University of Mosul

College of Nursing

Fundamentals of Nursing

اعداد

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(2024-2025)

The contents

Entrance to Fundamental of nursing

Health: is a state of optimal functioning or well-being.

health is a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity (World Health Organization, 1974).

Health integrates all the human dimensions—the physical, intellectual, emotional, sociocultural, spiritual, and environmental aspects of the whole person. The nurse giving holistic care must equally consider all these interrelated dimensions of the whole person

Disease: is a medical term, referring to pathologic changes in the structure or function of the body or mind.

Illness: is the response of the person to a disease.

Illness is a state in which a person's physical, emotional, intellectual, social, developmental, or spiritual functioning is diminished or impaired. Cancer is a disease process, but one patient with leukemia who is responding to treatment may continue to function as usual, whereas another patient with breast cancer who is preparing for surgery may be affected in dimensions other than the physical. Therefore, illness is not synonymous with disease.

Classifications of Illness

Illnesses are classified as either acute or chronic. A person may have an acute illness, a chronic illness, or both at the same time; for example, an adult with diabetes (a chronic illness) may also have an acute episode of severely low blood sugar.

Acute Illness

An **acute illness** usually has a rapid onset of symptoms and lasts only a relatively short time. Although some acute illnesses are life threatening, simple acute illnesses, such as the common cold or diarrhea, do not usually require medical treatment.

Chronic Illness

Chronic illness is a broad term that encompasses a number of different physical and mental alterations in health, each having one or more of the following characteristics: It is a permanent change. It causes, or is caused by, irreversible alterations in normal anatomy and physiology. It requires special patient education for rehabilitation. It requires a long period of care or support.

A risk factor: is any situation, habit, or other variable such as social, environmental, physiological, psychological, developmental, intellectual, or spiritual that increases the vulnerability of an individual or group to an illness or accident.

Nurse: Is a person educated and licensed in the practice of nursing, is concerned with the diagnosis and treatment of human responses to actual or potential health problems.

Nursing: Nursing is an art and a science. As a professional nurse you will learn to deliver care artfully with compassion, caring, and respect for each patient's dignity and personhood. As a science, nursing practice is based on a body of knowledge that is continually changing with new discoveries and innovations.

The patient is (the person receiving care).

Causes of disease:

1. Inherited genetic defects
2. Developmental defects resulting from exposure to such factors as viruses or chemicals during pregnancy.
3. Biologic agents or toxins
4. Physical agents such as temperature, chemicals, and radiation
5. Generalized tissue responses to injury or irritation
6. Physiologic and emotional reactions to stress
7. Excessive or insufficient production of body secretions (hormones, enzymes, and so forth)

The health of the public is measured globally by: morbidity and mortality

- **morbidity** (how frequently a disease occurs).
- **mortality** (the number of deaths resulting from a disease).

Aims of nursing:

1. To promote health
2. To prevent illness
3. To restore health
4. To facilitate coping with disability or death

Hospital: Is an institution for health care providing patient treatment by specialized staff and equipment, and often, but not always providing for longer-term patient stays.

Outpatients: Patients go to a hospital just for diagnosis, treatment, or therapy and then leave, without staying overnight.

Inpatients: Patients are admitted to a hospital and stay overnight or for several weeks or months.

The functions of the hospital

1. Patient care and comfort.
2. Are distinguished by their ability to admit and care for inpatients.
3. The basic functions of a hospital such as:

    a. Care of the sick and injured
    b. Diagnosis
    c. Treatment
    d. Rehabilitative services
    e. Many undertake education of doctors, nurses, technicians etc.

4. Some hospitals do research work

Types of Hospitals

1. **Public Hospital:** A Public Hospital are financed and operated by the government agency at the local, state or national level. Hospitals provide services at free of cost.
2. **Private Hospitals:** Private Hospitals are owned and operated by churches, corporations, individuals and charitable organizations. Private hospitals are operated on a for profit-basis.
3. **Military Hospitals:** Military Hospitals provide medical care for the armed forces and their families.
4. **Teaching:** A teaching hospital combines assistance to patients with teaching to medical students and nurses and often is linked to a medical school, nursing school or university.
5. **Clinics:** A medical facility smaller than a hospital is generally called a clinic, and often is run by a government agency for health services or a private partnership of physicians. Clinics generally provide only outpatient services.

Maslow's Hierarchy

Maslow ranked human needs as follows:

- **Physiologic needs** (Oxygen, Fluids, Nutrition, Body temperature, Elimination, Shelter, Sex).
- **Safety and security** (Physical safety and Psychological safety).
- **Love and belonging needs.**
- **Self-esteem.**
- **Self-actualization** (is the highest expression of one's individual potential and allows for continual self-discovery.

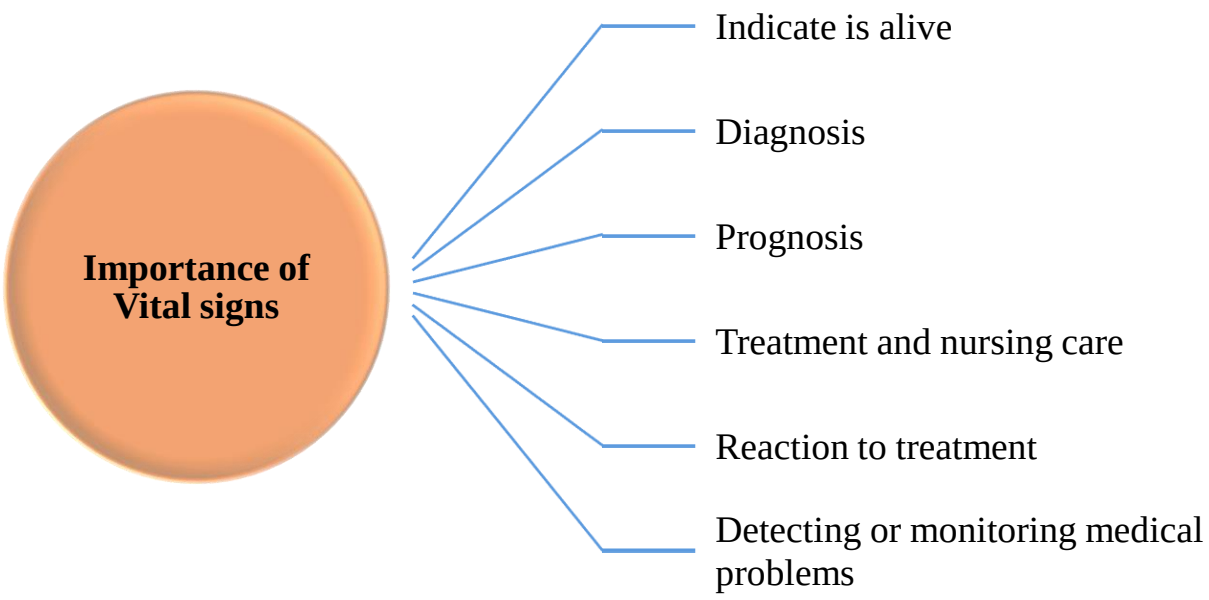
Figure 1-1 This scheme of Maslow's hierarchy of human needs shows how a person moves from fulfillment of basic needs to higher levels of needs, with the ultimate goal being integrated human functioning and health.

Chapter one

… The Vital Signs…

The Vital Signs

The most frequent and routine measurements obtained by health care providers are those of **temperature, pulse, blood pressure (BP), respiratory rate, and oxygen saturation.** As indicators of health status, these measures indicate the effectiveness of circulatory, respiratory, neural, and endocrine body functions. Because of their importance, they are referred to as vital signs. Pain, a subjective symptom, is often called another vital sign and is frequently measured with the others. Measurement of vital signs provides data to determine a patient's usual state of health (baseline data). Vital signs are a quick and efficient way of monitoring a patient's condition or identifying problems and evaluating his or her response to intervention.



When to Assess Vital Signs

- On admission to a health care facility
- When assessing a patient during home care visits
- In a hospital on a routine schedule according to the health care provider's order or hospital standards of practice before, during, and after a surgical procedure or invasive diagnostic procedure
- Before, during, and after a transfusion of blood products
- Before, during, and after the administration of medication or therapies that affect cardiovascular, respiratory, or temperature-control functions
- When a patient's general physical condition changes (e.g., loss of consciousness or increased intensity of pain)
- Before, during, and after nursing interventions influencing a vital sign.

(Vital Signs) Acceptable Ranges for Adults:

Temperature Range

Average temperature range: 36° to 38° C (96.8° to 100.4° F)

Average oral/tympanic: 37° C (98.6° F)

Average rectal: 37.5° C (99.5° F)

Axillary: 36.5° C (97.7° F)

Pulse

60 to 100 beats/min, strong and regular

Pulse Oximetry (SpO2)

Normal: SpO2 ≥95%

Respirations

Adult: 12 to 20 breaths/min, deep and regular

Blood Pressure

Systolic <120 mm Hg

Diastolic <80 mm Hg

Pulse pressure: 30 to 50 mm Hg

Capnography (EtCO2)

Normal: 35-45 mm Hg

Pulse

Less than 60 Bradycardia

More than 100 Tachycardia

Respirations

Less than 12 Bradypnea

More than 20 Tachypnea

- **Body temperature**

Body temperature is the difference between the amount of heat produced by the body and the amount of heat lost to the environment measured in degrees. Heat is generated by metabolic processes in the core tissues of the body, transferred to the skin surface by the circulating blood, and then dissipated to the environment.

Heat Produced − Heat Lost = Body Temperature

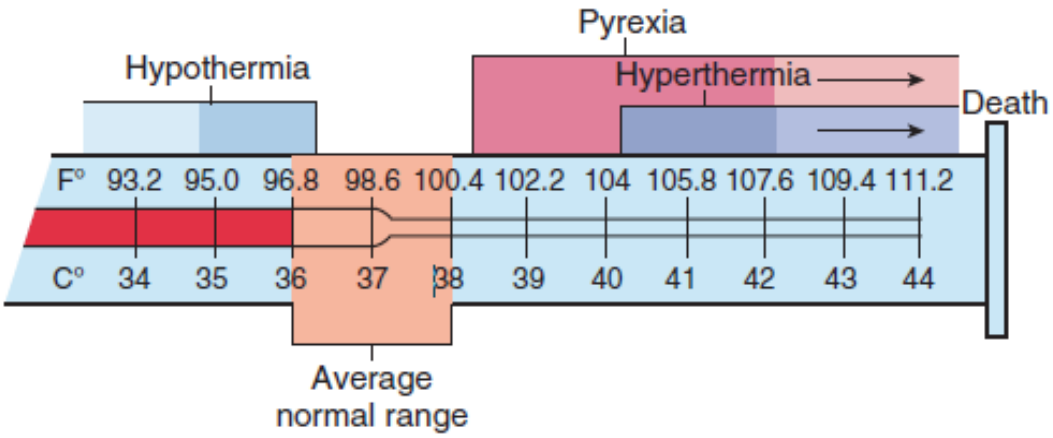


FIGURE 30-1 Ranges of normal temperature values and abnormal body temperature alterations.

Factors affect the body's heat production

1. **Basal metabolic rate.** The basal metabolic rate (BMR) is the rate of energy utilization in the body required to maintain essential activities such as breathing. Metabolic rates decrease with age. In general, the younger the person, the higher the BMR.
2. **Muscle activity.** Muscle activity, including shivering, increases the metabolic rate.
3. **Thyroxine output.** Increased thyroxine output increases the rate of cellular metabolism throughout the body.
4. **Epinephrine, norepinephrine, and sympathetic stimulation/ stress response.** These hormones immediately increase the rate of cellular metabolism in many body tissues.
5. **Fever.** Fever increases the cellular metabolic rate and thus increases the body's temperature further.

Heat is lost from the body through **radiation, conduction, convection, and evaporation**

	RADIATION	CONVECTION	EVAPORATION	CONDUCTION
Definition	The diffusion or dissemination of heat by electromagnetic waves	The dissemination of heat by motion between areas of unequal density	The conversion of a liquid to a vapor	The transfer of heat to another object during direct contact
Example	The body gives off waves of heat from uncovered surfaces.	An oscillating fan blows currents of cool air across the surface of a warm body.	Body fluid in the form of perspiration and insensible loss is vaporized from the skin.	The body transfers heat to an ice pack, causing the ice to melt.

Radiation Convection Evaporation Conduction

Factors Affecting Body Temperature

1. **Age and Biologic Sex**

Older adults lose some thermoregulatory control with aging; body temperatures in older adults may be lower than the average adult temperature. Both the very old and the very young are more sensitive to changes in environmental temperature. Older adults are at risk for harm from extremes of temperature due to impaired thermoregulatory responses. The body temperature of infants and children changes more rapidly in response to both hot and cold air temperatures. Women tend to experience more fluctuations in body temperature than do men, probably as the result of changes in hormones. The increase in progesterone secretion at ovulation increases body temperature as much as 0.5°C.

2. **Physical Activity**

   Physical exertion increases body temperature. Increased metabolism resulting from muscle activity results in the production of heat.

3. **State of Health**

   Alterations in a person's health can contribute to variations in body temperature. The presence of certain disease conditions and other health problems may result in alterations in body temperature.

4. **Stress.**

   Physical and emotional stress increase body temperature through hormonal and neural stimulation. These physiological changes increase metabolism, which increases heat production. A patient who is anxious about entering a hospital or a health care provider's office often has a higher normal temperature.

5. **Environmental Temperature**

   Most of us respond to changes in environmental temperature by wearing clothing that either allows increased heat loss when it is hot or retains heat when it is cold. When one is exposed to extreme cold without adequate protective clothing, heat loss may be increased to the point of hypothermia (low body temperature). Similarly, if one is exposed to extremes of heat for long periods of time, hyperthermia (high body temperature) may result. Both hypothermia and hyperthermia may cause serious illness or death.

Alterations in Body Temperature

- **hypothermia (**low body temperature**)**
- **hyperthermia (**high body temperature**)**
- **afebrile** (without fever)
- **febrile (**A person with a fever)
- **Fever** or **pyrexia** is an increase above normal in body temperature.

Physical Effects of Fever

Patients with fever may experience loss of appetite; headache; hot, dry skin; flushed face; thirst; muscle aches; and fatigue. Respirations and pulse rate increase. Infants and children may experience febrile seizures as a result of a fever. Older adults may experience periods of confusion and delirium related to an increased body temperature. Fever blisters may develop in some people as the fever activates the type I herpes simplex virus. Fluid, electrolyte, and acid–base imbalances are potentially dangerous complications of fever.

Treatment of Fever

Fever is an important part of a person's defense mechanisms against infection. Determining the cause of the fever and treating its underlying cause is an important part of patient care. Nursing care related to fever focuses on increasing patient comfort and preventing complications. If the fever is the result of a bacterial or other type of microbial infection, the appropriate antibiotic or anti-infective may be prescribed. Antipyretic (fever-reducing) drugs, such as aspirin, ibuprofen, or acetaminophen, may be administered in certain circumstances.

Frostbite

occurs when the body is exposed to subnormal temperatures. Ice crystals form inside the cells, and permanent circulatory and tissue damage occurs. Areas particularly susceptible to frostbite are the earlobes, tip of the nose, and fingers and toes. The patient loses sensation in the affected area. Interventions include gradual warming measures and analgesia.

Heatstroke

Prolonged exposure to the sun or a high environmental temperature, the heat-loss mechanisms of the body. These conditions cause heatstroke, defined as a body temperature of 40° C (104° F) or more. Heatstroke is a dangerous heat emergency with a high mortality rate. Patients at risk include the very young or very old and those who have cardiovascular disease, hypothyroidism, diabetes, or alcoholism. Signs and symptoms of heatstroke include giddiness, confusion, delirium, excess thirst, nausea, muscle cramps, visual disturbances, and even incontinence. Vital signs reveal a body temperature sometimes as high as 45° C (113° F), with an increase in heart rate (HR) and lowering of BP. The most important sign of heatstroke is hot, dry skin. Victims of heatstroke do not sweat because of severe electrolyte loss and hypothalamic malfunction. If the condition progresses, a patient with heatstroke becomes unconscious, with fixed, nonreactive pupils. Permanent neurological damage occurs unless cooling measures are rapidly started.

Assessing Body Temperature

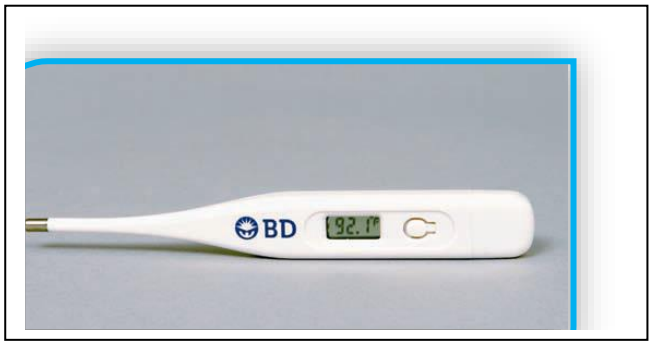
The most common sites for measuring body temperature are oral, rectal, axillary, tympanic membrane, and skin/temporal artery.

The body temperature may be measured:

1. **orally.** If a client has been taking cold or hot food or fluids or smoking, the nurse should wait 30 minutes before taking the temperature orally to ensure that the temperature of the mouth is not affected by the temperature of the food, fluid, or warm smoke.
2. **Rectal.** Temperature readings are considered to be very accurate. Rectal temperatures are contraindicated for clients who are undergoing rectal surgery, have diarrhea or diseases of the rectum, are immunosuppressed, have a clotting disorder, or have significant hemorrhoids.
3. **The axilla.** is often the preferred site for measuring temperature in newborns because it is accessible and safe. Axillary temperatures are lower than rectal temperatures.
4. **Tympanic membrane.** Nearby tissue in the ear canal, is a frequent site for estimating core body temperature.

Types of Thermometers

1. Mercury-in glass thermometers.
2. Electronic thermometers
3. Chemical disposable thermometers.
4. Temperature-sensitive tape.
5. Infrared thermometers

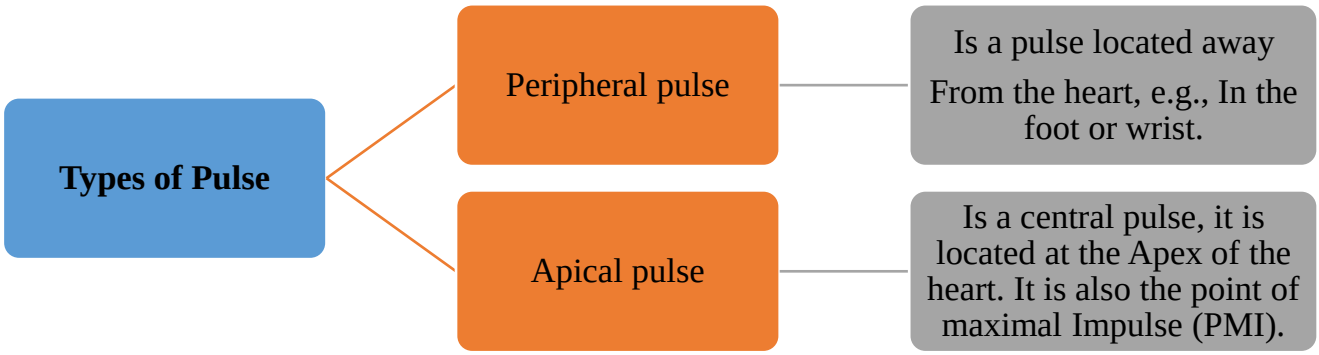


Temporal artery thermometer scanning child's forehead.

PULSE

The peripheral pulse is a throbbing sensation that can be palpated (felt) over a peripheral artery, such as the radial artery or the carotid artery. Peripheral pulses result from a wave of blood being pumped into the arterial circulation by the contraction of the left ventricle. ***A peripheral pulse*** is a pulse located away from the heart, for example, in the foot or wrist.

Cardiac output is the volume of blood pumped into the arteries by the heart. An apical pulse may also be auscultated (listened to) over the apex of the heart as the heart beats. Heart sounds, which are produced by closure of the valves of the heart, are characterized as "lub-dub." The apical pulse is the result of closure of the mitral and tricuspid valves ("lub") and aortic and pulmonic valves ("dub"). The combination of the two sounds is counted as one beat.



Factors Influencing Pulse Rate

Factor	Increases Pulse Rate	Decreases Pulse Rate
Exercise	Short-term exercise	Heart conditioned by long-term exercise, resulting in lower resting pulse and quicker return to resting level after exercise
Temperature	Fever and heat	Hypothermia
Emotions	Sympathetic stimulation increased by acute pain and anxiety, affecting heart rate; effect of chronic pain on heart rate varies	Parasympathetic stimulation increased by unrelieved severe pain affecting heart rate; relaxation
Medications	Positive chronotropic drugs such as epinephrine	Negative chronotropic drugs such as digitalis; beta-adrenergic and calcium channel blockers
Hemorrhage	Sympathetic stimulation	
Postural changes	Standing or sitting	Lying down
Pulmonary conditions	Diseases causing poor oxygenation such as asthma, chronic obstructive pulmonary disease (COPD)	

Variations in Pulse and Respirations by Age		
Age	**Pulse Ranges**	**Respirations Ranges**
Infant	(120–160)	(30–60)
Toddler	(90–140)	(25–32)
Preschooler	(80-110)	(20–30)
School-age child	(75-100)	(15–25)
Adolescent	(60–90)	(16–20)
Adult	(60–100)	(12–20)
Older adult	(60–100)	(12–20)

Pulse Sites

A pulse may be measured in nine sites:

1. Temporal, Over temporal bone of head, above and lateral to eye**.**

2. Carotid, Along medial edge of sternocleidomastoid muscle in neck.

Clinical Alert!

Never press both carotids at the same time because this can cause a reflex drop in blood pressure or pulse rate.

3. Apical, fourth to fifth intercostal space at left midclavicular line

4. Brachial, Groove between biceps and triceps muscles at antecubital fossa

5. Radial, Radial or thumb side of forearm at wrist.

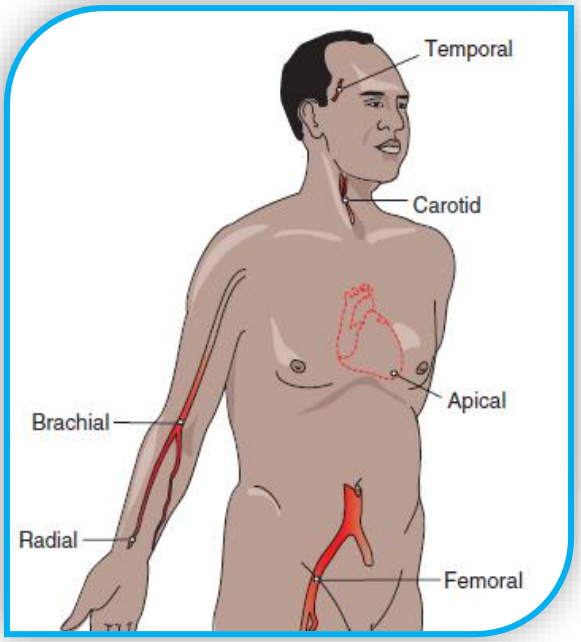
6. Femoral, where the femoral artery passes alongside the inguinal ligament.

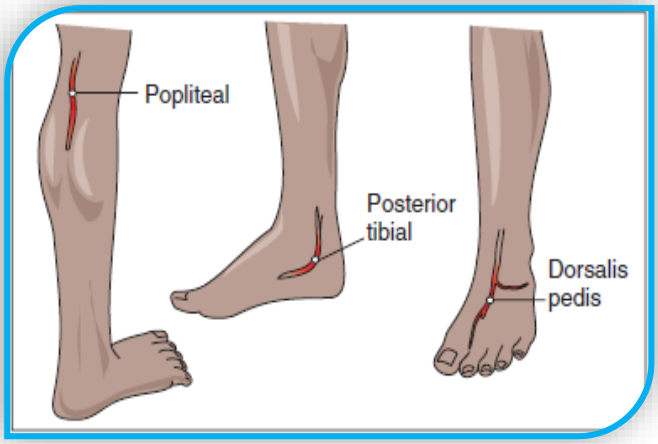
7. Popliteal, Behind knee in popliteal fossa.

