What is Skin Cancer?

Skin cancer is the most common of all cancers.It is the most common form of human cancer. It is estimated that over 1 million new cases occur annually. The annual rates of all forms of skin cancer are increasing each year, representing a growing public concern. It has also been estimated that nearly half of all Americans who live to age 65 will develop skin cancer at least once.

The most common warning sign of skin cancer is a change in the appearance of the skin, such as a new growth or a sore that will not heal.

There are three main types of skin cancers:

- **Squamous Cell Carcinoma**

  The top layer of the epidermis is mostly made up of flat, scale-like cells called squamous cells. Approximately 16% of skin cancers begin in this layer, and are called squamous cell carcinoma. They usually arise from sun exposure, but can appear on skin that has been burned, damaged by chemicals, or exposed to x-rays.

- **Basal Cell Carcinoma**

  Under squamous cells, in the lower epidermis are round cells known as basal cells. About 80% of skin cancers arise from this layer in skin that has been exposed to the sun, and are called basal cell carcinoma. Basal cell carcinomas most often form on the head and neck.

- **Melanoma**

  The deepest layer of the epidermis contains scattered cells called melanocytes, which produce the melanin that gives skin color. Melanoma starts in melanocytes, and it is the most serious of the three cancer types. For more information, see the summary on melanoma.

Basal cell and squamous cell cancers are known as non-melanoma skin cancers, to distinguish them from melanoma, which is much more dangerous. Basal cell carcinoma grows slowly and seldom spreads (metastasizes) to other parts of the body. Squamous cell carcinoma also rarely spreads, but is more likely to do so than basal cell carcinoma.

As we well know, there are many kinds of cancer; unfortunately they all come about because of the out-of-control growth of abnormal cells.

Basal cell carcinoma is the most common form of skin cancer. The second most common type of skin malignancy is squamous cell carcinoma. Although these 2 types of skin cancer are the most common of all malignancies, they account for less than 0.1% of patient deaths due to cancer. Both of these types of skin cancer are more likely to occur in individuals of light complexion who have had significant exposure to sunlight, and both types of skin cancers are more common in the southern latitudes of the Northern hemisphere.The overall cure rate for both types of skin cancer is directly related to the stage of the disease and the type of treatment used However, since neither basal cell carcinoma nor squamous cell carcinoma are reportable diseases, precise 5-year cure rates are not known. Although basal cell carcinoma and squamous cell carcinoma are by far the most frequent types of skin tumors, the skin can also be the site of a large variety of malignant neoplasms. These other types of malignant disease include malignant melanoma, cutaneous T-cell lymphomas (mycosis fungoides), Kaposi's sarcoma extramammary Paget's disease, apocrine carcinoma of the skin, and metastatic malignancies from various primary sites.

Basal cell carcinoma

Basal cell carcinoma is at least 3 times more common than squamous cell carcinoma in non- immuno compromised patients. It usually occurs on sun exposed areas of skin, and the nose is the most frequent site. Although there are many different clinical presentations for basal cell carcinoma, the most characteristic type is the asymptomatic nodular or nodular ulcerative lesion that is elevated from the surrounding skin and has a pearly quality and contains telangiectatic vessels. It is recognized that basal cell carcinoma has a tendency to be locally destructive. High-risk areas for tumor recurrence include the central face (periorbital region, eyelids, nasolabial fold, nose-cheek angle), postauricular region, pinna, ear canal, forehead, and scalp. A specific subtype of basal cell carcinoma is the morphea-form type. It typically appears as a scar-like, firm plaque and because of indistinct clinical tumor margins, it is difficult to treat adequately with traditional treatments.

Squamous cell carcinoma

Squamous cell tumors also tend to occur on sun-exposed portions of the skin such as the ears, lower lip, and dorsa of the hand. However, squamous cell carcinomas that arise in areas of non-sun-exposed skin or that originate de novo on areas of sun-exposed skin are prognostically worse since they have a greater tendency to metastasize. Chronic sun damage, sites of prior burns, arsenic exposure, chronic cutaneous inflammation as seen in long standing skin ulcers, and sites of previous x-ray therapy are predisposed to the development of squamous cell carcinoma.

