

Fundamentals of Nursing

DEFINITIONS OF NURSING

- ❖ **American Nursing Association (2003)**
 - "Nursing is the protection, promotion, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the diagnosis and treatment of human response, and advocacy in the care of individuals, families, communities and populations".
- ❖ **Florence Nightingale**
 - "Act of utilizing ENVIRONMENT of the patient to assist him in his recovery".
- ❖ **Virginia Henderson**
 - The unique function of the nurse is to assist the individual, sick or well, in the performance of those activities contributing to health or its recovery (or to peaceful death) that he would perform unaided if he had the necessary strength, will, or knowledge, and to do his in such a way as to help him gain independence as rapidly as possible.

NURSING THEORIES AND CONCEPTUAL FRAMEWORK

- ❖ **FLORENCE NIGHTINGALE (1820 – 1910)**
 - Considered the first nursing theorist and earned the title "Nursing with a Lamp"
 - **Environmental Theory**
 - Five environmental factors:
 - ✓ Pure/fresh air
 - ✓ Pure water
 - ✓ Efficient drainage
 - ✓ Cleanliness
 - ✓ Light (direct sunlight)
 - Deficiencies in this five factors produce lack of health or illness
 - Stressed the importance of keeping the client warm, maintaining a noise free environment, attending the client's diet
- ❖ **VIRGINIA HENDERSON**
 - **The Nature of Nursing Model**
 - Conceptualizes the nurse's role as assisting sick or healthy individuals to gain independence in meeting the **14 Fundamental Needs:**
 1. Breathing normally
 2. Eating and drinking adequately
 3. Eliminating body wastes
 4. Moving and maintaining a desirable position
 5. Sleeping and resting
 6. Selecting suitable clothes
 7. Maintaining body temperature
 8. Keeping the body clean and well groomed
 9. Avoiding dangers and injuring others
 10. Communicating with others
 11. Worshipping according to one's faith
 12. Working in such a way that one feels a sense of accomplishments
 13. Participating in various recreation
 14. Learning, discovering or satisfying the curiosity that leads to normal development and health
- ❖ **FAYE GLENN ABDELLAH**
 - **Patient-Centered Approaches to Nursing Model**
 - Identifies 21 nursing problems
 - Defines nursing as a service to individuals and families
 - Conceptualizes nursing as an art and science that molds the attitudes, intellectual competencies and technical skills of the individual nurse into the desire and ability to help people, sick or well and cope with their needs
- ❖ **DOROTHY E. JOHNSON**
 - **Behavioral System Model**
 - Each person as a behavioral system is composed of 7 subsystem:
 - ✓ Injunctive
 - ✓ Eliminative

- ✓ Affiliative
- ✓ Aggressive
- ✓ Dependence
- ✓ Achievement
- ✓ Sexual and role identity

❖ IMOGENE KING

- **Goal Attainment Theory**
- Viewed nursing as an interaction process between patient and nurse that lead to goal attainment
- Patient has 3 interacting system
 - ✓ Operational system (individuals)
 - ✓ Interpersonal system (nurse-patient)
 - ✓ Social system (health care system)

❖ MADELEINE LEININGER

- **Transcultural Nursing Model (Cultural Care Diversity and Universality Theory)**
- Emphasizes that human caring, although universal, varies among cultures in its expressions, process and patterns; it is largely culturally derived
- **Presents 3 intervention modes:**
 - ✓ Culture care preservation and maintenance
 - ✓ Culture care accommodation, negotiation or both
 - ✓ Culture care restructuring and re patterning

❖ MYRA ESTRIN LEVINE

- **Four Conservation Principles**
- Proposed principles which are concerned with the unity and integrity of the individuals
 - ✓ Conservation of energy
 - ✓ Conservation of structural integrity
 - ✓ Conservation of personal integrity
 - ✓ Conservation of social integrity

❖ BETTY NEUMAN

- **Health Care System Model**
- Asserted that nursing is unique profession in that is concerned with all the variables affecting the individuals response to stress, which are intrapersonal stressors (within the individual), interpersonal (occurs between individuals) and extra personal (outside the person) in the nature
- Nursing interventions focus on retaining or maintaining system stability

❖ DOROTHEA OREM

- **Self-care and Self-care deficit Nursing Theory**
- Defines self-care as performing activities independently by individual throughout life to promote and maintain personal well being
- Identifies 3 types of nursing system:
 - ✓ **Wholly Compensatory-** for individuals who are unable to control and monitor their environment and process information
 - ✓ **Partly Compensatory-** designed for individuals who are unable to perform some, but not all self-care activities
 - ✓ **Supportive-Educative-** for clients who need to learn to perform self-care measure and need assistant to do so

❖ HILDEGARD PEPLAU

- **Psychodynamic (interpersonal relations) Model**
- Use of therapeutic relationship between nurse and the client
- 4 phases:
 - ✓ Orientation
 - ✓ Identification
 - ✓ Exploitation
 - ✓ Resolution

❖ MARTHA ROGERS

- **Science of Unitary Human Being**
- Views the person as an irreducible whole, the whole being is greater than the sum of its parts
- According to Rogers, unitary man:
 - ✓ Is an irreducible, four-dimensional energy field by pattern

- ✓ Manifests characteristics different from the sum of the parts
- ✓ Interacts continuously and creatively with the environment
- ✓ Behaves as a totality
- ✓ As a sentient being, participates creatively in change

❖ **SISTER CALLISTA ROY**

- **Adaptation Model**
- Defines adaptation as the process and outcome whereby the thinking and feeling person uses conscious awareness and choice to create human and environmental integration
- Goal of model is to enhance life processes through adaptation in four adaptive modes:
 - ✓ Physiologic Mode
 - ✓ Self-concept mode
 - ✓ Role-function mode
 - ✓ Interdependence mode

❖ **LYDIA HALL**

- **Care, Core and Cure Model**
- Care- nurturance and is exclusive to nursing
- Core- involves the therapeutic use of self and emphasize the use of reflection
- Cure- focuses on nursing related to the physician's orders

❖ **IDA JEAN ORLANDO (1961)**

- **The Dynamic Nurse-Patient Relationship Model**
- Nurses provide direct assistance to meet an immediate need for help in order to avoid or to alleviate distress or helplessness
- She advocated that the three elements composing the nursing situation are:
 - ✓ Client behavior
 - ✓ Nurse reaction
 - ✓ Nurse action

❖ **JEAN WATSON (1979)**

- **Human Caring Theory**
- Practice of caring is central to nursing: it is the unifying focus for practice
- **10 curative factors**
 1. Formation of Humanistic- altruistic system of values
 2. Instillation of faith and hope
 3. Cultivation of sensitivity to one's self and others
 4. Development of helping – trusting relationship
 5. Promoting and accepting the expression of positive and negative feelings
 6. Systematically using the scientific problem-solving method for decision making
 7. Promoting transpersonal teaching-learning
 8. Provision of a supportive, protective and/or corrective mental, physical, societal and spiritual environment
 9. Assisting with gratification of human needs
 10. Allowance for existential- phenomenological - spiritual forces

❖ **ROSEMARIE RIZZO PARSE**

- **Human Becoming Theory**
- Proposed 3 assumptions about human becoming:
 1. Human becoming is freely choosing personal meaning in situations in the inter subjective process of relating value priorities
 2. Human becoming is co-creating rhythmic patterns or relating in mutual process with the universe
 3. Human becoming is transcending multidimensional with the emerging possibilities emphasizes how individuals choose and bear responsibility for patterns of personal health

SCOPE OF NURSING PRACTICE

❖ **PROMOTING HEALTH AND WELLNESS**

- A process that engages in activities and behaviors that enhance quality of life and maximize personal potential
- Activities that enhance healthy lifestyle:
 - ✓ Improving nutrition and physical fitness
 - ✓ Preventing drug and alcohol misuse

- ✓ Restricting smoking
- ✓ Preventing accidents and injury at home and workplace

❖ PREVENTING ILLNESS

- Goal of illness prevention program is to maintain optimal health by preventing disease which includes:
 - ✓ Immunizations
 - ✓ Prenatal and infant care
 - ✓ Prevention of STI

❖ RESTORING HEALTH

- Focuses on the ill client and it extends from early detection of disease through helping the client during the recovery period
- Activities include:
 - ✓ Providing direct care to the ill client
 - ✓ Performing diagnostic and assessment procedures
 - ✓ Teaching clients about recovery activities
 - ✓ Rehabilitating clients to their optimal functional level

❖ CARING FOR DYING

- Comforting and caring for people of all ages who are dying which includes:
 - ✓ Helping clients live as comfortably as possible until death
 - ✓ Helping support persons to cope with death

STANDARD OF NURSING PRACTICE

❖ ASSESSMENT

- Collect comprehensive data pertinent to the patient's health or situation

❖ DIAGNOSIS

- Analyzes the assessment data to determine the diagnose or issue

❖ OUTCOME IDENTIFICATION

- Identifies expected outcomes for a plan individualized to the patient or the situation

❖ PLANNING

- Develops a plan that prescribe strategies and alternatives to attain expected outcomes

❖ IMPLEMENTATION

- Implements the identified plan

❖ EVALUTION

- Evaluates progress towards attainment of outcomes

❖ QUALITY OF PRACTICE

- Systematically enhance the quality and effectiveness of nursing practice

❖ EDUCATION

- Attains knowledge and competency that reflects current nursing practice

❖ PROFESSIONAL PRACTICE EVALUATION

- Evaluate one's own practice in relation to professional practice standards and guidelines, relevant statutes, rules and regulation

❖ COLLEGIALLY

- Interacts with and contributes to the professional development of peers and colleagues

❖ COLLABORATION

- Collaborates with patients, family and others in the conduct of nursing practice

❖ ETHICS

- Integrates ethical provisions in all areas of practice

❖ RESEARCH

- Integrate research findings into practice

❖ RESOURCE UTILIZATION

- Considers factors related to safety, effectiveness, cost and impact on practice on the planning and delivery of nursing services

❖ LEADERSHIP

- Provides leadership in the professional practice setting and the profession

ROLES AND FUNCTIONS OF A NURSE

❖ CAREGIVER

- Encompasses activities that assist the client physically and psychologically while preserving the dignity of the client
- Nurse is primarily concerned with the client's needs

❖ COMMUNICATOR

- Communicates the identified problem of the client to other health care team

❖ TEACHER

- Nurse teaches client about their health and procedures they need to perform to restore their health

❖ CLIENT ADVOCATE

- Acts to protect the client
- Nurse assist clients in exercising their rights and help them speak for themselves

❖ COUNSELOR

- Nurse provides emotional, intellectual and psychological support

❖ CHANGE AGENT

- Nurse assists clients to make modification in their behavior

❖ LEADER

- Influences others to work together to accomplish a specific goal

❖ MANAGER

- Nurse plans, give direction, develop staffs, monitors operation, give rewards fairly and represents both staff members and administration as needed.

❖ CASE MANAGER

- Works with multidisciplinary health care team to measure the effectiveness of the case management plan and monitor outcomes.

❖ RESEARCHER

- Nurse participates in scientific investigation and uses research findings to improve client care

❖ COLLABORATOR

- Nurse works in combined effort with all those involve in care delivery

EXPANDED CAREER ROLES FOR NURSES

❖ NURSE PRACTITIONER

- Nurse who has advanced education & graduated from a nurse practitioner program
- Employed in health care agencies or community-based settings
- Deals with non-emergency acute or chronic illness & provide primary ambulatory care

❖ CLINICAL NURSE SPECIALIST

- Has an advanced degree or expertise and is considered to be an expert in a specialized area of practice (gerontology, oncology)
- Provides direct client care, educates others, conducts research, and manages care.

❖ CERTIFIED REGISTERED NURSE ANESTHETIST (CRNA)

- Completed advanced education in an accredited program in the anesthesiology
- Carries out pre-op and post-op visits and assessment
- Administers general anesthesia for surgery under the supervision of a physician prepared in anesthesiology and also assesses the postoperative status of clients

❖ NURSE-MIDWIFE

- RN who has completed a program in midwifery and gives prenatal & postnatal care and manages deliveries in normal pregnancies
- May also conduct pap smears, family planning and routine breast exams

❖ NURSE RESEARCHER

- Investigates nurse problems to improve nursing care and to refine and expand nursing knowledge
- Employed in academic institutions, teaching hospitals and research center, and usually has advanced education at the doctorate level

❖ NURSE ADMINISTRATOR

- Manages client care, including the delivery of nursing services
- Function:
 - ✓ Budgeting
 - ✓ Staffing and
 - ✓ Planning programs

❖ NURSE EDUCATOR

- Responsible for classroom and clinical teaching

❖ NURSE ENTREPRENEUR

- Manages health-related businesses

PATRICIA BENNER'S STAGES OF NURSING EXPERTISE

❖ STAGE I (Novice)

- No experience (student nurse)
- Performance is limited, flexible, and governed by context-free rules and regulations rather than experience

❖ STAGE II (Advanced Beginner)

- Demonstrates marginally acceptable performance
- Recognizes meaningful "aspects" of a real situation
- Experienced enough real situations to make judgments about them

❖ STAGE III (Competent)

- **2-3 years of experience**
- Demonstrates organizational and planning abilities
- Differentiates important factors from less important aspects of care
- Coordinates multiple complex care demands

❖ STAGE IV (Proficient)

- **3-5 years of experience**
- Perceives situations as a whole rather than in terms of parts
- Uses maxims as guides for what to consider in a situation
- Has holistic understanding of the client, which improves decision making
- Focuses on long term goal

❖ STAGE V (Expert)

- Performance is fluid, flexible, and highly proficient
- No longer requires rules, guidelines, or maxims to connect an understanding of the situations to appropriate actions
- Inclined to take a certain action because "it felt right".

COMMUNICATION IN NURSING

- ❖ Interchange of information between two or more people: exchange of ideas and thoughts. In addition, thoughts are conveyed to other not only by spoken or written words but also by gestures or body actions
- ❖ **Verbal Communication** uses spoken or written words
- ❖ **Non-verbal communication** uses gestures, facial expressions, posture/gait, body movements, physical appearance, eye contact and tone of voice
- ❖ **Components of communication**
 - **Sender-** is the person who encodes and deliver message
 - **Message-** the content of the communication, may contain verbal, nonverbal, and symbolic language
 - **Receiver-** the person who receives and decodes the message
 - **Channel-** means of conveying and receiving messages through visual, auditory and tactile senses
 - **Response/feedback-** message returned by the receiver to the sender

CHARACTERISTICS OF COMMUNICATION

- ❖ **Simplicity** – use of commonly understood words
- ❖ **Pace and Intonation** – modifies the feeling and the impact of the message
- ❖ **Clarity and Brevity** – message that is direct and simple
- ❖ **Timing and Relevance** – require choice of time and consideration of client's interest and concern
- ❖ **Adaptability** – message needs to be altered in accordance with behavioral cues from the client
- ❖ **Credibility** – means worthiness of belief, trustworthiness, and reliability
- ❖ **Humor** – used to help clients adjust to difficult and painful situation

DOCUMENTATION

- ❖ Written or computer-based
- ❖ Served as a permanent record of client's information and progress care
- ❖ Formal, legal document that provide evidence of a client's care

❖ PURPOSES OF DOCUMENTATION

- Planning client care
- Communication
- For legal documents purposes
- For research
- For education
- Reimbursement
- For statistics, reporting, epidemiology
- Auditing health agencies
- Health care analysis

❖ TYPES OF RECORDS

- **Source-Oriented Medical Record (Traditional Client Record/ SOMR)**
 - ✓ Each person or department makes notations in a separate section/s of client's chart
 - ✓ Specific information is easier to locate
- **Components of SOMR**
 - ✓ Admission sheet
 - ✓ Face sheet
 - ✓ Medical history and physical examination and sheet
 - ✓ Diagnostic finding sheet
 - ✓ TPR graphic sheet
 - ✓ Doctor's treatment and order sheet
 - ✓ Therapeutic sheet
 - ✓ Special flow sheet
 - ✓ Medication record
 - ✓ Nurses notes
 - ✓ Client discharge plan and referral summary
 - ✓ Initial nursing assessment

❖ PROBLEM-ORIENTED MEDICAL RECORD

- Data about the client are recorded and arranged according to the sources of the information
- Records integrates all data about the problem, gathered by members of health team
- **4 BASIC COMPONENTS OF POMR**
 - 1. DATABASE-** contains all information from the patient when he first entered the agency. It includes nursing assessment, physician's history, social and family data, results of physician's examination.
 - 2. Problem Lists-** contains all the aspects of the person's life requiring health care
 - Kept in front of the chart
 - Problems are listed in the order, which they are identified
 - Continually updated as new problems are identified and others are resolved
 - 3. Initial list of orders or plan of care-** made with reference to the active problems and are generated by the person who lists the problem
 - 4. Progress Notes-** which includes nurses narrative notes (SOAPIE, SOAPIE, SOAPIER)

❖ KARDEX

- Provides a concise method of organizing and recording data about the client, making information readily accessible to all members of the health care team
- May be written in a pencil to ease in recording frequent change in details of client care
- A series of flip cards usually kept in portable file

GENERAL GUIDELINES FOR RECORDING

❖ Date and Time

- For legal reasons and client's safety
- Record the time in conventional manner (ex. 9:00 am or 3:15 pm) or according to 24-hour clock (military time) to avoid confusion about whether time was am or pm

❖ Timing

- Adjust the frequency as per client's condition indicates
- No recording should be done BEFORE providing nursing care
- Documenting should be done as soon as possible after assessment/ intervention