8. Posterior tibial, Inner side of ankle, below medial malleolus

9. Dorsalis pedis, Along top of foot, between extension tendons of great and first toe

The radial site is most commonly used in adults. It is easily found in most people and readily accessible.





The apical pulse is usually found at (A) the fifth intercostal space just inside the midclavicular line and can be heard (B) over the apex of the heart.

Characteristics of Pulse

Characteristics of the peripheral pulse include **rate, rhythm, strength** (amplitude), and elasticity. These characteristics are indicators of the effectiveness of the heart as a pump.

Assessing the Pulse

The pulse may be assessed by palpating peripheral arteries, by auscultating the apical pulse with a stethoscope. The middle three fingertips are used for palpating all pulse sites except the apex of the heart. A stethoscope is used for assessing apical pulses.

The nurse should also be aware of the following:

1. Any medication that could affect the heart rate.
2. Whether the client has been physically active. If so, wait 10 to 15 minutes until the client has rested and the pulse has slowed to its usual rate.

Tachycardia: is an excessively fast heart rate (e.g., over 100 beats/min in an adult).

Bradycardia: is a heart rate in an adult of less than 60 beats/min.

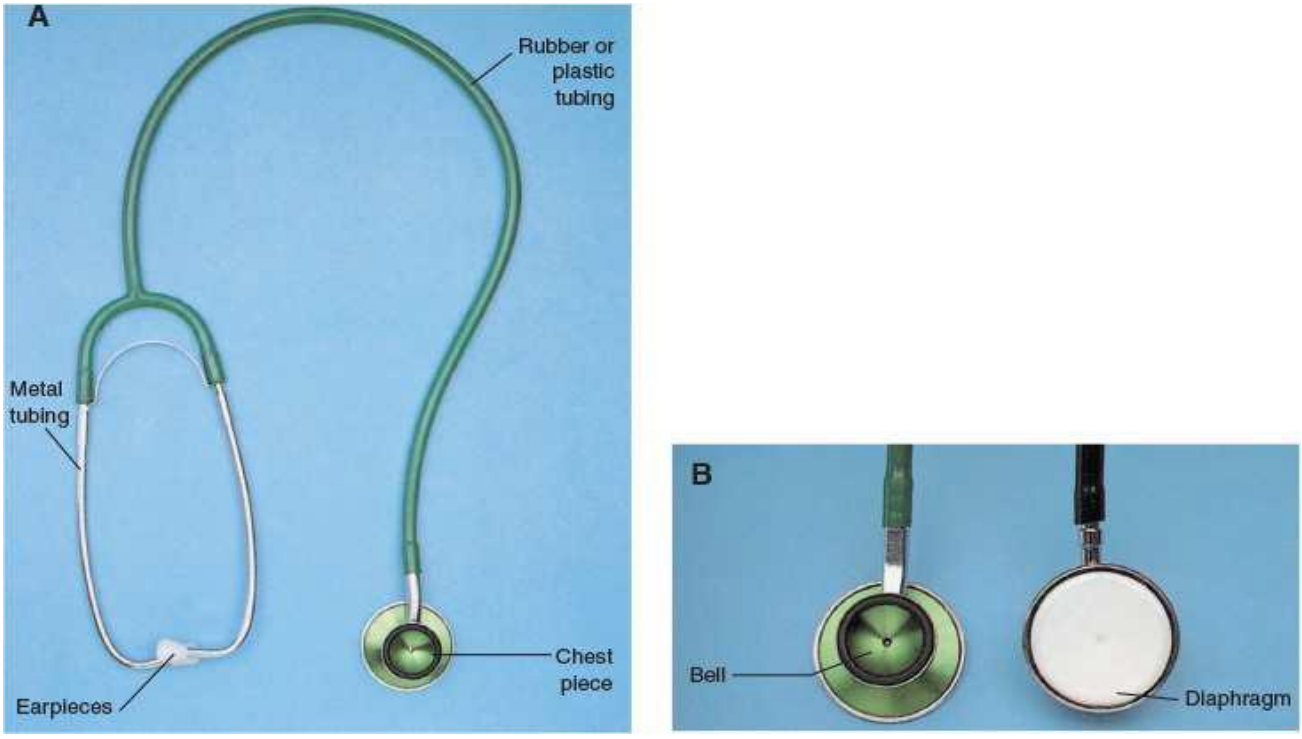
If a client has either tachycardia or bradycardia, the apical pulse should be assessed.

The pulse rhythm: is the pattern of the beats and the intervals between the beats. Equal time elapses between beats of a normal pulse. A pulse with an irregular rhythm is referred to as: **Dysrhythmia or Arrhythmia**.

Placing fingers over the artery

Factors Contributing to Tachycardia and Bradycardia

Tachycardia	Bradycardia
A decrease in blood pressure, such as occurs with blood loss, shock, trauma	Coronary artery disease; myocardial infarction (MI; heart attack)
An elevated body temperature	Decreased body temperature
Any condition resulting in poor oxygenation of blood, for example, chronic pulmonary disease or anemia	Hypoxemia, obstructive sleep apnea
Exercise	Acute altered mental status, such as delirium
Hyperthyroidism	Hypothyroidism
Pain	Increased intracranial pressure and other central nervous system conditions, such as cerebral vascular accident ([CVA]; stroke)
Strong emotions, such as fear, anger, anxiety, and surprise	Response to vagal stimulation, such as ocular pressure or vomiting
Some medications (e.g., atropine, epinephrine)	Some medications (e.g. antiarrhythmic)



A stethoscope. A. Parts of a stethoscope. B. Parts of the chest piece; the bell and diaphragm.

Respiration

Human survival depends on the ability of oxygen (O2) to reach body cells and carbon dioxide (CO2) to be removed from the cells. Respiration is the mechanism the body uses to exchange gases between the atmosphere and the blood and the blood and the cells. Respiration involves **ventilation** (the movement of gases in and out of the lungs), **diffusion** (the movement of oxygen and carbon dioxide between the alveoli and the red blood cells), and **perfusion** (the distribution of red blood cells to and from the pulmonary capillaries). Analyzing respiratory efficiency requires integrating assessment data from all three processes. Assess ventilation by determining respiratory rate, depth, rhythm and end-tidal carbon dioxide (ETCO2) value. Assess diffusion and perfusion by determining oxygen saturation.

Mechanics of Breathing

Although breathing is normally passive, muscular work is involved in moving the lungs and chest wall. Inspiration is an active process. During inspiration the respiratory center sends impulses along the phrenic nerve, causing the diaphragm to contract. Abdominal organs move downward and forward, increasing the length of the chest cavity to move air into the lungs.

Normal breathing is:

1. Slightly observable
2. Effortless
3. Quiet
4. Automatic
5. Regular.

Assessing Respirations

The nurse assesses respiratory rate (breaths per minute), depth (deep or shallow), and rhythm (regular or irregular) by inspection (observing and listening) or by listening with the stethoscope. Other methods of assessing respiratory effectiveness include using a pulse oximeter to determine oxygenation of blood and monitoring arterial blood gas results.

A nurse should be aware of the following:

1. The client's normal breathing pattern
2. The influence of the client's health problems on respirations
3. Any medications or therapies that might affect respirations

Assessing respirations

When assess respiration rate should be assessing:

1. The rate 2. Depth 3. Rhythm

Under normal conditions, healthy adults breathe about 12 to 20 times each minute; infants and young children breathe more rapidly.

Tachypnea Rate of breathing is regular but abnormally rapid (greater than 20 breaths/min).

Bradypnea Rate of breathing is regular but abnormally slow (less than 12 breaths/min).

Hyperpnea Respirations are labored, increased in depth, and increased in rate (greater than 20 breaths/min) (occurs normally during exercise).

Apnea Respirations cease for several seconds. Persistent cessation results in respiratory arrest.

Dyspnea is difficult or labored breathing (shortness of breath).

Hyperventilation an increase in both the rate and depth of respirations, is a state of ventilation in which the lungs remove carbon dioxide faster than it is produced by cellular metabolism. Severe anxiety, infection, drugs, or an acid-base imbalance induces hyperventilation.

Hypoventilation refers to shallow, slow respiration, occurs when alveolar ventilation is inadequate to meet the oxygen demand of the body or eliminate sufficient carbon dioxide.

Hypoxia is inadequate tissue oxygenation at the cellular level. It results from a deficiency in oxygen delivery or oxygen use at the cellular level. It is a life-threatening condition. Untreated it produces possibly fatal cardiac dysrhythmias.

Cheyne-Stokes Respiration Respiratory rate and depth are irregular, characterized by alternating periods of apnea and hyperventilation. Respiratory cycle begins with slow, shallow breaths that gradually increase to abnormal rate and depth. The pattern reverses; breathing slows and becomes shallow, concluding as apnea before respiration resumes.

Kussmaul's respiration Respirations are abnormally deep, regular, and increased in rate.

Factors Influencing Character of Respirations

1. Exercise

• Exercise increases rate and depth to meet the need of the body for additional oxygen and to rid the body of CO2.

2. Acute Pain

• Pain alters rate and rhythm of respirations; breathing becomes shallow.

• Patient inhibits or splints chest wall movement when pain is in area of chest or abdomen.

3. Anxiety

• Anxiety increases respiration rate and depth as a result of sympathetic stimulation.

4. Smoking

• Chronic smoking changes pulmonary airways, resulting in increased rate of respirations at rest when not smoking.

5. Body Position

• A straight, erect posture promotes full chest expansion.

• A stooped or slumped position impairs ventilator movement.

• Lying flat prevents full chest expansion.

6. Medications

• Opioid analgesics, general anesthetics, and sedative hypnotics depress rate and depth.

• Amphetamines and cocaine sometimes increase rate and depth.

• Bronchodilators slow rate by causing airway dilation.

7. Neurological Injury

• Injury to brainstem impairs respiratory center and inhibits respiratory rate and rhythm.

8. Hemoglobin Function

• Decreased hemoglobin levels (anemia) reduce oxygen-carrying capacity of the blood, which increases respiratory rate.

• Increased altitude lowers amount of saturated hemoglobin, which increases respiratory rate and depth.

• Abnormal blood cell function (e.g., sickle cell disease) reduces ability of hemoglobin to carry oxygen, which increases respiratory rate and depth.

Blood Pressure

Blood pressure is the force exerted on the walls of an artery by the pulsing blood under pressure from the heart. Maximum blood pressure is exerted on the walls of arteries when the left ventricle of the heart contracts and pushes blood through the aortic valve into the aorta at the beginning of systole. The pressure rises as the ventricle contracts (**systole**) and falls as the heart relaxes (**diastole**).

The difference between the diastolic and the systolic pressures is called the **pulse pressure**. A normal pulse pressure is about 40 mmHg but can be as high as 100 mmHg during exercise. Blood pressure is measured in millimeters of mercury (mm Hg): systolic pressure over the diastolic pressure. **A typical blood pressure for a healthy adult is 120/80 mmHg (pulse pressure is 30-50).**

Factors Influencing Blood Pressure

1. **Age:** Older adults often have a rise in systolic pressure related to decreased vessel elasticity; however, BP greater than 140/90 mm Hg is defined as hypertension and increases the risk for hypertension-related illness.
2. **Stress**: Anxiety, fear, pain, and emotional stress result in sympathetic stimulation, which increases HR, cardiac output, and vascular resistance. The effect of sympathetic stimulation increases BP. Anxiety raises BP as much as 30 mm Hg.
3. **Gender:** There is no clinically significant difference in BP levels between boys and girls. After puberty males tend to have higher BP readings. After menopause women tend to have higher BP levels than men of similar age.
4. **Daily Variation:** Blood pressure varies throughout the day, with lower BP during sleep between midnight and 3:00 AM. Between 3:00 AM and 6:00 AM there is a slow and steady rise in BP. When a patient awakens, there is an early-morning surge. It is highest during the day between 10:00 AM and 6 PM. No two people have the same pattern or degree of variation.
5. **Medications:** Some medications directly or indirectly affect BP. Before BP assessment ask whether the patient is receiving antihypertensive, diuretic, or other cardiac medications, which lower BP.
6. **Activity and Weight:** A period of exercise can reduce BP for several hours afterwards. An increase in oxygen demand by the body during activity increases BP. Inadequate exercise frequently contributes to weight gain, and obesity is a factor in the development of hypertension.
7. **Smoking:** Smoking results in vasoconstriction, a narrowing of blood vessels. BP rises when a person smokes and returns to baseline about 15 minutes after stopping smoking.

Hypertension

The most common alteration in BP is hypertension. Hypertension is often asymptomatic. Prehypertension is diagnosed in adults when a People with a family history of hypertension are at significant risk. Modifiable risk factors include obesity, cigarette smoking, heavy alcohol consumption, and high sodium (salt) intake. Sedentary lifestyle and continued exposure to stress are also linked to hypertension. The incidence of hypertension is greater in patients with diabetes, older adults, and African-Americans. It is a major factor underlying deaths from strokes and is a contributing factor to myocardial infarctions (heart attacks). When patients are diagnosed with hypertension, educate them about BP values, long-term follow-up care and therapy.

1. **Primary hypertension**: is an elevated blood pressure of unknown cause
2. **Secondary hypertension**: is an elevated blood pressure of known cause.

Hypotension

Hypotension is present when the systolic BP falls to 90 mm Hg or below. Although some adults have a low BP normally, for most people low BP is an abnormal finding associated with illness.
Hypotension occurs because of the dilation of the arteries in the vascular bed, the loss of a substantial amount of blood volume (e.g,. hemorrhage), or the failure of the heart muscle to pump adequately (e.g., myocardial infarction). Hypotension associated with pallor, skin mottling, clamminess, confusion, increased HR, or decreased urine output is life threatening and is reported to a health care provider immediately.

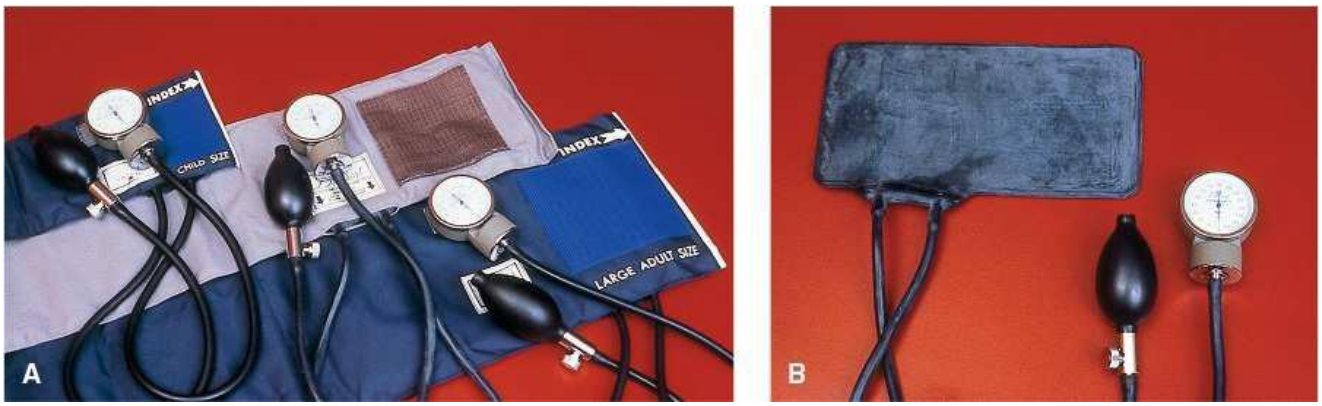
Orthostatic hypotension, also referred to as **postural hypotension**, occurs when a normotensive person develops symptoms and a drop in systolic pressure by at least 20 mm Hg or a drop in diastolic pressure by at least 20 mm Hg within 3 minutes of rising to an upright position.

Categories for Blood Pressure Levels in Adults (Ages 18 and Older)		
Category	**Systolic BP (mmHg)**	**Diastolic BP (mmHg)**
Normal	120 (110-130)	80 (70-90)
Hypertension, stage 1	130–139	90–99
Hypertension, stage 2	140-160	100-120
Hypertensive crisis	Over than 160	Over than 120

Sources of Error in Blood Pressure Measurement

1. Use of noncalibrated, nonvalidated, nonmaintained device.
2. Use of a cuff of incorrect size
3. Patient movement during measurement
4. Patient talking during the measurement
5. Incorrect placement and/or orientation of the cuff
6. Incorrect positioning of the patient
7. Use of inaccurate measurement technique
8. Incorrect positioning of the limb used for measurement
9. Inflation of cuff that is too rapid
10. Deflation of cuff that is too rapid (faster than 2 to 3 mm Hg per second)
11. Environmental noise
12. Failure to allow for a rest period prior to measurement
13. Incorrect interpretation

The electronic blood pressure monitor reports systolic and diastolic blood pressure



A sphygmomanometer, along with a stethoscope, is used to assess blood pressure in the auscultatory method of BP measurement. The sphygmomanometer consists of a cuff (with an air compartment), a pump, and the manometer.

Arm blood pressure

Thigh blood pressure

Oxygen Saturation

A pulse oximeter is a noninvasive device that estimates a client's arterial blood oxygen saturation (SaO2) by means of a sensor attached to the client's finger (Figure 6–13), toe, nose, earlobe, or forehead (or around the hand or foot of a neonate). The oxygen saturation value is the percent of all hemoglobin binding sites that are occupied by oxygen. The pulse oximeter can detect **hypoxemia** (low oxygen saturation) before clinical signs and symptoms, such as a dusky color to skin and nail beds develop. **Normal oxygen saturation is 95% to 100%, and below 70% is life threatening.** Pulse oximeters with various types of sensors are available from several manufacturers. The oximeter unit consists of an inlet connection for the sensor cable, and a faceplate that indicates (a) the oxygen saturation measurement and (b) the pulse rate. Cordless units are also available (Figure 6–14).

Factors Affecting Oxygen Saturation Readings

1. **Hemoglobin**. If the hemoglobin is fully saturated with oxygen, the SpO2 will appear normal even if the total hemoglobin level is low.
2. **Circulation**. The oximeter will not return an accurate reading if the area under the sensor has impaired circulation.
3. **Activity**. Shivering or excessive movement of the sensor site may interfere with accurate readings.
4. **Carbon monoxide poisoning**. Pulse oximeters cannot discriminate between hemoglobin saturated with carbon monoxide versus oxygen. In this case, other measures of oxygenation are needed.

Figure 6–13 • Fingertip oximeter sensor (adult).

Figure 6–14 • Fingertip oximeter sensor (cordless).

B

C

D

E

B, Palpation of femoral pulse.

C, Palpation of popliteal pulse.

D, Palpation of dorsalis pedis pulse.

E, Palpation of posterior tibial pulse.

Chapter two

… Asepsis and infection control…

Asepsis and infection control

Infection is the invasion of a susceptible host by **pathogens** or microorganisms, resulting in disease.

Colonization is the presence and growth of microorganisms within a host but without tissue invasion or damage.

Communicable disease is an infectious disease can be transmitted directly from one person to another.

If the pathogens multiply and cause clinical signs and symptoms, the infection is **symptomatic**. If clinical signs and symptoms are not present, the illness is termed **asymptomatic**.

Inflammation: The cellular response of the body to injury, infection, or irritation is termed inflammation. Inflammation is a protective vascular reaction that delivers fluid, blood products, and nutrients to an area of injury. The process neutralizes and eliminates pathogens or dead (necrotic) tissues and establishes a means of repairing body cells and tissues. Signs of localized inflammation include swelling, redness, heat, pain or tenderness, and loss of function in the affected body part. When inflammation becomes systemic, other signs and symptoms develop, including fever, increased white blood cells (WBCs), malaise, anorexia, nausea, vomiting, lymph node enlargement, or organ failure.

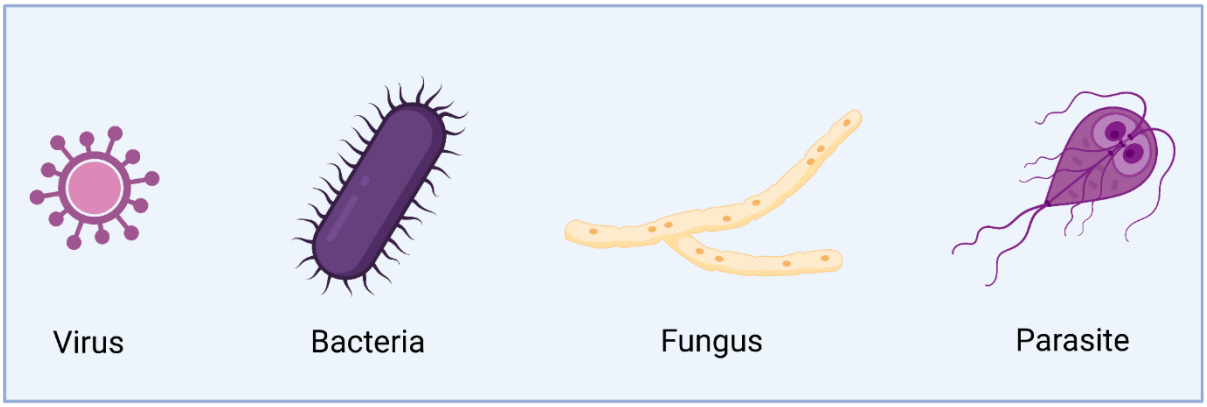
Vascular and Cellular Responses. Acute inflammation is an immediate response to cellular injury. Rapid vasodilation occurs, allowing more blood near the location of the injury. The increase in local blood flow.

Immune Response: The normal immune response involves the collective reaction of the immune system to an invading organism. The complex mechanisms that constitute the immune response occur as the body attempts to protect and defend itself. The foreign material is called an **antigen**, and the body commonly responds to the antigen by producing an **antibody**. This antigen–antibody reaction, also known as humoral immunity, is one component of the overall immune response. The other component that also helps the body defend against invaders is cell-mediated immunity.

There are four major categories of microorganisms cause infection in humans:

bacteria, viruses, fungi, and parasites.

1. **Bacteria:** there are two types:
    - **Commensal bacteria** found as normal flora of healthy humans. These have a significant protective role by preventing colonization of pathogenic microorganisms.
    - **Pathogenic bacteria** have greater virulence, and cause infections
2. **Viruses:** such as hepatitis B, C viruses and HIV, influenza viruses.
3. **Fungi:** include yeasts and molds.
4. **Parasites:** include protozoa.



Stages of Infection

An understanding of the stages in the development of an infection is necessary to intervene and disrupt the infection cycle. An infection progresses through the following phases:

1. Incubation period
2. Prodromal stage
3. Full (acute) stage of illness
4. Convalescent period

Incubation Period

Interval between entrance of pathogen into body and appearance of first symptoms (e.g., chickenpox, 14 to 16 days after exposure; common cold, 1 to 2 days; influenza, 1 to 4 days; measles, 10 to 12 days; mumps, 16 to 18 days.

Prodromal Stage

Interval from onset of nonspecific signs and symptoms (malaise, low-grade fever, fatigue) to more specific symptoms. (During these time microorganisms grow and multiply, and patient may be capable of spreading disease to others.) For example, herpes simplex begins with itching and tingling at the site before the lesion appears.

Illness Stage

Interval when patient manifests signs and symptoms specific to type of infection. For example, strep throat is manifested by sore throat, pain, and swelling; mumps is manifested by high fever, parotid and salivary gland swelling.

Convalescence

Interval when acute symptoms of infection disappear. (Length of recovery depends on severity of infection and patient's host resistance; recovery may take several days to months).

The Primary Signs of Inflammation and Infection

1. Redness (erythema)
2. Heat
3. Pain
4. Swelling (edema)
5. Loss of function
6. Pus (purulent exudate)

Types of infections

1. **Localized infections** are limited to a defined area or single organ with symptoms that resemble inflammation (redness, tenderness, and swelling).
2. **Generalized** such as pneumonia (in the lungs).
3. **Systemic infections** affect the entire body and involve multiple organs.

