

<b>Title</b>	Skin Cancer the Real Picture for Early Detection and Treatment
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## Purpose

The purpose of this course is to provide general information about skin cancer types that affects the general population.

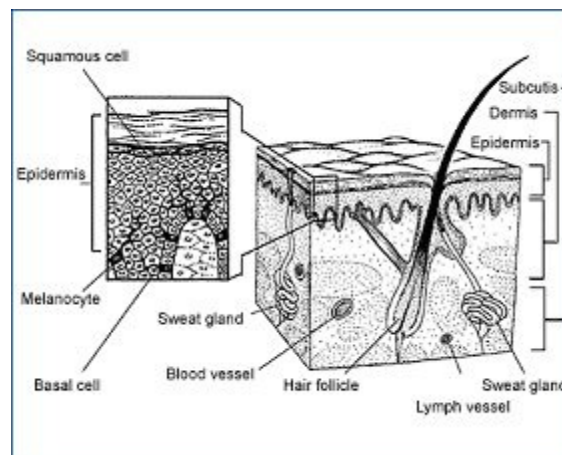
## Objectives

1. Provide epidemiology of various skin cancer types including morbidity and mortality.
  2. Identify the populations at risk.
  3. Identify common types, characteristics, and assessment findings of the various types of skin cancers.
  4. Provide patients with basic knowledge of early detection of suspicious skin lesions.
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## Introduction

The skin is the largest organ in the body. It acts as a barrier to the sun, provides thermoregulation, and provides a waterproof barrier, stores fat, water, and vitamin D. The skin has two distinct layers the epidermis the (outer layer) and dermis (the inner layer). Most skin cancer begins at the epidermal level.

Skin cancer is one of the most common of all human cancers which is preventable and treatable when detected early and treatment is initiated.



## Epidemiology

- Skin cancer is diagnosed in some form in over 1 million people each year.

- There are 900,000 cases of basal cell carcinoma each year.
- In The United States alone there are 80,000-100,000 cases of Squamous Cell Carcinoma
- Melanoma is the most deadly form of skin cancer. There are 45,000 to 50,000 new cases each year.
- In the United States 6-7 deaths from skin cancers are from melanoma.

## Skin Cancer Definition

There are three major types of skin cancer: basal cell carcinoma (BCC), Squamous cell carcinoma (SCC), and melanoma. The majority of skin cancers are BCC and SCC. Although both are malignant they tend not to spread to other parts of the body but can be locally disfiguring if not treated early. Malignant melanoma makes up a small but significant number of skin cancers. Melanoma is a highly aggressive cancer that can rapidly spread to other parts of the body and can be fatal if not treated early.

## Basal Cell Carcinoma and Squamous Cell Carcinoma (non melanoma skin cancers)

### Basal Skin Carcinoma

Basal is the most common of skin cancers as the name implies arises from the basal layer of the skin. (BCC's) typically appear on sun exposed areas, are slow growing, and rarely metastasize. If the tumor is neglected may grow to be both unsightly and locally disfiguring.

### Pathophysiology

The exact etiology of BCCs is not known but it has been well established that there is a relationship between the (BCC) and the pilosebaceous unit because most all of tumors present on hair-bearing areas believes to arise from pluripotent cells. These are the cells that have the capacity to form hair cells (sebaceous glands). Tumors usually arise through an outer sheath of a hair follicle in the epidermis.

**Race:** BCC can occur in people of all races and skin types it is most often found in fair skinned individuals. Dark skinned people are rarely affected.

**Sex:** In the past men were affected twice as many times as women, but changes in lifestyle and activity, the differences are becoming less.

**Age:** The incidence of BCC increases with age. With some exception BCC rarely occurs in patients under 40.

**History:** Patients generally complain of a slowly growing lesion that does not heal and has a tendency to bleed. They also may refer to it as an acne bump that does not heal.

### Risk factors

- Excessive exposure to sunlight and artificial light
- Persons with a fair complexion :( especially light hair blond or red, and light eyes green or blue.
- Burns or scars on skin.
- Chemical exposure arsenic (miners, sheep shearers, and farmers.
- Chronic inflammatory skin disorders or ulcers.

- Radiation Therapy
- Actinic keratosis is brown scaly rough skin lesions which are caused by excessive sunlight that may develop into SCC.

**Physical Presentation:** There are 5 types of BCC and they vary in presentation by type.

- **Nodular** (BCC) Most common type that presents as round pearly papule. These papules contain telangiectasis which is abnormally dilated blood vessels (figure 1). As the (BCC) enlarges it often ulcerates centrally leaving a raised pearly boarder with telangiectasis which can aid diagnosis. Most of this type of (BCC) occur on the face but can also occur on the trunk and extremities.



