Anatomy and Pathophysiology for ICD-10

Module 2

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Content

Module 2

Integumentary System

Terminology

Abscess—A collection of pus that accumulates in a body part, usually due to a bacterial infection.

Biopsy—A diagnostic test in which a specimen is removed for microscopic examination.

Bullous—Also known as a blister is when fluid collects between the epidermis (upper layer of skin) and the layers below. The fluid cushions the tissue underneath, which protects it from further damage.

Carbuncle—A painful localized bacterial infection of the skin and subcutaneous tissue that usually has several openings in which pus is discharged.

Cutaneous—Relating to skin.

Edema—Swelling on the body caused by a buildup of excess fluids.

Furuncle—Also known as a boil, is an infection of the hair follicle.

Impetigo—A contagious, superficial skin infection.

Necrosis—The death or decay of tissue occurring when not enough blood is supplied to the tissue.

Nevus—A brown spot on the skin derived from cells that contain melanin, the pigment that gives skin its color (also known as a mole).

Papule—A small, soft, flesh-colored growth that protrudes from the skin.

Paronychia—An inflammation that affects the tissue surrounding a fingernail, sometimes extending to the tissue under the nail, which is caused by bacterium, virus, or fungus.

Petechia—A small purplish spot on the body surface, such as skin or mucous membrane, caused by a minute hemorrhage.

Skin ulcers—Open sores that develop on the skin when a person sits or lies in the same position for an extended amount of time (also known as bed sores, decubitus ulcers, pressure ulcers).

Verruca—A common wart, which is a benign growth that occurs anywhere on the skin or mucous membranes (there are more than 70 different types).

Vesicle—A small pouch, sac, or hollow organ typically filled with fluid, as in a blister.

Vulgaris—Being of the most common type.

Introduction

The integumentary system is made up of the structures that cover the body: skin, hair, nails, sebaceous glands, and sweat glands. It is the largest organ system in the body. It functions as a protective barrier against outside invasion to harmful substances. It also regulates body temperature, synthesizes vitamin D, and contains touch and pressure receptors.

The skin itself has two parts—the epidermis (the outermost layer) and the dermis underneath. The epidermis consists of five layers containing keratin and pre-keratin substances. The dermis is deeper and thicker and consists of two layers containing fibrous connective tissue, collagen, and other types of cells. The "living" part of the skin is in the dermis—hair bulbs, glands, nerve receptors, etc.

The Epidermis

Epidermal Cells

Four different types of cells are found in the epidermis:

- Melanocytes
- Keratinocytes
- Langerhans cells
- Merkel cells

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Melanocytes are located in the lowest layer of the epidermis and are pigment-producing cells. The pigment that melanocytes make is called melanin. There are typically between 1000 and 2000 melanocytes per square millimeter of skin. Melanocytes comprise from 5 percent to 10 percent of the cells in the basal layer of epidermis and vary in size, but are typically 7 micrometers in length.

The major determinant of color is not the number but rather the activity of the melanocytes (quantity and relative amounts of eumelanin and pheomelanin). This process is under hormonal control, including the MSH and ACTH peptides that are produced from the precursor proopiomelanocortin. Once made, melanin is moved along dendrites (arm-like structures) in a special container called a melanosome, which is shipped to the keratinocytes. Melanin production takes place in unique organelles (tiny structures within the cell) known as melanosomes, which are organized as a protective cap for the nucleus of the keratinocyte. People with darkly pigmented skin, hair, and eyes have melanosomes that contain more melananin.

Keratinocytes are the predominant cell type in the epidermis, comprising about 95 percent of the cells. The major proteins formed within keratinocytes are keratins, which protect the skin and underlying tissue from environmental damage (heat, UV rays, etc.). Keratins are intermediate filament proteins that form the cytoskeleton of keratinocytes. This layer is formed through a process called keratinization or cornification, in which the keratinocytes produce more and more keratin and eventually undergo programmed cell death. The fully cornified keratinocytes that form the outermost layer are constantly shed off and replaced by new cells. Those keratinocytes found in the basal layer of the skin are sometimes referred to as "basal cells" or "basal keratinocytes."

Keratinocytes gradually migrate upward, becoming squamous cells before reaching the surface of the skin over the course of about 30 days, but may be accelerated in some skin diseases, like psoriasis. For this reason, basal cell carcinoma and squamous cell carcinoma are sometimes called keratinocyte cancers. The most common type of keratinocyte cancer is basal cell carcinoma.

Langerhans cells are a specific type of white blood cell found in the stratum spinosum layer of the epidermis and contain large granules called Birbeck granules. They are an important element of the immune system, protecting the skin from harm. Langerhans cells work to prevent infections and help trigger immune reactions by interacting with T-cells. They are considered dendritic cells and are produced in the bone marrow. Langerhans cells are part of an overall category called macrophages, whose name comes from the Greek meaning "big eater." These cells are responsible for the clean-up and elimination of pathogens, dead cells, and cellular debris in the body.

Merkel cells are oval receptor cells found in the stratum basale layer of the epidermis. Their function is not fully understood. They are associated with sensory nerve endings in the skin and are sensitive to light touch and assist in the discrimination of shapes and textures. They can turn malignant and form the skin tumor known as Merkel cell carcinoma.

Epidermal Tissue—Function and Structure

The epidermis contains mostly dead cells and has no blood vessels. The epidermis is important because it protects against water loss, mechanical injury, chemicals, and microorganisms. The thickness of the epidermis varies in different types of skin. It is the thinnest on the eyelids at .05 mm and the thickest on the palms and soles at 1.5 mm.

