.

PDQ

Physician Data Query. PDQ is an online database developed and maintained by the National Cancer Institute. Designed to make the most current, credible, and accurate cancer information available to health professionals and the public, PDQ contains peer-reviewed summaries on cancer treatment, screening, prevention, genetics, complementary and alternative medicine, and supportive care; a registry of cancer clinical trials from around the world; and directories of physicians, professionals who provide genetics

services, and organizations that provide cancer care. Most of this information, and more specific information about PDQ, can be found on the NCI's Web site at <http://www.cancer.gov/cancertopics/pdq>.

pelvis

The lower part of the abdomen, located between the hip bones.

PET scan

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

pigment

A substance that gives color to tissue. Pigments are responsible for the color of skin, eyes, and hair.

primary tumor

The original tumor.

prognosis (prog-NO-sis)

The likely outcome or course of a disease; the chance of recovery or recurrence.

quality of life

The overall enjoyment of life. Many clinical trials assess the effects of cancer and its treatment on the quality of life. These studies measure aspects of an individual's sense of well-being and ability to carry out various activities.

radiation (RAY-dee-AY-shun)

Energy released in the form of particles or electromagnetic waves. Common sources of radiation include radon gas, cosmic rays from outer space, and medical x-rays.

radiation therapy (RAY-dee-AY-shun THAYR-uh-pee)

The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy, implant radiation, or brachytherapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy.

radioactive (RAY-dee-oh-AK-tiv)

Giving off radiation.

radioactive seed

A small, radioactive pellet that is placed in or near a tumor. Cancer cells are killed by the energy given off as the radioactive material decays (breaks down).

recur

To occur again.

recurrent cancer

Cancer that has returned after a period of time during which the cancer could not be detected. The cancer may come back to the same place as the original (primary) tumor or to another place in the body. Also called recurrence.

regional chemotherapy (REE-juh-nul KEE-moh-THAYR-uh-pee)

Treatment with anticancer drugs directed to a specific area of the body.

risk factor

Something that may increase the chance of developing a disease. Some examples of risk factors for cancer include age, a family history of certain cancers, use of tobacco products, certain eating habits, obesity, lack of exercise, exposure to radiation or other cancer-causing agents, and certain genetic changes.

sentinel lymph node

The first lymph node to which cancer is likely to spread from the primary tumor. When cancer spreads, the cancer cells may appear first in the sentinel node before spreading to other lymph nodes.

sentinel lymph node biopsy

Removal and examination of the sentinel node(s) (the first lymph node(s) to which cancer cells are likely to spread from a primary tumor). To identify the sentinel lymph node(s), the surgeon injects a radioactive substance, blue dye, or both near the tumor. The surgeon then uses a scanner to find the sentinel lymph node(s) containing the radioactive substance or looks for the lymph node(s) stained with dye. The surgeon then removes the sentinel node(s) to check for the presence of cancer cells.

skin graft

Skin that is moved from one part of the body to another.

squamous cell carcinoma (SKWAY-mus sel KAR-sih-NOH-muh)

Cancer that begins in squamous cells, which are thin, flat cells that look like fish scales. Squamous cells are found in the tissue that forms the surface of the skin, the lining of the hollow organs of the body, and the passages of the respiratory and digestive tracts. Also called epidermoid carcinoma.

stage

The extent of a cancer in the body. Staging is usually based on the size of the tumor, whether lymph nodes contain cancer, and whether the cancer has spread from the original site to other parts of the body.

stage I melanoma

Stage I is divided into stages IA and IB. In stage IA, the tumor is not more than 1 millimeter thick, with no ulceration. The tumor is in the epidermis (outer layer of skin) and upper layer of the dermis (inner layer of skin). In stage IB, the tumor is either not more than 1 millimeter thick, with ulceration, and may have spread into the dermis or the tissue below the skin; or 1 to 2 millimeters thick, with no ulceration.

stage II melanoma

Stage II is divided into stages IIA, IIB, and IIC. In stage IIA, the tumor is either 1 to 2 millimeters thick, with ulceration; or 2 to 4 millimeters thick, with no ulceration. In stage IIB, the tumor is either 2 to 4 millimeters thick, with ulceration; or more than 4 millimeters thick, with no ulceration. In stage IIC, the tumor is more than 4 millimeters thick, with ulceration.

stage III melanoma

The tumor may be any thickness, with or without ulceration (formation of a break on the skin or surface of an organ), and (1) has spread to 1 or more lymph nodes; or (2) has spread into the nearby lymph system but not into nearby lymph nodes; or (3) has spread to lymph nodes that are matted (not moveable); or (4) satellite tumors (additional tumor growths within 2 centimeters of the original tumor) are present and nearby lymph nodes are involved.

stage IV melanoma

The tumor may be any thickness, with or without ulceration (formation of a break on the skin or surface of an organ), may have spread to 1 or more nearby lymph nodes, and has spread to other places in the body.

staging (STAY-jing)

Performing exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body. It is important to know the stage of the disease in order to plan the best treatment.

standard therapy (...THAYR-uh-pee)

In medicine, treatment that experts agree is appropriate, accepted, and widely used. Health care providers are obligated to provide patients with standard therapy. Also called standard of care or best practice.

surgery (SER-juh-ree)

A procedure to remove or repair a part of the body or to find out whether disease is present. An operation.

symptom

An indication that a person has a condition or disease. Some examples of symptoms are headache, fever, fatigue, nausea, vomiting, and pain.

systemic chemotherapy (sis-TEH-mik KEE-moh-THAYR-uh-pee)

Treatment with anticancer drugs that travel through the blood to cells all over the body.

tissue (TISH-oo)

A group or layer of cells that work together to perform a specific function.

tumor (TOO-mer)

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

ulceration

The formation of a break on the skin or on the surface of an organ. An ulcer forms when the surface cells die and are cast off. Ulcers may be associated with cancer and other diseases.

ultraviolet radiation (ul-tra-VYE-o-let ray-dee-AY-shun)

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

urine (YOOR-in)

Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra.

vaccine

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

x-ray

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