Figure 1 Nodular BCC

- Cystic (BCC) This type of (BCC) is an uncommon variation that is often indistinguishable from the nodular type and may have a polypoid appearance. These lesions are typically bluish gray and the center is cystic with a gelatin like consistency.
- Pigmented (BCC) This type of BCC is also an uncommon variation of nodular type (Figure 2). They contain brown and black macules in some or all areas that make it difficult to differentiate it from malignant melanoma. Some areas of the tumor do not retain pigment but the raised borders and telangiectases are preserved and can aid in the differential diagnosis of melanoma.

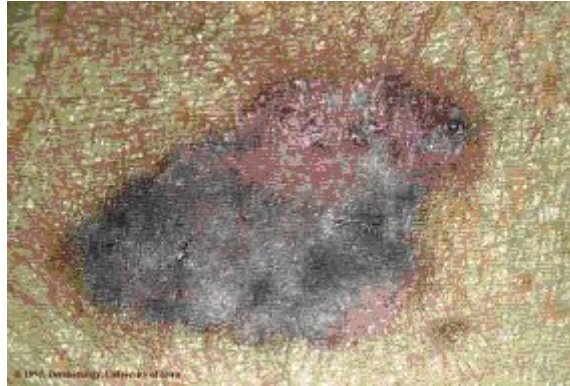


Figure 2. Pigmented BCC

- Morpheaform (BCC) this is a rare variant of BCC where tumor cells induce a proliferation of fibroblast within the dermis with increased collagen deposition. These deposits clinically resemble the tumor itself. The tumor appears waxy, yellow, or sclerotic. The similarity of tumor tissue and collagen deposits makes distinguishing the tumor margins more difficult (Figure 3).



Figure 3. Morpheaform (BCC)

- Superficial (BCC) Appears as a well circumscribed patch, erythematous or whitish scale (figure 4). The areas involved can be intervened by clinically normal skin.

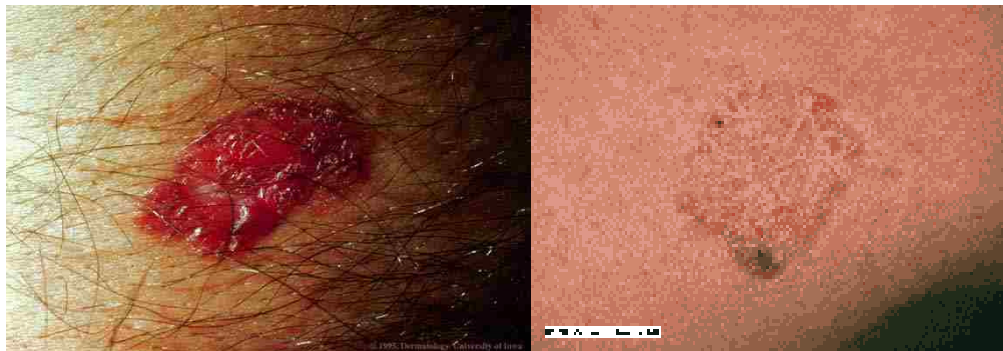


Figure 4. Superficial (BCC)

## Differential Diagnosis

- Melanocytic nevi
- Squamous cell carcinoma
- Actinic keratosis
- Fibrous papule
- Sebaceous hyperplasia

## Lab Studies:

Laboratory and radiological studies are seldom indicated since metastasis of these tumors is rare. Skin biopsies are often performed to confirm histology of the tumor.

## Squamous Cell Carcinoma (SCC)

Squamous cell carcinoma is the second most common form of cutaneous skin cancer. This type of skin cancer generally arises from overexposure to sun light or other forms of artificial forms of light. SCC mostly occurs in middle-aged and elderly individuals. Most of these tumors are easily identified and removed in the doctor's office.

## Pathophysiology

Squamous cell carcinoma is a malignant tumor of the keratinocytes. These tumors arise from sun induced precancerous lesions called actinic keratosis. These tumors generally do not metastasize but are capable of local and distant metastasis if not treated.

## Race:

- Squamous cell carcinoma is common in Caucasians.
- African Americans are rarely affected.
- People of Scottish or Irish ancestry have the highest incidence in the United States.

**Sex:** SCC is twice as common in men as women.

**Age:** SCC generally affects the elderly population at approximately 70 years of age.

**History:** Patient will complain of an enlarging lesion. The SCCs are generally asymptomatic but the presents of bleeding, tenderness and pain may exist. History of northern European ancestry, prolonged sun exposure, and family history of skin cancer is a usual finding. Ionizing radiation is a rare finding.