Actinic keratosis

Actinic keratoses are potential precursors of squamous cell carcinoma. These typical red scaly patches usually arise on areas of chronically sun-exposed skin, and are likely to be found on the face and dorsal aspects of the hand. Although the vast majority of actinic keratoses do not become squamous cell carcinomas, it is thought that as many as 5% of

actinic keratoses will evolve into this locally invasive carcinoma. Due to this premalignant potential, the destruction of actinic keratoses is advocated.

Healthy Cells vs. Cancer Cells

Healthy cells are like a cat. They need structure to determine the size of bones and shape of the body, tail and whiskers. The DNA in genes and chromosomes determine this. They need energy to play and prowl and sustain life. This is derived from chemicals in food. Cats need a system to deliver chemicals (food nutrients like amino acids, carbohydrates, fats, vitamins and minerals) to all parts of their body. These are the blood vessels. Growth factors take a kitten into a lazy old cat, all the while helping it to function normally.

The body and its cells are mostly made up of protein. The building blocks of proteins are substances called amino acids that in the form of enzymes and hormones literally control every chemical reaction within the cells. When these are modified, different messages are sent to a complex control system that can alter their function. There are twenty different kinds of amino acids that are essential to life. Twelve of these can be synthesized within the body however; eight must be supplied by the daily diet.

Structure	
Normal Cells	**Cancer Cells**
DNA in genes and chromosomes go about their business in a normal way.	Cancer cells develop a different DNA or gene structure or acquire abnormal numbers of chromosomes.
Cells divide in an orderly way to produce more cells only when the body needs them.	Cells continue to be created without control or order. If not needed, a mass of tissue is formed which is called a tumor.
Energy	
Normal Cells	**Cancer Cells**
Cells derive 70% of their energy from a system called the “Krebs Cycle.”	Cells have a defective “Krebs Cycle” and derive little or no energy from it.
Cells derive only 20% of their energy from a system called “Glycolosis.”	Cancer cells derive almost all their energy from “Glycolosis.”
Cells derive most of their energy with the use of oxygen.	Cells derive most of their energy in the absence of oxygen.
Blood Vessels	
Normal Cells	**Cancer Cells**
Cells have a built-in blood vessel system.	Cells do not have a built-in blood vessel system. They require more of certain amino acids to grow.

Growth Factors	
Normal Cells	**Cancer Cells**
While similar to cancer cells, the amount of them is more in balance to produce a more normal level of activity.	These cells have over produced, require more chemicals (food) and are over active.

Functions	
Normal Cells	**Cancer Cells**
The enzymes and hormones go about business in a normal balanced manner.	The enzymes and hormones are either over active or under active.
Tumors are Different	
Benign	**Malignant**
Benign tumors are not cancerous. They do not invade nearby tissues nor spread to other parts of the body. They can be removed and are not a threat to life.	Malignant tumors are cancerous. They can invade and damage nearby tissues and organs and they can break away and enter the blood stream to form new tumors in other parts of the body. The spread of cancer is called metastasis.

What is screening?

Screening is looking for cancer before a person has any symptoms. This can help find cancer at an early stage. When abnormal tissue or cancer is found early, it may be easier to treat. By the time symptoms appear, cancer may have begun to spread.

Scientists are trying to better understand which people are more likely to get certain types of cancer. They also study the things we do and the things around us to see if they cause cancer. This information helps doctors recommend who should be screened for cancer, which screening tests should be used, and how often the tests should be done.

It is important to remember that your doctor does not necessarily think you have cancer if he or she suggests a screening test. Screening tests are given when you have no cancer symptoms.

If a screening test result is abnormal, you may need to have more tests done to find out if you have cancer. These are called diagnostic tests.

Screening tests have risks.

Decisions about screening tests can be difficult. Not all screening tests are helpful and most have risks. Before having any screening test, you may want to discuss the test with your doctor. It is important to know the risks of the test and whether it has been proven to reduce the risk of dying from cancer.

The risks of melanoma screening tests include the following:

Finding melanoma may not improve health or help a person live longer.

Screening may not improve your health or help you live longer if you have advanced melanoma or if it has already spread to other places in your body.