❖ Legibility

- All entries must be easy to read prevent interpretation errors

- ❖ **Permanence**
 - Records are made in the dark permanent ink
- ❖ **Use of accepted terminology**
 - Use only commonly accepted abbreviation, symbols and terms that are specified by the agency
- ❖ **Correct Spelling**
 - Is essential for accuracy in recording
 - If unsure how to spell, look it up in a dictionary or other resource book
- ❖ **Signature**
 - Each recording in nursing notes is signed by the nurse making it
 - Include name and title (ex. Ralf Jake M. Faustino RN)
- ❖ **Accuracy**
 - Clients name should be written on each page of the clinical record
 - Accurate notations consist of facts/ observations rather than opinions or interpretation
 - ✓ e.g. Fact " Client refused Medication"
 - ✓ Opinion " Client was Uncooperative"
 - When recording MISTAKE is made, draw a line through it and write the words "mistaken entry" (avoid writing the word error) above or next to the original entry with your initials or name
 - Do not erase, blot out or use correction fluid
 - Write every line but not between line
 - If a blank appears in the notation, draw a through the blank space and sign the notation
- ❖ **Sequence**
 - Document events in the order which they occur
- ❖ **Appropriateness**
 - Record only information that pertains to the client's health problems and care
 - Recording irrelevant information may be considered an invasion of the client privacy
- ❖ **Completeness**
 - Information needs to be complete and helpful to the client and health care professionals
 - Care that is omitted because of client's refusal of treatment must also be recorded. Document what and why it is omitted and who was notified
- ❖ **Conciseness**
 - Recording needs to be brief as well as completed to save time in communication
- ❖ **Legal Prudence**
 - Accurate and complete documentation should be a legal protection to the client and health care team
- ❖ **Confidentiality**
 - Only the health professionals who participate in the care of the client are allowed to read the chart

REPORTING

- ❖ Takes place when two or more people share information about client care, either face-face o via telephone

Types of Reporting

- ❖ **Change-of-shifts report or endorsement**
 - For continuity of care of clients by providing quick summary of health care needs and details of care to be given
 - It is not merely reciting the content or the KARDEX
- ❖ **Telephone Reports**
 - Provide clear, accurate and concise information:
 - ✓ Date and time
 - ✓ Name of the person giving the information
 - ✓ Subject of information received
 - ✓ Name and signature of the receiver
 - Person receiving the information should repeat it back to the sender to ensure accuracy
- ❖ **Telephone Orders**
 - Only RN's may receive telephone orders.
 - Another RN should listen in another telephone line to countercheck the details.
 - Write the date and time the telephone order was received.
 - Write the complete order and read it back.
 - Question primary care provider about any order that is unusual or contraindicated to client's condition

- The order should be countersigned by the physician who made the order within the prescribed period of time (within 24 hours)

❖ **Transfer Report**

- Done when transferring a client to other unit

NURSING PROCESS

❖ **Purposes of nursing process**

1. To identify client's health status
 - Actual health problem
 - Potential health problems or needs
2. To establish plans to meet identified needs
3. To deliver specific nursing care and improve the quality of care

CHARACTERISTICS OR NURSING CARE

- ❖ **Cyclical** (regularly repeated events) and **Dynamic** (continuously changing)
- ❖ **Client-centered** – organizes the plan or care according to client's problems rather than nursing goal
- ❖ **Focused on Problem Solving**- nursing process is directed towards a client's responses to disease and illness
- ❖ **Decision making**- involved in every phase of nursing process
- ❖ **Interpersonal and Collaborative**
 - Communicates with the client and family
 - Collaborates with other members of the health care team
- ❖ **Universally applicable**- used in all types of health care setting with the clients of all age group
- ❖ Nurses must use a variety of critical thinking skills to carry out the nursing process

COMPONENTS OF THE NURSING PROCESS (ADPIE)

- ❖ Assessment
- ❖ Diagnosis
- ❖ Planning
- ❖ Implementation
- ❖ Evaluation

ASSESSMENT

- ❖ **Assessment** is a systematic and continuous collection, organization, validation and documentation of data about the client health status
 - Purpose: establish a database
- ❖ **Activities during assessment**
 - **Data Collection**
 - ✓ Gathering information about client, considering the physical, psychological, emotional, social-cultural, and spiritual factors that may affect his/her health status
 - **Sources of data**
 - ✓ Client (primary)
 - ✓ Support people (secondary)
 - ✓ Family members, friends, and caregivers who know the client well
 - ✓ Client records
 - ✓ Medical records- past and present health and illness patterns
 - ✓ Records of therapies social – workers, nutritionist, dieticians,
 - ✓ Physical therapist
 - ✓ Laboratory record
 - ✓ Health care professionals
 - ✓ Literature
- ❖ **Data collection methods**
 - **Observing** - gathers data by using the senses
 - 2 aspects:
 - ✓ Noticing the data
 - ✓ Selecting, organizing and interpreting data
 - **Interviewing** – is a planned communication or a conversation with a purpose

2 approaches:

✓ **Directive**

- **Highly structured** and elicits specific information
- Uses closed-ended questions (YES/NO)
- The nurse establishes the purposes & control the interview
- Used when you need to elicit specific data
- Used in emergency situation

✓ **Non-directive (rapport-building)**

- Nurse allow the client to control the purpose, subject matter & pacing
- Uses more open-ended questions
- Advantage: allows the patient to explain certain information

❖ **Stages of Interview**

• **The Opening**

- ✓ Most important
- ✓ Establish rapport
- ✓ Orientation

- **The Body**- the client communicates what he or she thinks, feels, and perceives in response to the question

- **The Closing**- termination of the interview

❖ **Data Organization**

- Clustering/ organizing of facts into group of information
- Nurse uses a written/computerized data systematically

❖ **Validating Data**

- Double checking or verifying data to confirm that it is accurate and factual

❖ **Documenting Data**

- Accurate documentation is essential and should include all data collected about the client's health status

❖ **4 Types of Assessment**

• **Initial Assessment**

- ✓ Perform within the specified time after admission
- ✓ Main purpose is to create data base for problem identification reference and future comparison

• **Problem-focused Assessment**

- ✓ Integrated throughout the nursing process
- ✓ Purpose is to determine the status of a specific health problem (ex. Hydration status every 15 minutes)

• **Emergency assessment**

- ✓ Done during an acute physiologic and psychologic crisis of the client
- ✓ Purpose: identify life-threatening condition and to identify new or overlooked problems
- ✓ Framework and principle in emergency assessment

- A- Airway
- B- Breathing
- C- Circulation

- ✓ Use either Maslow's Hierarchy of needs or ABC principles

• **Time-lapsed Assessment**

- ✓ Done several months after initial assessment
- ✓ Purpose: to compare clients current status to base line data (initial assessment) previously obtained

DIAGNOSIS

❖ **2ND PHASE** of nursing process

❖ The process, which results to a diagnostic statement or nursing diagnosis. It is the clinical act of identifying problems.

❖ Purpose: to identify the client's health care needs and to prepare diagnostic statement.

❖ **Activities during diagnosing**

- Organized cluster/group of data
- Compare data with standards (norm)
- Analyze data after comparing with standards
- Identifying gaps & inconsistencies in data
- Determine the client's health problems, risks, and strengths
- Final output: Nursing Diagnosis statement

- ❖ **Nursing diagnosis** is a statement of client's potential or actual alteration of health status. It uses the critical-thinking skills of analysis and synthesis.
- ❖ **Basic 2-part statements**
 - Problem (statement of the client's response)
 - Etiology (factors contributing to or probable causes of the responses)
 - The two parts are joined by the words "related to" (implies relationship)

e.g.: Constipation related to prolonged laxative use
e.g.: Ineffective breast feeding related to breast engorgement
- ❖ **Basic 3-part statements (PES format)**
 - Problem
 - Etiology
 - Signs and symptoms (defining characteristics manifested by the client)
 - e.g.: Situational low self-esteem related to rejection by husband as manifested by hypersensitivity to criticism; states "I don't know if I can manage by myself" and rejects positive feedback.
- ❖ **One-part statements**
 - Consists of NANDA label only

e.g.: Rape-Trauma syndrome; Anticipatory grieving
- ❖ **Collaborative problems**
 - Suggested that all collaborative problems begin with diagnosing label "Potential Complications"
 - e.g.: Potential complications of head injury: Increased intracranial pressure
- ❖ **Purpose of NANDA**
 - To define, refine, and promote taxonomy (classification or system or set of categories arranged on basis of a single principle or set of principles) of nursing diagnostic terminology of general use to professional nurses
 - Members
 - ✓ Staff nurses
 - ✓ Clinical specialists
 - ✓ Faculty, directors of nursing
 - ✓ Deans, theorists, and researchers
- ❖ **Types of Nursing Diagnosis**
 - **Actual diagnosis**
 - ✓ Client problem that is present at the time of the nursing assessment (based on the presence of associated signs and symptoms)

eg: Ineffective breathing pattern; Anxiety
 - **Risk nursing diagnosis**
 - ✓ Clinical judgment that a problem does not exist, but the presence of risk factors indicates that a problem is likely to develop unless nurses intervene

eg: Risk for Infection
 - **Wellness diagnosis**
 - ✓ Describes human responses to levels of wellness in an individual, family or community that have a readiness for enhancement"

eg: Readiness for enhanced spiritual well -being; Readiness for enhanced family coping
 - **Possible nursing diagnosis**
 - ✓ Evidence about a health problem is incomplete or unclear
 - ✓ eg: Possible social isolation related to unknown etiology
 - **Syndrome diagnosis**
 - ✓ Associated with a cluster of other diagnoses

eg: Risk for disuse syndrome; Impaired physical mobility; Risk for infection; Impaired gas exchange

PLANNING

- ❖ Deliberative, systematic phase of nursing process that involves decision making and problem solving
- ❖ Goal setting: to have criteria for evaluation
- ❖ For the goal to be useful during evaluation, it should be stated in BEHAVIORAL TERMS
- ❖ To be effective, involve the patient and family

Types of Planning

- **Initial Planning** — done by the nurse who performs the admission assessment
- **Ongoing Planning**
 - ✓ Done by all nurses who work with the client

- ✓ Occurs at the beginning of a shift as the nurse plans the care to be given that day
- **Discharge Planning**
 - ✓ Process of anticipating and planning for needs after discharge, is a crucial part of comprehensive health care.
 - ✓ Begins at first client contact and involves comprehensive & ongoing assessment to obtain information about client's ongoing needs.
- ❖ **The Planning Process**
 1. Setting priorities
 2. Establishing client goals/desired outcomes
 3. Selecting nursing interventions
 4. Writing individualized nursing interventions on care plans
- ❖ **Guidelines for Writing Nursing Care Plans**
 1. Date and sign the plan.
 2. Use category headings.
 3. Use standardized/approved medical or English symbols and key words rather than complete sentences to communicate your ideas unless the agency policy dictates otherwise.
 4. Be specific.
 5. Refer to procedure books or other sources of information rather than including all the steps on a written plan.
 6. Tailor the plan to the unique characteristics of the client by ensuring that the client's choices such as preferences about the times of care and methods used are included.
 7. Ensure that the nursing plan incorporates preventive and health maintenance aspects as well as restorative ones.
 8. Ensure that the plan contains interventions for ongoing assessment of the client.
 9. Include collaborative and coordination activities in the plan.
 10. Include plans for the client's discharge and home care needs.

Characteristics of the Planning Process (CSMART)

C-Client-centered

S-Specific

M- Measurable

A-Attainable

R- Realistic

T-Time bound

IMPLEMENTATION

- ❖ Doing and documenting the activities that are specific nursing actions needed to carry out the interventions (or nursing orders)
- ❖ Reassessing the client before implementing an intervention
- ❖ Determining the nurse's need for assistance
- ❖ Implementing the nursing interventions
- ❖ Supervising the delegated care
- ❖ Documenting nursing activities

REQUIREMENTS FOR IMPLEMENTATION

- ❖ Adequate knowledge
- ❖ Technical Skills
- ❖ Communication skills
- ❖ Therapeutic use of self
- ❖ Right attitude

EVALUATION

- ❖ Collecting data, comparing data, and relating nursing activities to outcomes
- ❖ Drawing conclusions about problem status
- ❖ Continuing, modifying or terminating the NCP (Nursing Care Plan)

TYPES OF EVALUATION

- ❖ **On-going/Formative Evaluation**
 - Done during or immediately after the intervention
 - Allows the nurse to decide and make on-the-spot modification/s in an intervention
- ❖ **Intermittent Evaluation**
 - Done at a specified time & it shows the extent of progress of the patient

- Enables the nurse to correct deficiencies and modify the nursing care plan
- ❖ **Terminal/Summative Evaluation**
- Done at or immediately before discharge
- Importance: It determines whether the goals are **met, partially met or unmet**
- When goals have been partially met or when goals have not been met, two conclusions may be drawn:
 - ✓ The care plan may need to be revised, since the problem is only partially resolved
 - ✓ Or the care plan does not need revision, because the client merely needs more time to achieve the previously established goal(s)

CONCEPTS OF HEALTH AND ILLNESS

- ❖ Health is state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity (WHO).
- ❖ Health is the ability to maintain homeostasis or dynamic equilibrium. Homeostasis is regulated by the negative feedback mechanism (Walter Cannon).

MODELS OF HEALTH AND ILLNESS

Travis's Illness-Wellness Continuum

- ❖ The illness-wellness continuum developed by Travis ranges from high-level wellness to premature death.
- ❖ The model illustrates two arrows pointing in opposite directions and joined at a neutral point.
- ❖ Movement to the right of the neutral point indicates increasing levels of health and well-being for an individual. This is achieved in three steps:
 - ✓ Awareness
 - ✓ Education
 - ✓ Growth
- ❖ In contrast, movement to the left of the neutral point indicates progressively decreasing levels of health.

Health Belief Model

- ❖ The model of Becker (1975) which describes the relationship between a person's belief and behavior
- ❖ Individual perceptions and modifying factors may influence health beliefs and preventive health behavior
- ❖ Individual perceptions include the following:
 - Perceive susceptibility to illness
 - Perceive seriousness of an illness
 - Perceive threat of an illness
- ❖ Modifying factors including the following
 - Demographic variables (age, sex, race, etc.)
 - Socio-psychologic variables (pressure from peers)
 - Structural variables (knowledge about the disease)
 - Cues to action (internal: fatigue; external: mass media)

SMITH'S MODEL OF HEALTH

- ❖ **Clinical model** — identifies health as absence of signs and symptoms of disease or injury
- ❖ **Role performance model** — health is identified in terms of individual's ability to perform his/her work
- ❖ **Adaptive model** — Health is a creative process; disease is a failure in adaptation; focuses on the ability of the person to cope
- ❖ **Eudemonistic model** — health is seen as a condition of actualization or realization of person's potential

LEAVELL AND CLARK'S AGENT-HOST- ENVIRONMENTAL MODEL (ECOLOGIC MODEL)

- ❖ States that there are three interactive factors that affect health and illness
- **Agent** — any factor or stressor that can cause or lead to illness
- **Host** — person who may or may not be at risk of acquiring the disease
- **Environment** — any factor external to the host that may or may not predispose the person to the development of the disease
- **Illness** — is the state in which the person's physical, emotional, intellectual, social, developmental, or spiritual functioning is diminished or impaired compared with previous experiences
- **Disease** — an alteration in body functions resulting in reduction of capacities or a shortening of the normal life span
- ❖ **COMMON CAUSES OF DISEASE**
 - Biologic agents (microorganisms)
 - Inherited genetic defects (hemophilia)

- Developmental defects (imperforated anus)
- Physical agents (hot and cold substances)
- Chemical agents (emissions from smoke)
- Tissue response to injury (inflammation)
- Faulty chemical / metabolic process (inadequate iodine — goiter)
- Emotional / physical reaction to stress (anxiety)

STAGES OF ILLNESS

❖ Symptom Experiences

- Person comes to believe something is wrong
- ✓ Physical — experience of symptoms
- ✓ Cognitive- the interpretation of the symptoms in terms that have some meaning to the person.
- ✓ Emotional-fear and anxiety.