## Risk Factors/Causes:

- Similar to BCC with the exception of:
- Marjolin ulcer- This SCC arises from a chronic area of inflammation (i.e. an old burn scar or draining sinus tract).
- May arise as a result of the HPV (Human papillomavirus).
- Failure of DNA to repair sun damaged skin.

## Physical Presentation

May present with or without symptoms with many primary morphologies.

- Similar to actinic keratosis, lesions may appear as scaly pink patch or a thin patch with sharply demarcated borders that is associated with Bowen's disease. This type of lesion is generally asymptomatic. SCC can also be a whitish plaque that may involve the penis or oral mucosa.



**Figure 5 Actinic keratosis**



**Figure 6 Bowen's disease**

- Keratotic SCC can appear as a raised keratotic pink to flesh colored papule with surrounding sun damaged skin. Lesions may be ulcerated and painful. There may or may not be a cutaneous horn (figure 5).



**Figure 7 Cutaneous horn**

- Erythroplasia of Queyrat Red velvety plaques in situ found in one or more areas of the penis.



**Figure 8 Erythroplasia of Queyrat**

- Nodular SCC: Similar to keratotic lesions this type presents as a more elevated lesion. It may be pink with no overlying changes. When there is pain associated with this lesion there may be nerve and lymph involvement.
- Periungual SCC (tissue surrounding the nail folds) this lesion resembles a wart (verruca) and may be misdiagnoses for many years prior to verification of diagnosis with a biopsy.
- Marjolin ulcer: This type of SCC occurs from a site of chronic inflammation such as a burn scar. These lesions will present as an area of persistent ulceration.
- Typically SCC lesions are 0.5-1.5 cm but can also be larger.

### **Differential diagnosis:**

- Actinic Keratosis
- Basal Cell Carcinoma
- Atypical Fibroxanthoma
- Genital Warts
- Nongenital Warts
- Pyoderma Gangrenosum

### **Lab Studies:**

Lab tests are generally not indicated and diagnosis is based on clinical findings.

- Punch biopsies
- Shave biopsies
- Incisional biopsies
- Excisional biopsies

Biopsies must be at least the depth of the dermis to determine level of invasiveness. These biopsies are done in a physician's office under local anesthesia.

### **Staging:**

- T0 lesions are in situ (at the point of origin)
- T1 lesions are less than 2cm in diameter
- T2 lesions are 2-4 cm in diameter
- T3 lesions are greater than 4 cm in diameter
- T4 lesions are invasive of muscle or bone.

(Goldman, 2003)

## Treatment Options for Non Melanoma Skin Cancers

- Radiation Therapy: This treatment is advocated for the elderly or debilitated who can not or wish not to have surgery. Radiation is given in fractional doses over 5-6 weeks. Radiation is not indicated for young or middle-aged persons due to the risk of developing cutaneous cancers later in life. Cure rate 85-95%
- Cryosurgery: Liquid nitrogen is a safe low cost procedure that is tolerated well by the elderly. This treatment is reserved for well circumscribed lesions. There is a high cure rate.
- Electodesiccation: The use of electrical current to destroy cancer cells. The base and lateral margins are treated. The procedure is repeated twice. This is appropriate for T0 and T1 lesions with a cure rate of 96-99%.
- Standard excision: Appropriate for T1 low risk lesions.
- Mohs surgery: Micrographic surgery used to preserve tissue. It allows the surgeon to map out the tumor margins and increase cure rate. The preserving nature of this surgery offers added benefit for preserving tissue for reconstruction.

## Melanoma

Melanoma is a cancer of the pigment producing cells called melanocytes. Melanocytes are found in the lower part of the epidermis. When skin is exposed to sunlight the melanocytes produce more melanin causing the skin to tan or darken. This malignancy can occur on oral or genital mucosa, skin, ears, GI tract, and the leptomeninges of the CNS. In the interest of this article we will focus solely on the skin cancer form.

## Pathophysiology

The transition of melanocytes to melanoma is poorly understood. Melanomas may develop near or in an existing precursor lesion in what appears to be healthy skin. They may appear without a precursor lesion. Melanomas are said to occur from solar induced radiation. Unlike Squamous and basal cell carcinoma, melanoma stems from a more acute, intense, and blistering sun burn. Melanoma may develop from precursor lesions such as common acquired nevus, congenital nevus, dysplastic nevus, and cellular blue nevus. Melanoma may appear in non sun exposed areas such as the palms, feet, and perineum. There have been many genes associated with melanoma that are important in hereditary and sporadic melanomas. Melanoma has 2 growth phases which are radial and vertical. In the radial phase (spreading from a central point) malignant grow on the epidermis. In time, progression to the vertical (deeper) phase occurs is when the lesion invades the dermis and has the ability to metastasize.