Some cancers never cause symptoms or become life-threatening, but if found by a screening test, the cancer may be treated. It is not known if treatment of these cancers would help you live longer than if no treatment were given, and treatments for cancer may have serious side effects.

False-negative test results can occur.

Screening test results may appear to be normal even though melanoma is present. A person who receives a false-negative test result (one that shows there is no cancer when there really is) may delay seeking medical care even if there are symptoms.

False-positive test results can occur.

Screening test results may appear to be abnormal even though no cancer is present. A false-positive test result (one that shows there is cancer when there really isn't) can cause anxiety and is usually followed by more tests (such as a biopsy), which also have risks.

A biopsy may cause scarring.

When a skin biopsy is done, the doctor will try to leave the smallest scar possible, but there is a risk of scarring and infection.

Your doctor can advise you about your risk for skin cancer and your need for screening tests.

Basal Cell Carcinoma of the Skin

The traditional methods of treatment involve the use of cryosurgery, radiation therapy, electrodesiccation and curettage, and simple excision. Each of these methods is useful in specific clinical situations. Depending on case selection, these methods have cure rates ranging from 85% to 95%. Mohs micrographic surgery, a newer surgical technique, has the highest 5-year cure rates for surgical treatment of both primary (96%) and recurrent (90%) tumors. This method uses microscopic control to evaluate the extent of tumor invasion.

Standard treatment options:

1. **Mohs micrographic surgery.** Although this method is complicated and requires special training, it has the highest cure rate of all surgical treatments because the tumor is microscopically delineated until it is completely removed. While other treatment methods for recurrent basal cell carcinoma have failure rates of about 50%, cure rates have been reported at 96% when treated by Mohs micrographic surgery. In addition, it is indicated for the treatment of primary basal cell carcinomas when they occur at sites known to have a high initial treatment failure rate with traditional methods (periorbital area, nasolabial fold, nose-cheek angle, posterior cheek sulcus, pinna, ear canal, forehead, scalp, or tumors arising in a scar). Mohs micrographic surgery is also indicated for tumors with poorly defined clinical borders, tumors with diameters larger than 2 cm, tumors with histopathologic features showing morpheaform or sclerotic patterns, and tumors arising in regions where maximum preservation of uninvolved tissue is desirable, such as eyelid, nose, finger, and genitalia.
2. **Simple excision with frozen or permanent sectioning for margin evaluation.** This traditional surgical treatment usually relies on surgical margins ranging from 3 to 10 mm, depending on the diameter of the tumor. Tumor recurrence is not

uncommon because only a small fraction of the total tumor margin is examined pathologically. Recurrence rate for primary tumors greater than 1.5 cm in diameter is at least 12% within 5 years; if the primary tumor measures larger than 3 cm, the 5-year recurrence rate is 23.1%. Primary tumors of the ears, eyes, scalp, and nose have recurrence rates ranging from 12.9% to 25%.

3. **Electrodesiccation and curettage.** This method is the most widely employed method for removing primary basal cell carcinomas. Although it is a quick method for destroying the tumor, adequacy of treatment cannot be assessed immediately since the surgeon cannot visually detect the depth of microscopic tumor invasion.

   Tumors with diameters ranging from 2 to 5 mm have a 15% recurrence rate after treatment with electrodesiccation and curettage. When tumors larger than 3 cm are treated with electrodesiccation and curettage, a 50% recurrence rate should be expected within 5 years.