The epidermis has four to five layers that are called stratum:

- The stratum corneum
- The stratum lucidum
- The stratum granulosum
- The stratum spinosum
- The stratum basale

The stratum corneum is the outermost layer of the epidermis and is made up of dead, flat skin cells that shed about every two weeks, and is largely responsible for the vital barrier function of the skin. The stratum corneum contains about 12–16 layers of corneocytes, which are protein complexes made up of tiny threads of keratin in an organized matrix. These serve as a binding "glue" as it keeps molecules from passing into and out of the skin.

The stratum lucidum is a thin, clear layer of dead skin cells in the epidermis named for its translucent appearance under a microscope. It is found only in areas of thick skin, most noticeably on the palms of the hands and the soles of the feet. It is composed of three to five layers of dead, flattened keratinocytes. The keratinocytes of the stratum lucidum do not feature distinct boundaries and are filled with eleidin, an intermediate form of keratin.

The stratum granulosum is the middle layer and is impermeable to water and water-soluble substances. It forms a barrier between the active cells of the lower epidermis and the outer dead cells. The stratum granulosum is around three to five cells thick; along with lamellar granules (which secrete sheets of fatty substances), these cells also contain keratohyalin granules (which later become keratin).

The stratum spinosum is the fourth of the five layers and is also called the spinous or prickle cell layer because of the presence of cells with spiny arms diverging outward and interconnecting with other prickle cells. The stratum spinosum also contains keratinocytes and Langerhans cells. Its main function is to protect against foreign materials, and to produce and retain layers of lipids that prevent moisture loss from the skin. The stratum spinosum contains five to ten layers of cells.

The stratum basale is the layer of reproducing cells which lies at the base of the epidermis and receives its nourishment from dermal blood vessels. It is also called the germinativum and is responsible for constantly renewing epidermal cells. This layer contains just one row of undifferentiated columnar stem cells that divide very frequently. Half of the cells differentiate and move to the next layer to begin the maturation process. The other half stay in the basal layer and divide over and over again to replenish the basal layer. Cells are pushed outward as new cells are formed, and become keratinized as they die. This is a 14–28 day continual process.

The Dermis

Dermal Cells

Three different types of cells are found in the dermis:

- Fibroblasts
- Mast cells
- Macrophages

Fibroblasts synthesize the extracellular matrix and collagen (the structural framework for tissues), and plays a critical role in wound healing. Fibroblasts are the most common cells of connective tissue in animals. Fibroblasts make collagens, glycosaminoglycans, reticular and elastic fibers, and glycoproteins found in the extracellular matrix and cytokine TSLP. Tissue damage stimulates fibrocytes and induces the mitosis of fibroblasts.

Mast cells are resident cells of several types of tissues and contain many granules rich in histamine and heparin. They play an important protective role as well, being involved in wound healing and defense against pathogens. Two types of mast cells are recognized: those from connective tissue and a distinct set of mucosal mast cells. Mast cells are present in most tissues characteristically surrounding blood vessels and nerves, and are especially prominent near the boundaries between the outside world and the internal environment, such as the skin, mucosa of the lungs, and digestive tract, as well as in the mouth, conjunctiva, and nose.

Mast cells have immunological functions. They form part of an early warning system. When stimulated, they release chemicals that signal either injury or infection and cause an inflammation in the area. The chemicals that are produced by a mast cell are called *mediators*. Two common mediators are histamine and heparin. Histamine, the most important chemical mediator causes capillary walls to become more permeable, or let substances through. Heparin prevents blood from clotting to allow blood to flow to the area of infection or injury. Mast cells play an important role in allergic reactions because of their ability to produce and release histamine.

Macrophages are a type of white blood cell that ingests (takes in) foreign material and produced by the differentiation of monocytes in tissue. Macrophages are key players in the immune response to foreign invaders such as infectious microorganisms. Blood monocytes migrate into the tissues of the body and evolve into macrophages.

Macrophages help destroy bacteria, protozoa, and tumor cells. They also release substances that stimulate other cells of the immune system. And they are involved in antigen presentation. To do this, they carry the antigen on their surface and present it to T cells. Monocytes

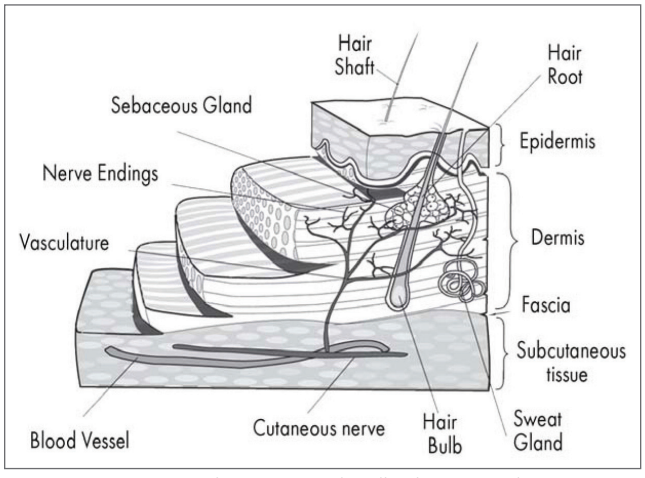
and macrophages are phagocytes. Macrophages function in both non-specific defense (innate immunity) as well as help initiate specific defense mechanisms (adaptive immunity) of vertebrate animals. Their role is to phagocytose (engulf and then digest) cellular debris and pathogens, either as stationary or as mobile cells. They also stimulate lymphocytes and other immune cells to respond to pathogens.