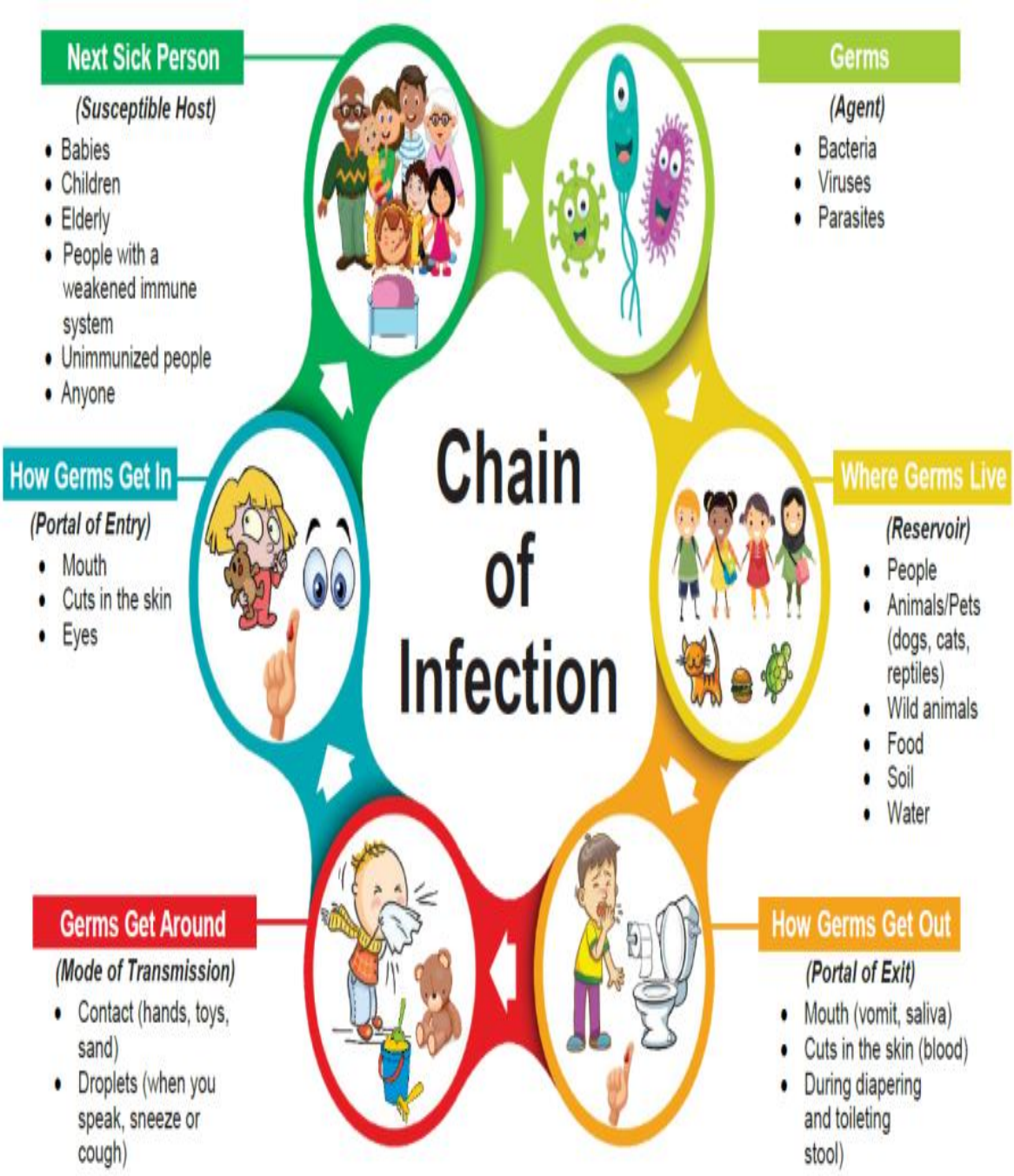
Nosocomial Infections

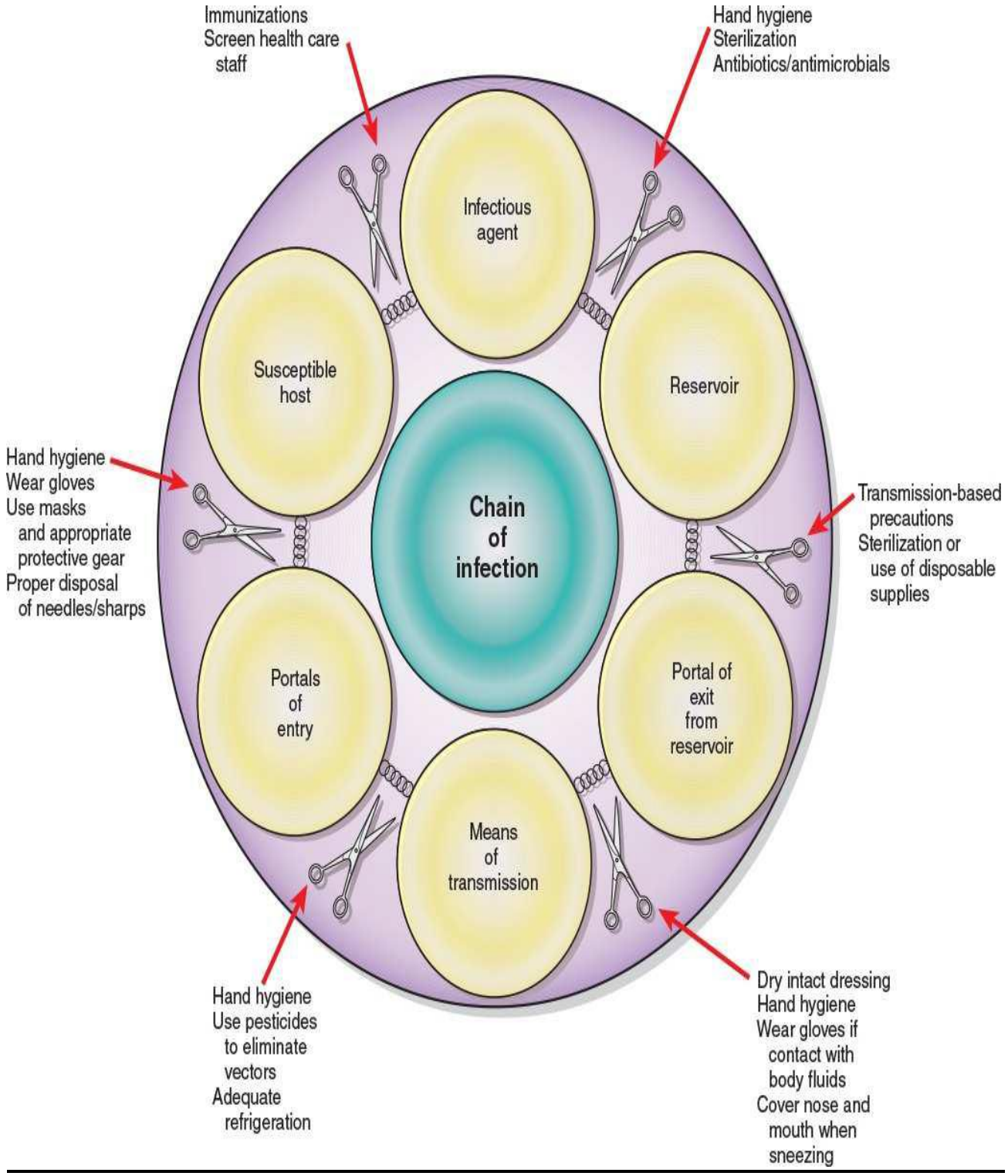
Nosocomial infections or (hospital-acquired infections) are infections acquired in the hospital or other health care facilities that were not present or incubating at the time of the client's admission.

Nosocomial infections include those infections that become symptomatic after the client is discharged as well as infections among medical personnel. Most nosocomial infections are transmitted by health care personnel who fail to practice proper hand washing procedures or change gloves between client contacts.

Types of Nosocomial Infections:

1. Nosocomial of urinary tract infection.
2. Nosocomial of respiratory tract infection.
3. Nosocomial of blood stream infection.
4. Nosocomial of surgical site infection.


Chain of Infection
Next Sick Person
(Susceptible Host)
Babies
Children
Elderly
People with a weakened immune system
Unimmunized people
Anyone
Germs
(Agent)
Bacteria
Viruses
Parasites
How Germs Get In
(Portal of Entry)
Mouth
Cuts in the skin
Eyes
Where Germs Live
(Reservoir)
People
Animals/Pets (dogs, cats, reptiles)
Wild animals
Food
Soil
Water
Germs Get Around
(Mode of Transmission)
Contact (hands, toys, sand)
Droplets (when you speak, sneeze or cough)
How Germs Get Out
(Portal of Exit)
Mouth (vomit, saliva)
Cuts in the skin (blood)
During diapering and toileting stool)



The infection cycle is demonstrated as a chain. The goal is to break the links of the chain to end the cycle.

(Breaking the Chain of Infection)

Normal Floras: The body normally contains microorganisms that reside on the surface and deep layers of skin, in the saliva and oral mucosa, and in the GI and GU tracts. A person normally excretes trillions of microbes daily through the intestines. Normal floras do not usually cause disease when residing in their usual area of the body but instead participate in maintaining health.

Normal floras of the large intestine exist in large numbers without causing illness. They also secrete antibacterial substances within the walls of the intestine. The normal floras of the skin exert a protective, bactericidal action that kills organisms landing on the skin. The mouth and pharynx are also protected by floras that impair growth of invading microbes. Normal floras maintain a sensitive balance with other microorganisms to prevent infection. Any factor that disrupts this balance places a person at increased risk for acquiring a disease. For example, the use of broad-spectrum antibiotics for the treatment of infection can lead to suprainfection. A suprainfection develops when broad-spectrum antibiotics eliminate a wide range of normal flora organisms, not just those causing infection. When normal bacterial floras are eliminated, body defenses are reduced, which allows disease producing microorganisms to multiply, causing illness.

Body defenses against infection

The body has some natural defenses to protect it from infections.

- **Natural external defenses against infectious agents:**
  1. **Skin and normal flora-** intact skin acts as a mechanical barrier against the entry of pathogens.
  2. **Mucous membranes**- lining the respiratory, reproductive, gastrointestinal, and urinary tracts. The mucus is sticky and traps foreign materials before they can cause damage.
  3. **Coughing and sneezing-** remove foreign materials from the respiratory tract.
  4. **Hydrochloric acid**- a strong chemical that is produced in the stomach destroys many microbes.
  5. **Eyes** are protected by **tears** that provide a flushing action to remove most microbes that enter the eyes.
- **Natural internal defenses against infectious agents:**
  1. **Phagocytes**- special cells in the blood act to destroy microbes.
  2. **Temperature**- an elevated temperature is believed to increase the body's ability to fight infection.
  3. **Inflammation**- a process that brings blood and phagocytes to the area of infection.

Factors increasing susceptibility to infection:

1. **Inadequate primary defenses-** (broken skin).
2. **Inadequate secondary defenses-** (decrease hemoglobin, leucopenia).
3. Inadequate acquired immunity.
4. Immunosuppression.
5. Tissue destruction and increased environmental exposure.
6. Chronic diseases.
7. Elderly.
8. Malnutrition.
9. Invasive procedures.
10. Pharmaceutical agents.
11. Trauma.
12. Insufficient knowledge to avoid exposure to pathogens.

Supporting Defenses of a Susceptible Host

The following measures can reduce a person's susceptibility:

1. **Hygiene:** Intact skin and mucous membranes is one barrier against microorganisms entering the body. In addition, good oral care, including flossing the teeth, reduces the likelihood of an oral infection.
2. **Nutrition:** A balanced diet enhances the health of all body tissues, Adequate nutrition enables tissues to maintain and rebuild themselves and helps keep the immune system functioning well.
3. **Fluid:** Fluid intake permits fluid output that flushes out the bladder and urethra, removing microorganisms that could cause an infection.
4. **Sleep:** Adequate sleep is essential to health and to renewing energy.
5. **Stress:** Excessive stress predisposes people to infections.
6. **Immunizations:** The use of immunizations has dramatically decreased the incidence of infectious diseases.

Cleaning

Cleaning is the removal of organic material (e.g., blood) or inorganic material (e.g., soil) from objects and surfaces.

Disinfecting and Sterilizing

Disinfection and sterilization use both physical and chemical processes that disrupt the internal functioning of microorganisms by destroying cell proteins. Disinfection describes a process that eliminates many or all microorganisms, with the exception of bacterial spores, from inanimate objects.

There are two types of disinfection:

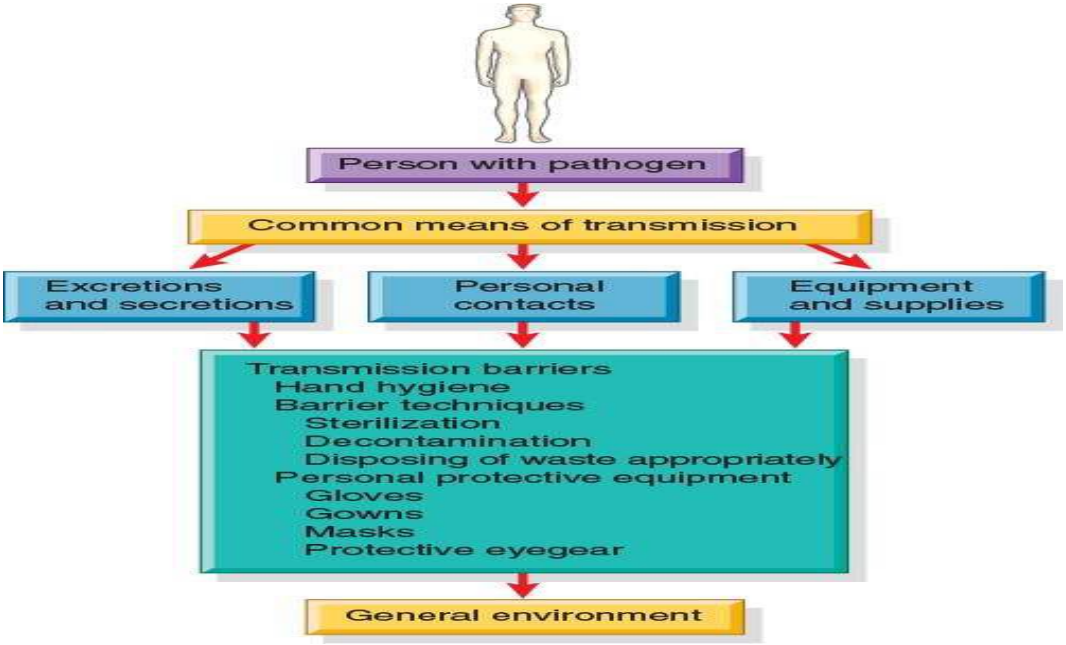
(1) the disinfection of surfaces

(2) high-level disinfection, which is required for some patient care items such as endoscopes and bronchoscopes.

Sterilization eliminates or destroys all forms of microbial life, including spores. Sterilization methods include processing items using steam, dry heat.

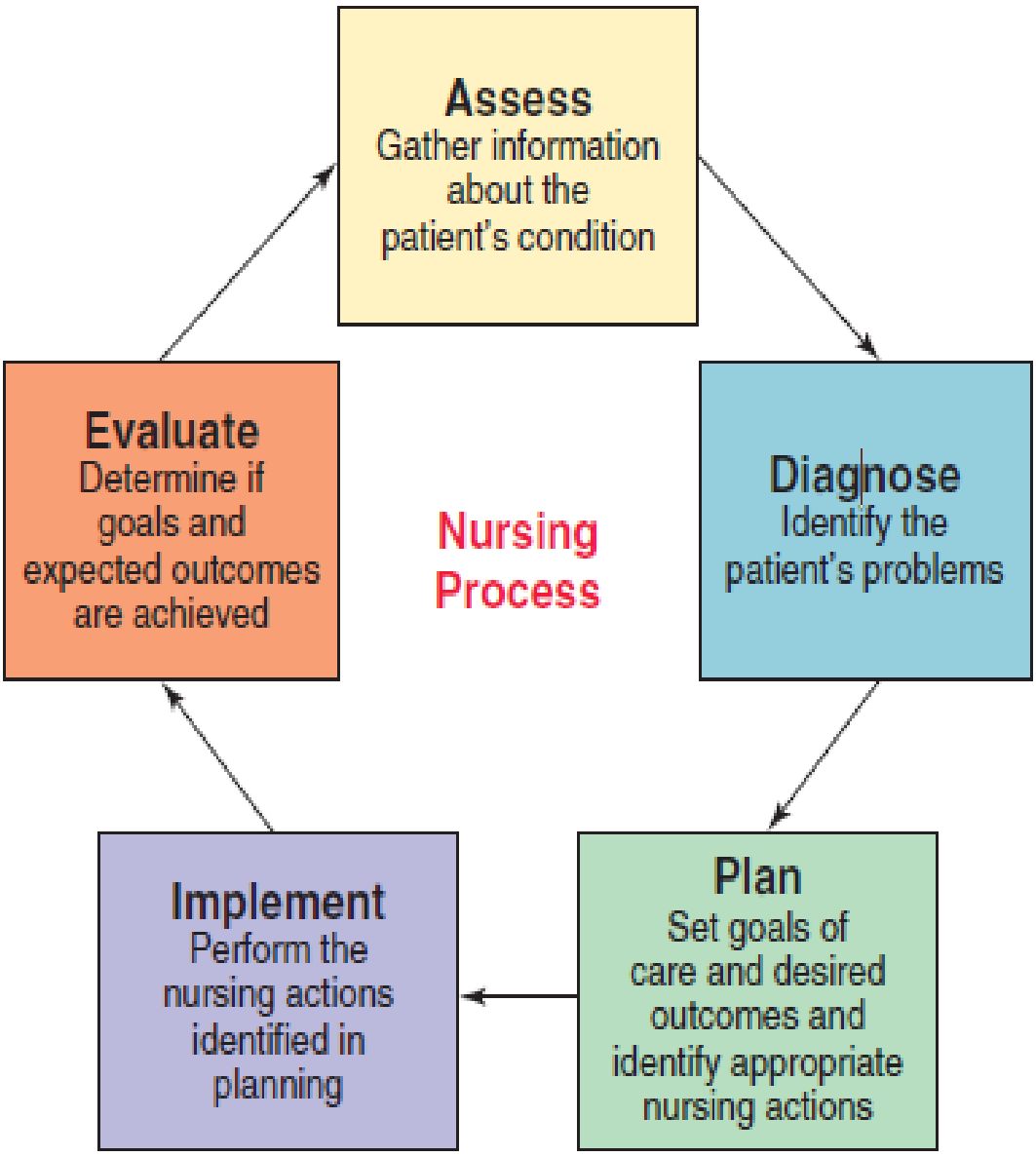
Nurse's Role in Controlling Infections

1. Providing the client with a safe environment, including prevention of infections.
2. Reduce the risk of infection center around ensuring asepsis and properly disposing of infectious materials.
3. Use of aseptic technique decreases the risk and spread of infections.



Chapter Three

… The nursing process…



The nursing process is a systematic, rational method of planning and providing individualized nursing care.

Purposes of **nursing process** are:

1. To identify a client's health status and actual or potential health care problems or needs
2. To establish plans to meet the identified needs
3. To deliver specific nursing interventions to meet those needs.

Advantages of nursing process:

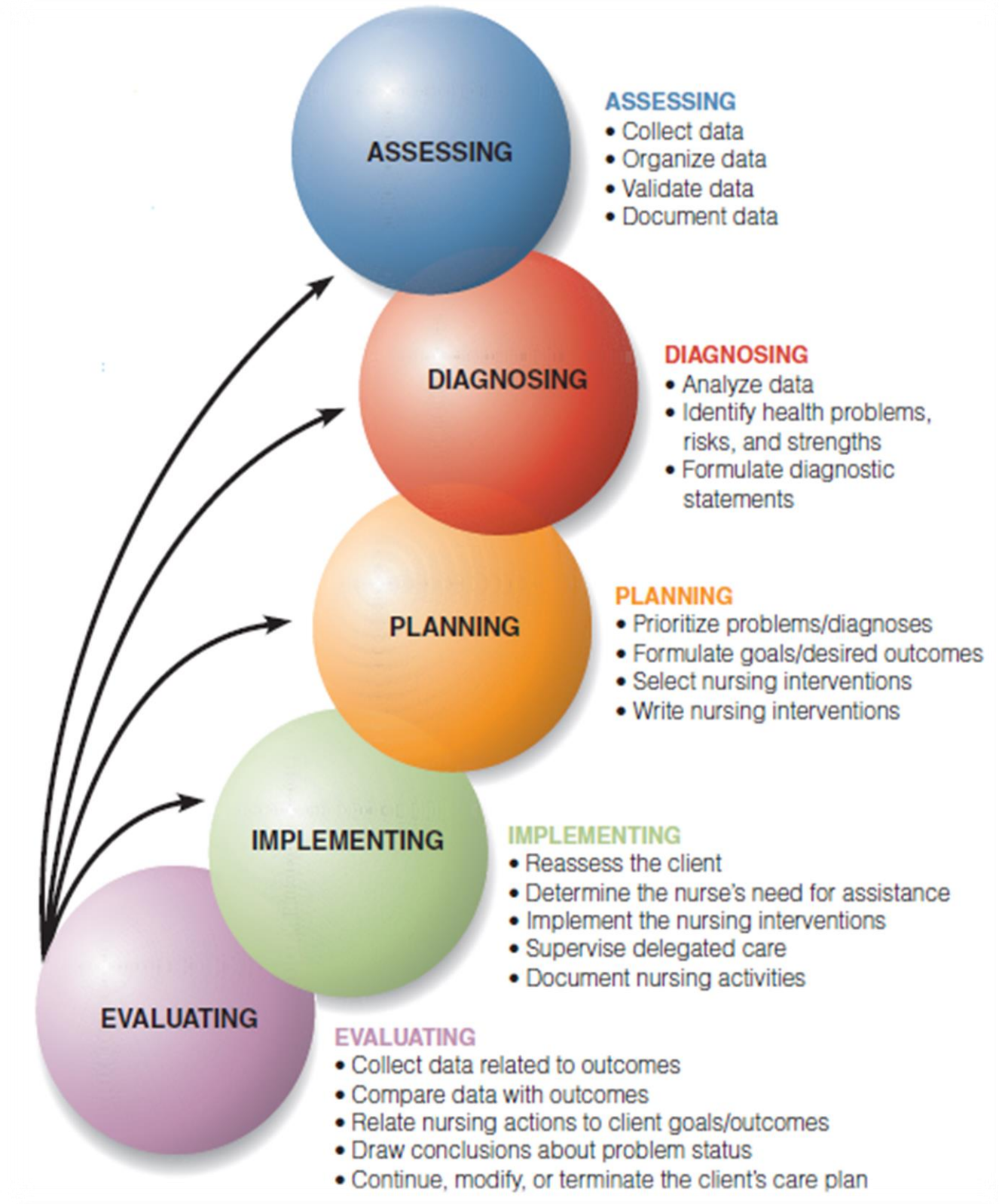
The nursing process helps the nurse and the nursing in many ways:

1. Create a health data base of a patient
2. Identify actual or potential health problems of a patient
3. Establish priorities of nursing actions for providing proper services to the patients.
4. Define specific nursing actions for providing proper services to the patients
5. Develop planned organized and individualized nursing care.
6. Encourage for innovative nursing care.
7. Provide for alternative nursing actions.
8. Develop nursing autonomy and to foster nursing accountability
9. Increase the effectiveness of nursing care

Documenting the nursing process

1. Accurately
2. Concisely
3. Timely
4. Relevant, to provides a complete picture of the patient health.

Components of the Nursing Process



Box (1-1) Components of a Nursing Health History

Biographic Data

1. Client's name
2. Age
3. Sex
4. Address
5. Marital status
6. Occupation
7. Religious preference

Chief Complaint or Reason for Visit

The answer given to the question "What is troubling you?" or "Describe the reason you came to the hospital or clinic today." The chief complaint should be recorded in the client's own words.