❖ Assumption of the sick role

- Acceptance of the illness
- Excused from normal duties and role expectations
- Confirmation from family and friends

❖ Medical care contact

- Seek advice of the health professionals for validation of real illness, explanation of symptoms, and reassurance or prediction of what the outcome will be

❖ Dependent Patient Role

- Client becomes dependent on the health professionals for help
- Accepts / rejects health professional's suggestions
- Later becomes more passive and accepting
- May regress to an earlier behavior stage

❖ Recovery or Rehabilitation

- Client is expected to relinquish the dependent role and resume former roles and responsibilities

- ❖ **Risk factors** — any situation, habit, environmental, physiologic, psychologic condition or other variable that increases the vulnerability of the individual to illness or accident

- Genetic and physiological factors
- Age
- Environment
- Lifestyle

LEAVELL AND CLARK'S THREE LEVEL OF PREVENTION

❖ PRIMARY PREVENTION

- To encourage optimal health and to increase the person's resistance to illness
- Seeks to prevent a disease or a condition at a pre-pathologic state
- Health promotion
- Specific protection
 - ✓ Quit smoking
 - ✓ Avoid / limit alcohol intake
 - ✓ Exercise regularly
 - ✓ Eat well-balanced diet
 - ✓ Reduce fat intake and increase fiber in the diet

❖ SECONDARY PREVENTION

- It is also known as health maintenance
- Seeks to identify specific illnesses or conditions at an early stage with prompt intervention to prevent or limit disability
- Early diagnosis / detection / screening
 - ✓ Prompt treatment to limit disability
 - ✓ Have annual physical examination
 - ✓ Regular pap's smear test for women
 - ✓ Monthly BSE for women

❖ TERTIARY PREVENTION

- Occurs after a disease or disability has occurred and the recovery process has begun

- Intent is to halt the disease or injury process and assist the person in obtaining an optimal health status
- Rehabilitation
 - ✓ Self-monitoring of blood glucose level among diabetics
 - ✓ Physical therapy after CVA
 - ✓ Undergoing speech therapy after laryngectomy

PHYSIOLOGIC RESPONSES TO STRESS AND ILLNESS

❖ STRESS

- Is a universal phenomenon, All person experience it
- Is a condition in which the person responds to changes in the formal balanced state

❖ STRESSOR – is any event or stimulus that causes an individual to experience stress

- When a person faces stress, responses are called coping strategies, coping responses, or coping mechanism

❖ SOURCES OF STRESS

- **Internal stressor** – originate within the person (Depression in cancer patients)
- **External stressors** – originate outside the individual. (A death in family)
- **Developmental stressors** – occurs at predictable times throughout an individual's life. (Getting started in an occupation by a young adult)
- **Situational stressors** – are unpredictable and may occur at any time during life, may be positive or negative. (Marriage or divorce, birth of a child)

RESPONSE BASED MODEL OF STRESS

(HANS SELYE)

❖ Adaptation

- The adjustments that a person make in different situations

❖ Type of Adaptation

- **General Adaptation Syndrome (GAS)**

- ✓ The entire body is involved wherever man responds to stress
- ✓ There are many similar manifestations that characterized different disease conditions; and there are very few specific manifestations that characterized by a particular disease

- **Stage in GAS**

- ❖ **Alarm Reaction / Stage of Alarm**

- ✓ Alerts the body's defense
 - ✓ The person becomes aware of the presence of threat or danger
 - ✓ Levels of resistance are decreased
 - ✓ Adaptive mechanism are mobilized
 - ✓ If the stress is intense enough, even at the stage of alarm, death may ensue

- ❖ **Shock/Resistance Phase**

- ✓ The stressor may be perceived consciously or unconsciously by the person
 - ✓ Autonomic nervous system reacts, and large amount of epinephrine (adrenaline) and cortisone are released into the body
 - ✓ "Fight or Flight"
 - ✓ This primary response is short, lasting from 1 minute to 24 hours

- ❖ **Counter-shock/Exhaustion phase**

- ✓ The changes produced in the body during the shock phase are reversed
 - ✓ The person is best mobilized to react during the shock phases of the alarm reaction

- ❖ **Stage of Resistance**

- ✓ Is when the body's adaptation takes place
 - ✓ The body attempts to cope with the stressor and limit the stressor to the smallest area of the body that can deal with it
 - ✓ The person moves back to homeostasis

- ❖ **Stage of Exhaustion**

- ✓ The adaptation that the body made during the second stage cannot be maintained
 - ✓ The ways used to cope with the stressors have been exhausted
 - ✓ If adaptation has not overcome the stressor, the stress affects may spread to the entire body
 - ✓ At the end of this stage, the body may either rest and return to normal, or death may be the ultimate consequence

- ❖ **Local Adaptation Syndrome (LAS)**

- Man may respond to stress through a particular body part or body organ

(e.g. Inflammation, backache, headache and diarrhea)

❖ Homeostasis

- A state of dynamic equilibrium; stability, balance; uniformity
- It is now more commonly referred to as "hemodynamics", because it is characterized by constant change.
- It is regulated by negative feedback mechanism.

❖ Concepts of Homeostasis

• Sympatho-Adreno-Medullary Responses (Walter Cannon)

- ✓ SAMR or fight-or flight response
- ✓ Adreno-cortical Response
- ✓ Neurohypophyseal Response

❖ Local Physiologic Responses to Stress

- Inflammation involves mobilization of specific and nonspecific defense mechanism in response to tissue injury or infection
- Purposes of Inflammation
 - ✓ To localize tissue injury
 - ✓ To protect tissue from injury
 - ✓ To prepare tissue for repair

❖ Cellular Response

- Neutrophils — are first to be launched at the site of injury
- Monocytes — perform phagocytosis in chronic tissue injury
- Lymphocytes — responsible for immune responses

Processes Involved:

- Marginal / pavementation — phagocytes line up at the peripheral walls of the blood vessels
- Emigration / diapedesis — phagocytes shift out of the blood vessels
- Chemotaxis — injured tissues release substances which exert magnet-like force to the phagocytes to bring them to the areas of injury
- Phagocytosis — phagocytes ingest or engulf the antigens

❖ EXUDATE PRODUCTION

- Inflammatory exudate is produced, consisting of fluid that escaped from the blood vessels, dead phagocytic cells, and dead tissue cells and products that they release
- Plasma protein fibrinogen (which is converted to fibrin when it is released into the tissues), thromboplastic (released by injured tissue cells), and platelets together form an interlacing network to wall off the area, and prevent spread of the injurious agent
- During this stage, the injurious agent is overcome, and the exudate is cleared away by lymphatic drainage

❖ Healing Process (Reparative Phase)

- **Regeneration** — involves replacement of damaged tissue cells by new cells which are identical in structure or function
- **Scar Formation** — involves replacement of damaged tissue cells by fibrous tissue formation
 - ✓ Granulation tissue (pink or red, fragile gelatinous tissue — early stage)
 - ✓ Cicatrix or scar — later stage, forms because the tissue shrinks and the collagen fibers contract

❖ Healing may also be classified as follows:

- First Intention — occurs in clean-cut wound. The wound edges are approximated and there is minimal or no scar tissue formation
- Second Intention — occurs when the wound is extensive and there is a great amount of tissue loss. The repair time is longer and the scarring is greater
- Third Intention — occurs when there is delayed surgical closure of infected wound

ASSESSING VITAL SIGNS / CARDINAL SIGNS

1. Temperature
2. Pulse
3. Respirations
4. Blood Pressure
5. Pain — the fifth vital sign

TEMPERATURE

- ❖ **Body Temperature**- balance between heat produced by the body and heat loss from the body

❖ Types of Body Temperature

- **Core Temperature**
 - ✓ Temperature of the deep tissues of the body such as abdominal and pelvic cavity.
- **Surface temperature**
 - ✓ Temperature of skin, SQ tissue and fat. Rises and falls in response to the environment.

❖ Processes Involved in Heat Loss

- **Radiation** - transfer of heat from surface to surface of one object to surface of another w/o contact
- **Conduction** - transfer of heat from one surface to another through direct contact
- **Convection** - dispersion of heat by air currents
- **Evaporation** - vaporization of moisture from the respiratory tract, mucosa of the mouth and skin

❖ Factors Affecting Body Temperature

- Age
- Diurnal variation (circadian rhythms)
 - ✓ **Highest temp: 4pm to 6pm**
 - ✓ **Lowest temp: 4am — 6am**
- Exercise
- Hormones (progesterone raises body temp)
- Stress
- Environment

❖ Alterations in Body Temperature

- **Pyrexia/Hyperthermia/Fever**
- ✓ Body temperature is above the usual range
- **Hyperpyrexia**
- ✓ Very high fever, 41°C (105.8°F) and above
- **Hypothermia**
- ✓ Core body temperature is below the lower limit of normal
- ✓ May be caused by excessive heat loss, inadequate heat production or impaired hypothalamic thermoregulation

❖ Types of Fever

- **Intermittent fever** - body temperature alternates at regular intervals between periods of fever and normal or subnormal temperature
- **Remittent fever** - wide range of temp fluctuations more than 2°C for over 24 hrs, all of which are above normal
- **Relapsing fever** - short febrile periods of a few days are interspersed with periods of 1-2 days of normal temperature
- **Constant fever** - body temperature fluctuates minimally but always remains above normal.
- **Fever spike (Staircase)** —temperature rises to fever level rapidly following a normal temperature then returns to normal within a few hours

ASSESSING BODY TEMPERATURE

❖ Oral

- ✓ Considered to be the most convenient and most accessible
- ✓ Wait for 30 mins. before taking oral temperature if the client has taken cold or hot drinks/food or smoked
- ✓ Contraindicated to patients with;
- ✓ Oral lesions/ surgery
- ✓ Dyspnea
- ✓ Cough
- ✓ Nausea and vomiting
- ✓ Presence of oro-nasal pack, NGT, ET
- ✓ Seizure prone
- ✓ Very young children
- ✓ Unconscious
- ✓ Restless, disoriented, confused
- Clean the thermometer before use (from bulb to stem), and after use (from stem to bulb)
- Place the bulb of the thermometer on either side of the frenulum
- Take oral temperature for 2-3 mins.
- Normal range: 36°C to 37.5°C

❖ Rectal

- Considered to be very accurate
- Contraindicated to patients with:
 - Anal or rectal conditions/surgery
 - Diarrhea
 - Quadriplegia and Myocardial Infarction
- Wear clean gloves and assist the client to assume lateral/sim's position
- Lubricate thermometer before insertion
- Instruct the client to take a slow deep breath during insertion
- Never force the thermometer if resistance is felt
- Insert 15 cm (6 in.) in adults and 11 cm for children
- Hold the thermometer in place for 2 mins.
- Normal range: 36°C to 37.8°C

❖ Axillary

- Safest and non-invasive
- Pat dry the axilla. Rubbing causes friction that may increase surface temperature
- The bulb is placed in the center of the axilla
- Place the arm tightly across the chest to keep the thermometer in place and leave it for 9 mins.

❖ Tympanic membrane

- Frequent site for estimating core body temperature
- Pull pinna back and upward (adults)
- Supine, head stabilized; pull pinna straight back and slightly downward for children <3 y/o
- Put child on adult's lap; pull pinna straight back and upward for children >3 y/o
- Point the probe slightly anteriorly, toward the eardrum
- Insert the probe slowly using a circular motion until snug

Conversion of Fahrenheit to Centigrade

- $5/9 (°F - 32) = °C$

Conversion of Centigrade to Fahrenheit

- $(°C \times 9/5) + 32 = °F$

TEPID SPONGE BATH (TSB)

- ❖ When will you start TSB? If there is 1°C to 2°C increase in body temperature
- ❖ Temperature of water: 32°C
- ❖ How to apply: Done by patting
 - Rationale: To avoid friction, which increases temperature
- ❖ Do NOT use ALCOHOL when applying TSB
 - Rationale: Alcohol dries the skin and leads to irritation

PULSE

- ❖ Wave of blood created by contraction of the left ventricle of the heart
- ❖ Cardiac output is the volume of blood pumped into the arteries by the heart. Normal CO is 5 L of blood per minute
- ❖ $CO = \text{Stroke Volume} \times \text{Heart Rate}$
- ❖ Factors Affecting the Pulse
 - Age
 - Gender (male < female)
 - Exercise
 - Fever
 - Medications
 - Hypovolemia
 - Stress
 - Position changes
 - Pathology
- ❖ Pulse Sites
 - **Temporal**- used when radial pulse is not accessible
 - **Carotid**- used during cardiac arrest and
 - **Radial**- readily accessible

- **Apical**- routinely used for infants and children up to 3 y/o
- **Brachial**- used to measure BP and used during cardiac arrest in infants)
- **Femoral**- used in cardiac arrest/shock and determine leg circulation)
- **Popliteal**- used to determine circulation on the lower leg
- **Posterior tibia and Dorsal Pedal**- used to determine circulation to the foot

Assessment of the Pulse

- ❖ **Pulse Rate**
 - Normal pulse rate for adult is 60-100 beats/min
 - Tachycardia- excessively fast heart rate (over 100 beats/min)
 - Bradycardia- heart rate in adult that is less than 60 beats/min
- ❖ **Rhythm**
 - The pattern of the beats and the intervals between beats.
 - Irregular rhythm is referred to as dysrhythmia or arrhythmia
- ❖ **Pulse Volume (Amplitude)** — force of blood with each beat
 - A **normal pulse** can be felt with moderate pressure of the fingers
 - **Full bounding pulse** is a forceful volume that is obliterated with difficulty
 - A pulse that is readily obliterated with pressure from fingers is referred to as weak or thready
- ❖ **Arterial Wall Elasticity**
 - A healthy, normal artery feels straight, smooth, soft and pliable
- ❖ **Pulse Deficit**
 - Discrepancy between the apical and radial pulse
- ❖ **Scale in Pulse Assessment**
 - 0 - Absence or cannot be felt
 - 1+ - Weak or thread
 - 2+ - Normal
 - 3+ - Bounding

RESPIRATIONS (The Act of Breathing)

- ❖ **Involves three processes:**
 - **Ventilation**- movement of air in and out of the lungs
 - ✓ Inhalation (inspiration)
 - ✓ Exhalation (expiration)
 - **Diffusion**- exchange of gases from higher pressure to an area of lower pressure. It occurs at the alveolocapillary membrane
 - Perfusion-availability and movement of the blood for transport of gases. Nutrients and metabolic waste products
- ❖ **Two types of Breathing**
 - **Costal (thoracic)**- involves the external intercostal muscles and other accessory muscles
 - **Diaphragmatic** (abdominal)- involves the contraction and relaxation of the diaphragm
- ❖ **Respiratory center**
 - **Medulla Oblongata**- primary respiratory center. CO₂ is the primary chemical stimuli for breathing
 - **Pons** contains pneumotaxic center that is responsible for rhythmic quality of breathing, and apneustic center that is responsible for deep prolonged inspiration
 - **Carotid and Aortic Bodies** contains peripheral chemoreceptors that are sensitive to O₂ and CO₂ level in the blood
- ❖ **Assessing Respirations**
 - Normal rate is 12-20 breaths/min
 - Depth is observed through the movement of the chest and describe. as normal, deep or shallow
 - Rhythm refers to the regularity of the expirations and inspirations
 - Quality or character refers to respiratory effort and sound of breath
- ❖ **Factors Affecting Respiratory Rate**
 - Exercise
 - Stress
 - Environment
 - Increased altitude
 - Medications

TERMINOLOGIES

- ❖ **Tachypnea**- quick, shallow breaths (>20cpm)
- ❖ **Bradypnea**- abnormally slow breathing (<12cpm)
- ❖ **Apnea**- cessation of breathing
- ❖ **Hyperventilation**- rapid, deep breathing
- ❖ **Hypoventilation**- shallow respirations
- ❖ **Cheyne-Stokes**- very deep to very shallow breathing followed by temporary apnea
- ❖ **Kussmaul's**- rapid, deep and labored breathing
- ❖ **Dyspnea**- difficult and labored breathing
- ❖ **Orthopnea**- ability to breathe only in upright sitting or standing position
- ❖ **Stridor**- shrill, harsh sound heard during inspiration
- ❖ **Stertor**- snoring or sonorous respiration
- ❖ **Wheeze**- high-pitched musical squeak or whistling sound occurring on expiration
- ❖ **Bubbling**- gurgling sounds heard as air passes through moist secretions in the respiratory tract
- ❖ **Biot's (cluster) respirations** - Shallow breaths interrupted by apnea

BLOOD PRESSURE (BP)

- ❖ Pressure exerted by blood as it flows through the arteries
- ❖ **Systolic pressure**: BP as a result of ventricular contraction
- ❖ **Diastolic pressure**: BP when ventricles are at rest
- ❖ **Pulse pressure**: difference between systolic and diastolic pressure
- ❖ **Hypertension**- blood pressure that is persistently above normal
- ❖ **Hypotension**- blood pressure that is below normal
- ❖ **Orthostatic Hypotension**- blood pressure that falls when the client sits or stands

Determinants of BP

- **Pumping Action of the Heart**- when the pumping action of the heart is weak, the BP decreases
- **Peripheral Vascular Resistance**- peripheral resistance can increase BP
- **Blood Vessel Diameter** – decreased blood vessel diameter (vasoconstriction) can increase BP
- **Blood Volume**- when blood vol. decreases, BP decreases
- **Blood Viscosity**- BP increases when blood is viscous

Factors Affecting BP

- Age
- Exercise
- Stress
- Race
- Disease process
- Gender
- Medications
- Obesity
- Diurnal variations

Classification of Blood Pressure

CATEGORY	SYSTOLIC BP MMHG	DIASTOLIC BP MMHG
Normal	<120 and	<80
Prehypertension	120-139 or	80-89
Hypertension, stage 1	140-159 or	90-99
Hypertension, stage 2	>160 or	>100

Korotkoff's Sound

- Phase 1: first faint, clear tapping or thumping sounds are heard
- Phase 2: heard sounds have a muffled, whooshing or swishing sound quality
- Phase 3: sounds become crisper and more intense, softer thumping sound
- Phase 4: sound become muffled and have a soft, blowing quality
- Phase 5: period of silence

ASSESSING BLOOD PRESSURE

- ❖ Ensure the equipment's needed. Use appropriate size of BP cuff
- ❖ Ensure that the client has rested. Allow 30 mins to pass if the client had engaged to exercise, had smoked or ingested caffeine before taking BP.
- ❖ Position the client in sitting or supine position

- ❖ Position the arm at the level of the heart, left arm is preferably used
- ❖ Wrap the cuff evenly around the upper arm, 1 inch above the antecubital space
- ❖ Determine palpatory BP first before auscultatory BP
- ❖ Position the stethoscope appropriately
- ❖ Inflate the cuff until sphygmomanometer reads 30 mmHG above the point where the brachial pulse disappeared
- ❖ Release the valve of the cuff at the rate of 2-3mmHG per second
- ❖ As the pressure falls, identify the manometer reading at the Korotkoff's phases
- ❖ Deflate the cuff rapidly and completely
- ❖ Wait 1-2 mins before making further determinations

Errors in BP Assessment

- ✓ **False Low BP**
- ✓ Bladder cuff too wide
- ✓ Arm above level of the heart
- **False High BP**
- ✓ Bladder cuff too narrow
- ✓ Loose cuff
- ✓ Arm below the level of the heart
- ✓ Arm unsupported
- ✓ Insufficient rest

PAIN

- ❖ Pain is an unpleasant sensory and emotional experience associated with actual and potential tissue damage.
- ❖ Pain is referred to as the "fifth vital sign" (American Pain Society, 2003).