Dermal Tissue—Function and Structure

The dermis contains structures that nourish and innervate the skin. They are:

- Nerves and nerve endings
- Cutaneous blood vessels
- Hair
- Nails
- Glands

The dermis binds the epidermis to underlying tissues and consists of connective tissue with collagen and elastic fibers within a gel-like ground substance. Dermal blood vessels carry nutrients to upper layers of skin and help to regulate temperature. Below the dermis lies the subcutaneous tissue, made up of loose connective tissue and adipose tissue, which provides insulation and protection for deeper structures. It binds the skin to underlying organs and contains the blood vessels that supply the skin.



The dermis has two layers:

- Papillary
- Reticular

The papillary dermis is thinner, consisting of loose connective tissue containing capillaries, elastic fibers, reticular fibers, and some collagen. The connective tissue found in the papillary dermis also helps control the temperature of the skin. The papillary dermis is the main agent in dermis function. It is from here that the dermis supplies nutrients to select layers of the epidermis and regulates temperature. Both of these functions are accomplished with a thin but extensive vascular system that operates like vascular systems throughout the body.

The reticular dermis consists of a thicker layer of dense connective tissue containing larger blood vessels, closely interlaced elastic fibers, and coarse bundles of collagen fibers arranged in layers parallel to the surface. The reticular layer also contains fibroblasts, mast cells, nerve endings, lymphatics, and epidermal appendages. It strengthens the skin, providing structure and elasticity. As a foundation, it supports other components of the skin, such as hair follicles, sweat glands, and sebaceous glands.

Diseases and Disorders

Most skin problems can be categorized into nine different types:

Rashes—A rash is a flat or raised skin eruption characterized by changes in skin color or texture. They can be caused by irritation, allergy, and infection from an underlying disease or structural defects of the skin (blocked pores or malfunctioning oil glands). Some examples of rashes include:

- **Eczema**—Refers to various skin inflammations with common features such as itching, red patches, and small blisters that burst, causing the skin to become moist and crusty. Atopic eczema is the most common type, and is associated with an allergic reaction.
- **Atopic dermatitis**—A chronic, noninfectious skin disease characterized by itchy inflamed skin (usually associated with asthma or hay fever).

- **Contact dermatitis**—A localized reaction that includes redness, itching, and burning due to contact with an allergy-causing substance such as nickel or nail polish or an irritant such as a cleaning agent or other chemical.

There are eleven categories for dermatitis in ICD-10-CM They are:

ICD-10-CM Subcategory	
Atopic dermatitis	L20.
Seborrheic dermatitis	L21.
Diaper dermatitis	L22.
Allergic contact dermatitis	L23.
Irritant contact dermatitis	L24.
Unspecified contact dermatitis	L25.
Exfoliative dermatitis	L26.
Dermatitis due to substance taken internally	L27.
Lichen simplex chronicus and prurigo	L28.
Pruritis	L29.
Other and unspecified dermatitis	L30.

- **Psoriasis**—A chronic, noncontagious skin disorder characterized by scaling of the skin, which occurs when cells in the epidermis (outer layer of skin) form too rapidly and pile up on the surface of the skin.
- **Pityriasis rosea**—A benign skin rash that usually begins with a single oval patch and then spreads, which may be rosy pink, tan, or salmon in color. Most commonly appears on the trunk.

There are six categories for papulosquamous disorders in ICD-10-CM. They are:

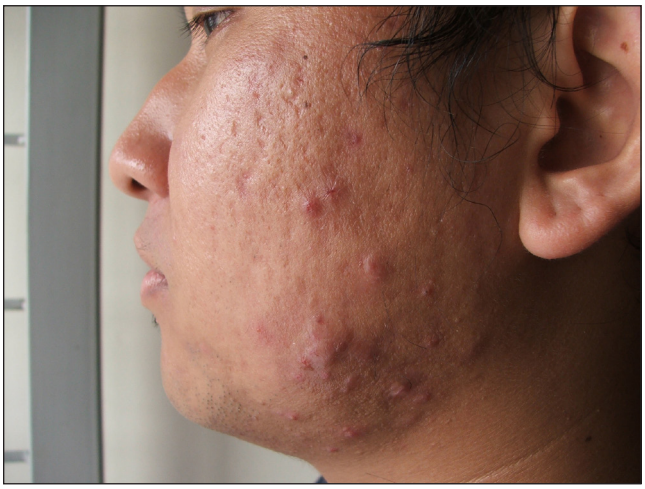
ICD-10-CM Subcategory	
Psoriasis	L40.
Parapsoriasis	L41.
Pityriasis rosea	L42.
Lichen planus	L43.
Other papulosquamous disorders	L44.
Papulosquamous disorders in diseases classified elsewhere	L45.

- **Hives**—Pink, itchy, round swellings that can occur anywhere on the body and develop when natural chemicals, including histamine, are released in the skin. Hives are also known as urticaria, and the most commonly occurs as a response to an allergic reaction to food, medication, pollen, or infections.

There are nine subcategories for hives (urticarial) in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Allergic urticaria	L50.0
Idiopathic urticaria	L50.1
Urticaria due to cold and heat	L50.2
Dermatographic urticaria	L50.3
Vibratory urticaria	L50.4
Cholinergic urticaria	L50.5
Contact urticaria	L50.6
Other urticaria	L50.8
Urticaria, unspecified	L50.9

- **Acne**—An inflammatory condition characterized by whiteheads, blackheads, and pimples. Contrary to common beliefs, acne is very closely linked with hormonal influences rather than poor hygiene, which is why it is most commonly seen during adolescence.