History of Present Illness

- When did you first begin having this problem?
- Did it happen suddenly or slowly?
- Show me exactly where you are having this problem.
- What other symptoms have you had with this problem?
- How have you treated this problem?

Past History

- Tell me about the childhood illnesses, such as measles or mumps, that you had.
- What are you allergic to"?
- Describe any accidents, injuries, and surgeries you have had".
- What prescribed or over-the-counter medications do you use"?
- Do you take any herbal or dietary supplements"?
- What is the date of your most recent immunization for tetanus; pertussis; polio; measles; rubella; mumps; influenza; hepatitis A, B, and C.

Family History

- How old are the members of your family?
- If any members of your family are not living, what caused their death?
- Is there any history of this health problem you have in other family members?
- Do any family members have long-term illnesses?

Lifestyle

1. **Personal habits***:* the amount, frequency, and duration of substance use (tobacco, alcohol, coffee, cola, tea, and illegal or recreational drugs)
2. **Diet***:* description of a typical diet on a normal day or any special diet, number of meals and snacks per day, who cooks and shops for food, ethnic food patterns, and allergies
3. **Sleep patterns***:* usual daily sleep/wake times, difficulties sleeping, and remedies used for difficulties

Social Data

1. **Family relationships/friendships***:* the client's support system in times of stress (who helps in time of need?), what effect the client's illness has on the family, and whether any family problems are affecting the client
2. **Educational history**
3. **Occupational history***:* current employment status, the number of days missed from work because of illness, any history of accidents on the job, any occupational hazards with a potential for future disease or accident
4. **Economic status**
5. **Home conditions***:* home safety measures and activities of daily living.

Psychological Data

1. **Major stressors** experienced and the client's perception of them
2. **Usual coping pattern**
3. **Communication style***:* ability to verbalize appropriate emotion; nonverbal communication—such as eye movements, gestures, use of touch, and posture; interactions with support persons; and the congruence of nonverbal behavior and verbal expression.

Collecting Data

Data collection is the process of gathering information about a client's health status. A database contains all the information about a client; it includes the nursing health history (Box 1–1), physical assessment, primary care provider's history and physical examination, results of laboratory and diagnostic tests, and material contributed by other health personnel.

Types of Data

Subjective data: can be described or verified only by that person. Itching, pain, and feelings of worry are examples of subjective data. Subjective data include the client's sensations, feelings, values, beliefs, attitudes, and perception of personal health status and life situation.

Objective data: are detectable by an observer or can be measured or tested against an accepted standard. They can be seen, heard, felt, or smelled, and they are obtained by observation or physical examination.

A complete database provides a baseline for comparing the client's responses to nursing and medical interventions. Examples of subjective and objective data are shown in Table 1–1.

TABLE 1–1 Examples of Subjective and Objective Data

Subjective	Objective
"I feel weak all over when I exert myself."	Blood pressure 90/50 mmHg* Apical pulse 104 beats/min Skin pale and diaphoretic
Client states he has a cramping pain in his abdomen. "I feel sick to my stomach."	Vomited 100 mL green-tinged fluid Abdomen firm and slightly distended

Sources of Data

Sources of data are primary or secondary:

Primary Sources: ***patient***

The patient is the primary and usually the best source of information. Unless specified otherwise.

Secondary Sources:

1. **Family and Significant Others**

   Family members, friends, and caregivers who know the client well often can supplement or verify information provided by the client.

2. **Patient Record**

   Types of patient records include:

   A. **Medical records** (e.g. medical history, physical examination, operative report, progress notes, and consultations done by primary care providers).

   B. **Laboratory records** also provide pertinent health information.

Data Collection Methods

1. **Observation**

   These observations occur whenever there is contact with the client and include factors such as client mood, interactions with others, physical and emotional responses, and any safety considerations.

2. **Interview**

   The nurse interviews for a variety of reasons throughout the nurse-client relationship, including data collection, teaching, exploration of the client's feelings or concerns, and provision of support.

3. **Health History**

   The health history is a review of the client's functional health patterns prior to the current contact with a health care agency.

4. **Physical Examination**

   The purpose of the physical examination is to make direct observations of any deviations from normal and to validate subjective data gathered through the interview.

5. **Laboratory and Diagnostic Data**

   Results of tests can be useful objective data as these values often serve as defining characteristics for various altered health states; these can also be helpful in ruling out certain suspected problems.

Organizing Data

The nurse uses a written (or electronic) format that organizes the assessment data systematically.

Validating Data

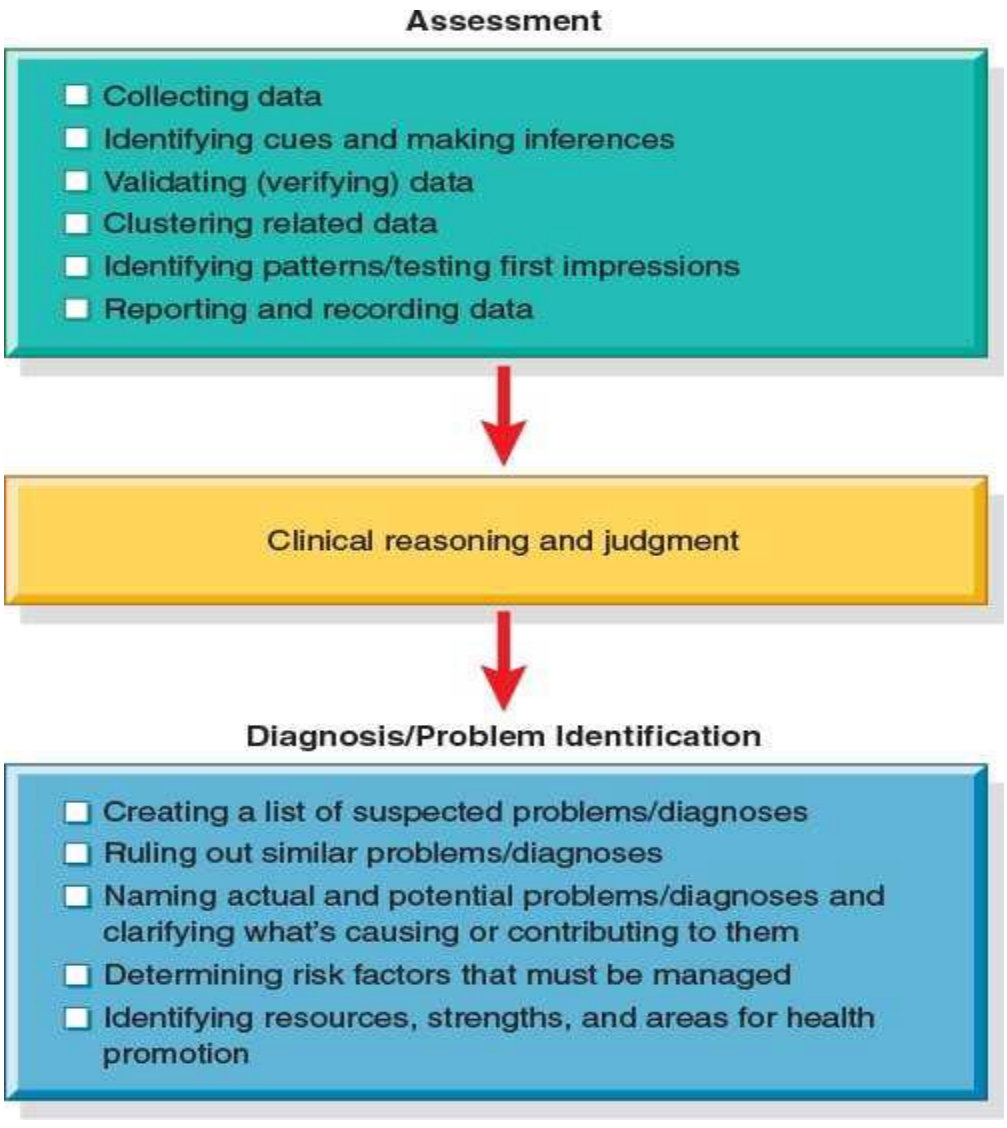
Validation is the act of "double-checking" or verifying data to confirm that it is accurate and factual.

Documenting Data

To complete the assessment phase, the nurse records client data. Accurate documentation is essential and should include all data collected about the client's health status.

Diagnosing

Diagnosing Problem identification—the second step/phase in the nursing process—begins after the nurse has collected and recorded the patient data. The purposes of diagnosing/analyzing are to (1) identify how a person, group, or community responds to actual or potential health and life processes; (2) identify factors that contribute to or cause health problems (etiologies); and (3) identify resources or strengths that the person, group, or community can draw on to prevent or resolve problems. In the diagnosing phase of the nursing process, the nurse interprets and analyzes data gathered from the nursing assessment.



Assessing

Diagnosing/Problem identification

- Interpret and analyze patient data
- Identify patient strengths and health problems
- Formulate and validate actual and potential health problems
- Develop a prioritized list of patient health problems
- Detect and refer signs and symptoms that may indicate a problem beyond the nurse's experience

Outcome identification and planning

Implementing

Evaluating

Differentiating Nursing Diagnoses from Medical Diagnoses

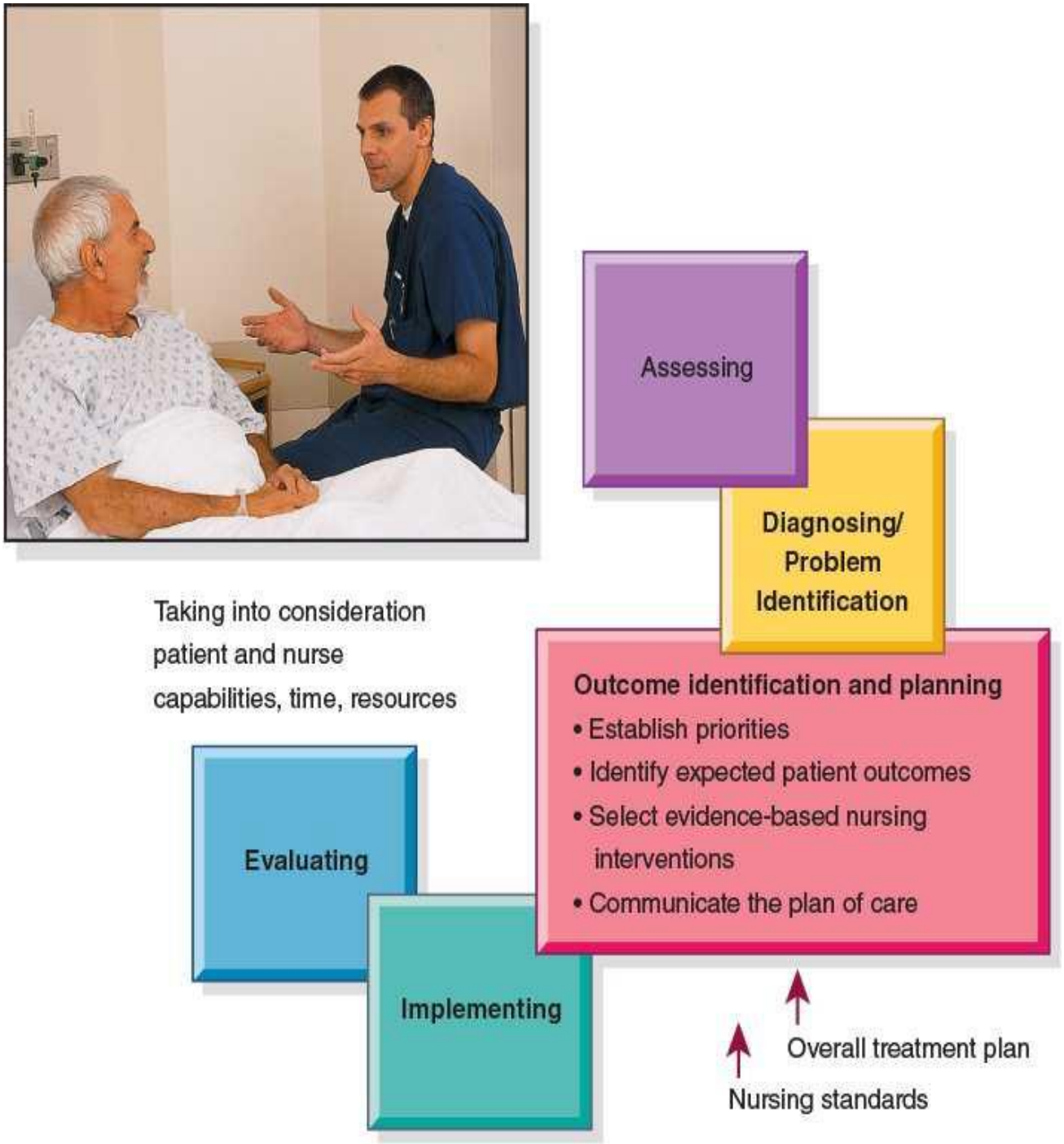
A nursing diagnosis refer to signs and symptoms of the health problem but Medical diagnoses refer to disease processes.

A Comparison: Nursing Diagnosis and Medical Diagnosis

	Medical Diagnosis	**Nursing Diagnosis**
Definition	Traumatic or disease condition or syndrome validated by medical diagnostic studies	A nursing diagnosis is a clinical judgment about individual, family,or community responses to actual or potential health problems or life processes.
Focus	Correcting or preventing pathology of specific organs or body systems	Monitoring human responses to actual and potential health problems
Problem statement	Cystitis	Stress Incontinence of Urine; degenerative changes in pelvic muscles and structural supports associated with advanced age, obesity, gravid uterus
	Example: Myocardial infarction	Example: Chest pain, nausea

Planning

Is a deliberative, systematic phase of the nursing process that involves decision making and problem solving. In planning, the nurse refers to the client's assessment data and diagnostic statements for direction in formulating client goals and designing the nursing interventions required to prevent, reduce, or eliminate the client's health problems.



Types of Planning

1. **Initial Planning:**

   Initial planning is performed by the nurse with the admission nursing history and the physical assessment. This comprehensive plan addresses each problem listed in the prioritized nursing diagnoses and identifies appropriate patient goals and the related nursing care.

2. **Ongoing Planning:**

   Ongoing planning is carried out by any nurse who interacts with the patient. Its chief purpose is to keep the plan up to date to facilitate the resolution of health problems, manage risk factors, and promote function.

3. **Discharge Planning:**

   Discharge planning is best carried out by the nurse who has worked most closely with the patient and family to help the patient and family develop sufficient knowledge of the health problem and the therapeutic regimen to carry out necessary self-care behaviors at home competently.

The Planning Process

In the process of developing client care plans, the nurse engages in the following activities:

a. Setting priorities
b. Establishing client goals/desired outcomes
c. Selecting and writing nursing interventions and activities

Implementation

The purpose of implementation is to help the patient achieve valued health outcomes: promote health, prevent disease and illness, restore health, and facilitate coping with altered functioning.

Implementing Skills:

1. **The cognitive skills** (intellectual skills) include problem solving, decision making, critical thinking, clinical reasoning, and creativity
2. **Interpersonal skills** are all of the activities, verbal and nonverbal, people use when interacting directly with one another. The effectiveness of a nursing action often depends largely on the nurse's ability to communicate with others.
3. **Technical skills** are purposeful "hands-on" skills such as manipulating equipment, giving injections, bandaging, moving, lifting, and repositioning clients.

Evaluating

In the fifth phase of the nursing process, evaluating, the nurse and patient together measure how well the patient has achieved the outcomes specified in the care plan. When evaluating patient outcome achievement, the nurse identifies factors that contribute to the patient's ability to achieve expected outcomes and, when necessary, modifies the plan of care. The purpose of evaluation is to allow the patient's achievement of expected outcomes to direct future nurse–patient interactions.

Based on the patient's responses to the plan of care, the nurse decides to:

- Terminate the plan of care when each expected outcome is achieved
- Modify the plan of care if there are difficulties achieving the outcomes
- Continue the plan of care if more time is needed to achieve the outcomes

When evaluation points to the need to modify nursing care, the nurse reviews each preceding phase of the nursing process (assessing, diagnosing, planning, and implementing). Successful evaluation helps ensure that valued patient outcomes are attained.

CLINICAL REASONING AND JUDGMENT AND EVALUATING

The five classic elements of evaluation are:

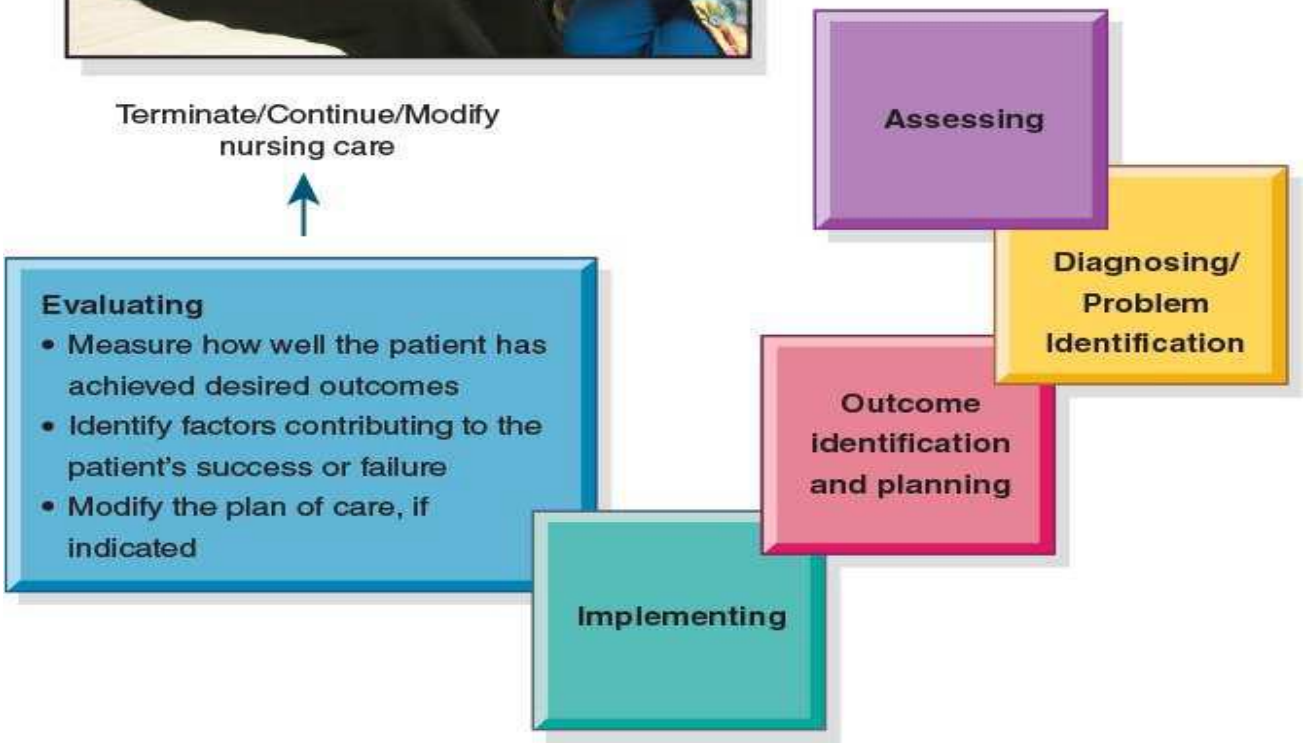
1 .Identifying evaluative criteria and standards (expected patient outcomes)

2 .Collecting data to determine whether these criteria and standards are met

3 .Interpreting and summarizing findings

4 .Documenting your judgment

5. Terminating, continuing, or modifying the plan



Comparing Data with Desired Outcomes

When determining whether a goal has been achieved, the nurse can draw one of three possible conclusions:

1. The goal was met; that is, the client response is the same as the desired outcome.

2. The goal was partially met; that is, either a short-term outcome was achieved but the long-term goal was not, or the desired goal was incompletely attained.

3. The goal was not met.

Chapter Four

... Care of Surgical Patients ...

Perioperative nursing includes activities performed by a professional nurse before (preoperative), during (intraoperative) and after (postoperative) surgery.

- **Preoperative phase:** Begins when the patient and surgeon mutually decide that surgery is necessary and will take place; ends when the patient is transferred to the operating room (OR) or procedural bed.
- **Intraoperative phase:** Begins when the patient is transferred to the OR bed; ends with transfer to the post anesthesia care unit (PACU). The PACU is an area often adjacent to the surgical suite designed to provide care for patients recovering from anesthesia or moderate sedation/analgesia.
- **Postoperative phase:** Begins with admission to the PACU or other recovery area; ends with complete recovery from surgery and the last follow-up health care provider visit.

Classification of Surgical Procedures

According to Seriousness:

Major surgery Involves extensive reconstruction or alteration in body parts; poses great risks to well-being such as: Coronary artery bypass, colon resection, removal of larynx, resection of lung lobe.

Minor surgery Involves minimal alteration in body parts; often designed to correct deformities; involves minimal risks compared with major procedures, such as: Cataract extraction, facial plastic surgery, tooth extraction.

According to Urgency

1. **Emergency surgery:** Must be done immediately to save life or preserve function of body part, such as: Repair of perforated appendix or traumatic amputation; control of internal hemorrhaging.
2. **Urgency surgery:** Necessary for patient's health; often prevents development of additional problems (e.g., tissue destruction or impaired organ function); not necessarily emergency, such as: Excision of cancerous tumor; removal of gallbladder for stones; vascular repair for obstructed artery (e.g., coronary artery bypass).

3. **Elective surgery**: Performed on basis of patient's choice; is not essential and is not always necessary for health e.g. facial plastic surgery; hernia repair.

The degree of risk involved in a surgical procedure is affected by the client's:

- age
- general health
- nutritional status
- use of medications, and mental status.

Preoperative Phase:

A. Assessment

Preoperative assessment includes collecting and reviewing specific client data to determine the client's needs both pre-and postoperatively. Physical, psychological, and social needs are determined during assessment.

1. Nursing History

2. Physical Assessment:

A. General Survey: Note general state of health, body posture and stature.
B. Head and Neck.
C. Upper Extremities.
D. Anterior and Posterior Chest and Abdomen.
E. Lower Extremities.

3. Physical Preparation

a. Skin Preparation
b. Nutrition
c. Gastrointestinal Preparation
d. Bowel Preparation
e. Urinary Elimination
f. Safety Precautions
g. Medications

4. **Check the vital sings**
5. **Laboratory tests as physician prescribe**.

Intra-operative Phase:

The intraoperative nurse is a vital member of the surgical team, advocating for the client, maintaining safety.

Anesthesia

Anesthetic agents can be administered systemically (to the whole body) or regionally (to a specific region of the body) to block nerve conduction. General, or systemic, anesthesia is a balance of loss of consciousness, analgesia (pain relief), relaxation, and loss of reflexes (temporary paralysis). In contrast, regional anesthesia does not cause narcosis (sleepiness), but results in analgesia and reflex loss.