TYPES OF PAIN

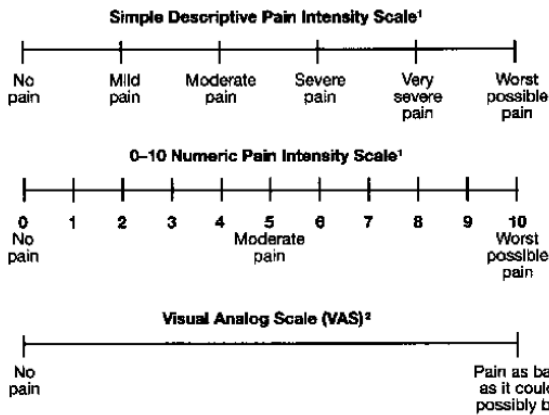
- ❖ **Acute Pain** – lasts from seconds to 6 months
- ❖ **Chronic Pain** – constant or intermittent pain that lasts for 6 months or longer.
 - Persistent, non-malignant
- ❖ **Cancer-related Pain**

CHARACTERISTICS OF PAIN (PQRST)

- ❖ **Provoking Factors**
 - What are you doing at the time of onset?
- ❖ **Quality**
 - How does the pain feel?
 - e.g., throbbing, burning, aching, stabbing
- ❖ **Radiation**
 - Where is the pain?
 - Is there pain anywhere else?
 - **Referred pain** – Pain that radiates to other areas of the body
- ❖ **Severity/Intensity**
 - Pain rating using a standard scale
 - Mild to Severe
 - Pain score: 0 to 10
- ❖ **Time**
 - How long have you had the pain?
 - Acute/Chronic

ASSESSMENT OF PAIN

- ❖ Descriptive Pain Intensity Scale
 - No Pain to Worst Possible Pain
- ❖ Numeric Pain Scale
 - 0 to 10
- ❖ Visual Analogue Scales
 - No pain to Pain as bad as it could be



❖ Faces Pain Scale

- Suitable for children to describe pain

Source: www.painbc.ca

Source: www.painbc.ca

PHYSICAL HEALTH EXAMINATION

- ❖ Conducted from head to toes (cephalo-caudal technique)
- ❖ Determine the state of awareness of the client at the beginning of the physical examination
- ❖ The most important consideration during physical examination is to prepare the client physical and psychologically
- ❖ Protect the client's privacy during the entire procedure. Invasive procedures cause feelings of embarrassment
- ❖ Prepare the needed articles and equipment before the start of the procedure to conserve time, effort, and prevent fatigue in the client

Modes of Examination

- **Inspection** – assessing the patient using the sense of sight
- **Palpation** – examining the body using the sense of touch by using the fat pads of the fingers
 - ✓ Light (superficial) palpation should always precede by deep palpation
 - ✓ For light palpation, the nurse extends the dominant hand's fingers parallel to the skin surface and presses gently while moving the hand in a circle
- **Percussion** – tapping the body parts to produce sound

Percussion Sounds and Tones

SOUND	INTENSITY	QUALITY	EXAMPLE OF LOCATION
Flatness	Soft	Extremely dull	Muscle and bone
Dullness	Medium	Thud-like	Liver and Heart
Resonance	Loud	Hollow	Normal lung
Hyper resonance	Very loud	Booming	Emphysematous lung
Tympany	Loud	Musical	Stomach filled with gas (air)

- ❖ **Auscultation** — listening to the body sounds with the use of stethoscope

Normal Breath Sounds

Type	Description
Vesicular	Soft-intensity, low-pitched, "gentle sighing" sounds created by air moving through smaller airways (bronchioles and alveoli)
Broncho- vesicular	Moderate-intensity and moderate-pitched "blowing" sounds created by air moving through larger airway (bronchi)
Bronchial (tubular)	High pitched loud, "harsh" sounds created by air moving through the trachea

POSITIONS

- ❖ **Dorsal recumbent** - Back lying position with knees flexed and hips externally rotated (examines head and neck, axillae, anterior thorax, lungs, breasts, heart, abdomen, extremities, peripheral pulse, vital signs and vagina)
- ❖ **Dorsal (supine)** - Back lying position with legs extended (examines head and neck, axilla, anterior thorax, lungs, breasts, heart, extremities, peripheral pulse)
- ❖ **Sitting** - Seated position; back unsupported and leg hanging freely (Head and neck, axillae, anterior and posterior thorax, lungs, breasts, heart, vital signs, upper and lower extremities, reflexes)

- ❖ **Lithotomy** - Back lying position with feet supported in stirrups, hips in line with edge of the table (examines female genitals, rectum and female reproductive tract)
- ❖ **Sim's** - Side lying with lowermost arm behind the body and uppermost leg flexed (examines rectum and vagina)
- ❖ **Prone** - Face-lying position, with or without a small pillow (examines posterior thorax)

Special Nursing Consideration

- ❖ The sequence of methods for physical examination is as follows: (IPPA)
 - Inspection
 - Palpation
 - Percussion
 - Auscultation
- ❖ The sequence for examination of the abdomen is as follows: (IAPePa)
 - Inspection
 - Auscultation
 - Percussion
 - Palpation
- ❖ Palpate the painful quadrant of the abdomen last
- ❖ No abdominal palpation among clients with tumor of the liver or kidneys
- ❖ During abdominal examination, it is important to flex the knees to relax the abdominal muscles
- ❖ The sequence of examining the abdomen is as follows; right lower quadrant → right upper quadrant → left upper quadrant left lower quadrant
 - The best position when examining the chest is sitting/upright
 - The best position when examining the back standing position
 - To palpate the neck for lymphadenopathy or thyroid gland enlargement, the nurse stands behind the client
 - If ophthalmoscopy is done, darken the room for illumination
 - If a female client is examined by a male, female nurse must be in attendance to ensure that the procedure is done in ethical manner

SKIN CARE

- ❖ **Common Problems of the skin**
 - **Abrasion**
 - ✓ Superficial layers of the skin are scrapped or rubbed away
 - ✓ Area appears red or with localized bleeding or serous weeping
 - ✓ Should be kept clean and dry
 - **Excessive dryness**
 - ✓ Skin is scaly and rough
 - ✓ Encourage the client to increase oral fluid intake
 - ✓ Apply moisturizing cream or lotion and avoid using of alcohol
- **Acne**
 - ✓ Inflammatory condition of the skin which occurs in and around the sebaceous gland
 - ✓ Avoid food with high fat content and reduce emotional stress and anxiety
 - ✓ Avoid pricking or squeezing of pimples
- **Erythema**
 - ✓ Redness of the skin which may be associated with rashes, exposure to sun and elevated body temperature
 - ✓ Wash the skin thoroughly to minimize the microorganism
 - ✓ Apply antiseptic spray or lotion to relieve pruritus
- **Hyperhidrosis** is excessive perspiration
- **Bromhidrosis** is foul-smelling perspiration
- **Vitiligo** are patches of hypo pigmented skin caused by destruction of melanocytes in the area

TYPES OF SKIN LESION

- ❖ **Primary**
 - **Macule** — flat, circumscribed area of color with no elevation; <1cm (Freckles)
 - **Patch** — same as macule but >1 cm, port wine birth mark)

- **Papule** — circumscribed elevation, <0.5 cm diameter (nevus, acne)
- **Plaque** — same as papule but >0.5cm)
- **Nodule** — solid mass that extends into the dermis (pigmented)
- **Tumor** — solid mass larger than nodule
- **Vesicle** — circumscribed elevation serous fluid or blood <1cm blister. chicken pox)
- **Bulla** — large fluid filled sac
- **Pustule** — vesicle or bulla filled with past
- **Wheal**— elevated, localized, collection of edema fluids
- **Cyst** — elevated, thick-wall lesions containing fluid or semisolid matter
- **Telangiectasia**- dilated capillary with fine purplish lines
- **Petechiae** — pinpoint red spots

❖ Secondary scale

- **Scale** — thickened epidermal cells that take off
- **Crust** — dried serum or pus on the skin surface
- **Erosion** — loss of all parts of the epidermis
- **Excoriation** — superficial linear or hallowed out rust area exposing dermis. Ex. Scratch
- **Atrophy** — decrease in the volume of epidermis
- **Scar** — formation of connective tissue
- **Ulcer** — an excavation extending in to dermis or below

BED BATH

❖ Purpose of bed bath

- Remove microorganisms, body secretions and excretions and dead skin cells
- Improve circulation
- Promote relaxation and comfort
- Prevent or eliminate body odor and promote self-esteem
- Promote sense of well being
- Assess client's skin and body parts
- Provide activity and exercise

❖ Guidelines during bed bath

- Inform the client and explain the procedure
- Provide privacy
- Turn off electric fan or air con to prevent chilling
- Encourage to void before the procedure
- Place the bed in flat position if permissible
- Move the client to one side of the bed
- Remove the patient's gown and cover patient with bath blanket
- Use warm water (110-115°F)
- Make bath mitt with the wash cloth
- Wash the body parts as follows;
 - ✓ Eyes, face, ears, neck
 - ✓ Farther arm
 - ✓ Nearer arm
 - ✓ Hands
 - ✓ Chest and abdomen
 - ✓ Farther leg
 - ✓ Nearer leg
 - ✓ Feet
 - ✓ Back and buttocks
 - ✓ Perineum
- Wash and dry one body part at a time
- Rinse soap thoroughly
- May apply cream, lotion or powder on the skin
- Change gown and do bed making
- Do after care of the equipment and articles Document relevant data

Considerations when bathing a client in bed:

- ✓ Cleanse eyes with water only, wiping from inner to outer cantus. Use separate corner of mitt for each eye
- ✓ Determine if client would like to use soap on face
- ✓ Wash, rinse and dry the arms and legs using long, firm strokes from distal to proximal areas
- ✓ Assess bath water temperature (43°C to 46°C) using dorsal part of the hand or elbow and change water as necessary

PRESSURE ULCER

- ❖ Any lesion caused by unrelieved pressure that result in damage to underlying tissues
- ❖ **Risk Factors**

- Friction and shearing
- Immobility
- Inadequate nutrition
- Fecal and urinary incontinence
- Decreased mental status
- Diminished sensation
- Excessive body heat
- Advanced age
- Chronic medical conditions

- ❖ **Stages of Pressure Sore Formation**

Stage I — non-blanchable erythema of intact skin

Stage II — partial thickness skin loss involving epidermis and possible dermis (abrasion, blister or shallow crater)

Stage III — full-thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through underlying fascia. Ulcer presents a deep crater

Stage IV — full-thickness skin loss with extensive destruction, tissue necrosis or damage to muscles, bone or supporting structures such as tendon or joint capsule

- ❖ **Prevention of Pressure Ulcers**

- Provide adequate and balanced nutrition
- Clients should be assisted to take at least 2500 ml of fluids a day unless contraindicated
- Provide sufficient protein, vit. A, B1, B5, C and zinc
- Provide smooth, firm and wrinkle free foundation on which client sits or lies
- Reduce shearing force by elevating the bed not more than 30 degrees
- Never use baby powder and cornstarch in preventing friction
- Apply cream or lotion on dry skin and protective films such as transparent dressing and alcohol free barrier films
- Avoid massage over bony prominences
- Change position every 15 mins to 2 hours
- Use lifting devices such as trapeze in lifting a patient instead of dragging
- Keep the skin clean and dry
- Ongoing assessment for early Signs and symptoms of pressure sores

- ❖ **Treatment of Pressure Ulcers**

- Minimize direct pressure on the ulcer
- Clean the ulcer with every dressing change, hydrocolloid dressing is used
- Clean and dress the ulcer using surgical asepsis
- Obtain a sample of drainage for culture and sensitivity
- Gently cleanse the wound using alcohol-free cleanser. Do not use hydrogen peroxide
- Black wounds requires debridement

- ✓ **Sharp debridement** uses scalpel to separate and remove dead tissues
- ✓ **Mechanical debridement** uses moist-to-moist dressing
- ✓ **Chemical debridement** uses collagenase enzyme agents
- ✓ **Autolytic debridement** uses dressings that contains wound moisture

ADMINISTRATION OF MEDICATIONS

- ❖ Before giving any medication, the nurse must:
 - Know the drugs prescribed dose, methods of administration, actions, expected therapeutic effect, possible interactions with other drugs and adverse effects.
 - Know and use the institution's administration procedures for the client's welfare and nurse's legs, protection.
 - Review the physician's order for completeness: the client's name, date of the order, name of the drug, dose, route, time of administration, and the physician's signature.
 - Discuss the medication and its actions with the client; re-check the medication order if the client disagrees with the dose.
 - Check the physician's order against the client's medication administration record (MAR) for accuracy.
- ❖ To ensure the client's safety, the nurse adheres to the Ten Rights of medication administration:
 - Right drug
 - Right dose
 - Right client
 - Right route
 - Right time
 - Right documentation
 - Right approach
 - Right to know about the drug
 - Right to refuse
 - Right drug history
- ❖ Commonly used administration route are oral (usually absorbed in the GIT), topical (applied to the skin or mucous membranes), and parenteral (administered by injection with a needle).
- ❖ Medication can also be instilled into the eye or ear or administered by suppository.
- ❖ Medication may be given on a regular schedule, as a one-time dose, or as needed

Essential parts of Drug Order

- Full name of the client
- Date and time the order is written
- Name of the drug to be administered
- Dosage of the drug
- Frequency of administration
- Route of administration
- Signature of the person writing the order

Types of Medication Action

- Therapeutic Effect: Primary effect
- Side effect
 - ✓ Secondary effect - Predictable, maybe harmless or potentially harmful
- ❖ Adverse effect: More severe side effect and may justify the discontinuation of the drug
- ❖ Toxic effect results from over dosage, or buildup of the drug in the blood because of impaired metabolism or excretion
- ❖ Idiosyncratic effects — unexpected and maybe individual to a client
- ❖ Allergic Reaction: Immunologic reaction

TYPES OF MEDICATION ORDER:

- ❖ **Stat** - An order for a single dose of medication to be given immediately
- ❖ **Single Dose** – medication to be given once at a specified time
- ❖ **Standing Order** – may or may not have termination date may be carried out indefinitely until an order is written to cancel it or may be carried out for a specified number of days
- ❖ **PRN** – permits the nurse to give a medication. When, in the nurse's judgment, the client requires it

ROUTES OF DRUG ADMINISTRATION

- ❖ **ORAL**
 - Considered to be the most convenient, usually less expensive, and safe because skin is not broken
 - Disadvantages includes:
 - ✓ Drugs may have unpleasant taste
 - ✓ Inappropriate to client with nausea and vomiting and cannot swallow Drugs may stain the teeth

- ✓ Drug may irritate the gastric mucosa
- ✓ Drugs may be aspirated by seriously ill patient

❖ Never crush enteric coated or sustained release tablets

Drug forms for oral administration:

- ✓ **Solid** – capsules, pills, tablets or powder
- ✓ **Liquid** – syrup, suspension, emulsion, elixir,
 - Syrup – sugar based liquid medication
 - Suspension – water-based liquid medication, shake the bottle before use
 - Emulsion- oil-based Medication
 - Elixir - alcohol-based medication, allow 30 mins to elapse

❖ **SUBLINGUAL**

- Drug that is placed under the tongue where it is dissolved
- Drug is rapidly absorbed
- If swallowed, may be inactivated by the gastric juice

❖ **BUCCAL**

- Medication is held in the mouth against re mucus membrane of the cheek until the drug is dissolved
- Medication should not be chewed, swallowed or placed under the tongue
- Swallowed drug may be inactivated by the gastric juices

❖ **TROPICAL**

- Application of the medication to a circumscribed area of the body
- Dermatologic preparation – applied to the skin
- Instillation and immigration- applied into the body cavities or orifices such urinary bladder, eyes, ears, nose, rectum and vagina
- Inhalations- administrated in the respiratory tract by a nebulizer or positive pressure breathing apparatus

❖ **Parenteral**

- Administration of medication via needle
- Routes are as follows:
 - ✓ **Subcutaneous** – into the subcutaneous tissue, just below the skin
 - ✓ **Intramuscular** – into the muscle
 - ✓ **Intradermal** – under the epidermis (into the dermis)
 - ✓ **Intravenous** – into a vein
 - ✓ **Intra-arterial** – into to artery
 - ✓ **Intracardiac** – into the heart muscle
 - ✓ **Intraosseous** – into a bone
 - ✓ **Intrathecal** – into spinal canal
 - ✓ **Epidural** – into epidural space
 - ✓ **Intrapleural** – into the pleural space

❖ **Intradermal Injection**

- Administration of the drug into the dermal layer of the skin beneath the epidermis
- The sites are the inner lower arm, upper chest and back, beneath the scapulae, and buttocks
- Indicated for allergy and tuberculin testing and for vaccinations
- Use needle gauge #25-27 that is 1/4 to 5/8 inch long
- Needle at 10 to 15 degree angle level up
- Inject a small amount of drug slowly to form a wheal or bleb
- Do not massage the site of injection