Source: AAPC

There are eight subcategories for acne in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Acne vulgaris	L70.0
Acne conglobata	L70.1
Acne varioliformis	L70.2
Acne tropica	L70.3
Infantile acne	L70.4
Acne excoriee des jeunes filles	L70.5
Other acne	L70.8
Acne, unspecified	L70.9

Viral infections—Viral infections often involve many parts of the body or more than one body system at the same time, which is known as systemic. Other symptoms may include fever, fatigue, sinus congestion, etc. Viral infections differ from bacterial infections in such that they cannot be cured with antibiotics. These types of infections are classified in chapter 1 of ICD-10-CM. Some viral infections include:

- **Viral warts**—A rough, infectious, skin-colored bump caused by a virus in the human papillomavirus family, which are contagious and are caused by direct or indirect contact with the human papilloma-virus.

There are three subcategories for warts in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Plantar wart	B07.0
Other viral warts	B07.8
Viral wart, unspecified	B07.9

- **Herpes simplex virus**—There are two different types of herpes simplex virus (HSV). HSV-1 is the most common type and usually affects the lips, mouth, and face causing sores inside the mouth or cold sores on the lips and face. Herpes simplex virus II is usually sexually transmitted causing genital ulcers or sores.

There are nine subcategories for herpesviral [herpes simplex] infections in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Eczema herpeticum	B00.0
Herpesviral vesicular dermatitis	B00.1
Herpesviral gingivostomatitis and pharyngotonsillitis	B00.2
Herpesviral meningitis	B00.3
Herpesviral encephalitis	B00.4
Herpesviral ocular disease	B00.5
Disseminated herpesviral disease	B00.7
Other forms of herpesviral infection	B00.8
Herpesviral infection, unspecified	B00.9

- **Shingles (Herpes Zoster)**—A painful rash that is a second outbreak of the varicella-zoster virus, the virus that causes chickenpox. Shingles is due to reactivation of the virus that has remained dormant after the initial outbreak of chickenpox. It is characterized by a rash and blisters that typically occur on one side if the body following the path of a nerve. Some older people are at risk for developing postherpatic neuralgia once the shingles have healed causing nerve damage, which leaves the patient with severe pain in the area where blisters occurred, even after the blisters have healed.

There are seven subcategories for herpes zoster in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Zoster encephalitis	B02.0
Zoster meningitis	B02.1
Zoster with other nervous system involvement	B02.2
Zoster ocular disease	B02.3
Disseminated zoster	B02.7
Zoster with other complications	B02.8
Zoster without complications	B02.9

Bacterial infections—Caused by the presence and growth of microorganisms that causes damage to host tissue. The number of organisms present and the

amount of toxins they release will determine the extent of the infection. Infections can be effectively treated with antibiotics. These types of infections are classified in chapter 1 of ICD-10-CM.

- **Staphylococcal infection**—A group of infections caused by bacteria of the *Staphylococcus* genus, commonly know as staph. The bacteria produces illness directly by causing infection or indirectly by making toxins that is responsible for food poisoning and toxic shock syndrome.
- **Streptococcal infections**—Infections caused by the *Streptococcus* genus of bacteria. There are several classified groups within this genus, each one responsible for a different group of infections: group A and group B are the most common types. Group A can be classified as invasive and can be fatal. They include streptococcal toxic shock syndrome, which causes a dramatic drop in blood pressure and organ failure. The second, known as necrotizing fasciitis or "flesh eating disease" is a severe, painful inflammation of the fibrous sheath that encloses and connects the muscles, causing tissue death in surrounding muscle, fat, and skin.

Coding for these types of infections may require more than one code to fully explain the disease process.

ICD-10-CM Subcategory	
Toxic shock syndrome*	A48.3
Necrotizing fasciitis*	M72.6
*Tabular notes indicate for reader to *use additional code to identify causative organism (B95.–B96.)*	
Streptococcus, staphylococcus, and enteococcus as the cause of diseases classified elsewhere	B95.
Other bacterial agents as the cause of diseases classified elsewhere	B96.
Foodborne staphylococcal intoxication (No additional code required because the combination code provides the necessary information)	A05.0

- **Cellulitis**—An acute, spreading infection of the skin with symptoms of redness, warmth, and tenderness of the affected area. Fever, chills and fatigue may also be present. It is a serious condition because the infection can spread via the lymph system or the blood stream.

There are six subcategories for cellulitis in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Cellulitis and lymphangitis of finger and toe	L03.0
Cellulitis and lymphangitis of other parts of limb	L03.1
Cellulitis and lymphangitis of face and neck	L03.2
Cellulitis and lymphangitis of trunk	L03.3
Cellulitis and lymphangitis of other sites	L03.8
Cellulitis and lymphangitis, unspecified	L03.9

- **Lyme disease**—An inflammatory disorder that causes a rash, which may not show symptoms until weeks or a month after the initial infection. The bacterial infection is transmitted to humans by a bite of certain infected ticks. The infection can affect the skin, joints, heart, and nervous system, with symptoms that persist for months or even years without treatment.

There are five subcategories for Lyme disease in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Lyme disease, unspecified	A69.20
Meningitis due to Lyme disease	A69.21
Other neurologic disorders in Lyme disease	A69.22
Arthritis due to Lyme disease	A69.23
Other conditions associated with Lyme disease	A69.29

Fungal infections—Superficial fungal infections are found in the top layers of skin and mucous membranes, the hair, and the nails. Deep fungal infections invade deeper layers of skin and hair follicles and can spread to the blood or internal organs.

- **Athlete's foot**—A common infection of the skin between the toes, which leads to itching and soreness; also known as tinea pedis, and is characterized by a red, scaly, cracked rash between the toes. Tinea is a group of related skin infections caused by different species of fungus. Fungi thrive in moist, warm areas.
- **Jock itch**—A fungal infection of the groin mostly affecting men, especially in those who frequently wear protective athletic gear. It is also known as tinea cruris and is characterized by a scaly red skin rash with sharply defined borders. Friction, poor hygiene, and prolonged moist skin increase susceptibility to the infection.
- **Ringworm**—A fungal skin infection characterized by ring-shaped, red, scaly patches. It is a common skin disorder that can affect people of all ages, but is most common in children. Although the name suggests otherwise, a fungus, and not a worm cause ringworm.