## Frequency:

- In the US: Melanoma accounts for approximately 5% of skin cancers, and is responsible for 3 times as many deaths each year as other skin cancers.
- Melanoma is the seventh most common cancer.
- The incidence of melanoma increases by 5-7% yearly
- An estimated 1 per 75 have a lifetime risk for melanoma.
- An estimated 53600 Americans developed cutaneous melanoma in 2002.
- Australia, New Zealand, and Israel have the highest incidence in the world.

**Sex** Men have a slightly higher risk of melanoma than women.



## Age

- Rarely occurs in children less than 10 years.
- Most common in women 25-29 year and is responsible for over 7000 deaths annually.
- The median age for melanoma is 53 years old.

**Race:** Melanoma is 20 times greater in Caucasians than African Americans. Darker skin decreases the risk of melanoma. Fair skinned blonds or red heads that have a tendency to freckle when exposed to the sun are at higher risk.

**History:** The patient usually presents with a mole that has changed color, shape, size height, or symmetry. These characteristics are found in 80% of all cases.

## Risk factors/Causes

- Exposure to natural sunlight, including sunburns during childhood.
- Exposure to artificial ultraviolet light (tanning booth).
- Family or personal history of melanoma.
- Red or blond hair.
- White or light-colored skin and freckles.
- Light eyes.
- Unusual looking moles.
- Dysplastic nevi or congenital nevus.
- 50 or more nevi greater than 2mm.
- Immunosuppression

**Physical:** There are four subtypes of malignant melanoma:

- Superficial melanoma: Most common of the four subtypes that occurs in 70% of patients. Characteristics include a flat or slightly elevated that is greater than 6 mm. The color may be brown with variegated colors of pink black, or blue. The borders are asymmetrical and irregular (figure 9). The most common site is the legs of women and the trunks of men.



**Figure 9 Superficial melanoma**



**Figure 10 Superficial melanoma**

- Nodular melanoma: Accounts for 15-30% of cases. It presents as a dark brown to black papule or may be dome shaped. The lesion may ulcerate and bleed even with minor trauma. Growth occurs over weeks or months. The lesions are usually found on the legs and trunk (figure 11).



**Figure 11 Nodular melanoma**

- Lentigo maligna melanoma: occurs in 4-15% of cutaneous melanoma. Lesions typically appear on the head, neck, and arms of fair skinned individuals at a mean age of 65 years. Grows slowly over 5-20 years. Only 5-8% of this type of melanoma arises from a precursor lesion. If a precursor lesion is present it is usually greater than 3cm in diameter. This lesion will have existed 10-15 years and later develop blue black nodules (figure 12).



**Figure 12 Lentigo maligna melanoma**

- Acral lentiginous melanoma: Although the least common melanoma in Caucasians (2-8%), it accounts for 29-72% in dark skinned persons or African Americans. It is often mistaken for a splinter or hemorrhage. These lesions are typically found on the hands and the soles of the feet. This type of melanoma like the others is highly aggressive and can transition from the radial phase of growth to the vertical phase rapidly.

## Differential diagnosis

- Squamous cell carcinoma
- Dysplastic nevi
- Halo nevus
- Pigmented basal cell carcinoma
- Pigmented actinic keratosis

## Morbidity and mortality

According to stage:

- Stage I: Lesions are less than 1.5 mm thick without evidence of metastasis has a 90% 5 year survival rate.
- Stage II: If the lesion is less than 4mm thick and greater than 1.5mm thick have a 70% overall survival rate if there is no evidence of metastasis.
- Stage III: Lesions 4mm thickness or more or have lymph Involvement has a significantly lower survival rate at about 35-48%.
- Stage IV: The 5 year survival rate is less than 2%. At this stage distant metastasis has already progressed.

## Lab studies:

- Complete blood count
- Chemistry panel may demonstrate evidence of metastasis.
- Aspartate aminotransferase (AST): Elevated levels may indicate bone metastasis.
- Alanine aminotransferase: Elevated levels may indicate liver metastasis.
- Total protein: can determine the over all health of the patient.
- Lactic dehydroginase: is not specific to melanoma but elevated levels may indicate distant metastasis to the lung or liver. It also may be useful as a follow up to melanoma patients. Multiple studies have shown that an elevated LDH may be a predictor of prognosis.