❖ **Subcutaneous Injection**

- Drugs that are administered Subcutaneously are vaccines, preoperative medications, narcotics, insulin, heparin
- Sites are the outer aspects of the upper arm, anterior aspect of the thighs, abdomen, scapular area of the upper back, and buttocks
- Rotate sites of injection to minimize tissue damage
- Gauge 25, 5/8 inch needle is used for adults of normal weight and is injected at 45 degree angle
- 3/8 inch needle is used at 90degree angle for obese patients
- A child may need 1/2 inch needle and is inserted at 45 degree angle
- For insulin injection, do not massage to prevent rapid absorption

❖ Intramuscular injection

- Needle length is 1, 1 1/2 inches
- Use needle gauge 20,21,22,23 depending on the type of muscle and age of the client
- Do not inject on injured tissues, or in area where nodules, lumps, abscesses, tenderness or other pathology are present
- Avoiding hitting the major blood vessels bone or sciatic nerve to prevent complications
- Sites of injection are dorsogluteal, deltoid, ventrogluteal, vastus lateralis and rectus femoris
- Vastus lateralis is the site of choice for IM injections for infants 1 year and younger

❖ Intravenous Medication

- Medication enters the client's bloodstream directly by way of vein
- It is appropriate when medications are too irritating to tissues to given by other routes
- Observe reaction
- It can be given through the ff method:
 - ✓ Large volume infusion of IV fluids
 - ✓ Intermittent IV infusion (piggyback)
 - ✓ Volume controlled infusion
 - ✓ IV push or bolus
 - ✓ Intermittent injection ports

❖ Calculating Dosages

- **Oral Medication: solid**

$\frac{\text{Desired dosage}}{\text{Stock dosage}} = \text{quantity of drugs}$

- **Oral/ parenteral Medication: liquids**

$\frac{\text{Desire dose} \times \text{dilution}}{\text{Stock dose}} = \text{quantity of drugs}$

- **Pediatric Doses
(Clark's rule)**

$\frac{\text{Wt. in lbs.} \times \text{usual adult dose}}{150} = \text{safe child dose}$

(Fried's rule)

$\frac{\text{Age in mos.} \times \text{usual adult dose}}{150} = \text{child's dose (CD)}$

(Young 's rule)

$\frac{\text{Age in years}}{\text{Age in years} + 12} \times \text{usual adult dose} = \text{CD}$

PREPARING MEDICATIONS FROM AMPULES

- ❖ Check the medication order
- ❖ Check the label of the ampule carefully against the MAR to make sure that correct medication is being prepared
- ❖ Follow the three checks for administering medications. Read the label on medication (1), when it is taken from the cart (2), before withdrawing the medication and (3) after withdrawing the medication
- ❖ Check for expiration date
- ❖ Perform hand hygiene
- ❖ Flick the upper stem of the ampule several times
- ❖ Use an ampule opener or place a piece of sterile gauze or alcohol wipe between your thumb and the ampule neck or around the ampule neck and break off the top by bending it toward you to ensure the ampule is broken away from yourself and away from others
- ❖ Place the ampule on a flat surface
- ❖ Insert the needle into the center of the ampule. Hold the ampule slightly on its side if necessary to obtain more than the ordered amount of medication
- ❖ Replace the filter needle with a regular needle, tighten the cap at the hub of the needle and push solution into the needle

PREPARING MEDICATIONS FROM VIAL

- ❖ Perform hand hygiene
- ❖ Mix the solution if necessary by rotating the vial between palms of the hands, not by shaking
- ❖ Remove the protective cap and clean the rubber cap with antiseptic wipes by rubbing it in circular motion
- ❖ Attach a filter needle to draw up premixed liquid medications from multi dose vials
- ❖ Draw up into the syringe the amount of air equal to the volume of the medication to be withdrawn
- ❖ Insert the needle into the upright vial through the center of the rubber cap
- ❖ Inject the air into the vial keeping the bevel of the needle above the surface of the medication
- ❖ Withdraw the prescribed amount of medication using either of the following:
 - Hold the vial down, move the needle tip so that it is below the fluid level and withdraw the medications. Avoid drawing up the last drop of the vial, or
 - Invert the vial, ensure the needle tip is below the fluid level; and gradually withdraw the medication
- ❖ Hold the syringe and vial at eye level to determine that the correct dosage of drug is drawn into the syringe. Eject air remaining at the top of the syringe into the vial
- ❖ When the correct volume of medication plus a little more (eg. 0.25 ml) is obtained, withdraw the needle using the scoop method, thus maintaining its sterility
- ❖ If necessary, tap the syringe barrel to dislodge any air bubbles present in the syringe
- ❖ If giving injection, replace the filter needle, if used, with a regular or safety needle of the correct gauge and length

MIXING MEDICATIONS USING ONE SYRINGE

- ❖ Check the medication administrative record
- ❖ Perform hand hygiene
- ❖ Prepare the medication ampule or vial for drug withdraw
- ❖ Inspect the appearance of the medication for clarity
- ❖ If using insulin, thoroughly mix the solution in each vial prior administration
- ❖ Clean the tops of vial with antiseptic swabs
- ❖ **Mixing medication from two vials**
 - Take the syringe and draw up a volume _ of air equal to the volume of medications to be withdrawn from both vials A and B
 - Inject a volume of air equal to the volume of medication to be withdrawn into vial A. Make sure the needle does not touch the solution
 - Withdraw the needle from vial A and inject the remaining air into vial B
 - Withdraw the required amount of medication from vial B
 - Using a newly attached sterile needle, withdraw the required amount of medication from vial A. Avoid pushing the plunger as that will introduce medication B into vial A
- ❖ **Mixing medication from one vial to one ampule**
 - Prepare and withdraw the medication from the vial because ampules do not require addition of air prior to withdrawal
 - Withdraw the required amount of medication from the ampule
- ❖ **Mixing insulin's**
 - Inject 30 units of air into the NPH vial and withdraw the needle (there should be no insulin in the needle) The needle should not touch the insulin
 - Inject 10 units of air into regular insulin vial and immediately withdraw 10 units of regular insulin and **always withdraw regular insulin first**
 - Reinsert the needle into the NPH insulin vial and withdraw 30 units of NPH insulin

PARENTAL FLUID AND ELECTROLYTE REPLACEMENT

- ❖ IV fluid therapy is essential when client s are unable to take food and fluids orally
- ❖ An efficient and effective method of supplying fluids directly into the intravascular fluid compartment and replacing electrolyte losses
- ❖ **Types of intravascular solution**
 - Isotonic solution – often used to restore vascular volume

- ✓ 0.9% NaCl (normal saline)
- ✓ Lactated ringer's (balance electrolyte solution)
- ✓ 5 % dextrose in water (D5W)
- Hypotonic solution- have a lesser concentration of solutes
 - ✓ 0.45% NaCl (half normal saline)
 - ✓ 0.33 % NaCl (one-third normal saline)
- Hypertonic solution- have greater concentration of solutes than plasma
 - ✓ 5 % dextrose in normal saline (D5NS)
 - ✓ 5% dextrose in 0.45 % NaCl (D5 ½ NS)
 - ✓ 5 % dextrose in lactated ringers (D5LR)
- Lactate is metabolized in the liver to form HCO₃ (Bicarbonate, an alkaline compound)
- Saline and balanced electrolytes are commonly used to restore vascular volume particularly after trauma or surgery
- Lactated ringer's is an alkalinizing solution that maybe given to treat metabolic acidosis
- Volume expanders are used to increase the blood volume following severe blood loss or loss of plasma. Examples are dextran, plasma and albumin

Venipuncture sites

- Site chosen for venipuncture varies with the client's age, length of time of infusion, type of solution, and the condition of the veins
- For adults, veins in the arm and hand are commonly used
- For infants, veins in the scalp and dorsal foot are often used
- Larger veins are preferred for infusions that need to be given rapidly and solutions that could be irritating
- Metacarpal, basilic and cephalic veins are commonly used for intermittent or continuous infusions
- Central venous catheter is inserted when long term IV therapy or parenteral nutrition or Iv medications that are damaging to the vessels are given

Guidelines in Vein Selection

- Use distal veins of the arms first
- Use the client's non-dominant hand/arm whenever possible
- Select a vein that is:
 - ✓ Easily palpated and feels soft and full
 - ✓ Naturally splinted by bone
 - ✓ Large enough to allow adequate circulation around the catheter
- Avoid using veins that are:
 - ✓ In areas of flexion
 - ✓ Highly visible because they tend to roll away from the needle
 - ✓ Damaged by previous use, phlebitis, infiltration or sclerosis
 - ✓ Continually distended by blood or knotted or tortuous
 - ✓ In a surgically compromised or injured extremities

INTRAVENOUS EQUIPMENT

- ❖ Solution containers are available in various sizes (50, 100, 250, 500, 1000 ml) and smaller containers are usually used to administer medications
- ❖ Solution must be sterile and in good condition that is, clear
- ❖ Cloudiness is evidence that the solution is already contaminated
- ❖ Check the expiration date of the solution

Infusion sets

- Insertion spike is kept sterile and inserted into the solution container
- Drip chamber permits a predictable amount of fluid to be delivered
- Roller valve or screw clamp compresses the lumen of the tubing controls the flow rate
- Protective cap maintains the sterility of the end of the tubing
- Most infusion sets include one or more injection ports for administering IV medications or secondary infusions
- Over the needle (angiocath) are commonly used for adults. Plastic catheter fits over a needle used to pierce the skin and the vein wall. Once inserted to the vein, the needle is withdrawn and discarded
- Butterfly or wing-tipped needles with plastic flaps which hold needle tightly together to secure it during insertion

COMPUTATION OF INTRAVENOUS INFUSION

Drops per minute

$$\frac{\text{Total infusion volume (mL)} \times \text{drop factor}}{\text{Total Time of infusion (hours)} \times 60 \text{ min}}$$

Milliliters per minute

$$\frac{\text{Total infusion volume (mL)}}{\text{Total infusion time (min)}} = \text{mL/min}$$

COMPLICATIONS OF IV INFUSION

- ❖ **Infiltration** — needle is out of the vein and fluids accumulate in the surrounding tissues

Signs:

- ✓ Swelling
- ✓ Coldness, Pallor
- ✓ Pain around infusion site

Management:

- ✓ Disconnect the IV infusion and restart at a different site
- ✓ Limit the movement of the extremity

- ❖ **Circulatory overload** — results from administration of excessive volume of IV fluids

Signs:

- ✓ Engorged neck veins
- ✓ Hypertension
- ✓ Dyspnea

Management:

- ✓ Slow the rate of the infusion
- ✓ Notify the doctor
- ✓ Monitor V/S and rate of intravenous fluid

- ❖ **Superficial thrombophlebitis** — due to overuse of a vein, irritating solutions or drugs, clot formation or large bore catheters

Signs:

- ✓ Local tenderness
- ✓ Acute tenderness
- ✓ Redness, warmth Slight edema of the vein above the insertion site

Management:

- ✓ Discontinue the infusion immediately
- ✓ Apply warm, moist compress to the affected site
- ✓ Avoid further use of the vein
- ✓ Restart the infusion at a different site

- ❖ **Air Embolism** — air manages to get into the circulatory system

Management:

- ✓ Position the patient on left side lying
- ✓ Notify the physician especially if the patient experiences sudden pain or difficulty of breathing

- ❖ **Infection** — invasion of pathogenic organisms into the body

Signs:

- ❖ Fever, malaise, pain
- ❖ Swelling at the site of infusion
- ❖ Discharge at the IV insertion site

Management:

- ✓ Use aseptic technique when starting an infusion
- ✓ Change the dressing regularly
- ✓ Always wash hands before handling the tubing
- ✓ Administer antibiotic as ordered

- ❖ **Speed shock** — may result from administration of IV push medications rapidly

Signs:

- ✓ Pounding headache
- ✓ Fainting, chills
- ✓ Rapid pulse rate, back pains

- ✓ Apprehension, dyspnea

Management:

- ✓ Refer to the physician and monitor V/S and rate of infusion
- ✓ Use proper tubing specially to all pediatric clients

BLOOD TRANSFUSION

- ❖ Introduction of whole blood or blood Components in o the venous circulation

Blood Products for Transfusion

Product	Use
Whole blood	For extreme cases of acute hemorrhage
Packed RBC	Used to increase oxygen-carrying capacity of the blood
Autologous RBC	Used for blood replacement following planned elective surgery
Platelets	Used in clients with bleeding disorders or platelet deficiency
Fresh frozen plasma	Expands blood volume and provides clotting factor
Albumin and plasma protein fraction	Blood volume expanders and provides plasma protein
Clotting Factors and cryoprecipitate	Used for clients with clotting factor deficiencies

ADMINISTERING BLOOD

- ❖ When BT is ordered, obtain the blood from the bank before starting the infusion
- ❖ Once blood/blood product is removed from the refrigerator, there is limited amount of time to administer it (e.g. Packed RBC should not hang for more than 4 hours after being removed from the ref)
- ❖ Verify that the unit is correct
- ❖ Blood is usually administered through a #18- #20 gauge intravenous needle or catheter
- ❖ Y-type blood transfusion set with an inline or add on-filters used when administering blood.

ONLY 0.9NaCl (NSS) should be administered with blood. Dextrose + blood products will result to hemolysis

- ❖ Transfusion should be completed within 4 hours
- ❖ Blood tubing is changed after 4-6 units per agency policy

INITIATING, MAINTAINING AND TERMINATING BLOOD TRANSFUSION

- ❖ Introduce self and verify clients identity
- ❖ Explain the procedure and purpose to the client
- ❖ Instruct the client to report promptly any sudden chills, nausea, itching, rash, dyspnea, back pain, or other unusual symptoms
- ❖ Obtain the correct blood component for the client
- ❖ Check the doctors order with requisition
- ❖ Check the requisition form and the blood bag label, specifically client's name, identification number, blood type and Rh group, blood donor number and expiration date of the blood. Return outdated or abnormal blood-to-blood bank.
- ❖ With another nurse, compare the laboratory blood record with:
 - Clients name and identification number
 - Serial number on the blood bag label
 - ABO group and Rh type on the blood bag label
 - Expiry date
- ❖ Make sure that blood is left at room temperature for no more than 30 minutes before starting the infusion
- ❖ Verify the client identity
- ❖ Set up the infusion set
 - Ensure that the blood filter inside the drip chamber for the blood components to be transfused
 - Put on gloves
 - Close all clamps on the Y-set
 - Insert spike on 0.9 % saline solution and hang the container
 - Prime the tubing
 - Start the saline tubing
 - Start the saline solution
 - Attach the blood tubing primed with normal saline to the intravenous catheter
 - Open the saline and main flow rates

- Allow a small amount of solution, to infuse to make sure there are no problems with the flow or with venipuncture
- ❖ Prepare the blood bag
 - Invert the blood bag gently several times to mix the cells with plasma
 - Expose the port on the blood bag by pulling back the tabs
 - Insert the remaining Y-set spike into the blood bag
 - Suspend the blood bag and close the upper clamp below the IV saline solution
 - Open the clamp on the blood arm of the y-set and prime the tubing
- ❖ The blood will run with saline-filled drip chamber
- ❖ Readjust the flow rate with the main clamp
- ❖ Observe the client closely for the first 5 to 15 minutes
- ❖ Run the blood slowly for the first 15 minutes at 10 drops per minute
- ❖ Note adverse reaction
- ❖ Remind the client to call a nurse immediately if any unusual symptoms are felt during transfusion
- ❖ If any reaction occurs, stop the BT and take appropriate nursing action
- ❖ Monitor the client
 - Check v/s fifteen minutes after initiating the transfusion
 - If there are no reactions, establish the required flow rate
 - Assess the clients V/S every 30 minutes or more often
 - If the blood is discontinued send the blood bag and tubing to the laboratory for investigation

Termination of the Transfusion

- ❖ Put on clean gloves
- ❖ If the primary IV is to be continued flush the maintenance line with saline solution
- ❖ Disconnect the blood tubing system and re-establish the IV infusion using new tubing
- ❖ Discard the administration set according to agency practice. Blood bag and administration set should be bagged and labelled before being sent for decontamination
- ❖ Removes gloves
- ❖ Monitor vital signs
- ❖ Follow agency protocol for appropriate disposition of the blood bag
- ❖ Document relevant data

Transfusion reaction

- ❖ **Hemolytic reaction-** incompatibility between client's blood and donor 's blood
 - Clinical manifestations: chills, fever, headache, backache, dyspnea, cyanosis, chest pain, tachycardia, hypotension
 - Nursing interventions includes:
 - ✓ Stop the transfusion
 - ✓ Maintain vascular and Access with normal saline
 - ✓ Notify the physicians immediately
 - ✓ Monitor vital signs
 - ✓ Monitor fluid intake and output
 - ✓ Send the remaining blood, blood set, sample of the client's blood to the laboratory
- ❖ **Febrile reaction** — sensitivity of the client's blood to white blood cells, platelets or plasma proteins
 - Clinical manifestations: fever, chills, warm, flushed skin, headache, anxiety, muscle pain
 - Nursing interventions
 - ✓ Stop the transfusion immediately
 - ✓ Give antipyretics as ordered
 - ✓ Notify the physician
 - ✓ KVO (keep vein open) with normal saline

Allergic reaction (mild) — sensitivity to infused plasma protein

- Clinical manifestations: flushing, itching, urticaria, bronchial wheezing
- Nursing interventions
 - ✓ Stop or slow the transfusion
 - ✓ Notify the physician
 - ✓ Administer antihistamine as ordered