There are nine subcategories for dermatophytosis (fungal tinea infections) in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Tinea barbae and tinea capitis	B35.0
Tinea unguium	B35.1
Tinea manuum	B35.2
Tinea pedis	B35.3
Tinea corporis	B35.4
Tinea imbricata	B35.5
Tinea cruris	B35.6
Other dermatophytoses	B35.8
Dermatophytosis, unspecified	B35.9

Parasitic infections—Skin parasites are tiny insects that burrow into the skin and make their homes there. These infections usually cause severe itching and inflammation.

- **Head lice**—Small grey parasites that feed on blood from the scalp causing an intensely itching scalp. They are extremely contagious and affect primarily school children.
- **Scabies**—A parasitic infection where small mites burrow into the skin to lay eggs causing intense itching and a rash. It is usually spread through close contact with an infected person.

There are five subcategories for pediculosis and phthiriasis (head and body lice), and one category for scabies in ICD-10-CM. They are:

ICD-10-CM Subcategory	
Pediculosis due to Pediculus humanus capitis	B85.0
Pediculosis due to Pediculus humanus corporis	B85.1
Pediculosis,unspecified	B85.2
Phthiriasis	B85.3
Mixed pediculosis and phthiriasis	B85.4
Scabies	B86

Pigmentation disorders—Pigm`entation disorders affect the color of the skin. Skin cells give your skin color by producing a substance called melanin. When the cells are damaged or unhealthy, the production of melanin can be affected, which may only affect patches of skin or can affect the entire body.

- **Age spots**—Flat gray or brown spots that appear on sun-exposed areas of aging skin and are also known as liver spots or solar lentigines. They range from freckle-size to half an inch across, and most commonly appear on the face, backs of the hands, chest, and upper back.
- **Freckles**—A small, flat, brown or tan, benign spot occurring on sun-exposed skin, and are most common in fair-skinned people, especially those with red hair. They are a sign of sun damage and increase in number and darken with sun exposure. People who develop freckles are advised to use protective sunscreen because they are more susceptible to developing skin cancer.
- **Vitiligo**—A skin disorder characterized by patches of white skin due to loss of pigment cells (melanocytes). The exact cause remains unknown, but it is believed to have an autoimmune component, which causes the body to manufacture antibodies that destroy its

own melanocytes. Many people report pigment loss shortly after emotional stress or sunburn.

There are ten subcategories for other disorders of pigmentation in ICD-10-CM, and one category for Vitiligo. They are:

ICD-10-CM Subcategory	
Vitiligo	L80.
Postinflammatory hyperpigmentation	L81.0
Chloasma	L81.1
Freckles	L81.2
Café au lait spots	L81.3
Other melanin hyperpigmentation	L81.4
Leukoderma, not elsewhere classified	L81.5
Other disorders of diminished melanin formation	L81.6
Pigmented purpuric dermatosis	L81.7
Other specified disorders of pigmentation	L81.8
Disorder of pigmentation, unspecified	L81.9

Tumors and Neoplasms

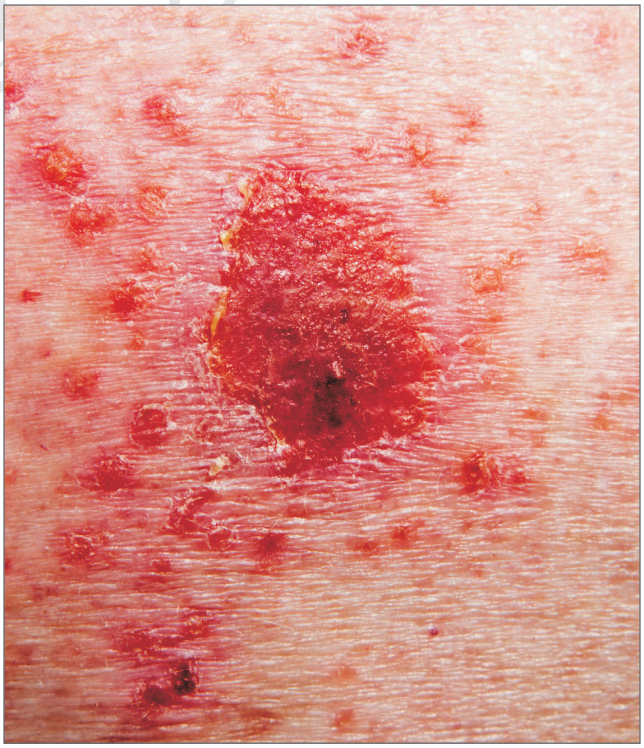
The term neoplasm means "new growth." A neoplasm is a mass of new cells that grow without control and serve no useful function. A neoplasm can be benign, potentially malignant (pre-cancer), or malignant (cancer). Malignant, or cancerous, neoplasms can affect any organ. They are often fatal and the second leading cause of death in the United States. Cancer is an invasive kind of tumor that destroys the normal cells around it as it grows. A main characteristic of malignant neoplasms is they tend to spread, or metastasize, to other sites. A malignant neoplasm can be primary, where it started; secondary, where it spreads; or in situ.