Type of anesthesia

1. **General anesthesia:** General anesthesia involves the administration of drugs by inhalation or the IV route to produce central nervous system depression. General anesthesia typically is a combination of both IV and inhalation anesthetics that allows for rapid induction, excretion, and reversal of effects. The desired actions of general anesthesia are loss of consciousness, amnesia (short-term loss of memory), analgesia (the brain does not respond to pain signals), relaxed skeletal muscles, and depressed reflexes.
2. **Regional Anesthesia:** Regional anesthesia occurs when an anesthetic agent is injected near a nerve or nerve pathway in or around the operative site, inhibiting the transmission of sensory stimuli to central nervous system receptors. the temporary interruption of the transmission of nerve impulses. The client loses sensation in an area of the body but remains conscious. Several techniques are used:

- **Topical (surface) anesthesia** is primarily applied to intact skin but may be used with mucous membranes and in some cases of wound care.
- **Local anesthesia** is the injection of an anesthetic agent such as lidocaine to a specific area of the body
- **nerve block** (peripheral) are accomplished by injecting a local anesthetic around a nerve trunk supplying the area of surgery such as the jaw, face, or extremities.
- **Intravenous block** Intravenous anesthesia with pneumatic tourniqueting primarily occurs with surgery or procedures involving an extremity. The equipment consists of a tourniquet cuff, tubing, and a pressure regulator. Risks include nerve injuries, skin integrity issues, pain, compartment syndrome, formation of a deep vein thrombosis.
- **Spinal anesthesia** is achieved by injecting a local anesthetic into the subarachnoid space through a lumbar puncture, causing sensory, motor, and autonomic blockage. This type of anesthesia is used for surgery of the lower abdomen, perineum, and legs.
- **Epidural anesthesia** involves the injection of the anesthetic through the intervertebral spaces, usually in the lumbar region (although it may also be used in the thoracic or cervical regions). It is used for surgeries of the chest, abdomen, pelvis, and legs; epidurals are also commonly used in childbirth.

Post-operative Phase: The primary goal of nursing care during the immediate postoperative phase is to maintain the "A-B-Cs": airway, breathing, and circulation.

A: Assessment

This phase includes the assessment of both Normal and Abnormal Findings

- **Airway and Respiratory Status**
    a. Adequacy of airway and return of gag, cough, and swallowing reflexes.
    b. Type of artificial airway.
    c. Rate, rhythm, and depth of respirations.
    d. Symmetry of chest wall movements and use of accessory muscles.
    e. Breath sounds.
    f. Pulse oximeter readings.
    g. Color of mucous membranes.
    h. Amount and method of oxygen administration.
    i. If awake, ability to deep breath and cough.

- **Circulatory Status**
    a. Apical and peripheral pulses.
    b. Blood pressure (BP).
    c. Nail bed and skin color and temperature.
    d. Monitoring devices:
        - Cardiac monitor (ECG).
        - Pressure readings (arterial blood pressure or central venous pressure)
- **Neurologic Status**
    a. Level of consciousness (Glasgow Coma Scale).
    b. Eye opening.
    c. Verbal response.
    d. Motor response

- **Fluid and Metabolic Status**
    - **a.** Intake and output.
    - **b.** Palpate for bladder distention.
    - **c.** Patency of intravenous (IV) infusion (type, rate, and amount).
    - **d.** Signs of dehydration (skin integrity and turgor) or overload (edema).
    - **e.** Patency, amount, and character of drainage (catheters, drains, or tubes).
    - **f.** Inspect operative dressing (type, color and amount of drainage).
    - **g.** Auscultation for bowel tones in all four quadrants and inspect for abdominal distension

- **Level of Discomfort or Pain**
    - **a.** Location, intensity, and duration.
    - **b.** Type, amount of analgesia administered and client's response

- **Wound Management**
    - **a.** Inspect the dressing.
    - **b.** Note type and amount of drainage.
    - **c.** If drainage is present, reassess in 15-minute intervals**.**

B: Nursing Diagnosis: Depending on the individual client's needs, other nursing diagnoses can be included in the plan of care.

1. **Ineffective Airway Clearance related to:**
    - Anesthesia (diminished cough reflex).
    - Increased pulmonary congestion *Ineffective Breathing Pattern* related to Pain and Decreased energy/fatigue.
2. **Ineffective Tissue Perfusion (Cardiopulmonary) related to:**
    - Anesthesia.
    - Position or immobility

3. Deficient Fluid Volume related to:

- Active fluid volume loss.
- Inadequate fluid intake

4. Imbalanced Nutrition: Less Than Body Requirements related to:

- Anesthesia.
- Surgical manipulation of intestines

5. Urinary Retention related to:

- Anesthesia.
- Surgical manipulation of the bladder *Acute Pain* related to: Surgical incision

6. Risk for Infection related to:

- Impaired skin integrity from surgical wound.
- Deficient knowledge of wound or drainage tube care.

C: Outcome Identification and Planning

D: Interventions

1. Maintaining Respiratory Status.
2. Maintaining Circulatory Status.
3. Maintaining Neurologic Status.
4. Maintaining Fluid and Metabolic Status.
5. Managing Pain.

E: Evaluation

- The client is conscious, oriented, and can move all extremities.
- The client demonstrates full return of reflexes.
- The client can clear the airway and cough effectively.
- Vital signs have been stable or within baseline ranges for 30 minutes.
- Intake and urinary output are adequate to maintain the circulating blood volume.
- The client is a febrile, or a febrile condition has been treated accordingly.
- Dressings are dry or have only minimal drainage.

Chapter Five

…Medications Administration…

A **drug** or **medication** is any substance that modifies body functions when taken into the body. The study of drugs and their effect on the body's functioning is called **pharmacology**. A **pharmacist** is a person licensed to prepare and dispense drugs. Physicians, dentists, psychiatrists, podiatrists, physician assistants, and advanced practice nurses have prescriptive authority. Prescriptive authority for advanced practice nurses (clinical nurse specialists, nurse practitioners, certified nurse anesthetists, nurse midwives) and physician assistants varies in the degree of independence and the medications that may be prescribed from state to state.

Note: Medication administration is a core nursing function that involves skillful technique and consideration.

A drug's trade name (sometimes called the brand name) is the name given by the drug manufacturer and identifies it as property of that company.

The official name is the name under which a drug is listed in one of the official publications (e.g., the *United States Pharmacopeia*).

Therapeutic Effects. The therapeutic effect is the expected or predicted physiological response caused by a medication. For example, nitroglycerin reduces cardiac workload and increases myocardial oxygen supply. Some medications have more than one therapeutic effect. For example, prednisone, a steroid, decreases swelling, inhibits inflammation, reduces allergic responses, and prevents rejection of transplanted organs. Knowing the desired therapeutic effect for each medication allows you to provide patient education and accurately evaluate the desired effect of a medication.

Adverse Effects. Every medication has the ability to harm a patient. Undesired, unintended, and often unpredictable responses to medication are referred to as adverse effects. Adverse drug effects range from mild to severe. Some happen immediately, whereas others develop over time. Be alert and assess for unusual individual responses to drugs, especially with newly prescribed medications. Patients most at risk for adverse medication reactions include the very young and older adults, women, patients taking multiple medications, patients extremely underweight or overweight, and patients with renal or liver disease. If adverse effects are mild and tolerable, patients often remain on the medications. However, if they are not tolerated and are potentially harmful, stop giving the medication immediately.

Side Effects. A side effect is a predictable and often unavoidable adverse effect produced at a usual therapeutic dose. For example, some antihypertensive medications cause impotence in men.

Toxic Effects. Toxic effects often develop after prolonged intake of a medication or when a medication accumulates in the blood because of impaired metabolism or excretion. Excess amounts of a medication within the body sometimes have lethal effects.

Allergic Reactions. Allergic reactions also are unpredictable responses to a medication. Some patients become immunologically sensitized to the initial dose of a medication. With repeated administration the patient develops an allergic response to it, its chemical preservatives, or a metabolite. The medication or chemical acts as an antigen, triggering the release of the antibodies in the body. A patient's medication allergy symptoms vary, depending on the individual and the medication. Among the different classes of medications, antibiotics cause a high incidence of allergic reactions. Severe or anaphylactic reactions, which are life threatening, are characterized by sudden constriction of bronchiolar muscles, edema of the pharynx and larynx, and severe wheezing and shortness of breath. Immediate medical attention is required to treat anaphylactic reactions.

Medication Interactions. When one medication modifies the action of another, a medication interaction occurs. Medication interactions are common when individuals take several medications.

Common Types of Drug Preparations	
PREPARATION	DESCRIPTION
Capsule	Medication encased in gelatin shell
Elixir	Clear fluid containing water and/or alcohol; often sweetened
Enteric coated	A tablet or pill coated to prevent stomach irritation
Lotion	Drug particles in a solution for topical use
Lozenge	Small oval, round, or oblong preparation containing a drug in a flavored or sweetened base that dissolves in the mouth and releases the medication
Ointment (salve or cream)	Semisolid, externally applied preparation, usually containing one or more medications
Pill	Mixture of a powdered drug with a cohesive material; may be round or oval
Powder	Sterile particles of medication that are dissolved in a sterile liquid (e.g., water, normal saline) before administration
Solution	Sterile preparation that contains water with one or more dissolved compounds
Suppository	Solid dosage form mixed with gelatin and shaped in form of pellet for insertion into body cavity (rectum or vagina); melts
Suspension	Finely divided, undissolved particles in a liquid medium; should be shaken before use
Syrup	Medication dissolved in a concentrated sugar solution
Tablet	Powdered medication compressed into hard disk or cylinder
Transdermal disk or patch	Medicated disk or patch absorbed through skin slowly over long period of time (e.g., 24 hours)

Routes of Administration

A. Oral Routes The oral route is the easiest and the most commonly used route of medication administration. Medications are given by mouth and swallowed with fluid. Oral medications have a slower onset of action and a more prolonged effect than parenteral medications. Patients generally prefer the oral route.

- Sublingual Administration. Some medications (e.g., nitroglycerin) are readily absorbed after being placed under the tongue to dissolve.
- Buccal Administration. Administration of a medication by the buccal route involves placing the solid medication in the mouth against the mucous membranes of the cheek until it dissolves.

Figure 1 Sublingual administration of a tablet.

Figure 2 Buccal administration of a tablet.

B. Parenteral Routes. Parenteral administration involves injecting a medication into body tissues.

The following are the four major sites of injection:

- Intradermal (ID): Injection into the dermis just under the epidermis
- Subcutaneous: Injection into tissues just below the dermis of the skin
- Intramuscular (IM): Injection into a muscle
- Intravenous (IV): Injection into a vein

Some medications are administered into body cavities through other routes, including **epidural**, **intrathecal, intraosseous, intraperitoneal, intrapleural, and intraarterial**. Nurses usually are not responsible for the administration of medications through these advanced techniques. Whether or not you actually administer a medication, you remain responsible for monitoring the integrity of the medication delivery system, understanding the therapeutic value of the medication, and evaluating a patient's response to the therapy.

- ***Epidural.*** Epidural medications are administered in the epidural space via a catheter, which is placed by a nurse anesthetist or an anesthesiologist. This route is used for the administration of regional analgesia for surgical procedures.
- ***Intrathecal.*** Physicians and specially educated nurses administer intrathecal medications through a catheter surgically placed in the subarachnoid space or one of the ventricles of the brain. Intrathecal medication administration often is a long-term treatment.
- ***Intraosseous.*** This method of medication administration involves the infusion of medication directly into the bone marrow. It is used most commonly in infants and toddlers who have poor access to their intravascular space or when an emergency arises and IV access is impossible.
- ***Intraperitoneal.*** Medications administered into the peritoneal cavity are absorbed into the circulation. Chemotherapeutic agents, insulin, and antibiotics are administered in this fashion.
- ***Intrapleural.*** A syringe and needle or a chest tube is used to administer intrapleural medications directly into the pleural space. Chemotherapeutic agents are the most common medications administered via this method.
- ***Intraarterial.*** Intraarterial medications are administered directly into the arteries. Intraarterial infusions are common in patients who have arterial clots and receive clot-dissolving agents.

C. Topical Administration: Medications applied to the skin and mucous membranes generally have local effects.

D. Inhalation Route. The deeper passages of the respiratory tract provide a large surface area for medication absorption. Nurses administer inhaled medications through the nasal and oral passages or endotracheal or tracheostomy tubes.

RIGHTS OF ADMINISTRATION

1. The right medication
2. The right dose
3. The right patient
4. The right route
5. The right time
6. The right documentation

Equipment

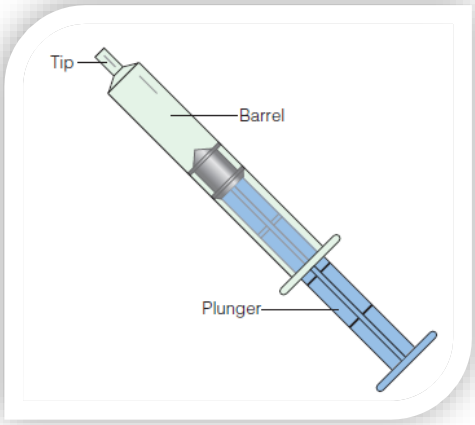
To administer parenteral medications, nurses use syringes and needles to withdraw medication from ampules and vials.

SYRINGES

Syringes have three parts: the tip, which connects with the needle; the barrel, or outside part, on which the scales are printed; and the plunger, which fits inside the barrel (Figure 35–14 •).

Several kinds of syringes are available in differing sizes, shapes, and materials. Syringes range in sizes from 1 to 60 mL. A nurse typically uses a syringe ranging from 1 to 3 mL in size for injections (e.g., subcutaneous or intramuscular). **A hypodermic syringe** comes in 3- and 5-mL sizes. The choice of syringe depends on many factors, such as medication, location of injection, and type of tissue.

An insulin syringe is similar to a hypodermic syringe, but the scale is specially designed for insulin: a 100-unit calibrated scale intended for use with U-100 insulin. This is the only syringe that should be used to administer insulin. Several low-dose insulin syringes are also available (e.g., 30-unit and 50-unit). These syringes frequently have a no removable needle. All insulin syringes are calibrated on the 100-unit scale in North America. The correct choice of syringe is based on the amount of insulin required (Figure 35–16 •).



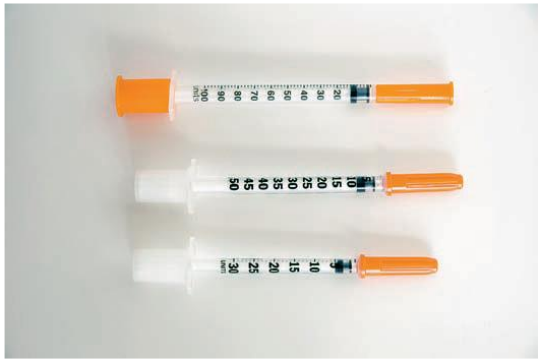


Figure 35–14 • The three parts of a syringe. Figure 35–16 • Different insulin syringes based on the amount of insulin required.

NEEDLES

Needles are made of stainless steel, and most are disposable. Reusable needles (e.g., for special procedures) need to be sharpened periodically before resterilization because the points become dull with use and are occasionally damaged or acquire burrs on the tips. A dull or damaged needle should *never* be used. A needle has three discernible parts: the hub, which fits onto the syringe; the cannula, or shaft, which is attached to the hub; and the bevel, which is the slanted part at the tip of the needle (Figure 35–22).

A disposable needle has a plastic hub. Needles used for injections have three variable characteristics:

1. *Slant or length of the bevel.* The bevel of the needle may be short or long. Longer bevels provide the sharpest needles and cause less discomfort. They are commonly used for subcutaneous and intramuscular injections. Short bevels are used for intradermal and IV injections because a long bevel can become occluded if it rests against the side of a blood vessel.

2. *Length of the shaft.* The shaft length of commonly used needles varies from 1/2 to 2 inches. The appropriate needle length is chosen according to the client's muscle development, the client's weight, and the type of injection.

3. Gauge ***(or diameter) of the shaft.*** The gauge varies from #18 to #30. The larger the gauge number, the smaller the diameter of the shaft. Smaller gauges produce less tissue trauma, but larger gauges are necessary for viscous medications, such as penicillin.

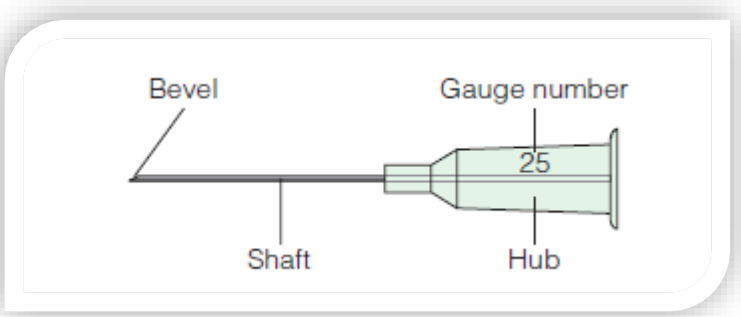
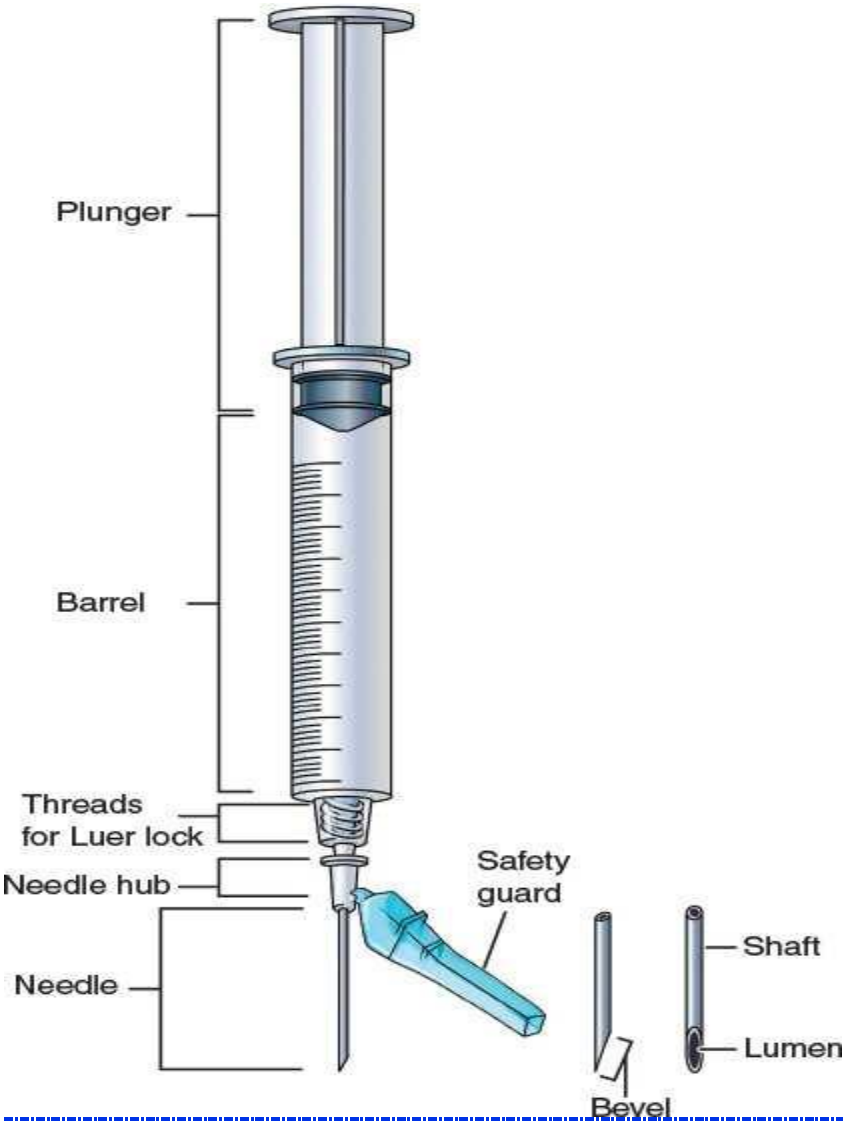


Figure 35–22 • The parts of a needle.



Parts of a needle and syringe.

Preparing Injectable Medications

Injectable medications can be prepared by withdrawing the medication from an ampule or vial into a sterile syringe, using prefilled syringes, or by using needleless injection systems.

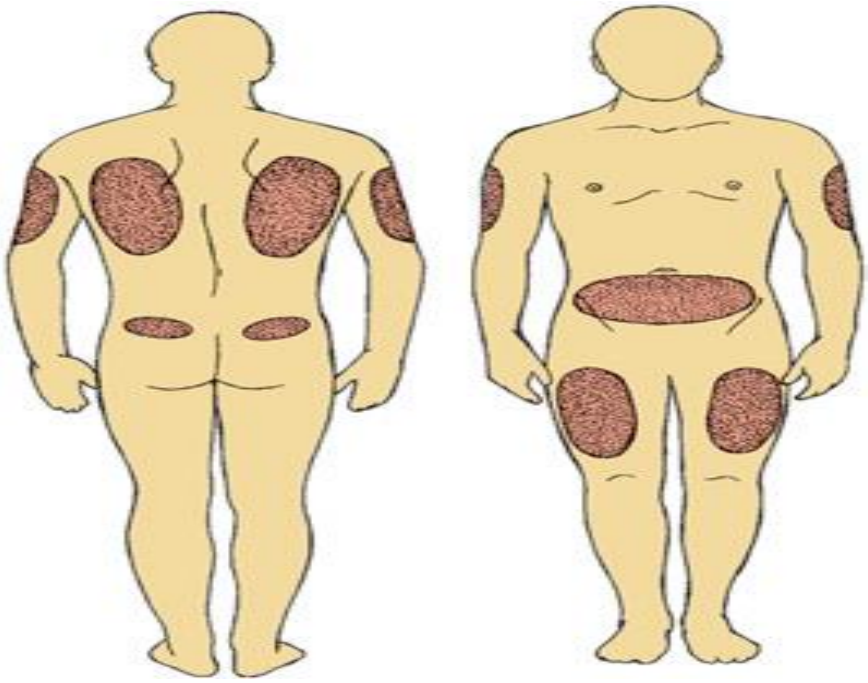
AMPULES AND VIALS

Ampule

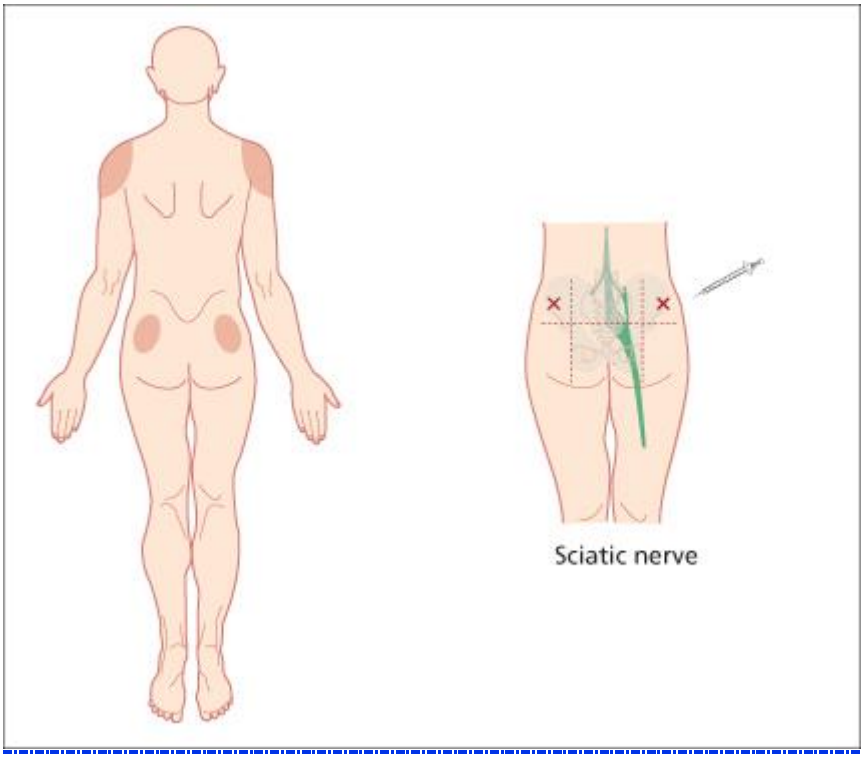
Vials

Patient using an insulin pen

Ampules and vials are frequently used to package sterile parenteral medications. **An ampule** is a glass container usually designed to hold a single dose of a drug. It is made of clear glass and has a distinctive shape with a constricted neck. Ampules vary in size from 1 to 10 mL or more. Most ampule necks have colored marks around them, indicating where they are presorted for easy opening. **A vial** is a small glass bottle with a sealed rubber cap. Vials come in different sizes, from single-use vials to multiple-dose vials. They usually have a metal or plastic cap that protects the rubber seal and must be removed to access the medication.