Allergic reaction (severe) — antibody-antigen reaction

- Clinical manifestations: dyspnea, chest pain, circulatory collapse, cardiac arrest
- Nursing interventions
- ✓ Stop the transfusion
- ✓ KVO with NSS
- ✓ Notify the physician immediately
- ✓ Monitor V/S
- ✓ Administer medications/oxygen as ordered

Circulatory overload — blood administered faster than the circulation can accommodate

- Clinical signs: cough, dyspnea, crackles, distended neck veins, tachycardia, hypertension
- Nursing interventions:
- ✓ Place the patient upright with feet dependent
- ✓ Stop or slow the infusion
- ✓ Notify the physician
- ✓ Administer diuretics and oxygen as ordered

Sepsis — contaminated blood is administered

- Clinical signs: high fever, chills, vomiting, diarrhea, hypotension
- Nursing interventions
- ✓ Stop the transfusion
- ✓ KVO with NSS
- ✓ Notify the physician
- ✓ Administer IV fluids, antibiotic
- ✓ Obtain blood specimen for culture
- ✓ Send the remaining blood and tubing to the laboratory

ASEPSIS AND INFECTION CONTROL

❖ **Nosocomial infection**

- Associated with the delivery of health care services in a health care facility
- Can be develop during client's stay in the facility or manifest after discharge
- **Endogenous** — microorganisms that cause infection originates from the client themselves
- **Exogenous** — microorganisms that caused infection originates from the hospital environment and/personnel
- **Latrogenic infection** - direct result of diagnostic or therapeutic procedures

DISINFECTING AND STERILIZING

❖ **Disinfectant**

- Chemical preparation (phenol / iodine compounds) used on inanimate objects
- Frequently caustic and toxic to tissue

❖ **Antiseptics** are chemical preparation used on skin and tissues

- Bactericidal (destroys bacteria)
- Bacteriostatic (prevents growth & reproduction of some bacteria)

Types of Disinfection

- **Concurrent Disinfection** — On going practices that are observed in the care of the client, his supplies, his immediate environment to limit/control the spread of microorganisms
- **Terminal Disinfection** — practices to remove pathogens from the client's belongings and his/her immediate environment after his/her illness is no longer communicable

COMMONLY USED ANTISEPTICS AND DISINFECTANTS

❖ **Isopropyl and Ethyl alcohol**

- Kills bacteria, TB, fungi, virus
- Used on hands & vial stoppers

❖ **Chlorine (bleach)**

- Kills bacteria, TB bacteria, spores, fungi, virus
- Used to clean blood spills

❖ **Hydrogen peroxide**

- Kills bacteria, TB, spores, fungi, virus; used on surfaces

- ❖ **Iodophors**
 - Kills bacteria, TB, spores, fungi, virus
 - Used on equipment, intact skin & tissues (if diluted)
- ❖ **Phenol**
 - Kills bacteria, **TB**, fungi, virus; used on surfaces
- ❖ **Chlorhexidine**
 - Kills bacteria, viruses; used on hands
- ❖ **Triclosan (Bacti-stat)**
 - Kills bacteria; uses on hands, intact skin

STERILIZATION

- ❖ Process that destroys all microorganisms, including spores & viruses
- **Moist heat (steam)**
 - ✓ Steam under pressure (higher than boiling point) autoclave
 - ✓ Pressure: 15 — 17 pounds
 - ✓ Temp: 121°C — 123°C
- **Gas**
 - ✓ Use ethylene oxide
 - ✓ Has good penetration & effective for heat-sensitive items
 - ✓ Disadvantage: toxic to humans
- **Radiation**
 - ✓ UV light /rays do not penetrate deeply
 - ✓ Used to sterilize food, drugs and other items that are sensitive to heat
 - ✓ Ionizing radiation is expensive

CDC (COMMUNICABLE DISEASE CONTROL), HICPAC (HOSPITAL INFECTION CONTROL PRACTICES ADVISORY COMMITTEE) ISO STANDARD PRECAUTIONS

- ❖ Used in the care of all hospitalized persons regardless of their diagnosis or possible infection status
- ❖ Blood, all body fluids, secretions and excretions (except sweat), non-intact skin and mucous membranes
- ❖ Universal precaution + body substance isolation (BSI)
- ❖ Designed to reduce risk of transmission of microorganisms from recognized and unrecognized sources
- Wash hands after contact with blood, body fluids, secretions, excretions & contaminated objects whether or not gloves are worn
- ✓ Immediately after removing gloves
- ✓ Non- antimicrobial soap for routine hand washing
- ✓ Antimicrobial / antiseptic agent for control of specific outbreaks of infection
- Wear clean gloves when touching blood, body fluids, secretions, excretions & contaminated items (soiled gowns)
- ✓ Clean gloves can be unsterile unless their use is intended to prevent entrance of microorganism into the body
- ✓ Remove gloves before touching non - contaminated items & surfaces
- ✓ Wash hands immediately after removing the gloves
- Wear mask, eye protection, or face shield if splashes or sprays of blood, body fluids, secretions or excretions can be expected
- Wear clean, non-sterile gown to protect clothing from splashes/sprays of blood, body fluids, secretions or excretions
 - ✓ Remove a soiled gown carefully to avoid the transfer of microorganisms to others
 - ✓ Wash hands after removing the gown
- Handle client care equipment that is soiled with blood, body fluids, secretions or excretions carefully to prevent transfer of microorganism to others & environment
 - ✓ Make sure reusable equipment is
 - ✓ Cleaned and reprocessed correctly
- Dispose of single-use equipment correctly
- Handle, transport and process linen that is soiled with blood, body fluids, secretions & excretions in a manner to prevent contamination of clothing, and the transfer of microorganisms to others & environment
- Prevent injuries from used scalpels, needles, or other equipment & place in puncture-resistant containers

TRANSMISSION-BASED PRECAUTIONS

Airborne Precaution

- Clients known or suspected of having serious illnesses transmitted at a distance of more than 3 feet by airborne droplet nuclei smaller than 5 microns
- Ex: Measles (rubeola), Varicella, (including zoster), Pulmonary tuberculosis
- Use standard precaution as well as the following:
 - ✓ Place client in a private room that has a negative air pressure 6-12 air changes/hr, and either discharge of air to the outside or a filtration system for the room air
 - ✓ If a private room is NOT available, place client with another client who is infected with the same microorganism
 - ✓ Wear a respiratory device (N95 respirator) when entering the room of a client who is known or suspected of having PTB
 - ✓ Susceptible people should not enter the room of a client who has rubeola (measles) or varicella (chickenpox)
 - ✓ Limit movement of client outside the room to essential purposes. Place a surgical mask on the client during transport

❖ Droplet Precautions

- Clients known or suspected of having serious illness transmitted by particle droplets greater than 5 microns
- Example: diphtheria, mycoplasma pneumonia, pertussis, mumps, rubella, streptococcal pharyngitis, pneumonia, scarlet fever in infants & young children, pneumonic plague
- Use standard precaution as well as the following:
 - ✓ Place client in private room
 - ✓ If a private room is NOT available, place client with another client who is infected with the same microorganism
 - ✓ Wear a mask if working within 3 feet of the client
 - ✓ Limit movement of client outside the room to essential purposes. Place a surgical mask on the client

❖ Contact Precautions

- Clients known or suspected of having serious illness transmitted by direct client contact or by contact with items in the client's environment
- E.g. GI, respiratory, skin, or wound infections or colonization with multi-drug resistant bacteria, Clostridium difficile, E. coli, Shigella, Hepatitis A, RSV, herpes simplex virus, impetigo, pediculosis, scabies
- Use standard precaution as well as the following:
 - ✓ Place client in private room
 - ✓ If a private room is NOT available, place client with another client who is infected with the same microorganism
 - Wear gloves as described in Standard Precautions
 - Change gloves after contact with infectious material
 - Remove gloves before leaving client's room
 - Wash hands immediately after removing gloves. Use an antimicrobial agent
 - After hand washing, do not touch possibly contaminated surfaces or items in the room
 - ✓ Wear a gown when entering a room if there is a possibility of contact with infected surfaces or item, or if the client is incontinent, has diarrhea, a colostomy, or wound drainage not contained by a dressing
 - Remove gown in the client's room
 - Make sure uniform does not contact possible contaminated surfaces
 - ✓ Limit movement of client outside the room
 - ✓ Dedicate the use of non-critical client care equipment to a single client or to clients with the same infecting microorganisms
- For clients infected with the coronavirus that causes Severe Acute Respiratory Syndrome (SARS), Standard, Contact and Airborne Precautions are indicated

DISPOSAL OF SOILED EQUIPMENT AND SUPPLIES

- ❖ To prevent inadvertent exposure of health care workers to articles contaminated with body substance
- ❖ To prevent contamination of the environment
- ❖ **Bagging**
 - Articles contaminated with infective material such as pus, blood, body fluids, feces or respiratory secretions needs to be enclosed in sturdy bag impervious to microorganisms before they are removed from the client.
 - Uses label or bag of particular color that designates them as infective
 - Double-bagging are done if it is not sturdy and impervious to microorganisms

❖ Linens

- Handle soiled linens as little as possible and with the least agitation possible before placing it in the laundry hamper

❖ Laboratory Specimens

- Placed in a leak-proof container with a secure lid with a biohazard label

❖ Dishes

- Require no special precautions

❖ Blood pressure equipment

- Needs no special precautions unless it becomes contaminated with infective material

❖ Disposable needles, syringes and sharps

- Placed in a puncture-resistant container

✓ Color coded receptacles

- Black — non-biodegradable
- Orange — radio-active items
- Red — punctured resistant
- Green — biodegradable
- Yellow — infectious items

OXYGENATION

- ❖ Oxygen is a clear, odorless gas that constitutes approximately 21% of the air we breathe, is necessary for proper functioning of living cells.
- ❖ Absence of oxygen can lead to cellular, tissue and organ death

ALTERATIONS IN RESPIRATORY FUNCTIONS

- ❖ Hypoxia — a condition of insufficient oxygen anywhere in the body, from the inspired gas to the tissues
- ❖ Hypoxemia — refers to reduced oxygen in the blood
- ❖ Hypoventilation — inadequate alveolar ventilation
- ❖ Hypercapnia — accumulation of carbon dioxide in the blood
- ❖ Altered Breathing Pattern
- Eupnea — normal respiration
- Tachypnea — rapid rate
- Bradypnea— abnormally slow respiratory rate
- Apnea — cessation of breathing
- Kussmaul's breathing — deep, rapid breathing
- Cheyne-stokes respirations — from very deep to very shallow breathing followed by temporary apnea
- Biot's respirations — shallow breaths interrupted by apnea
- **Orthopnea** — inability to breathe except in upright or standing position
- **Dyspnea** — difficult or uncomfortable breathing

PROMOTING OXYGENATION

- ❖ Deep Breathing and Coughing
- To facilitate removal of secretions from the airways
- Coughing raises secretions high enough where the client can expectorate or swallow them
- Breathing exercises are indicated to patients with restricted lung expansion

CLIENT TEACHING ON ABDOMINAL (DIAPHRAGMATIC) AND PURSED-LIP BREATHING

- ❖ Assume a comfortable semi-sitting position or lying position in bed with one pillow
- ❖ Flex the knees to relax the muscles of the abdomen
- ❖ Place the patient's hand on abdomen just below the ribs
- ❖ Concentrate on feeling of rise/expansion of the abdomen; stay relax and avoid arching of the back
- ❖ Then purse lips as if about to whistle and breathe out slowly and gently without puffing out the cheeks
- ❖ Concentrate on feeling the abdomen fall or sink, and tighten (contract) the abdominal muscles while breathing out to enhance effective exhalation
- ❖ Use this exercise whenever feeling short of breath and increase gradually 5 to 10 minutes four times a day

CLIENT TEACHING ON CONTROLLED AND HUFF COUGHING

- ❖ Inhale deeply and hold your breath for few seconds
- ❖ Cough twice. First cough loosens the mucus, while the second expels the secretions
- ❖ For huff coughing, lean forward and exhale sharply with a "huff" sound
- ❖ Inhale by taking rapid short breaths in succession to prevent mucus from moving back into smaller airways
- ❖ Rest
- ❖ Try to avoid episodes of coughing because these may cause fatigue and hypoxemia

INCENTIVE SPIROMETRY

- ❖ Also referred to as sustained maximal inspiration devices (SMIs), measures the flow of air inhaled through the mouthpiece

Used for the following:

- Improve pulmonary ventilation
- Counteract the effects of anesthesia hypoventilation
- Loosen respiratory secretions
- Facilitate respiratory gaseous exchange
- Expand collapsed alveoli

Instructions in Using Incentive Spirometer

- Hold or place the spirometer in an upright position
- Exhale normally
- Seal the lips tightly around the mouthpiece
- ✓ Take in a slow, deep breath to elevate the balls or cylinder and then hold the breath for 2 seconds initially, increasing to 6 seconds (optimum), to keep the balls or cylinder elevated if possible
- ❖ For a flow-oriented device, avoid brisk, low volume breaths that snap the balls to the top of the chamber. Greater lung expansion is achieved with a very slow inspiration. Sustained elevation of the balls or cylinder ensures adequate ventilation of the alveoli
- ❖ If you have difficulty breathing only in the mouth, a nose clip can be used
- ❖ Remove the mouthpiece and exhale, normally
- ❖ Cough after the incentive effort. Deep ventilation may loosen secretions, and coughing can facilitate their removal
- ❖ Relax and take several normal breaths before using the spirometer again
- ❖ Repeat the procedure several times and then four or five times hourly
- ❖ Clean the mouthpiece with water and shake it dry

PERCUSSION, VIBRATION AND POSTURAL DRAINAGE

- ❖ Dependent nursing interventions performed according to a primary care provider's order
- ❖ The sequence for PVD is usually **postural drainage, percussion, vibration, removal of secretions** by coughing or suctioning
- ❖ Each position is usually assumed for 10-15 mins
- ❖ The nurse should auscultate the client's lung, compare the findings to the baseline data and document the amount, color and character of expectorated secretions after PVD

Percussions

- Sometimes called clapping, is a forceful striking of the skin with cupped hands
- When hands are used, fingers and thumb are held together and flexed slightly to form a cup
- Percussion over congested lung areas can mechanically dislodge tenacious secretions from the bronchial walls

The following are steps in percussion:

- ✓ Cover the area with a towel or gown to reduce discomfort
- ✓ Ask the client to breathe slowly and deeply to promote relaxation
- ✓ Alternately flex and extend the wrist rapidly to slap the chest
- ✓ Percuss each affected lung segment for 1-2 mins.
- ✓ Percussion is avoided over the breasts, sternum, spinal column and kidneys,

Vibration

- Series of vigorous quivering-produced vibration by hands that are placed flat against the client's chest wall

- Used after percussion to increase the turbulence of the exhaled air and thus loosen thick secretions
- Often done alternately with percussion

Following are steps in vibration:

- ✓ Place hand, palm down on the chest area to be drained, one hand over the other with the fingers together and extended. Hands may be placed side by side.
- ✓ Ask the client to inhale deeply and exhale slowly through the nose or pursed lips
- ✓ During the exhalation, tense all the hand and arm muscles, and using mostly the heel of the hand. Vibrate (shake) the hands, moving them downward. Stop vibrating when the client inhales
- ✓ Vibrate during five exhalations over one affected lung segment
- ✓ After each vibration and Encourage the client to cough and expectorate secretions into the sputum container

❖ **Postural Drainage**

- Drainage by gravity of secretions from various lung segments
- Wide variety of position is necessary to drain all segments of the lungs, but not all positions are required for every client
- Lower lobes require drainage frequently because the upper lobes drain by gravity
- Client may be given bronchodilator or nebulization to loosen secretions
- Scheduled 2-3 times daily depending on the degree of lung congestion
- Best time includes before breakfast, lunch, in the late afternoon and before bedtime
- Assess vital signs particularly the pulse and respiratory rate

OXYGEN THERAPY

- ❖ Clients who have difficulty ventilating all areas of their lungs. Those whose gas exchange is impaired, or people with heart failure may benefit from O₂ therapy
- ❖ Safety Precautions
 - Place "NO SMOKING" sign on the client's door, at the foot or head of the bed and on the oxygen equipment
 - Make sure that electric devices are in good working order to prevent short-circuit sparks
 - Avoid materials that generate static electricity such as woolen blankets and synthetic fabrics. Cotton blankets should be used
 - Avoid the use of volatile, flammable materials such as oils, greases, alcohols, ether and acetones
 - Be sure that electric monitoring equipment, suction machines and portable diagnostic machines are all electrically grounded
 - Make known the location of fire extinguishers. and make sure personnel are trained in their use

OXYGEN DELIVERY SYSTEM

Cannula

- Most common and inexpensive device
- Delivers relatively low concentration of O₂ (24-45%) at flow rates of 2-6 L/min
- Inability to deliver higher O₂ concentrations and irritation and drying of mucous membrane are limitations of nasal cannula

Face Mask

- **Simple face mask** — delivers O₂ concentration from 40-60% at liter flows of 5-10 L/min
- **Partial rebreather mask** — delivers O₂ concentration at 60-90% at liter flows of 6-10 L/min. Allows the client to rebreathe about the first third of the exhaled air
- **Nonrebreather mask** — delivers the highest O₂ concentration — 95-100% - at liter flows of 10-15 L/min
- **Venturi mask**— delivers O₂ concentrations varying from 24-40 or 50% at liter flows of 4-10 L/min. Delivers precise O₂ concentration and liter flow