Carcinoma in situ (CIS) identifies cancerous tumors that are noninvasive, or confined. Carcinoma in situ is an early form of carcinoma defined by the absence of invasion of surrounding tissues. The neoplastic cells proliferate in their normal habitat, hence the name "in situ" (Latin for "in its place"). For example, CIS of the skin, also called Bowen's disease, is the accumulation of neoplastic epidermal cells within the epidermis only. For this reason, CIS will usually not form a tumor. Rather, the lesion is flat (in the skin, cervix, etc) or follows the existing architecture of the organ (in the breast, lung, etc). Some CIS, however, form tumors—for example, colon polyps or papillary cancer of the bladder as well as some CIS of the breast (more properly called Ductal Carcinoma in situ).

Benign neoplasms, or tumors, are noncancerous. They do not metastasize, usually have defined edges, and do not grow back once they have been removed. Benign tumors may still pose a threat to a patient, though. Benign neoplasms include uterine fibroids and melanocytic nevi (skin moles).

Basal Cell and Squamous Cell Carcinoma

Skin cancer is divided into two major groups: nonmelanoma and melanoma. Basal cell carcinoma (BCC) is a type of nonmelanoma skin cancer, and is the most common form of cancer in the United States. According to the American Cancer Society, 75 percent of all skin cancers are BCCs.



Basal Cell Carcinoma

Source: AAPC

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Basal cell carcinoma starts in the epidermis and grows slowly. A new skin growth that bleeds easily or does not heal well may suggest basal cell carcinoma. The majority of these cancers occur on areas of skin that are regularly exposed to sunlight or other ultraviolet radiation. They may also appear on the scalp. Risk for basal cell carcinoma is higher if a patient has light-colored skin, blue or green eyes, blond or red hair, live closer to the equator, or have suffered overexposure to ultraviolet radiation. Basal cell skin cancer almost never spreads. But, if left untreated, it may grow into surrounding areas and nearby tissue and bone.

Squamous Cell Carcinoma (SCC) is the second most common cancer of the skin (after basal cell carcinoma but more common than melanoma). The risks for squamous cell carcinoma are similar to basal cell carcinoma. Sunlight exposure and immunosuppression are risk factors for SCC of the skin with chronic sun exposure being the strongest environmental risk factor. The risk of metastasis is low, but is much higher than basal cell carcinoma. Squamous cell cancers of the lip and ears have high metastatic and recurrence rate (20 to 50 percent). Squamous cell cancers of the skin in individuals on immunotherapy or having lymphoproliferative disorders (leukemias) are much more aggressive, regardless of their location. Squamous cell cancer spreads faster than basal cell cancer, but still may be relatively slow-growing. Rarely, it can spread (metastasize) to other locations, including internal organs. Most (95 percent) of squamous cell tumors can be cured if removed promptly.

Melanoma

Melanoma is a malignant tumor of melanocytes and is the most serious form of skin cancer. Melanoma is one of the less common types of skin cancer, but causes the majority (75 percent) of skin cancer related deaths. If it is recognized and treated early, it is almost always curable, but if it is not, the cancer can advance and spread to other parts of the body, where it becomes hard to treat and can be fatal. Around 160,000 new cases of melanoma are diagnosed in the world each year.

ICD-10-CM for Neoplasms

The ICD-10-CM code range for neoplasms is dependent on the type of neoplasm. Primary skin malignancies and melanomas, for example are in the C43–C44 range, while benign skin neoplasms are found in the D48 code range. In order to code a neoplasm in ICD-10-CM the following is necessary:

- Anatomic site
- Type of neoplasm (malignant, primary, in situ, melanoma, basal cell, squamous cell, etc.)
- Laterality, when appropriate

Example of codes for neoplasm of skin of the left knee from the neoplasm table and the alphabetic index

Basal cell carcinoma of skin of left lower limb, including hip	C44.719
Squamous cell carcinoma of skin of left lower limb, including hip	C44.729
Secondary malignant neoplasm of skin	C79.2
Carcinoma in situ of skin of left lower limb, including hip	D04.72
Other benign neoplasm of skin of left lower limb, including hip	D23.72
Neoplasm of uncertain behavior of skin	D48.5
Neoplasm of unspecified behavior of bone, soft tissue, and skin	D49.2
Malignant melanoma of left lower limb, including hip	C43.72
Personal history of malignant neoplasm of skin NEC	Z85.828
Personal history of malignant melanoma	Z85.820
Personal history of Merkel cell carcinoma	Z85.821

According to the guidelines, if the histological term is documented, that term should be referenced first not the table. For example, if the documentation indicates "adenoma," refer to the term in the Alphabetic index to review the entries under this term and the instructional note to "see also neoplasm, by site, benign." The guidelines further state that it is important to select the proper

column in the table that corresponds to the type of neoplasm, but to always verify the coding choice in the Tabular index. If malignant, any secondary sites should also be determined.

Other important guidelines are as follows:

Personal history. When a primary malignancy has been previously excised or eradicated from its site and there is no further treatment directed to that site and there is no evidence of any existing primary malignancy, a code from category Z85, personal history of primary and secondary malignant neoplasm, should be used to indicate the former site of the malignancy. Any mention of extension, invasion, or metastasis to another site is coded as a secondary malignant neoplasm to that site. The secondary site may be the first listed diagnosis with the Z85 code used as a secondary code.

Treatment directed at the malignancy. If the treatment is directed at the malignancy, designate the malignancy as the first listed code. The only exception to this guideline is if a patient admission/encounter is solely for the administration of chemotherapy, immunotherapy, or radiation therapy, assign the appropriate Z51 category of codes as the first listed code and the diagnosis or problem for which the service is being performed as a secondary code.

Pressure Ulcers

Pressure ulcers, also called bed sores or decubitus ulcers, are lesions caused by many factors—unrelieved pressure; friction; humidity; shearing forces; temperature; age; and continence and medication—to any part of the body, especially portions over bony or cartilaginous areas such as sacrum, elbows, knees, and ankles.