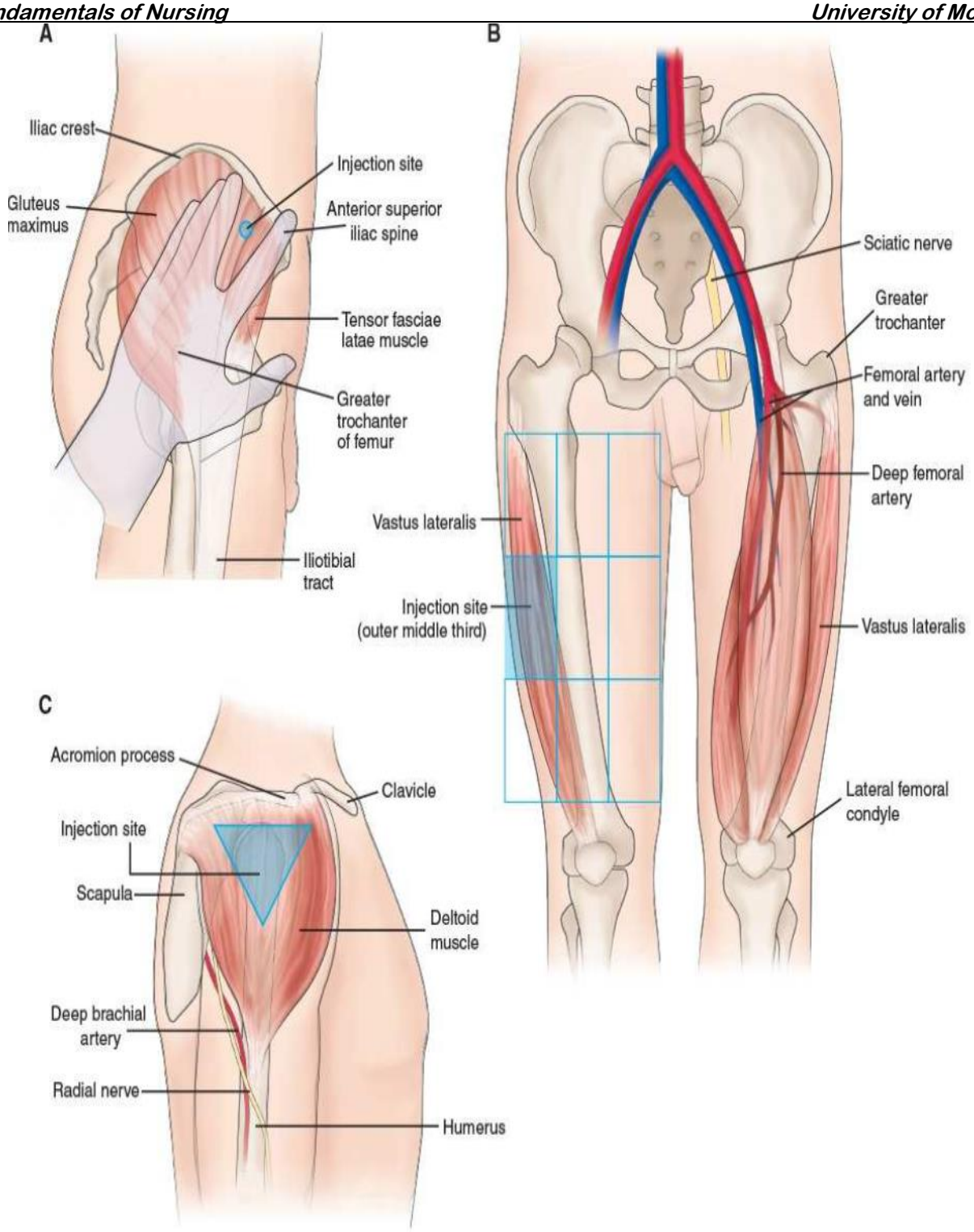
Body sites commonly used for subcutaneous injections.



dorsogluteal site injection

DORSOGLUTEAL SITE

Historically, the dorsogluteal site was primarily used for intramuscular injections. However, this site is close to the sciatic nerve and the superior gluteal nerve and artery. As a result, complications (e.g., numbness, pain, paralysis) occurred if the nurse injected a medication near or into the sciatic nerve. In addition, there tends to be more subcutaneous tissue at the dorsogluteal site. As a result, the medication may be injected into the subcutaneous tissue instead of the muscle, which can then affect the intended therapeutic effect.



Administering an intramuscular injection into the Ventrogluteal site using the Z-track method.

VASTUS LATERALIS SITE

The vastus lateralis muscle is usually thick and well developed in both adults and children. It is recommended as the site of choice for intramuscular injections for infants and young children because it is the largest muscle mass. Because there are no major blood vessels or nerves in the area, it is desirable for infants whose gluteal muscles are poorly developed. It is situated on the anterior lateral aspect of the infant's thigh (Figure 35–37 •).

In the adult, the landmark is established by dividing the area between the greater trochanter of the femur and the lateral femoral condyle into thirds and selecting the middle third (Figures 35–38 • and 35–39 •). The client can assume a back-lying or a sitting position for an injection into this site.

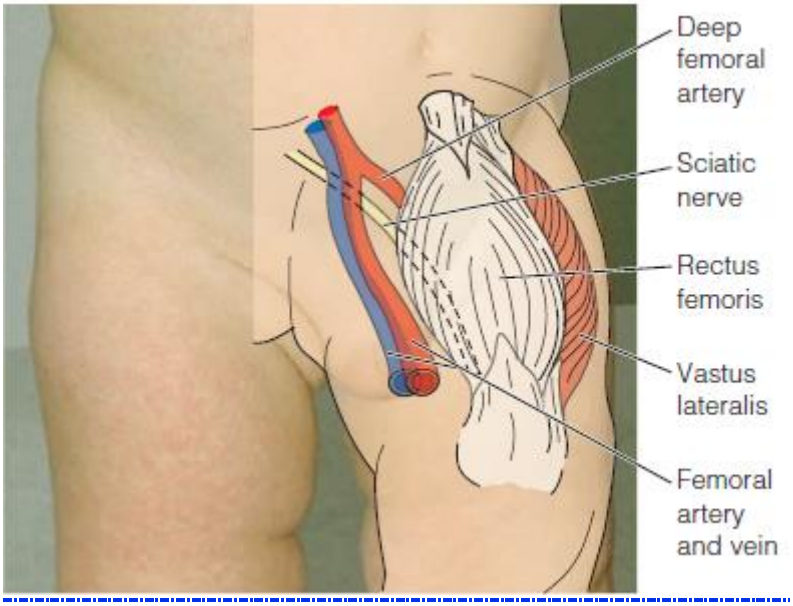


Figure 35–37 • The vastus lateralis muscle of an infant's upper thigh, used for intramuscular injections.

DELTOID SITE

The deltoid muscle is found on the lateral aspect of the upper arm. It is not used often for intramuscular injections because it is a relatively small muscle and is very close to the radial nerve and radial artery. It is sometimes considered for use in adults because of rapid absorption from the deltoid area, but no more than 1 mL of solution can be administered. This site is recommended for the administration of hepatitis B vaccine in adults. The nurse locates the upper landmark for the deltoid site by placing four fingers across the deltoid muscle with the first finger on the acromion process. The top of the axilla is the line that marks the lower border landmark (Figure 35–41 •). A triangle within these boundaries indicates the deltoid muscle about

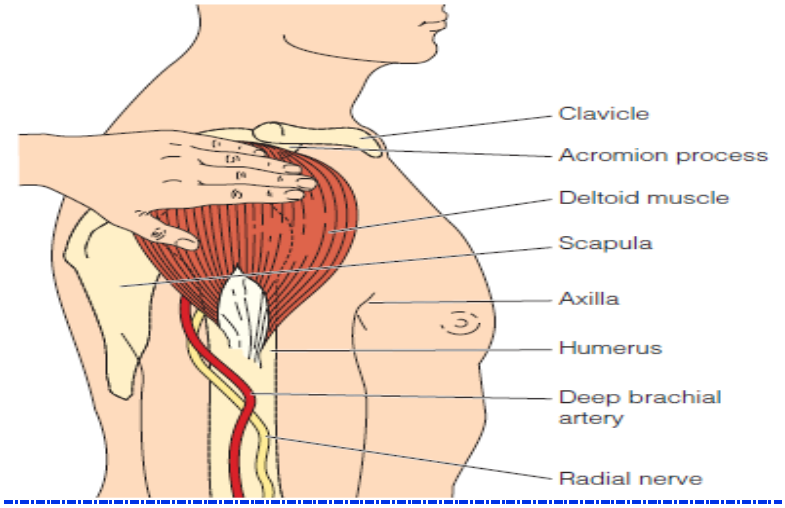


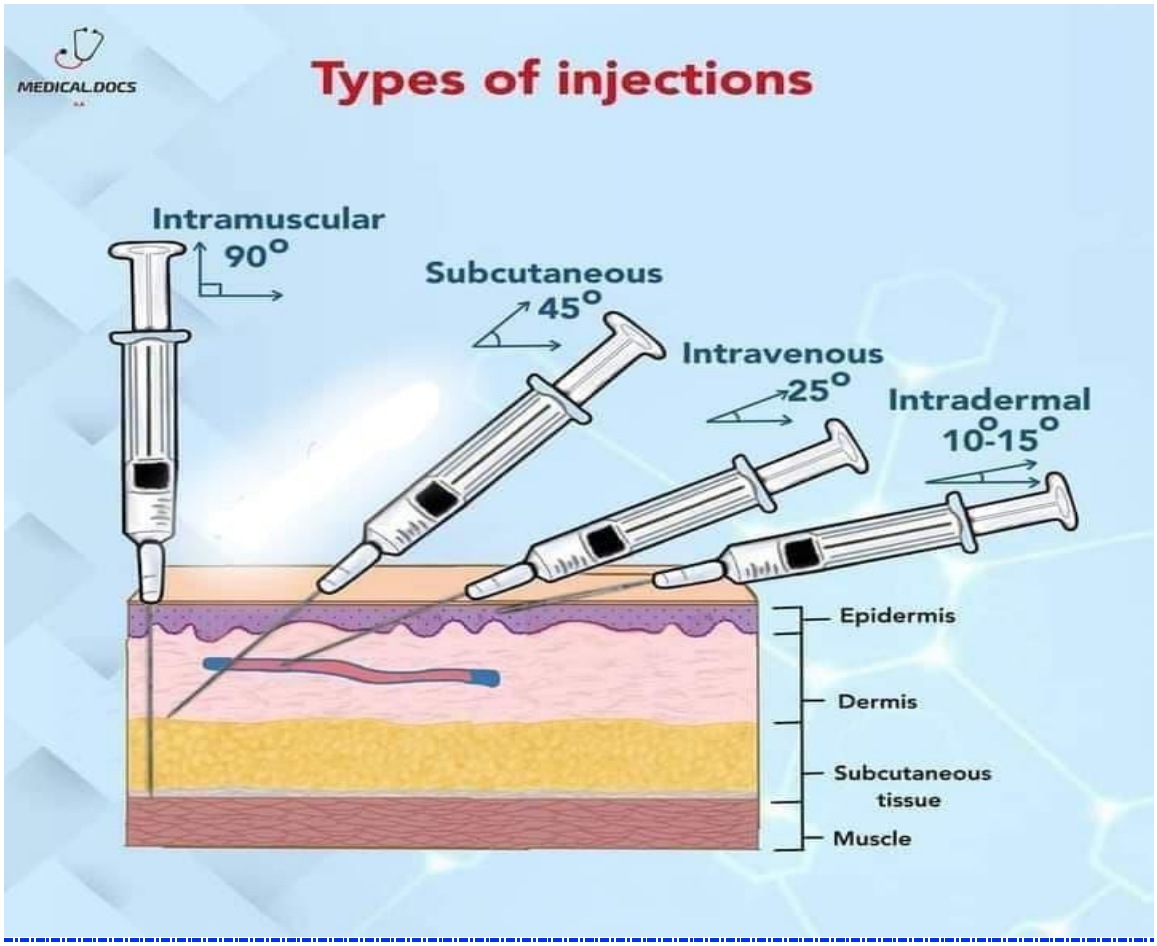
Figure 35–41 • A method of establishing the deltoid muscle site for an intramuscular injection.

Figure 35–43 • Administering an intramuscular injection into the deltoid site.

Intravenous Medications

Because IV medications enter the client's bloodstream directly by way of a vein, they are appropriate when a rapid effect is required. This route is also appropriate when medications are too irritating to tissues to be given by other routes. When an IV line is already established, this route is desirable because it avoids the discomfort of other parenteral routes. Methods for administering medications intravenously include the following:

- Large-volume infusion of intravenous fluid
- Intermittent intravenous infusion (piggyback or tandem setups)
- Volume-controlled infusion (often used for children)
- Intravenous push (IVP) or bolus
- Intermittent injection ports (device).



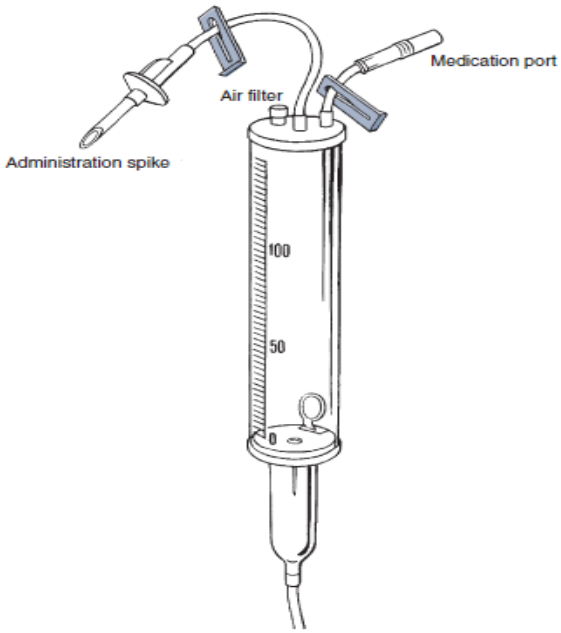


Figure 35–47 • A volume-control infusion set.

Chapter six

… Skin Integrity and Wound Care…

Skin Integrity and Wound Care

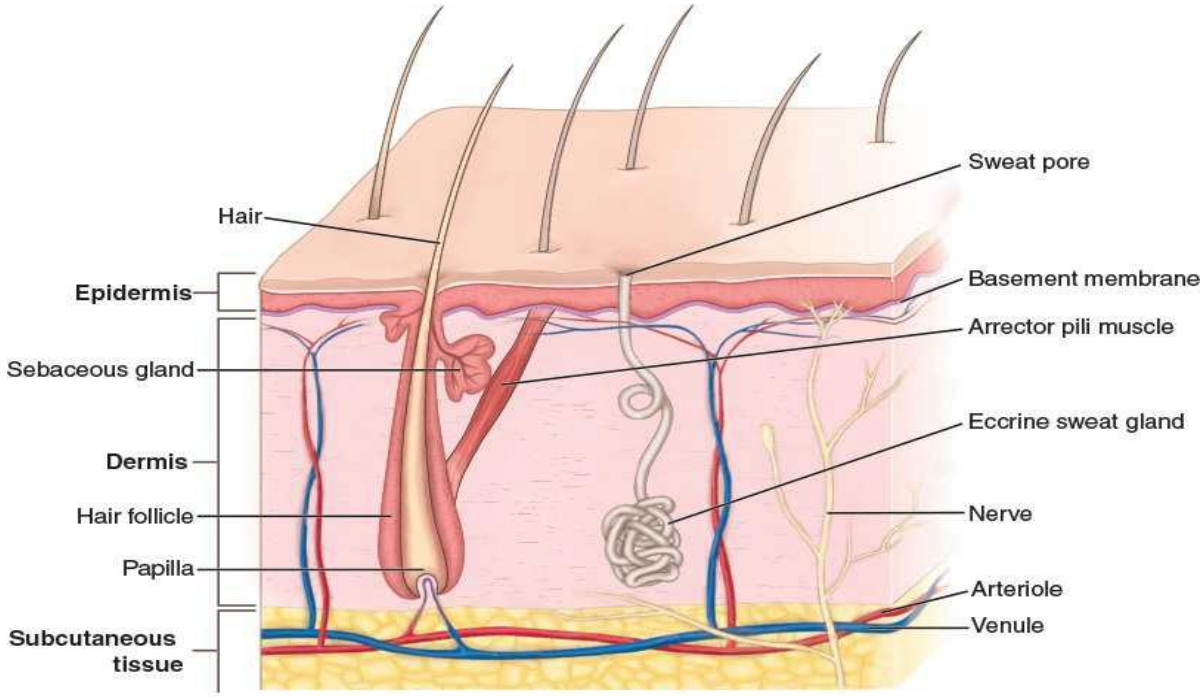
The skin is the body's first line of defense, protecting the underlying structures from invasion by organisms. Maintaining an intact skin surface is important because a break or disruption in this integrity is potentially dangerous and possibly life threatening. The nurse plays a major role in maintaining the patient's skin integrity, identifying risk factors that predispose a patient to a break in integrity.

Structures of the Skin

The skin, or integument, is the largest organ of the body and has multiple functions. The skin covers the entire body and is continuous with mucous membranes at normal body orifices. It is essential for maintaining life. The integumentary system is made up of the skin, the subcutaneous layer directly under the skin, and the appendages of the skin, including glands in the skin, hair, and nails. The integumentary system also includes the blood vessels, nerves, and sensory organs of the skin.

The skin has three layers: the epidermis, the dermis, and the subcutaneous tissue layer.

A wound is a break or disruption in the normal integrity of the skin and tissues. That disruption may range from a small cut on a finger to a third-degree burn covering almost all of the body. Wounds may result from mechanical forces (such as surgical incisions) or physical injury (such as a burn).



A cross section of normal skin.

Functions of the Skin:

- Protection
- Temperature Regulation
- Psychosocial
- Sensation
- Vitamin D Production
- Immunologic
- Absorption
- Elimination

TYPES OF WOUNDS

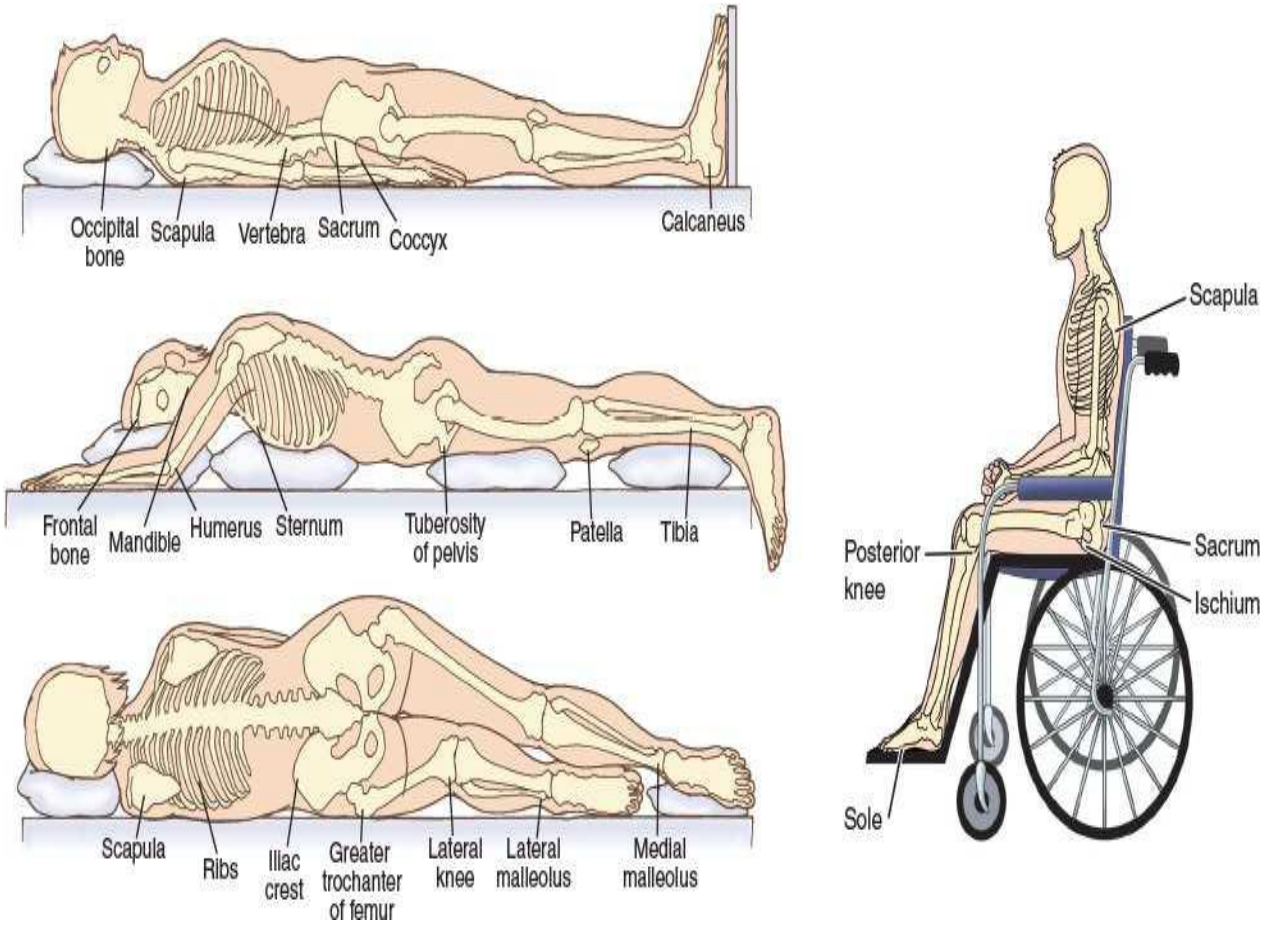
Type	Cause
Incision	Cutting or sharp instrument; wound edges well approximated and aligned; surrounding tissue undamaged; bleeds freely and least likely to become infected
Contusion	Blunt instrument, overlying skin remains intact, with injury to underlying soft tissue; possible hematoma
Abrasion	Friction; rubbing or scraping epidermal layers of skin; top layer of skin scraped away; dirt and germs often embedded and can become infected
Puncture	Blunt or sharp instrument puncturing the skin; intentional (such as venipuncture) or accidental; consider penetrating object when considering infection probability
Laceration	Tearing of skin and tissue with blunt or irregular instrument frequently contaminated with dirt or other material ground into the wound and likely to become infected
Penetrating	Foreign object entering the skin or mucous membrane and lodging in underlying tissue
Chemical	Toxic agents such as drugs, acids, alcohols, metals, and substances released from cellular necrosis
Thermal	High or low temperatures; cellular necrosis as a possible result
Diabetic ulcers	Injury and underlying diabetic neuropathy, peripheral arterial disease, diabetic foot structure; located below the ankle

PRESSURE ULCERS

Pressure ulcer, pressure sore, decubitus ulcer, and bedsore are terms used to describe impaired skin integrity related to unrelieved, prolonged pressure.