Face Tent

- Can replace masks when masks are poorly tolerated by clients
- Provide varying O₂ concentrations (30-50%) at 4-8 L./min.
- Client's facial skin must be kept dry

TRACHEOSTOMY

- ❖ An opening into the trachea through the neck
- ❖ A tube is usually inserted through the opening and an artificial airway is created
- ❖ A curved tracheostomy tube is inserted to extend through the stoma into the trachea

TRACHEOSTOMY CARE

- ❖ Introduce self and verify client's identity Perform hand hygiene
- ❖ Provide privacy
- ❖ Assist the client in semi-fowler's or fowler's position
- ❖ Open the tracheostomy kit or sterile basin and other sterile supplies needed
- ❖ Suction the tracheostomy tube if needed
- ❖ Put on sterile gloves
- ❖ Suction the tracheostomy tube to remove secretions and ensure patent airway
- ❖ Rinse the catheter
- ❖ Unlock the inner cannula (counter clockwise) and remove it gently by pulling it out toward you in line with the curvature place the inner cannula in the soaking solution
- ❖ Removed soiled dressing and change gloves
- ❖ Clean the inner cannula by using brush or pie cleaners
- ❖ Inspect the inner cannula for cleanliness by holding it at eye level and looking through it into the light
- ❖ Rinse the inner cannula thoroughly in the sterile normal saline
- ❖ After rinsing and gently tap the cannula against the inside edge of the sterile saline container Use a pipe cleaner folded in half to dry only the inside of the cannula, do not dry the outside
- ❖ Replace the inner cannula, securing it in place
- ❖ Insert the inner cannula in the direction of its curvature
- ❖ Lock the cannula in place by turning the lock into position to secure the flange of the inner cannula to the outer cannula
- ❖ Clean the incision site and tube flange using sterile applicators or gauze dressings moistened with normal saline. Clean the incision site. Use each applicator or gauze dressings only once and then discard
- ❖ Hydrogen peroxide maybe used to remove crusty secretions. Thoroughly rinse the cleansed area
- ❖ Clean the flange of the tube with the same manner
- ❖ Thoroughly dry the client's skin and tube flanges
- ❖ Use a commercially prepared tracheostomy dressing of non-raveling material or refold a 4in x 4in gauze dressing into a V shape. Avoid using cotton-filled gauze square or cutting the 4in x 4in gauze
- ❖ Place the dressing under the flange of the tracheostomy tube
- ❖ Ensure that the tracheostomy tube is securely supported while applying the dressing
- ❖ Change the tracheostomy ties
- ❖ Tape and pad the tie knot
- ❖ Place a folded 4in x 4in gauze square under the tie knot and apply tape over the knot
- ❖ Check the tightness of the ties
- ❖ Document all relative data

SUCTIONING

- ❖ Aspirating secretions through a catheter connected to a suction machine or wall suction outlet
- ❖ Sterile technique is recommended for all suctioning to avoid introducing pathogens into the airway
- ❖ **Whistle-tipped** catheter is less irritating to respiratory tissue Open-tipped catheter is more effective for removing thick mucus plugs
- ❖ **Yankauer suction catheter** is used for oropharyngeal
- ❖ **Hyperinflation** — giving the client breaths that are 1-1.5 times the tidal volume set on the ventilator through ventilator circuit or via manual resuscitation bag
- ❖ **Hyperoxygenation** — done with a manual resuscitation bag or through the ventilator and is performed by increasing the O₂ flow (usually to 100%) before suctioning and between suction attempts
- ❖ Suction Catheter Sizes:
 - **Adults:** Fr 12-18
 - **Children:** Fr 8-10
 - **Infant:** Fr 5-8
 -

OROPHARYNGEAL, NASOPHARYNGEAL AND NASOTRACHEAL SUCTIONING

- ❖ Introduce self and verify the client's identity Perform hand hygiene
- ❖ Provide privacy
- ❖ Position a conscious person who has functional gag reflex in **Semi-Fowler's** position with the head turned to one side for oral suctioning or neck hyper extended for nasal suctioning
- ❖ Position unconscious client in **lateral position** facing you
- ❖ Place towel or moisture-resistant pad over the pillow or under the chin
- ❖ Set the pressure on the suction gauge and turn on the suction
 - Wall unit: Adult-100-120 mmHg Child — 95-110 mmHg
 - Infant — 50-95 mmHg
 - Portable unit: Adult-10-15 mmHg Child —5-10 mmHg Infant —2-5 mmHg
- ❖ For oropharyngeal suctioning:
 - Moisten the tip of the catheter with sterile or water saline
 - Pull the tongue forward if necessary
 - Do not apply suction during insertion
 - Advance the catheter about 10-15 cm. (4-6in.) along one side of the mouth into the pharynx
 - It may be necessary during oropharyngeal suctioning to apply suction to secretions that collect in the vestibule of the mouth and beneath the tongue
- ❖ For nasopharyngeal and nasotracheal
 - Open the lubricant
 - Open the sterile suction package
 - Setup the cup or container
 - Pour sterile water or saline in the container
 - Put on sterile gloves
- ❖ Measure the distance between the tip of the nose and earlobe or about 13cm. (5in.) for an adult and mark the position on the tube with the fingers
- ❖ Test the pressure of the suction and the patency of the catheter
- ❖ If needed, apply or increase supplemental O₂
- ❖ Lubricate the catheter tip
- ❖ Insert the catheter the recommended distance into either the nares and advance it along the floor of nasal cavity
- ❖ Never force the catheter against an obstruction, if one nostril is obstructed, try the other
- ❖ Apply suction for 5-10 secs and gently rotate the catheter. The whole suction attempt should last only 10-15 secs.
- ❖ Rinse and flush the catheter and tubing with sterile water or saline
- ❖ Relubricate the catheter and repeat suctioning until the air passage is clear
- ❖ Allow sufficient time between each suction for ventilation and oxygenation. Limit suctioning to 5 mins total
- ❖ Encourage the client to breathe deeply and to cough between suction
- ❖ Obtain a specimen if required
- ❖ Assist the client with oral or nasal hygiene
- ❖ Assist the client to the position that facilitates breathing
- ❖ Dispose of equipment and ensure availability for the next suction
- ❖ Assess the effectiveness of suctioning
- ❖ Document relevant data

SUCTIONING OF TRACHEOSTOMY OR ENDOTRACHEAL TUBE

- ❖ Introduce self and verify the client's identity
- ❖ Perform hand hygiene
- ❖ Provide privacy
- ❖ If not contraindicated, place the client in semi-Fowlers position
- ❖ If necessary, provide analgesia before suctioning
- ❖ Attach the resuscitation apparatus to the O₂ source. Adjust the O₂ flow to 100%
- ❖ Open the sterile supplies
- ❖ Place sterile towel across the client's chest below the tracheostomy
- ❖ Turn on the suction and set the pressure
- ❖ Put on goggles, mask and gown if necessary
- ❖ Put on sterile gloves
- ❖ Holding the catheter in dominant hand and the connector to non-dominant hand, attach the suction catheter to the suction tubing

- ❖ Using the dominant hand, place the catheter tip in sterile saline solution
- ❖ Using the thumb of non-dominant hand, occlude the thumb control and suction small amount of the sterile solution through the catheter
- ❖ If the client does not have copious secretions, hyperventilate the lungs with resuscitation bag before suctioning
 - ✓ Using your non-dominant hand. turn on the O2 to 12-15 L/min
 - ✓ If the client is receiving O2, disconnect the O2 source from the tracheostomy tube using non-dominant hand
 - ✓ Attach the resuscitator to tracheostomy or endotracheal tube
 - ✓ Compress the ambubag 3-5 times as the client inhales. This is best done by second person
 - ✓ Observe the rise and fall of the client's chest
 - ✓ Remove the resuscitation device
- ❖ If the client has copious secretions, do not hyperventilate instead keep the regular O2 delivery device and increase the liter flow to 100% for several breaths before suctioning
- ❖ Quickly but gently insert the catheter without applying any suction
- ❖ Insert the catheter about 12.5 cm (5in) for adults or until the client coughs or you feel resistance
- ❖ Apply suction for 5-10 seconds and rotate the catheter by rolling it between your thumb and forefinger while slowly withdrawing it
- ❖ Hyperventilate the client and suction again
- ❖ Reassess the client's oxygenation status and repeat suctioning
- ❖ Allow 2-3 mins with O2. as appropriate between suctionings when possible
- ❖ Flush the catheter and repeat suctioning until the air passage is clear and the breathing is relatively effortless and quiet
- ❖ Dispose the equipment and ensure availability for the next suction
- ❖ Assist the client to a comfortable position that aids breathing
 - ✓ If the client is conscious (Semi-Fowlers position)
 - ✓ If unconscious. Sim's position to aid drainage of secretions in the mouth
- ❖ Document relevant data

ENTERAL FEEDING

- ❖ Alternative feeding method to ensure adequate nutrition through the gastrointestinal system methods
- ❖ Also referred to as total enteral nutrition (TEN)
- ❖ Provided when the client is unable to ingest food or the upper gastrointestinal tract is impaired and the transport of food to the small intestine is interrupted.
 - Nasogastric
 - Gastrostomy
 - Jejunostomy

ENTERAL ACCESS DEVICE

- ❖ Enteral access -is achieved by means of nasogastric or nasointestinal (nasoenteric) tubes, gastrostomy or jejunostomy tubes.
- ❖ **Nasogastric tube-** is inserted through one of the nostrils, down the nasopharynx, and into the alimentary tract.
- ❖ **Purposes:**
 - Used for feeding clients who have adequate gastric emptying and who require short-term feedings. It is not advised for feeding clients without intact gag and cough reflexes.
 - To prevent nausea, vomiting and gastric distention following surgery
 - To remove stomach contents for laboratory analysis.
 - To lavage (wash) the stomach in cases of poisoning or overdose of medications.
- ❖ **Tubes:**
 - **Levin tubes-** a flexible rubber or plastic, single lumen tube with holes near the tip.
 - **Salem sump tube-** double lumen
 - **Sengstaken-Blakemore tube – triple-lumen tube** used to treat bleeding esophageal varices
 - **Miller Abbot –** used for intestinal decompression
 - **Nasoenteric (or nasointestinal) tube-**a longer tube than the nasogastric tube (at least 40 inches for an adult) is inserted through one nostril down into the upper small intestines.
 - Indications are the following:
 - Decreased level of consciousness
 - Poor cough or gag reflex
 - Endotracheal intubation

- Recent extubation
- Inability to cooperate with the procedure
- Restlessness or agitation
- Inability to cooperate with the procedure
- Restlessness or agitation

Enteral Feeding

- ❖ **Intermittent feedings**- is the administration of 300 to 500 mL of enteral formula several times per day.
- ❖ **Continuous feedings**- is generally administered over a 24-hour period using an infusion pump that guarantees a constant flow rate.
- ❖ **Cyclic feedings**- are continuous feedings that are administered in less than 24 hours
- ❖ The bag and tubing should be replaced every 24 hours

INSERTING A NASOGASTRIC TUBE

PROCEDURE	RATIONALE
Assist the client to a high fowler's position and support his head on pillow.	It is often easier to swallow in this position and gravity helps the passage of the tube
Assess the client's nares and select the nostril that has the greater airflow. Use the tube to mark off the distance from the tip of the client's nose to tip of the earlobe up to the xyphoid process.	This length approximates the distance from the nares to the stomach
Lubricate the tip of the tube well with water soluble lubricant or water to ease insertion	A water-soluble lubricant dissolves if the tube accidentally, enters the lungs. An oil-based lubricant such as petroleum jelly will not dissolve and could cause respiratory complication (eg lipid pneumonia) if it enters the lungs.
Ask the client to hyperextend neck and gently advance the tube towards the nasopharynx	Hyperextension of the neck reduces the curvatures of the nasopharyngeal junction.
Direct the tube along the floor of the nostril and toward the ear on that side.	Directing the tube along the floor avoids the projections (turbinate's) along the lateral wall
Slight pressure and twisting motion are sometimes required to pass the tube into the nasopharynx and some client's eyes may water at this point.	Tears are natural body response and provide the client with tissue as needed.
If the tube meets resistance, withdraw it, relubricate it, and insert it in the other nostril	The tube should never be forced against resistance because of the danger of injury.
Ask the client to tilt the head forward and encourage the client to drink and swallow	Tilting the head forward facilitates passage of the tube into the posterior pharynx and esophagus rather than
If the client continues to gag and the tube does not advance with each swallow, withdraw it slightly and inspect the throat	The tube may be coiled in the throat
Place the tape over the bridge of the client's nose and bring the split ends either under and around the tubing	Taping in this manner prevents the tube from pressing against and irritating the edge of the nostril
Attach a piece of adhesive tape to the tube, and pin the tape to the gown	The tube is attached to prevent it from dangling and pulling

PROCEDURE	RATIONALE
Assist the client to a fowlers position (at least 30 degrees elevation) in bed or a sitting position, if it is contradicted right-side lying position is acceptable	Prevents aspiration of fluid into the lungs
Aspirates all contents and measure the amount before administering feeding	Evaluate the absorption of the last feeding
If 100 ml is withdrawn, check with the agency policy before proceeding to reinsert the gastric contents into the stomach if this is the agency policy order	Feeding is delayed when the specified amount remains in the stomach and Removal of the contents could disturb the clients electrolyte balance
Warm feeding to room temperature	This minimizes the risk of contaminants entering the feeding bag or syringe.
Aspirate stomach contents and check the pH	Testing pH is a reliable way to determine location of a feeding tube. Gastric contents are commonly pH1 to 5
Aspirate can also be tested for bilirubin	Lungs-almost zero stomach -1.5 mg/dl intestine over 10mg/dl
Nasogastric tube position can be confirmed by spray	Nasogastric tubes are radiopaque Place a stethoscope over the clients epigastrium and inject 10 to 30 ml of air into the tube while listening to the wooshing/gurgling sound

GASTROSTOMY AND JEJUNOSTOMY

- ❖ Are used for long term nutritional support, generally more than 6 to 8 weeks
- ❖ Tubes are placed surgically or by laparoscopy through the abdominal wall in to the stomach or into the jejunum.

Feeding:

- After feeding, ask the client to remain in the sitting position or slightly elevated right lateral position for at least 30 minutes. This minimizes the risk for aspiration
- Assess status of peristomal skin. Gastric or jejuna] drainage contains digestive enzymes that can irritate the skin.

Parenteral Nutrition

- Also referred to as Total Parenteral Nutrition or Intravenous Hyperalimentation
- Gastrointestinal tract is nonfunctional because of an interruption in its continuity or because its' absorptive capacity is impaired.
- Through central venous catheter into the superior vena cava.
- Parenteral -composed of dextrose. Water, fat, proteins, electrolytes, vitamins and trace elements.
- Hypertonic- injected into high -flow central veins, diluted by the client's blood.
- Means of achieving an anabolic state in clients who are unable to maintain a normal nitrogen balance (severe malnutrition severe burns, bowel disease disorders)
- Infection control is of utmost importance during TPN therapy
- Infusions are started gradually to prevent hyperglycemia
- When TPN therapy is to be discontinued, the TPN infusion rates are decreased slowly to prevent hyperinsulinemia and rebound hypoglycemia
- Weaning may take 48 hours but can occur in 6 hours as long as the client receives adequate carbohydrates either orally or intravenously.