There are four stages of pressure ulcers recognized:

- **Stage I** is the most superficial, indicated by *non blanchable redness* that does not subside after pressure is relieved. The skin may be hotter or cooler than normal, have an odd texture, or perhaps be painful to the patient. Although easy to identify on a light-skinned patient, ulcers on darker-skinned individuals may show up as shades of purple or blue in comparison to lighter skin tones.
- **Stage II** is damage to the epidermis extending into, but no deeper than, the dermis. In this stage, the ulcer may be referred to as a blister or abrasion.
- **Stage III** involves the full thickness of the skin and may extend into the subcutaneous tissue layer. This layer has a relatively poor blood supply and can be difficult to heal. At this stage, there may be undermining damage that makes the wound much larger than it may seem on the surface.
- **Stage IV** is the deepest, extending into the muscle, tendon or even bone.
- **Unstageable** pressure ulcers are covered with dead cells, or eschar and wound exudate, so the depth cannot be determined.

ICD-10-CM for Pressure Ulcers

The ICD-10-CM code range for pressure ulcers is L89.000–L89.95.

To code pressure ulcers in ICD-10-CM the following is necessary:

- Anatomic site
- Laterality, when appropriate
- Stage of pressure ulcer

Example of codes for a pressure ulcer of the hip

Pressure ulcer of unspecified hip, unstageable	L89.200
Pressure ulcer of unspecified hip, stage I	L89.201
Pressure ulcer of unspecified hip, stage II	L89.202
Pressure ulcer of unspecified hip, stage III	L89.203
Pressure ulcer of unspecified hip, stage IV	L89.204
Pressure ulcer of unspecified hip, unspecified stage	L89.209

Pressure ulcer of right hip, unstageable	L89.210
Pressure ulcer of right hip, stage I	L89.211

Pressure ulcer of right hip, stage II	L89.212
Pressure ulcer of right hip, stage III	L89.213
Pressure ulcer of right hip, stage IV	L89.214
Pressure ulcer of right hip, unspecified stage	L89.219

Pressure ulcer of left hip, unstageable	L89.220
Pressure ulcer of left hip, stage I	L89.221
Pressure ulcer of left hip, stage II	L89.222
Pressure ulcer of left hip, stage III	L89.223
Pressure ulcer of left hip, stage IV	L89.224
Pressure ulcer of left hip, unspecified stage	L89.229

In the table, the laterality issue is shown. Note the fifth digit in the codes. The fifth digit of 0 denotes unspecified hip, the fifth digit of 1 denotes the right hip, and the fifth digit of 2 denotes the left hip.

According to the guidelines, assignment of the pressure ulcer stage should be guided by clinical documentation of the stage or documentation of the terms found in the index. If no documentation of the stage is found, the provider should be queried. They also state that as many codes as needed to identify all the pressure ulcers the patient has should be assigned.

Trauma—The skin is the first to suffer in almost all injuries from outside forces. The most common types of skin injuries are contusions (bruises), lacerations (cuts), and burns.

These types of injuries would be coded from the injury, poisoning and certain other consequences of external causes (Chapter 19) in ICD-10-CM, depending on the location and extent of the injury.