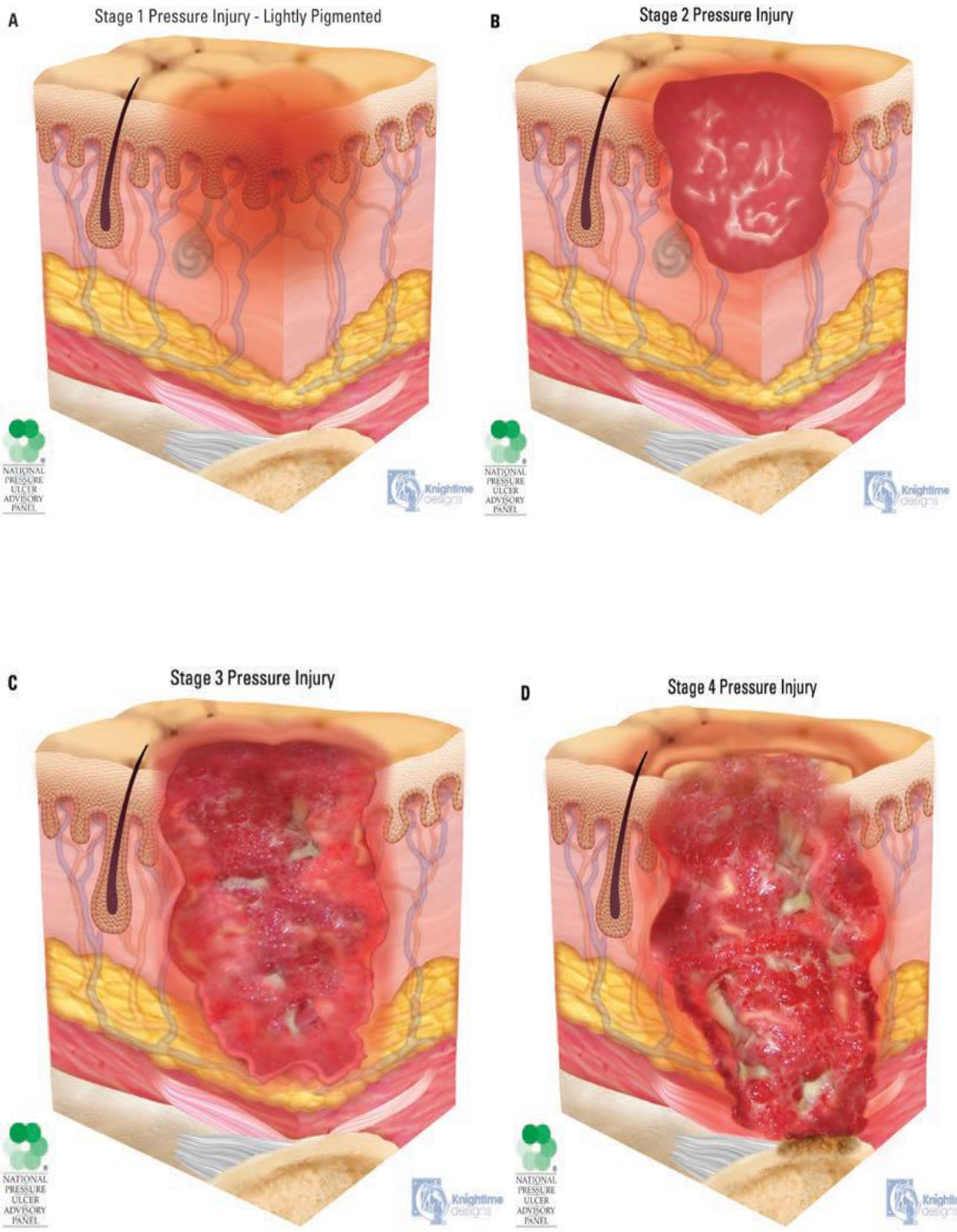
Examples of patients who are at risk for development of pressure ulcers include the following:

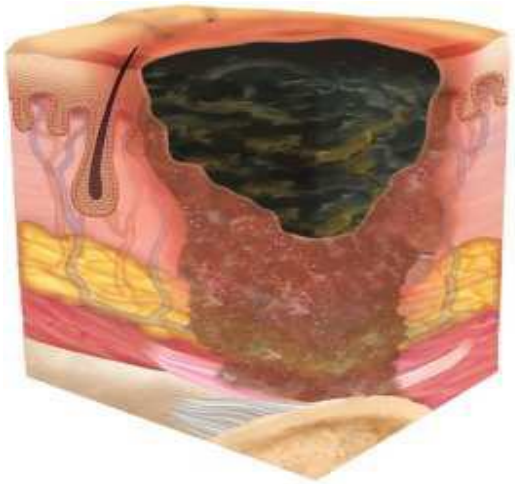
- •Older adults, those who have experienced trauma
- •Those with spinal-cord injuries (SCI)
- •Those who have sustained a fractured hip
- •Those in long-term homes or community care, the acutely ill
- •Individuals with diabetes
- • Patients in critical care settings



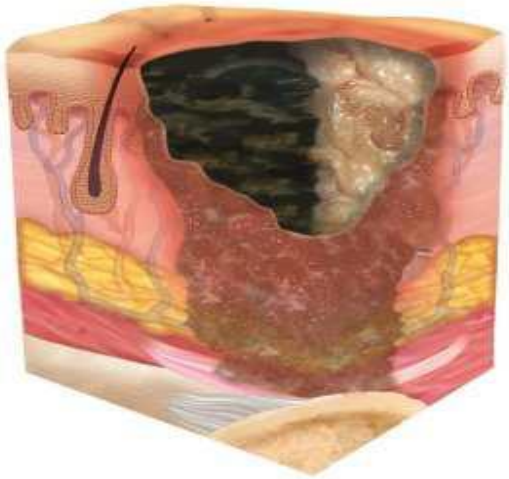
Common sites for development of pressure injuries

Stages of Pressure Ulcers

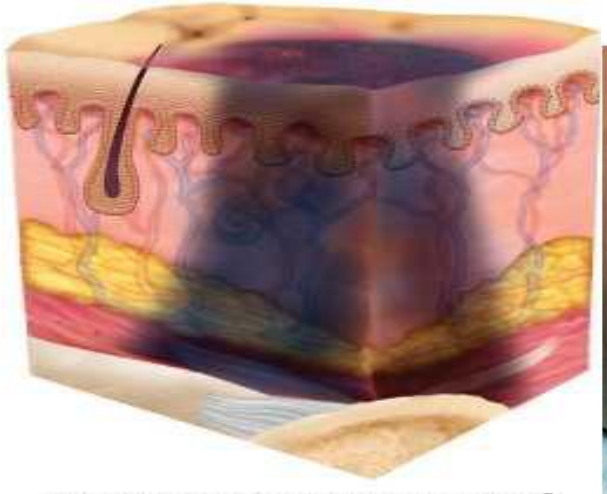




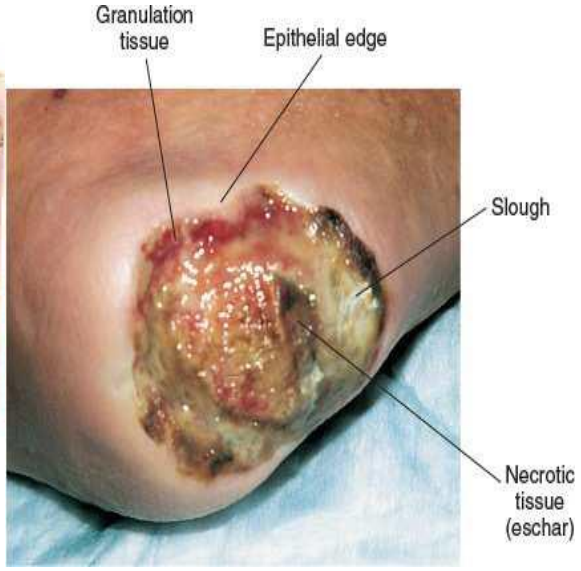
Unstageable pressure injury, dark eschar.[a]



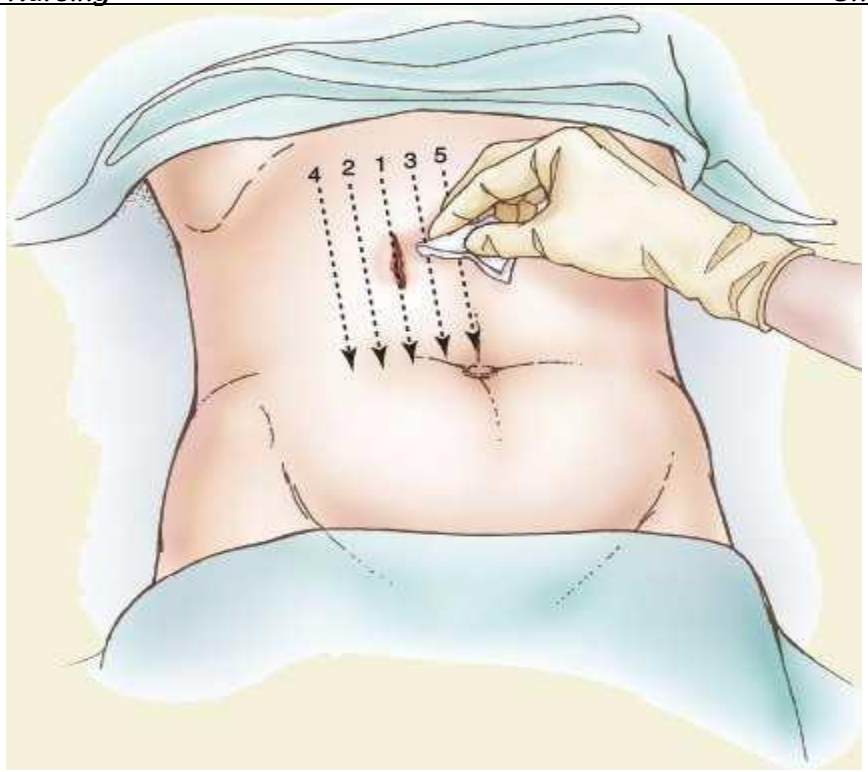
Unstageable pressure injury, slough and eschar.[a]



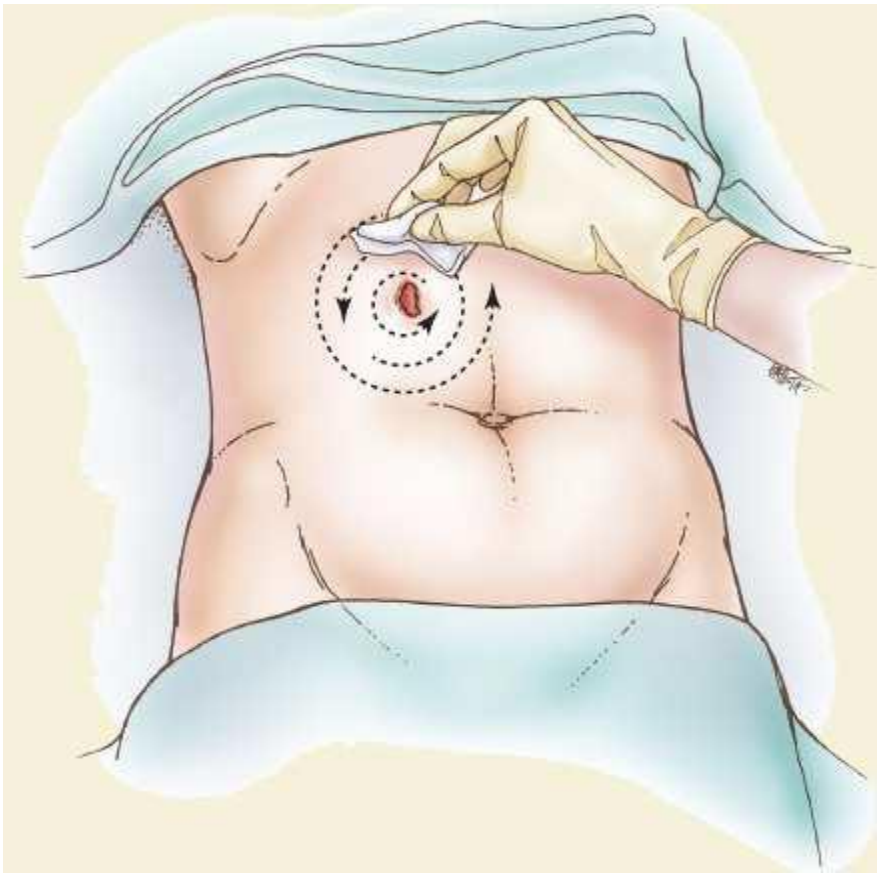
Deep tissue pressure injury.[a]



Pressure ulcer with tissue necrosis



Cleaning Wounds with Edges That Are Not Approximated



Cleaning the wound from inner to outer (rotation)

Wound Healing

Wound healing is a process of tissue response to injury. Injured tissues are repaired by physiologic mechanisms that regenerate functioning cells and replace connective tissue cells with scar tissue. The healing process fills the gap caused by tissue destruction, restoring the structural integrity of the damaged tissue through the orderly release of growth factors and chemical mediators. These substances help to increase the blood supply to the damaged area, wall off and remove cellular and foreign debris, and initiate cellular development. Normally, the healing process occurs without assistance. However, interventions can help to support the process. For example, tissue healing is promoted by keeping the injured area free of debris through proper cleaning. Positioning the wounded area to promote circulation to that part helps to promote tissue healing.

Phases of Wound Healing

The wound healing process can be divided into three or four phases, depending on the reference. In this chapter, four phases will be discussed: hemostasis, inflammation, proliferation, and maturation. These four phases systematically lead to repair of the injury. If three stages are identified, hemostasis is included as part of the inflammatory stage.

- **Hemostasis.** A series of events designed to control blood loss, establish bacterial control, and seal the defect occurs when there is an injury. During hemostasis injured blood vessels constrict, and platelets gather to stop bleeding. Clots form a fibrin matrix that later provides a framework for cellular repair.
- **Inflammatory Phase.** In the inflammatory stage damaged tissue and mast cells secrete histamine, resulting in vasodilation of surrounding capillaries and movement/migration of serum and white blood cells into the damaged tissues. This results in localized redness, edema, warmth, and throbbing. The inflammatory response is beneficial, and there is no value in attempting to cool the area or reduce the swelling unless the swelling occurs within a closed compartment (e.g., ankle or neck). Leukocytes (white blood cells) reach a wound within a few hours. The primary-acting white blood cell is the neutrophil, which begins to ingest bacteria and small debris. The second important leukocyte is the monocyte, which transforms into macrophages. The macrophages are the “garbage cells” that clean a wound of bacteria, dead cells, and debris by phagocytosis. Macrophages continue the process of clearing a wound of debris and release growth factors that attract fibroblasts, the cells that synthesize collagen (connective tissue). Collagen appears as early as the second day and is the main component of scar tissue.

- **Proliferative Phase.** With the appearance of new blood vessels as reconstruction progresses, the proliferative phase begins and lasts from 3 to 24 days. The main activities during this phase are the filling of a wound with granulation tissue, wound contraction, and wound resurfacing by epithelialization. Fibroblasts are present in this phase and are the cells that synthesize collagen, providing the matrix for granulation.

- **Maturation.** Maturation, the final stage of healing, sometimes takes place for more than a year, depending on the depth and extent of the wound. The collagen scar continues to reorganize and gain strength for several months.

Factors Affecting Wound Healing

- **Age:** Rate of cell growth and epithelialization of open wounds is lower with advancing age, so wound healing is slowed.
- **Nutrition:** A balanced diet with adequate amounts of protein, carbohydrates, fats, vitamins and minerals is needed to increase the body's resistance to pathogens and to decrease the susceptibility of skin and mucous membranes to infection and trauma. Surgery, severe wounds and infections, stress from burns and trauma, and pre-existing nutritional deficits increase nutritional requirements.
- **Body type:** Obesity may compromise wound healing due to fatty tissue's poor blood supply, protein malnutrition, difficulty in suturing adipose tissue, and increased complication of dehiscence, evisceration and infection.
- **Circulation to and oxygenation of tissues:** Decreased arterial oxygen tension alters the synthesis of collagen and the formation of epithelial cells, causing wounds to heal more slowly.
- **Smoking**: Functional hemoglobin levels decrease, impairing oxygenation to tissues.
- **Medication therapy:** Steroids reduce the inflammatory response and slow collagen synthesis. Anti-inflammatory medications suppress protein synthesis, wound contraction, epithelialization and inflammation. Prolonged antibiotic use, with development of resistant strains of bacteria, may increase the risk of superinfection.
- **Chronic disease:** Coronary artery disease, peripheral vascular disease, vascular insufficiency, cancer and diabetes mellitus are a few of the chronic diseases that can compromise wound healing.

Nutrients that enhance wound healing

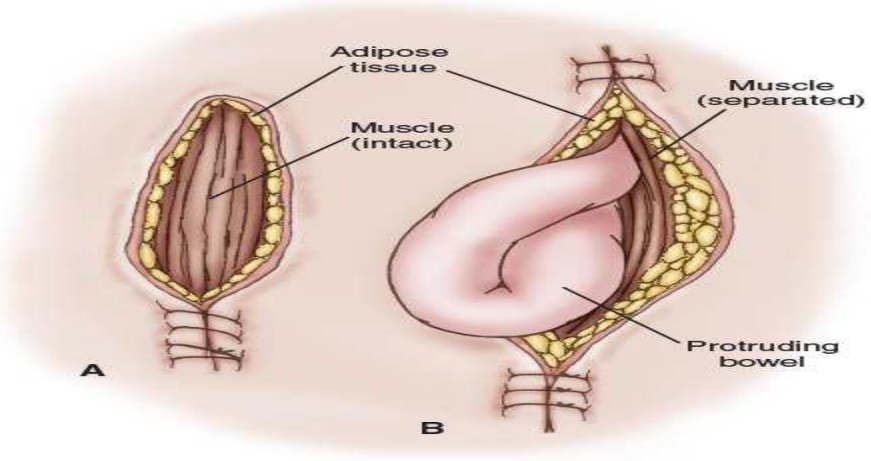
NUTRIENT	FUNCTION IN WOUND REPAIR
Proteins	
Amino acids	Neovascularization, lymphocyte formation, fibroblast proliferation, collagen synthesis, wound remodeling and cell-mediated responses (phagocytosis), insulin and growth factor stimulation
Albumin	Osmotic equilibrium control and edema prevention
Carbohydrates	Cellular energy and protein sparing
Fats	Cellular energy, component of cell membrane, and prostaglandin production
Minerals	
Copper	Collagen cross-linking for scar strength
Iron	Collagen synthesis and enhanced leukocytic bacterial activity
Zinc	Cell proliferation and cell membrane stabilization, collagen synthesis, protein use
Vitamins	
A	Collagen synthesis and epithelialisation
Pyridoxine, riboflavin, thiamine	Antibody and white blood cell formation; cofactors of enzyme systems
C	Resistance to infection, collagen synthesis, and capillary formation and stabilization
K	Coagulation

Complications of Wound Healing

- **Hemorrhage.** or bleeding from a wound site, is normal during and immediately after initial trauma. Hemostasis occurs within several minutes unless large blood vessels are involved or a patient has poor clotting function. Hemorrhage occurring after hemostasis indicates a slipped surgical suture, a dislodged clot, infection, or erosion of a blood vessel by a foreign object (e.g., a drain). Hemorrhage occurs externally or internally
- **Infection.** Wound infection is the second most common health care–associated infection (nosocomial). All wounds have some level of bacterial burden; few wounds are infected. Wound infection is present when the microorganisms invade the wound tissues. The local clinical signs of wound infection can include erythema; increased amount of wound drainage; change in

appearance of the wound drainage (thick, color change, presence of odor); and periwound warmth, pain, or edema.

- **Dehiscence.** When an incision fails to heal properly, the layers of skin and tissue separate. This most commonly occurs before collagen formation (3 to 11 days after injury). Dehiscence is the partial or total separation of wound layers. A patient who is at risk for poor wound healing (e.g., poor nutritional status, infection) is at risk for dehiscence. Obese patients have a higher risk of wound dehiscence because of the constant strain placed on their wounds and the poor healing qualities of fat tissue. Dehiscence can happen in abdominal surgical wounds and occurs after a sudden strain such as coughing and vomiting.
- **Evisceration.** With total separation of wound layers, evisceration (protrusion of visceral organs through a wound opening) occurs. The condition is an emergency that requires surgical repair.



Wound complications. A. Dehiscence. B. Evisceration.

Dressings. The more extensive a wound, the larger the dressing required. For example, a bulky dressing applied with pressure minimizes movement of underlying tissues and helps immobilize the entire body part. A bandage or cloth wrapped around a penetrating object should immobilize it adequately.

Purposes of Dressings. A dressing serves several purposes:

- Protects a wound from microorganism contamination
- Aids in hemostasis
- Promotes healing by absorbing drainage and debriding a wound
- Supports or splints a wound site
- Promotes thermal insulation of a wound surface
- Provides a moist environment

Therapeutic Effects of Heat and Cold Applications

Physiological Response	**Therapeutic Benefit**	**Conditions Examples of Treated**
Heat Vasodilation	Improves blood flow to injured body part; promotes delivery of nutrients and removal of wastes; lessens venous congestion in injured tissues	Open wounds, rectal surgery, episiotomy, painful hemorrhoids, muscle tension, vaginal inflammation, wound debridement
Reduced blood viscosity	Improves delivery of leukocytes and antibiotics to wound site	
Reduced muscle tension	Promotes muscle relaxation and reduces pain from spasm or stiffness	
Increased tissue metabolism	Increases blood flow; provides local warmth	
Increased capillary permeability	Promotes movement of waste products and nutrients	
Cold Vasoconstriction	Reduces blood flow to injured body part, preventing edema formation; reduces inflammation	Direct trauma (sprains, strains, fractures, muscle spasms) superficial laceration or puncture wound, minor burn, suspected malignancy in area of injury or pain, injections, arthritis, and joint trauma
Local anesthesia	Reduces localized pain	
Reduced cell metabolism	Reduces oxygen needs of tissues	
Increased blood viscosity	Promotes blood coagulation at injury site	
Decreased muscle tension	Relieves pain	

Chapter Seven

BLOOD TRANSFUSION

A blood transfusion is the infusion of whole blood or a blood component such as plasma, red blood cells, cryoprecipitate, or platelets into the patient's venous circulation. Red blood cells have the important role of carrying oxygen from the lungs to all body tissues. Oxygen is essential to maintain normal cellular metabolism and cellular integrity. Platelets and the coagulation factors found in cryoprecipitate and plasma are essential for establishing homeostasis following an injury or invasive procedure. These blood components promote normal blood clotting, thus are important in the prevention of excessive blood loss. A blood product transfusion is given when a patient's red blood cells, platelets, or coagulation factors decrease to levels that compromise a patient's health. Blood transfusions are not without risk, however. Potentially life-threatening complications include allergic reaction and anaphylactic reaction, hemolytic reaction, transfusion-related acute lung injury, circulatory volume overload, immunosuppression, and transmission of infectious diseases are a risk associated with blood product transfusion. It is important that the potential benefits of the transfusion be considered against the potential risks. The person receiving the blood is the recipient. The person giving the blood is the donor.

BLOOD TYPING AND CROSS-MATCHING

Before a blood product can be given to a patient, it must be determined that the blood of the donor is compatible with that of the patient. If incompatible, clumping and hemolysis of the recipient's blood cells result, and death can occur. The laboratory examination to determine a person's blood type is called **blood typing**. The process of determining compatibility between blood specimens is **cross-matching**.

Blood Types

Blood type, an inherited trait, is determined by the type of antigens and antibodies present in the blood. An **antigen** is a substance that causes the formation of antibodies. An **antibody** is a protein substance developed in the body in response to the presence of an antigen that has entered the body. An agglutinin is an antibody that causes a clumping of specific antigens. The four main blood types or groups in the ABO system of blood typing are A, B, AB, and O.

Rh Factor

The Rh factor is an inherited antigen in human blood. Rh-negative person must receive blood from another Rh-negative person. If Rh-positive blood is administered to a Rh-negative person, the recipient develops anti-Rh agglutinins. Subsequent transfusion with Rh-positive blood may cause serious reactions with clumping and hemolysis of red blood cells.

BLOOD DONORS

Blood donors must be selected with care. Not only must the donor's blood be typed accurately, but it is also important to determine that the donor is free of infectious disease. Transfusion-transmitted infections are infections resulting from the introduction of a pathogen into a person through blood transfusion. Transfusion-transmitted infections occur from the transfer of bacteria, viruses, prions, and parasites. Donor screening using questionnaires and laboratory tests helps reduce the risk of an infectious organism being transmitted by blood transfusion. The blood will be tested for human immunodeficiency virus (HIV), hepatitis B and C virus (HBV and HBC), human T-lymphotropic virus (HTLV), syphilis, West Nile virus, Zika virus, cytomegalovirus (CMV), and bacterial contamination.