4. **Cryosurgery.** Cryosurgery may be considered for small, clinically well defined primary tumors. It is especially useful for debilitated patients with medical conditions that preclude other types of surgery. However, the absolute contraindications for cryosurgery include patients with abnormal cold tolerance, cryoglobulinemia, cryofibrinogenemia, Raynaud's disease (only for treatment of lesions on hands and feet), and platelet deficiency disorders. Morphea or sclerosing basal cell carcinoma should not be treated by cryosurgery. Relative contraindications to cryosurgery include tumors of the scalp, ala nasi, nasolabial fold, tragus, postauricular sulcus, free eyelid margin, upper lip vermillion border, and lower legs. Caution should also be used before treating nodular ulcerative neoplasia greater than 3 cm, carcinomas fixed to the underlying bone or cartilage, tumors situated on the lateral margins of the fingers and at the ulnar fossa of the elbow, or recurrent carcinomas following surgical excision. There is significant morbidity associated with the use of cryosurgery. Edema is common following treatment, especially around the periorbital region, temple, and forehead. Treated tumors usually exude necrotic material, after which an eschar forms and persists for about 4 weeks. Permanent pigment loss at the treatment site is unavoidable. Atrophy and hypertrophic scarring have been reported, as well as instances of motor and sensory neuropathy.
5. **Radiation therapy.** Radiation is a logical treatment choice, particularly for primary lesions requiring difficult or extensive surgery (e.g., eyelids, nose, ears). It eliminates the need for skin grafting when surgery would result in an extensive defect. Cosmetic results are generally good to excellent with a small amount of hypopigmentation or telangiectasia in the treatment port. Radiation therapy can also be used for lesions that recur after a primary surgical approach. Radiation therapy is contraindicated for patients with xeroderma pigmentosum, epidermodysplasia verruciformis, or the basal cell nevus syndrome because it may induce more tumors in the treatment area.
6. **Carbon dioxide laser.** This method is most frequently applied to the superficial type of basal cell carcinoma. It may be considered when a bleeding diathesis is present, since bleeding is unusual when this laser is used.
7. Topical fluorouracil (5-FU). This method may be helpful in the management of selected patients with superficial basal cell carcinomas. Careful and prolonged follow-up is required, since deep follicular portions of the tumor may escape treatment and result in future tumor recurrence.

8. **Systemic retinoids.** Although several clinical trials have shown some efficacy for currently available systemic retinoids in both chemotherapy and chemoprevention, the long-term toxicity of these agents generally excludes them as treatment choices for most patients. Studies are exploring their value as cancer preventive agents in patients at high risk for developing multiple tumors.
9. **Interferon alfa.** Several early studies have shown variable responses of basal cell carcinoma to intralesional interferon alfa. Further reports are awaited until this treatment may be recommended for routine clinical practice.
10. **Photodynamic therapy.** Photodynamic therapy with photosensitizers may be effective treatment for superficial epithelial skin tumors.

Follow-up:

- Following treatment for basal cell carcinoma, the patient should be clinically examined every 6 months for 5 years. Thereafter, the patient should be examined for recurrent tumor or new primary tumors at yearly intervals. It has been prospectively found that 36% of patients who develop a basal cell carcinoma will develop a second primary basal cell carcinoma within the next 5 years. Early diagnosis and treatment of recurrent basal cell carcinomas or another primary basal cell carcinoma is desirable since the treatment of the disease in its earliest stages results in less patient morbidity.

Squamous Cell Carcinoma of the Skin

Localized squamous cell carcinoma of the skin is a highly curable disease. The traditional methods of treatment involve the use of cryosurgery, radiation therapy, electrodesiccation and curettage, and simple excision. Each of these methods may be useful in specific clinical situations. Of all treatment methods available, Mohs micrographic surgery has the highest 5-year cure rate for both primary and recurrent tumors. This method uses microscopic control to evaluate the extent of tumor invasion. Lymphadenectomy is indicated when regional lymph nodes are involved.

Standard treatment options:

1. **Mohs micrographic surgery.** Although this method is complicated and requires special training, it has the highest cure rate of all surgical treatments because the tumor is microscopically delineated until it is completely removed. It is indicated for the treatment of primary squamous cell carcinomas when they occur at sites known to have a high initial treatment failure rate following traditional methods, primary tumors with poorly defined clinical borders, primary tumors with diameters larger than 2 cm, or primary tumors arising in regions where the maximum preservation of uninvolved tissue is desirable, such as the face, head, and genitalia. It should be used for squamous cell carcinomas that show perineural invasion since tumor transit along nerves may extend many centimeters away from the primary or recurrent tumor site. Recurrent squamous cell carcinomas can also be treated with this technique.
2. **Simple excision with frozen or permanent sectioning for margin evaluation.** This traditional surgical treatment usually relies on surgical margins ranging from 3 to 10 mm, depending on the diameter of the original tumor. Tumor recurrence

is not uncommon because only a small fraction of the total tumor margin is examined pathologically.