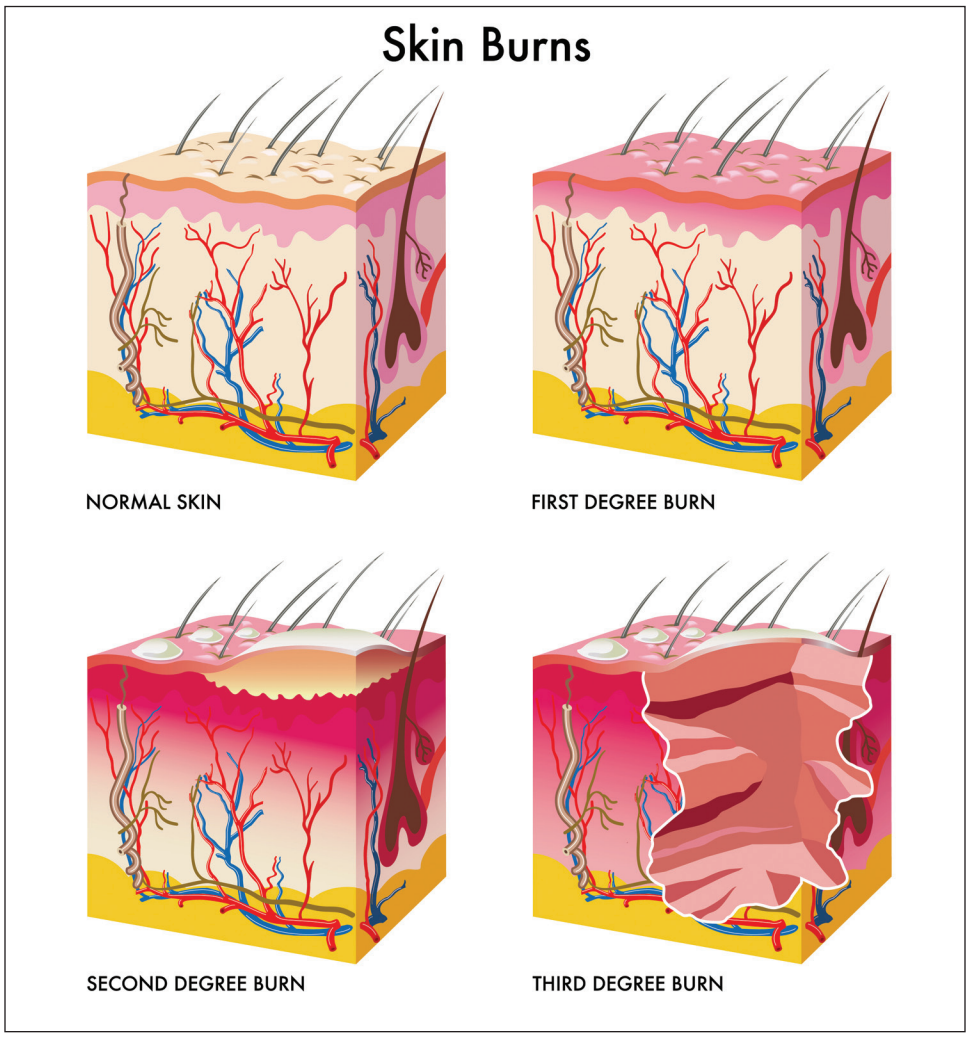
Burns

A burn is a type of injury to flesh caused by heat, electricity, chemicals, light, radiation, or friction. Most burns only affect the skin, but they can affect muscle, bone, and blood vessels. Complications such as shock, infection, multiple organ dysfunction syndrome, electrolyte imbalance, and respiratory distress may occur. The treatment of burns may include debridement, applying dressings to the wound, administering large volumes of intravenous fluids, administering antibiotics and skin grafting.

Burns can be classified by mechanism of injury, depth, extent, and associated injuries and comorbidities. Burns are described according to the depth of injury to the dermis and are loosely classified into first, second, and third degrees. First-degree burns, the mildest of the three, are limited to the epidermis. They are red, painful, and can have minor swelling. The skin is dry with no blisters. Healing time for a first-degree burn is about three to six days. Second-degree burns involve the dermis, but are partial thickness burns. They are red, severely painful, and will produce blisters that may break open. The burn area will look wet and have a bright pink or cherry red color. Healing time for a second-degree burn can take up to three weeks or longer. Third-degree burns involve the entire dermis (full thickness) and are the most serious type of burn. The skin may appear dry and waxy white, leathery, brown, or charred. There may be little or no pain present due to nerve damage. Healing time for a third-degree burn depends on the severity and size of the burn area.

The American Burn Association devised a classification system to aid in the decision-making process for burn treatment. Under this system, burns can be classified as minor, moderate, and major. This is assessed based on a number of factors, including total body surface area (TBSA) burnt, the involvement of specific anatomical zones, age of the person and associated injuries.

Burns can also be assessed in terms of total body surface area (TBSA), which is the percentage affected by partial thickness or full thickness burns. First-degree burns are not included in this estimation. The rule of nines is used as a quick and useful way to estimate the affected TBSA. Burns of 10 percent in children or 15 percent in adults (or greater) are potentially life threatening injuries because of the risk of hypovolemic shock.



Source: AAPC

ICD-10-CM for Burns

ICD-10-CM codes for burns are found in chapter 19, Injury, poisoning, and certain other consequences of external causes (S00-T88).

To code burns in ICD-10-CM the following is necessary:

- Burn or corrosion
- Depth of burn or corrosion (first degree, second degree, etc.)
- Extent of burn or corrosion
- Agent (X code)

The ICD-10-CM distinguishes between burns and corrosions. The burn codes are for thermal burns, except sunburns, that come from a heat source, such as fire or hot appliance. The burn codes are also for burns resulting from electricity and radiation. Corrosions are burns due to chemicals. The guidelines are the same for burns and corrosions.

Example of codes for burn and corrosion of the axilla

Burn of unspecified degree of right axilla	T22.041
Burn of first degree of right axilla	T22.141
Burn of second degree of right axilla	T22.241
Burn of third degree of right axilla	T22.341

Corrosion of unspecified degree of right axilla	T22.441
Corrosion of first degree of right axilla	T22.541
Corrosion of second degree of right axilla	T22.641
Corrosion of third degree of right axilla	T22.741

Burn of unspecified degree of left axilla	T22.042
Burn of first degree of left axilla	T22.142
Burn of second degree of left axilla	T22.242
Burn of third degree of left axilla	T22.342
Corrosion of unspecified degree of left axilla	T22.442
Corrosion of first degree of left axilla	T22.542
Corrosion of second degree of left axilla	T22.642
Corrosion of third degree of left axilla	T22.742

Burn of unspecified degree of unspecified axilla	T22.049
Burn of first degree of unspecified axilla	T22.149
Burn of second degree of unspecified axilla	T22.249
Burn of third degree of unspecified axilla	T22.349
Corrosion of unspecified degree of unspecified axilla	T22.449
Corrosion of first degree of unspecified axilla	T22.549
Corrosion of second degree of unspecified axilla	T22.649
Corrosion of third degree of unspecified axilla	T22.749

In order to complete the code, a seventh character extender is needed. The box is shown below for the above code set.

The appropriate 7th character is to be added to each code from category T22:

A Initial encounter

D Subsequent encounter

S Sequela

The applicable seventh character is required for all codes within the category, or as the notes in the Tabular List instruct. The seventh character must always remain the seventh character.

Other important guidelines are as follows:

Sequencing of Burns. Sequence first the code that reflects the highest degree of burn when more than one burn is present, not by largest area. Also, when internal and external burns are present the circumstances of admission should govern first listed diagnosis.

Total Body Surface Area. Codes from category T31, Burns classified according to extent of body surface involved, or T32, Corrosions classified according to extent of body surface involved, are to be assigned when the site of the burn is not specified or when there is a need for additional data.

Sources

Comprehensive Medical Terminology (Fourth Edition) by Betty Davis Jones.

Stedman's Medical Dictionary, 28th edition

Bates' Pocket Guide to Physical Examination and History Taking, Third Edition (Lynn S. Bickley-Lippincott)