INITIATION AND TRANSFUSION OF BLOOD

Identification of patients at risk for complications and patient monitoring during and after transfusion of blood products is essential because of ongoing risk for transfusion reaction. The nurse should always follow facility blood product transfusion policies and protocols. Two adults in the presence of the patient should perform pre-transfusion safety checks together prior to blood product administration. In the hospital or outpatient setting, this should be two practitioners trained in the identification of the recipient and blood components, such as registered nurses, advanced practice nurses, or physicians. Educate the patient about the signs and symptoms of a reaction and the importance of reporting so they will be aware if one develops and take action. Verify the patient's identity by at least two independent identifiers, such as the patient's full name and birthdate. In an in-patient or long-term care setting, the nurse confirms that this information matches the information on the patient's identification band. The patient's blood type and Rh factor should be checked against the blood type and Rh factor of the transfusion product. In addition, the nurse should always confirm the donation identification number (a code to track the blood back to its donor) and the expiration date and date/time of issue of the blood product.

The procedure for administering a blood transfusion is similar to the procedure for starting an IV infusion of fluids, with a few differences. Blood or blood components may be transfused via a 20- to 24-gauge PIVC for an adult. When rapid transfusion is required, a larger-sized catheter gauge is recommended (18 to 20 gauge). Transfusion for infants and children is usually given using a 22- to 24-gauge catheter (umbilical vein in neonates or a peripheral vein large enough to accommodate the catheter).

The Infusion Nurses Society Standards of Practice identifies important components of safe blood transfusion and include:

• Baseline assessment prior to obtaining blood for transfusion including measurement of vital signs, lung assessment, identification of conditions that may increase the risk of transfusion-related adverse reactions (e.g., fever, heart failure, renal disease).

• Use an in-line filter or an add-on filter that is designated for the specific blood or blood component.

• Plan to administer the blood or blood component within 4 hours.

• Use an electronic infusion pump labeled for blood transfusion.

• Administer blood or blood component infusions with 0.9% sodium chloride; do not add or infuse any other solutions or medications through the administration set and do not infuse transfusions through other administration sets.

• start infusion slowly and carefully monitor for complications after getting baseline vital signs; major reactions usually appear before the first 50 mL have been transfused.

• Check the patient's vital signs within 30 minutes prior to transfusion, 15 minutes after initiating the transfusion, after the transfusion is completed, 1 hour after the transfusion has been completed, and as needed based on clinical observation of the patient's condition.

- Increase the transfusion rate after 15 minutes when there are no signs of a reaction and to ensure completion of the transfusion within 4 hours.

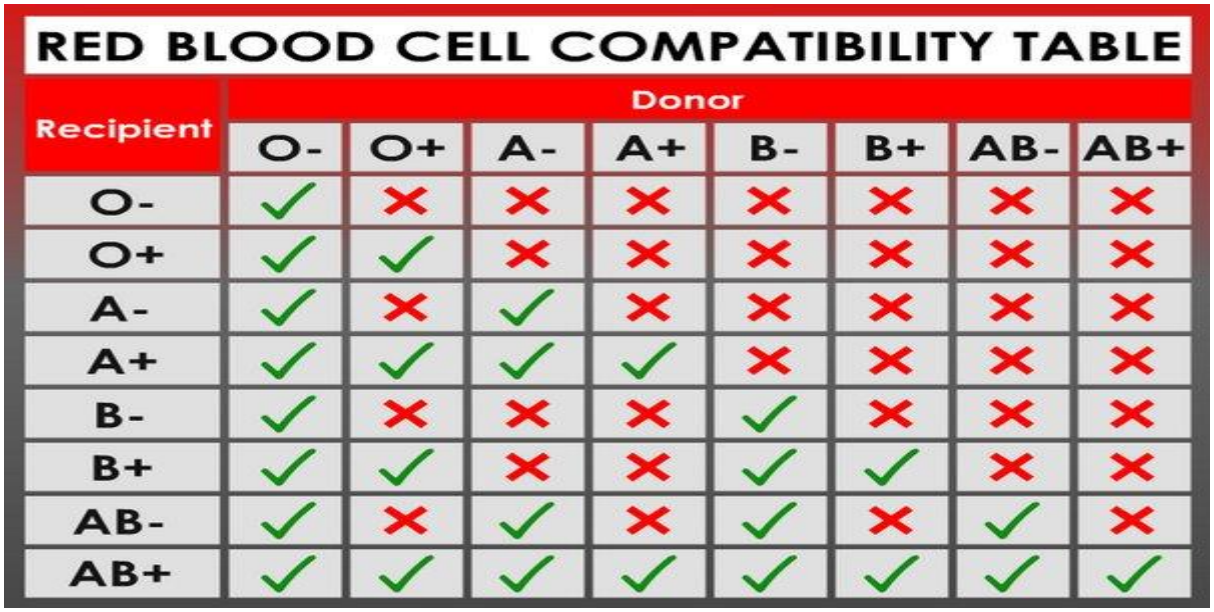
• Assess the patient for any adverse reactions at least every 30 minutes throughout the transfusion.

• Stop the transfusion immediately if signs and symptoms of a transfusion reaction are present (Table below)

• Monitor the patient to detect febrile or pulmonary transfusion reactions for at least 4 to 6 hours; educate patients who are not under direct observation after their transfusion about signs and symptoms of delayed transfusion reaction and the importance of reporting.

REACTION	SIGNS AND SYMPTOMS	NURSING ACTIVITY
Allergic reaction: allergy to transfused blood	Hives, itching Anaphylaxis	•Stop transfusion immediately and keep vein open with normal saline. •Notify health care team immediately. •Administer antihistamine parenterally as necessary
Febrile reaction: fever develops during infusion	Fever and chills Headache Malaise	•Stop transfusion immediately and keep vein open with normal saline. •Notify health care team. • Treat symptoms
Hemolytic transfusion reaction: incompatibility of blood product	Immediate onset Facial flushing Fever, chills Headache Low back pain Shock	•Stop infusion immediately and keep vein open with normal saline. •Notify health care team immediately. •Obtain blood samples from site.

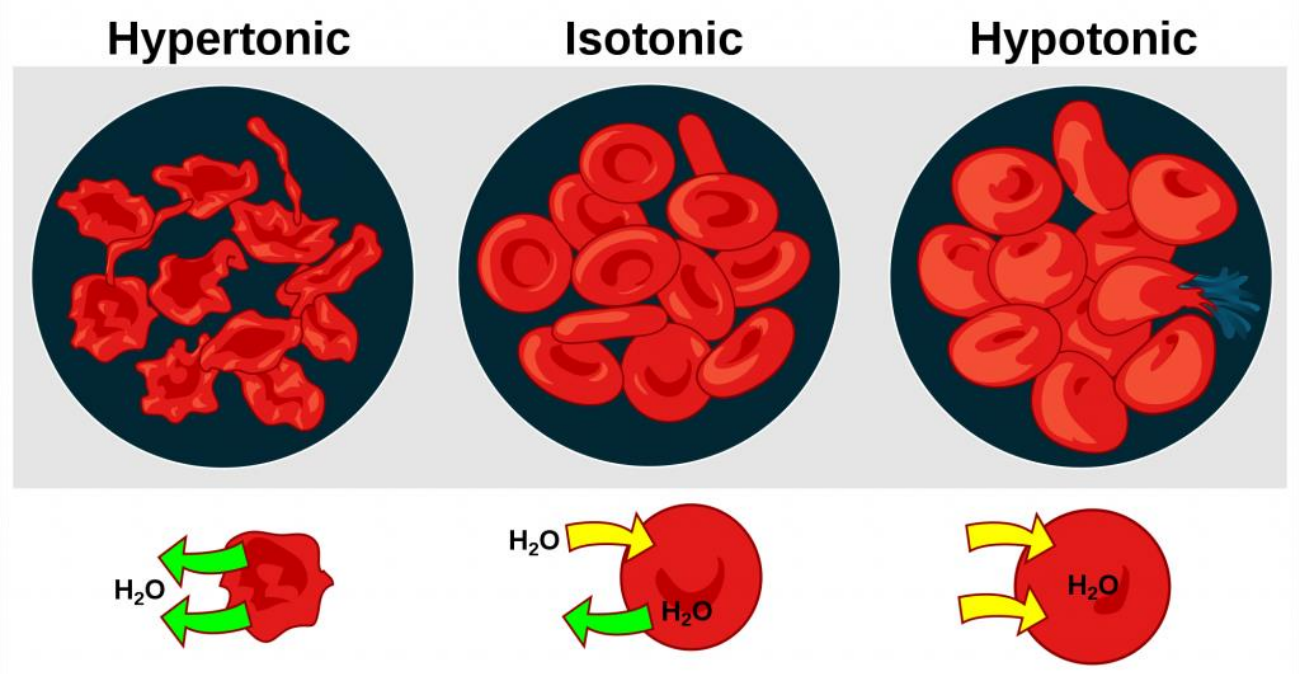
		•Obtain first voided urine. •Treat shock if present. •Send unit, tubing, and filter to lab. •Draw blood sample for serologic testing and send urine specimen to lab.
Circulatory overload: too much blood administered	Dyspnea Dry cough Pulmonary edema	•Slow or stop infusion. •Monitor vital signs. •Notify health care team. •Place in upright position with feet dependent.
Bacterial reaction: bacteria present in blood	Fever Hypertension Dry, flushed skin Abdominal pain	•Stop infusion immediately. •Obtain culture of patient's blood and return blood bag to lab. •Monitor vital signs. •Notify health care team. •Administer antibiotics as prescribed.



Chapter Eight

Intravenous (Solutions) Fluids

An illustration comparing how different types of IV solutions affect red blood cell size



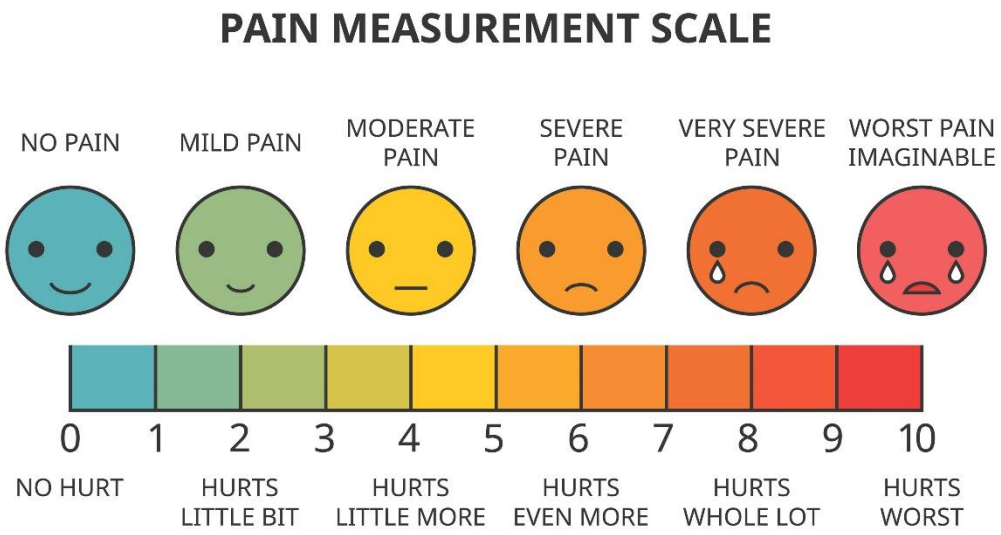
Comparison of Osmotic Effects of Hypertonic, Isotonic, and Hypotonic IV Fluids on Red Blood Cells

Type	IV Solution	Uses	Nursing Considerations
Isotonic	0.9% Normal Saline (0.9% NaCl)	Fluid resuscitation for hemorrhaging, severe vomiting, diarrhea, GI suctioning losses, wound drainage, mild hyponatremia, or blood transfusions.	Monitor closely for hypervolemia, especially with heart failure or renal failure.
Isotonic	Lactated Ringer's Solution (LR)	Fluid resuscitation, GI tract fluid losses, burns, traumas, or metabolic acidosis. Often used during surgery.	Should not be used if serum pH is greater than 7.5 because it will worsen alkalosis. May elevate potassium levels if used with renal failure.
Isotonic	5% Dextrose in Water (D5W) *starts as isotonic and then changes to hypotonic when dextrose is metabolized	Provides free water to help renal excretion of solutes, hypernatremia, and some dextrose supplementation.	Should not be used for fluid resuscitation because after dextrose is metabolized, it becomes hypotonic and leaves the intravascular space, causing brain swelling. Used to dilute plasma electrolyte concentrations.
Hypotonic	0.45% Sodium Chloride (0.45% NaCl)	Used to treat intracellular dehydration and hypernatremia and to provide fluid for renal excretion of solutes.	Monitor closely for hypovolemia, hypotension, or confusion due to fluid shifting into the intracellular space, which can be life-threatening. Avoid use in patients with liver disease, trauma, and burns to prevent hypovolemia from worsening. Monitor closely for cerebral edema.
Hypotonic	5% Dextrose in Water (D5W)	Provides free water to promote renal excretion of solutes and treat hypernatremia, as well as some dextrose supplementation.	Monitor closely for hypovolemia, hypotension, or confusion due to fluid shifting out of the intravascular space, which can be life-threatening. Avoid use in patients with liver disease, trauma, and burns to prevent hypovolemia from worsening. Monitor closely for

			cerebral edema.
Hypertonic	3% Sodium Chloride (3% NaCl)	Used to treat severe hyponatremia and cerebral edema.	Monitor closely for hypervolemia, hypernatremia, and associated respiratory distress. Do not use it with patients experiencing heart failure, renal failure, or conditions caused by cellular dehydration because it will worsen these conditions.
Hypertonic	5% Dextrose and 0.45% Sodium Chloride (D50.45% NaCl)	Used to treat severe hyponatremia and cerebral edema.	Monitor closely for hypervolemia, hypernatremia, and associated respiratory distress. Do not use it with patients experiencing heart failure, renal failure, or conditions caused by cellular dehydration because it will worsen these conditions.
Hypertonic	5% Dextrose and Lactated Ringer's (D5LR) D10	Used to treat severe hyponatremia and cerebral edema.	Monitor closely for hypervolemia, hypernatremia, and associated respiratory distress. Do not use it with patients experiencing heart failure, renal failure, or conditions caused by cellular dehydration because it will worsen these conditions.

Chapter Nine

Pain Management



PAIN: Is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Pain is a universal human experience; it is defined as "a state in which an individual experiences and reports the presence of severe discomfort or an uncomfortable sensation.

Pain is a subjective experience that is often difficult for clients to describe and nurses to understand, yet it is among the most common complaints that cause individuals to seek health care.

Pain is a stressor that can trigger both physiological and psychological discomfort. Untreated pain can lead to physical disorders related to under nutrition, immobility, and immune suppression.

Fact of pain:

1- **Perception:** is concerned with sensory processes when a stimulus for pain is present. It is based on previous experience and knowledge of pain and its characteristics that the threshold is decreased the intensity of stimulus that causes the subject intolerance to recognize the pain (phenomena on adaptation).

2- Reaction or response to pain: Its concerned with organism's method of coping with sensation.

3- Stimulants of pain: Any stimulus that causes tissue damage or perceived by the individual and causing injury to the body tissue causes pain, so pain may result from a number different kind of damaging stimuli, such as:

1- Chemical stimulant
2- Thermal stimulant
3- Electrical agent.
4- Mechanical stimulant.

Response of the body to pain:

1- Voluntary skeletal muscles response: it's muscle reaction which trigger the effort to remove the painful stimulus. e.g. person is pull his knee up to abdomen when abdominal pain is severing.
2- Involuntary or autonomic responses: it's also a protective method that increased the body's alertness to promote organic balance, so the body prepare for emergency action by increasing in perspiration, P.B, Pulse, Respiration. Pupil dilation and increasing in the output of adrenaline.
3- Emotional or psychic response: pain is always accompanied by anxiety, fear and sometime anger. e.g. some patients tend to complain of pain more during the night hours. Because the fell loneliness and with more anxiety.

Types of Pain

Pain can be qualified or described in two basic ways:

1- By its cause or origin.
2- By its description or nature.

1- Pain categorized by its origin is either cutaneous, somatic, or visceral.

a- Cutaneous pain is caused by stimulation of the cutaneous nerve endings in the skin and results in a well-localized "burning" or "prickling" sensation; getting a knot in the hair that is pulled out during combing may cause cutaneous pain.

b- Somatic pain is non-localized and originates in support structures such as tendons, ligaments, and nerves; jamming a knee or finger will result in somatic pain.

c- Visceral pain is discomfort in the internal organs and is less localized and more slowly transmitted than cutaneous pain. Visceral pain is often difficult to assess because the location may not be directly related to the cause.

d- Pain originating from the abdominal organs is often called referred pain because the sensation of pain is not felt in the organ itself but instead is perceived at the spot where the organs were located during fetal development.

2- Pain by its description or nature

a- Acute pain is most frequently identified by its sudden onset and relatively short duration, mild to severe intensity, and a steady decrease in intensity over a period of days to weeks. Some forms of acute pain may have a slower onset. Once the noxious stimulus is resolved, the pain usually decreases. Examples of noxious stimuli are needle sticks, surgical incisions, burns, and fractures.

b- Recurrent acute pain is identified by repetitive painful episodes that may recur over a prolonged period or throughout the client's lifetime. These painful episodes alternate with pain-free intervals. Examples of recurrent pain include migraine headaches, sickle cell pain crises, and the pain of angina pectoris due to myocardial hypoxia.

c- Chronic pain is identified as long-term (lasting 6 months or longer), persistent, nearly constant, or recurrent pain that produces significant negative changes in the client's life. Unlike acute pain, chronic pain may last long after the pathology is resolved.

d- Chronic nonmalignant pain (CNP), occurs almost daily and lasts for at least 6 months, with intensity from mild to severe. Chronic pain, a primary motivator for individuals to seek health care intervention, can greatly influence a client's quality of life, including emotional, social, vocational, and financial areas.

Examples of patho-physiology leading to chronic nonmalignant pain include:

• Low back pain

• Rheumatoid arthritis

e. Cancer Pain. Not all patients with cancer experience pain. For those who do, many are able to have their pain managed with relatively simple means. Some patients with cancer experience acute and/or chronic pain.

f. Psychogenic pain: The term "***psychogenic***" has been used to describe pain where no physical pathology has been found or where the pain appears to have a greater psychologic basis than a physical one. A caution here is that diagnostic tests are not definitive measures and may not be sophisticated enough to detect path physiologic changes. Distinguishing between physical and emotional components of pain is difficult and it is important to remember that all pain is real.

Factors Affecting the Pain Experience

The subjective nature of pain varies from person to person and is influenced by several variables. Many factors account for the differences in a client's individual response to pain, including:

1- age.
2- previous experience with pain.
3- cultural factors.

Physiology of Pain

There are four physiological processes of normal pain: transduction, transmission, perception, and modulation

- **Transduction.** Thermal, chemical, or mechanical stimuli usually cause pain. Transduction converts energy produced by these stimuli into electrical energy. It begins in the periphery when a pain-producing stimulus (e.g., exposure to pressure or a hot surface) sends an impulse across a sensory peripheral pain nerve fiber (nociceptor), initiating an action potential. Once transduction is complete, transmission of the pain impulse begins.
- **Transmission**. Movement of impulses from site of origin to the brain.
- **Perception.** Once a pain stimulus reaches the cerebral cortex, the brain interprets the quality of the pain and processes information from past experience, knowledge, and cultural associations in the perception of the pain. Perception is the point at which a person is aware of pain.
- **Modulation.** Once the brain perceives pain, there is a release of inhibitory neurotransmitters such as endorphins (endogenous opioids), serotonin, norepinephrine, and gamma aminobutyric acid (GABA), which hinder the transmission of pain and help produce an analgesic effect.

Nursing process of pain

A- Assessment

1- Data Collection

• Intensity

• Location

• Quality (radiating, burning, diffuse)

• Associated manifestations (factors that often accompany the pain, such as nausea, constipation, or dizziness)

• Aggravating factors (variables that worsen the pain, such as exercise, certain foods, or stress)

• Alleviating factors (measures the client can take that lessen the effect of the pain, such as lying down,

avoiding certain foods, or taking medication) Nurses must look for nonverbal signs of pain such as lying down, avoiding certain foods, or taking medication)

2- Assessment Tools

1- Age

2- cultural context

a- Initial Pain Assessment Tool

b- Pain Intensity Scales

c- Pain Diary

• Date/Time

• Intensity

• Situation (What were you doing?)

• How did you feel?

• What were you thinking?

• What did you do to ease the pain?

• How effective was the pain control strategy?

d- Psychosocial Pain Assessment

• Do the client and family/caregivers understand the diagnosis?

• How have previous experiences with pain affected the client and family?

• How does the client usually cope with pain and/or stress?

• What concerns do the client and family have about using certain medications such as opioids?

• Do the client and family understand the differences between tolerance, dependence, and addiction?

3- ***Developmental Considerations***

Children and Adolescents: Infants, children, and adolescents provide a special challenge in pain assessment because their pain behaviors often differ from those considered normal in the adult population.

B- **Nursing Diagnosis**

The two primary nursing diagnoses used to describe pain are *Acute Pain* and *Chronic Pain*. According to NANDA, ***Acute Pain*** is defined as "an unpleasant sensory and emotional experience arising from actual or potential tissue damage or described in terms of such damage . . . (with) sudden or slow onset of any intensity from mild to severe, with an anticipated or predictable end and a duration

of less than 6 months"

Chronic Pain is defined as *Acute Pain*, with the last phrase replaced by "constant or recurring without an anticipated or predictable end and a duration of greater than 6 months."

C- Outcome Identification and Planning

When planning care for the client experiencing pain, mutual goal setting is of utmost importance. After assessing the client's perception of the problem, work with the client in developing realistic outcomes. Be sure to use both non-pharmacologic and pharmacologic interventions in planning strategies to help clients achieve desired levels of functioning and pain control.

D- Implementation

• Recognize each client's right to pain assessment and treatment

• Monitor client responses to pain management strategies

• Educate staff and clients about pain management

• Clients have the right to appropriate pain assessment.

• Pain is to be assessed and regularly reassessed.

• Clients will be treated for pain or referred for treatment.

• Clients will be taught the importance of effective pain management.

• Clients will be taught that pain management is a part of treatment.

• Clients will be involved in making health care decisions.

• Analgesics are to be administered as needed.

• Discharge planning and teaching will include continuing needs for pain management.

1- Nurse-Client Relationship: **Client Education**

2- Pharmacologic Pain Management

Listed below are principles for the care of clients experiencing pain:

• Assess the pain.

• Treat the contributing factors (pathology).

• Individualize analgesic therapy to each client.

• Choose the least invasive route of administration.

• Administer analgesics at regularly scheduled intervals (around-the-clock dosing) rather than on an as needed (PRN) basis.

• Keep clients in control of their own analgesia as much as possible.

• Titrate doses to provide maximum pain relief and minimum side effects. Know that the right dose is "whatever it takes to relieve the pain with the fewest side effects".

3- Treatment of Neuropathic Pain

- Mood elevation
- Potentiation of opioid analgesia
- Direct analgesic effects

4- Cognitive-Behavioral Interventions

1- Reframing
2- Relaxation Techniques
3- Biofeedback
4- Cutaneous Stimulation
5- Transcutaneous Stimulation
6- Encourage Exercise
7- Nutrition
8- Herbals
9- Environment

E- Evaluation

Objective data used to evaluate pain management efficacy include:

- Client's facial expression and posture
- Presence (or absence) of restlessness
- Vital sign monitoring
- Ongoing use of pain assessment tools.

References:

1. Carol R. Taylor PhD, MSN, RN, Pamela B Lynn EdD, MSN, RN, Jennifer L Bartlett Ph.D., RN-BC, CNE, CHSE (2023). Fundamentals of nursing E-book: Active learning for collaborative practice. Elsevier Health Sciences.
2. Fundamentals of Nursing 9th Edition by Patricia A. Potter RN PhD FAAN (Author), Anne G. Perry RN MSN EdD FAAN, 2021.