3. **Electrodesiccation and curettage.** This is a quick method for destroying the tumor, but the adequacy of treatment cannot be assessed immediately since the surgeon cannot visually detect the depth of microscopic tumor invasion. It should be reserved for very small primary tumors since this disease has metastatic potential.
4. **Cryosurgery.** Cryosurgery is used for clinically well defined in situ tumors. It is especially useful for debilitated patients with medical conditions that preclude other types of surgery. However, the absolute contraindications for cryosurgery include patients with abnormal cold tolerance, cryoglobulinemia, cryofibrinogenemia, Raynaud's disease, and platelet deficiency disorders. Relative contraindications to cryosurgery include tumors of the scalp, ala nasi, nasolabial fold, tragus, postauricular sulcus, free eyelid margin, upper lip vermillion border, and lower legs. Caution should also be used before treating nodular ulcerative neoplasia greater than 3 cm, carcinomas fixed to the underlying bone or cartilage, tumors situated on the lateral margins of the fingers and at the ulnar fossa of the elbow, or recurrent carcinomas following surgical excision. There is significant morbidity associated with the use of cryosurgery. Edema is common following treatment, especially around the periorbital region, temple, and forehead. Treated tumors usually exude necrotic material, after which an eschar forms and persists for about 4 weeks. Permanent pigment loss at the treatment site is unavoidable. Atrophy and hypertrophic scarring have been reported, as well as instances of motor and sensory neuropathy.
5. **Radiation therapy.** Radiation is a logical treatment choice, particularly for primary lesions requiring difficult or extensive surgery (e.g., eyelids, nose, ears). It eliminates the need for skin grafting when surgery would result in an extensive defect. Cosmetic results are generally good to excellent with a small amount of hypopigmentation or telangiectasia in the treatment port. Radiation therapy can also be utilized for lesions that recur after a primary surgical approach. Radiation therapy is contraindicated for patients with xeroderma pigmentosum, epidermodysplasia verruciformis, or the basal cell nevus syndrome because it may induce more tumors in the treatment area.
6. **Topical fluorouracil (5-FU).** This method may be helpful in the management of selected in situ squamous cell carcinomas (Bowen's disease). Careful and prolonged follow-up is required since deep follicular portions of the tumor may escape treatment and result in future tumor recurrence.
7. **Carbon dioxide laser.** This method may be helpful in the management of selected squamous cell carcinoma in situ. It may be considered when a bleeding diathesis is present, since bleeding is unusual when this laser is used.
8. **Interferon alfa.** Clinical trials are ongoing to treat squamous cell carcinoma with intralesional interferon alfa. The results should be available in several years. One report shows the combination of interferon alfa and retinoids is effective treatment for squamous cell carcinoma.

Follow-up:

- Since squamous cell carcinomas have definite metastatic potential, these patients should be re-examined every 3 months for the first several years and then followed indefinitely at 6-month intervals.

Actinic Keratosis

Actinic keratosis commonly appears in regions of chronic sun exposure such as the face and dorsa of the hands. Actinic cheilitis is a related condition that usually appears on the lower lips. They represent early epithelial transformation that may eventually evolve into invasive squamous cell carcinoma. Actinic keratosis is a premalignant condition that should be treated with one of the methods available.

Standard treatment options:

1. Topical agents:
    1. Trichloroacetic acid.
    2. Phenol.
    3. Fluorouracil (5-FU): Treats the clinically obvious disease as well as regions of subclinical involvement. It is usually associated with a superior cosmetic result.
    4. Retinoic acid: Being evaluated for treatment and prevention of actinic keratosis.
2. Cryosurgery.
3. Electrodesiccation and curettage.
4. Dermabrasion.
5. Shave excision.
6. Carbon dioxide laser.

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. (Refer to the PDQ summary on Intyraocular (Eye) melanoma Treatment for more information.)

Melanoma is more aggressive than basal cell skin cancer or squamous cell skin cancer. (Refer to the PDQ summary on Skin cancer Treatment for more information on basal cell and 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).

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 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.

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).

Types of standard treatment used:

1. 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.

2. 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.

3. 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.

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.

Source: A.P. John Institute for Cancer Research

When considering any type of complementary cancer treatment or alternative cancer treatment, always consult with your physician first, as possible interactions could reduce your treatment protocol's efficacy.