## Imaging studies

- Chest x-ray: In stage I or II it is done as a baseline and is most likely negative. In stage III repeat films are usually done because the lung is the primary site of metastasis.
- CT scan or MRI: Should be done during the work up of a patient with known distant metastasis.

## Procedures:

- Biopsy and surgical excision of suspicious lesion. It may be an excisional biopsy that should include a 1-2 mm margin. If the lesion is large a punch biopsy may be indicated. Shave biopsies are contraindicated because all of the layers must be included. Reexcision must be performed after the biopsy to ensure that reoccurrence would be unlikely. If this is not done there can be a 40% reoccurrence.

Current recommendations for margins of excision are as follows: (Brick, 2004)

- Lesions <1 mm in thickness 1 cm margin
- Lesions 1-4 mm in thickness - 2 cm margin
- Lesions > than 4 mm in thickness - at least 2 cm margin

- Elective lymph node dissection: Patients who have enlarged lymph nodes without the presents of distant metastasis should have this procedure.
- Sentinel lymph node dissection: Lymph from anywhere in the skin drains into a single lymph node. This is called the sentinel lymph node and is commonly the first site of metastasis. There are two techniques to identify the sentinel node. First, there is a procedure of injecting blue dye at the nodal basin and thus identifying it and subsequent removal of the node. Second, there is the use of a radio-labeled solution that is injected into the site and a hand held gamma detector is used to determine the location of the sentinel node.

## Medication:

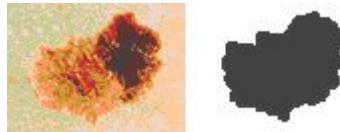
There are many chemotherapeutic medications that may be used in adjunct with surgical intervention. Medications may include dacarbazine, cisplatin, vinblastine, carmustime, and tamoxifen.

Patient education: Patients with a known history.

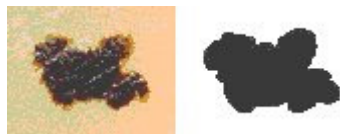
- Protective measures from the sun including sun screens, hats, and protective clothing.
- Regular self skin self exams. It may be helpful to have a friend or significant other assist in the exams.
- Chance of possible reoccurrence from a melanoma scar.
- Screening relatives for a history of abnormal looking moles.

## Prevention and assessment

- A=Asymmetry (right side the of the lesion is unlike the left side)



- B=Border Irregularity (the lesion has a scalloped or poorly defined border)



- C=Color Variation (all parts of the lesion are not the same color; In the lesion there may be patches of tan, brown, black, pink, white or blue)



- D=Diameter (a melanoma is usually greater than 6 millimeters in diameter, about the size of a pencil eraser)



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## Course Exam

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1. Malignant melanoma has the highest mortality rate of all skin cancers.  
 True    False
2. Basal cell carcinoma can be locally disfiguring but rarely metastasizes.  
 True    False
3. Dark skinned persons are an exceptionally high risk for melanoma.  
 True    False
4. Basal cell carcinoma occurs in persons under 40 years.

- True    False
5. Risk factors for basal cell carcinoma include sun exposure, fair complexion, and actinic keratosis.
- True    False
6. Laboratory studies are rarely indicated for Basal cell and squamous cell carcinoma.
- True    False
7. Squamous cell carcinoma is twice as common in woman as men.
- True    False
8. People who have developed human papillomvirus can develop squamous cell carcinoma.
- True    False
9. Melanoma is the seventh most common form of cancer.
- True    False
10. In melanoma, 80% of all cases present with a mole that has changed color, size symmetry, or height.
- True    False
11. Basal cell carcinoma rarely appears on sun exposed areas.
- True    False
12. Stage one melanoma has the highest cure rate.
- True    False
13. The Morpheaform basal cell carcinoma is rare but has the most difficult margins to distinguish.
- True    False
14. Squamous cell carcinoma is most common in Caucasians.
- True    False
15. Pain and bleeding may be present in squamous cell carcinoma.
- True    False
16. Skin biopsies are generally used to confirm diagnosis of most skin cancer.
- True    False
17. Radiation therapy is reserved for middle-aged patients in squamous cell carcinoma.
- True    False
18. The use of electrodesiccation generally safe and provides an 85-95% cure rate for stage T0 and T1 squamous cell carcinoma.
- True    False

19. Melanoma always has a precursor lesion when presenting.

True  False

20. The highest incidence of melanoma exists in Australia New Zealand and Israel.

True  False