BOWEL/FECAL ELIMINATION

Characteristics of Normal and Abnormal Feces

CHARACTERISTICS	NORMAL	ABNORMAL
Color	Adult: brown Infant: yellow	Clay or White, Black or Tarry, Red, Pale, orange or green
Consistency	Formed, soft, Semisolid, moist	Hard, Dry Diarrhea

Shape	Cylindrical about 2.5 cm in diameter in adults	Narrow, pencil Shaped: string-like stool
Amount	Varies with diet (100-400 g/day)	
Odor	Aromatic	Pungent
Constituents	Small amounts of undigested roughage, Sloughed dead bacteria and epithelial cells. Fat, protein, dried constituents of digestive juices	Pus, mucus, parasites, blood, large quantities of fat, foreign objects

FECAL ELIMINATION PROBLEMS

- ❖ **Constipation** - defined as fewer than three bowel movements per week
- ❖ **Fecal impaction** - a mass or collection of hardened feces in the folds of the rectum, results from prolonged retention and accumulation of fecal material
- ❖ **Diarrhea** - refers to passage of liquid feces and an increased frequency of defecation, results from rapid movement of fecal contents through the large intestines
- ❖ **Bowel incontinence** — refers to the loss of voluntary ability to control fecal and gaseous discharges through the anal sphincter
- ❖ **Flatulence** — the presence of excessive flatus in the intestines and leads to stretching and inflation of the intestines

ENEMA

- ❖ Is a solution introduced to the rectum and large intestines
- ❖ The main action are to distend the intestines and to irritate the mucosa thereby increasing peristalsis and the excretion of feces and flatulence

TYPES OF ENEMA

- ❖ **Cleansing Enema**
 - Done to prevent the escape of feces during surgery
 - Prepares the intestines for certain diagnostic test such as colonoscopy
 - Remove feces in instances of constipation or impaction
 - **High enema** is given to cleanse as much of the colon as possible. Client changes from left lateral to dorsal recumbent to right lateral position so that the solution can follow the large intestine. Container is held 12-18 inches above the rectum
 - **Low enema** is used to clean the rectum and sigmoid colon only. Solution container should be no higher than 12 inches

Carminative Enema

- Given primarily to expel flatus
- For an adult, 60-80 ml of solution is instilled

Retention enema

- Introduces oil or medication into the rectum and sigmoid colon
- Solution is retained for a long period (13 hours)
- Acts to soften the feces and to lubricate the rectum and anal canal

Return Flow Enema

- Used occasionally to expel flatus
- Alternating flow of 100-200 ml of fluid into and out of the rectum and sigmoid colon, this process is done 5-6 times until flatus is expelled
- Replace the solution several times as it becomes thick with the feces

Solutions Used in Enema

- **Hypertonic solution (Fleet phosphate enema)** — draws water into the colon
 - ✓ Introduced 90-120 ml of solution and remains 5-10 mins to take effect
- **Hypotonic** — distends colon, stimulates peristalsis and soften the stool
 - ✓ 500-1000 ml of tap water in given and remains 15-20 mins in the colon
- **Isotonic** — distends colon, stimulates peristalsis and soften the stool
 - ✓ 500-1000 ml of tap water in given and remains 15-20 mins in the colon

- **Soapsuds** — irritates the mucosa and distends the colon
- ✓ 500-1000 ml (3-5 ml of soap to 1000 ml water) is given and remains 10-15 mins
- **Oil (mineral, olive, cottonseed)** —lubricates the feces and colonic mucosa
- ✓ 90-120 ml is given and remains 1-3 hour

SIZE AND INSERTION OF RECTAL TUBE

- ❖ Adult — Fr. 22-32 inserted 3-4 inches in the anal canal
- ❖ Children — Fr. 14-18 inserted 2-3 inches in the anal canal
- ❖ Infant — Fr. 12 inserted 1-1.5 inches in the anal canal

ADMINISTRATION ENEMA

- ❖ Check the doctor's order
- ❖ Provide privacy
- ❖ Promote relaxation to relax the anal sphincter
- ❖ Lubricates 5 cm. (2 in.) of the rectal tube
- ❖ Run some solution through the connecting tubing to expel air
- ❖ Insert 3-4 in. of rectal tube smoothly and slowly into the rectum
- ❖ Slowly administer the enema solution If abdominal cramps occur, lower the container or clamp the tube to stop the flow for 30 sec. then restart the flow at a slow rate
- ❖ After introduction of the solution, press the buttocks together to inhibit the urge to defecate
- ❖ Assist the client to defecate. Ask the client who is using the toilet not to flush it. The nurse must observe the return flow
- ❖ Do perianal care
- ❖ Document the relevant data

BOWEL OSTOMIES

- An opening for the colon onto the skin
- The purpose of bowel ostomies is to divert and drain fecal material

Classifications

Permanence

- **Temporary colostomies**
 - ✓ Traumatic injuries
 - ✓ Inflammatory conditions of the bowel
 - ✓ Allow the distal diseased portion of the bowel to rest and heal
- **Permanent colostomies**
 - ✓ Rectum or anus is non-functional
 - ✓ Birth defect
 - ✓ Disease such as cancer of bladder

Anatomic Location

- **Ileostomy**
 - ✓ Empties from the distal end of the small intestine
 - ✓ Liquid fecal drainage
 - ✓ Cannot be regulated
 - ✓ Some digestive enzymes which are damaging the skin
 - ✓ Wear appliance continuously
 - ✓ Special precautions to prevent skin breakdown
 - ✓ Odor is minimal because fewer bacteria is present.
- **Cecostomy**- empties from cecum (the first part of the ascending colon)
- **Ascending colostomy**- empties from the ascending colostomy
 - ✓ Drainage is liquid
 - ✓ Cannot be regulated
 - ✓ Digestive enzymes are present
 - ✓ Odor is a problem
- **Transverse colostomy**- empties from the transverse colon
 - ✓ Malodorous, mushy drainage
 - ✓ Usually no control
- **Descending colostomy**- empties from the descending colon

- ✓ Increasingly fluid fecal drainage.
- **Sigmoidostomy**- empties from the sigmoid colon
 - ✓ Normal or formed consistency
 - ✓ Frequency of discharge can be regulated
 - ✓ Odor can be controlled May not have to wear an appliance

TYPES OF STOMA ACCORDING TO SURGICAL CONSTRUCTION

- ❖ **Single stomata (end/terminal)**
 - One end of bowel is brought out through an opening onto the anterior abdominal wall
- ❖ **Loop Colostomy**
 - A loop of bowel is brought out onto the abdominal wall and supported by a plastic bridge, or a piece of rubber tubing
- ❖ **Divided Colostomy**
 - Consists of two edges of bowel brought out onto the abdomen but separated from each other
- ❖ **Double-barreled Colostomy**
 - Resembles a double-barreled shotgun
 - Proximal and distal loops of bowel are sutured together and both ends are brought up onto the abdominal wall

PROMOTING REGULAR DEFECATION

- ❖ **Privacy**
- ❖ Provide as much privacy as possible
 - Timing
 - The client should be encouraged to defecate when the urge is recognized.
 - Discuss when mass peristalsis normally occurs and provide time for defecation.
 - Other activities should not interfere with the defecation time
- ❖ **Nutrition and Fluids**
 - For Constipation
 - ✓ Increase daily fluid intake, and instruct the client to drink hot liquids and fruits juices. Especially prune juice. Include fiber in the diet
 - **For Diarrhea**
 - ✓ Encourage oral intake of fluids and bland foods.
 - ✓ Eating small amounts can be helpful
 - ✓ Highly spiced foods and high fiber foods can aggravate diarrhea.
 - **For Flatulence**
 - ✓ Limit carbonated beverages. the use of drinking straws and chewing gum-all of which increase the ingestion of air. Gas forming foods should be avoided. (cabbage, beans, onions, cauliflower)

STOMA AND SKIN CARE

- ❖ Skin is kept clean by washing off any excretion and drying thoroughly.
- ❖ Closed pouches are often used by people who have a regular stoma discharge (empty pouch 1 to 2 times a day)
- ❖ Odor control (use of bathroom, appropriate kind of appliance. odor-barrier material) Ostomy appliances can be applied for up to 7 days
- ❖ If the skin is erythematous, eroded denuded or ulcerated, the pouch should be changed every 24 to 48 hours to allow appropriate treatment of the skin

COLOSTOMY IRRIGATION

- ❖ Form stoma management used only for client who have a sigmoid or descending colostomy
- ❖ **Purpose**
 - Distend the bowel sufficiently to stimulate peristalsis which stimulates evacuation. When a regular evacuation pattern is achieved, the wearing of a colostomy pouch is unnecessary

CHANGING A BOWEL DIVERSION OSTOMY APPLIANCE

Assess the following:

- ❖ **Stoma color**- the stoma should appear red, and slightly moist. Very pale or darker-colored stomas with a dusky bluish or purplish hue indicate impaired blood circulation to the area. Notify the surgeon immediately.
- ❖ **Stoma size and shape**- protrude slightly from the abdomen. New stomas normally appear swollen, but swelling generally decreases over 2 or 3 weeks or for as long as 6 weeks.
- ❖ **Stomal bleeding**- slight bleeding initially when the stoma is touched is normal but other bleeding should be reported.
- ❖ **Status of peristomal skin**- any redness and irritation of the peristomal skin- the 5 to 13 cm (2 to 5 in) of skin surrounding the stoma-should be noted.
- ❖ **Amount and type of feces**- inspect for abnormality like pus and blood. Empty if ostomy bag is 1/3 full.
- ❖ **Complaints** - burning sensation under the skin burrier may indicate skin breakdown

Procedures	Rationale
Assess fullness of the bag	The weight of an overly full bag may loosen the skin barrier and separate it from the skin
Avoid times close to meal or visiting hours	Ostomy odor and stool may reduce appetite or embarrass the client
Avoid times immediately after meals or the administration of any medications	It may stimulate bowel evacuation
Empty the contents of a drainable pouch through the bottom opening into a bedpan or a toilet	Emptying before removing the pouch prevents spillage of stool onto the clients skin
Use warm water, Mild soap and a washcloth to clean the skin and stoma.	Soap is sometimes not advice because it can be irritating to the skin
Do not use deodorant or moisturizing soaps	They may interfere with the adhesives in the skin barrier
Dry the area thoroughly by patting with a towel	Excess rubbing can abrade the skin
Place a piece of tissue or gauze over the stoma and change it as needed	This absorbs any seepage from the stoma while the ostomy appliance is being change
Make the opening of the barrier no more than 1/8 to 1/4 inch larger than the stoma	This allows space for the stoma to expand slightly when functioning and minimizing the risk of stool contacting peristomal skin
Center the one-piece skin barrier and apply over the stoma, and gently press it onto the client skin for 30 seconds.	The heat and pressure help activate the adhesives in the skin barrier

URINARY ELIMINATION

- ❖ Characteristics of normal and abnormal urine
 - Amount in 24 hours (adult)
 - ✓ Normal: 1200-1500 ml
 - Color, clarity
 - ✓ Normal: straw, amber, transparent
 - ✓ Abnormal: dark amber, cloudy, dark orange, red or dark brown, viscid, thick
 - Odor
 - ✓ Normal: faint aromatic
 - ✓ Abnormal: offensive
 - Sterility
 - ✓ Normal: no microorganism present
 - ✓ Abnormal: microorganism present
 - pH level
 - ✓ Normal: 4.5-8
 - ✓ Abnormal: over 8 and under 4.5
 - Specific gravity
 - ✓ Normal: 1.010-1.025
 - ✓ Abnormal: over 1.025 and under 1.010
 - Glucose
 - ✓ Normal: not present
 - ✓ Abnormal: present
 - Ketone bodies (acetone)
 - ✓ Normal: not present

- ✓ Abnormal: present
- Blood
 - ✓ Normal: present
 - ✓ Abnormal: occult (microscopic) bright red

PROBLEMS IN URINARY ELIMINATION

- ❖ **Altered Urine Production**
- **Polyuria**- production of abnormal large amounts of urine
- **Oliguria**- low urine output usually less than 500 ml/day or greater than 30 ml/hr for an adult
- **Anuria**- refers to lack of urine production (<100ml/day)
- ❖ **Altered urine frequency**
 - **Frequency**- voiding at frequent intervals more than 4-6 times per day
 - **Nocturia**- voiding two or more times at night
 - **Urgency**- sudden strong desire to void
 - **Dysuria**- voiding that is either painful or difficult
 - **Urinary hesitancy**- delay and difficulty in initiating voiding
 - **Enuresis**- involuntary urination in children beyond 4-5 years old
 - **Urinary incontinence**- involuntary urination
 - ✓ **Total incontinence** - continuous and unpredictable loss of urine
 - ✓ **Stress incontinence** – leakage of less than 50 ml of urine as a result of sudden increase in intra-abdominal pressure, ex. Sneezing, coughing etc.
 - ✓ **Urge Incontinence**- follows a sudden strong desire to urinate and leads to involuntary detrusor contraction
 - ✓ **Functional incontinence**- involuntary unpredictable passage of urine
 - ✓ **Reflex incontinence** – involuntary loss of urine occurring at somewhat predictable intervals when specific bladder volume is reached
- **Retention** – accumulate of urine in the bladder with associated inability of the bladder to empty itself

URINARY CATHETERIZATION

- ❖ Introduction of catheter into the urinary bladder
- ❖ **Straight catheter** is a single-lumen tube with small eye or opening from the insertion tip. This is used for short term and for men with prostatic hypertrophy because it is less traumatic on insertion.
- ❖ **Two-way Foley catheter (retention)** is a double lumen catheter. The larger lumen drains the urine from the bladder and the smaller lumen is used to inflate the balloon to hold the catheter in place within the bladder and used for long term.
- ❖ **Three-way Foley catheter** is used for clients who requires continuous or intermittent bladder irrigation, which has third lumen through which sterile irrigating fluid can flow into the bladder.

PURPOSE OF URINARY CATHETERIZATION

- ❖ To relieve bladder distension
- ❖ To instill medication into the bladder
- ❖ To irrigate the bladder
- ❖ To measure the urine output accurately
- ❖ To collect sterile urine specimen
- ❖ To measure residual urine. Residual urine is the amount of urine retained in the bladder after forceful voiding
- ❖ To maintain continence to incontinent patients
- ❖ To promote healing of the genito-urinary structures postoperatively
- ❖ To empty the bladder in preparation for diagnostic procedures and surgery

ADMINISTRATION OF URINARY CATHETER

- ❖ Verify the doctor's order and identify the client
- ❖ Explain the procedure and purpose of the procedure to the client
- ❖ Perform hand hygiene
- ❖ Provide privacy
- ❖ Practice strict asepsis
- ❖ Do perineal care before the procedure
- ❖ Use appropriate size of catheter to prevent trauma

- Male: Fr. 16-18
- Female: Fr. 12-14
- ❖ Position the patient
 - Male: supine, thighs slightly abducted or apart
 - Female: dorsal recumbent position
- ❖ Have adequate lighting to visualize urethral meatus properly
- ❖ Don sterile gloves and inflate the balloon of the catheter with air to check that it is intact then deflate again
- ❖ Locate the urinary meatus properly
 - Male: at the tip of the glans penis
 - Female: between the clitoris and the vaginal orifice
- ❖ Lubricate the catheter to reduce friction and prevent trauma
- ❖ Cleanse urinary meatus with antiseptic solution
- ❖ Insert the catheter gently and instruct the client to take slow deep breath to relax the sphincter or strain as if attempting to void to open the urinary meatus
- ❖ Advance the catheter 2 inches farther after the urine begins to flow
- ❖ If the catheter accidentally slips into vagina, leave it there until new catheter is inserted in the meatus
- ❖ Length of catheter insertion
 - Male: 6-9 inches
 - Female: 3-4 inches
- ❖ During the insertion of catheter in male, hold the penis at 90 degree angle or perpendicular to the body to straighten the urethra and facilitate catheter insertion
- ❖ If the purpose of catheterization is to relieve bladder distension, practice gradual decompression to prevent shock. Only 750-1000ml of urine are to be drained at a time
- ❖ For retention catheterization, inflate the balloon with 5 ml sterile NSS.
- ❖ Gently pull on the catheter, if resistance is felt, the catheter balloon is properly inflated in the bladder
- ❖ Anchor the catheter properly:
 - Male: laterally or upward over the lower abdomen to prevent penoscrotal pressure
 - Female: inner aspect of the thigh, providing enough "give" so it will not pull when the legs move
- ❖ Attach the drainage bag to the bed frame, ensuring that tubing does not fall into dependent loops
- ❖ Keep the client comfortable
- ❖ Do after care equipment and articles
- ❖ Document the catheterization procedure

REMOVAL OF INDWELLING CATHETER

- ❖ Check the doctor's order
- ❖ Wash hands. Remove the tape that secures the catheter to the client's body
- ❖ Don clean gloves
- ❖ Deflate the balloon by drawing out all the liquids via inflation port to prevent trauma to the urethra as the catheter is removed
- ❖ Instruct the client to inhale then kink and remove the catheter slowly and carefully as the client exhales
- ❖ After removal of the catheter, allow the urine to drain into collection bag. Measure and record the amount of urine in the bag
- ❖ Assess client's perineum and meatus for any sign of redness or irritations
- ❖ Assist patient to do perineal care
- ❖ Discard contaminated equipment and articles in appropriate containers
- ❖ Make relevant documentation
- ❖ Voiding should be expected within 6-8 hours from the time of removal of the catheter
- ❖ If the patient has not voided in 8 hours, assess for urinary retention
- ❖ If the client has difficulty establishing voluntary control of voiding, notify the physician

SAFE USE OF STRECHER

- ❖ Lock the wheels of the bed and stretcher before the client transfers in or out of them.
- ❖ Fasten safety straps across the client on a stretcher, and raise the side rails.
- ❖ Never leave a client unattended on a stretcher unless the wheels are locked and the side rails are raised on both sides and/or the safety straps are securely fastened across the client.
- ❖ Always push a stretcher from the end where the client's head is positioned. This position protects client's in the event of a collision.

- ❖ If the stretcher has two swivel wheels and two stationary wheels:
 - Always position the client's head at the end with stationary wheels and
 - Push the stretcher from the end with the stationary wheels. The stretcher is maneuvered more easily when pushed from this end.
- ❖ Maneuver the stretcher when entering the elevator so that the client's head goes in first.

TRANSFERRING OF PATIENT FROM BED TO WHEELCHAIR

- ❖ **Before transferring a client, assess the following:**
 - The client's body size
 - Ability to follow instructions
 - Activity tolerance
 - Muscle strength
 - Joints mobility
 - Presence of paralysis
 - Level of comfort
 - Presence of orthostatic hypotension
 - The technique with which the client is familiar
 - The space in which the transfer will need to be maneuvered (bathrooms, for example, are usually cramped)
 - The number of assistants (one or two) needed to accomplish the transfer safely
 - The skill and strength of the nurse(s)
- ❖ **IMPLEMENTATION**
 - Introduce yourself, verify the client's identity and explain the procedure
 - Observe infection control measure
 - Provide privacy
 - Lower the bed to its lowest position so that the client's feet will rest flat on the floor. Lock the wheels of the bed.
 - Place the wheelchair parallel to the bed as close to the bed as possible.
 - Put the wheelchair on the side of the bed that allows the client to move toward his or her stronger side.
 - Lock the wheels of the wheelchair and raise the footplate
 - Prepare and assess the client
 - As the client to move forward and sit on the edge of the bed, lean forward slightly from the hips and place the foot of the stronger leg beneath the edge of the bed and put the other foot forward
 - Place the client's hands on the bed surface or on your shoulders so that the client can push while standing.
 - Position yourself correctly.
 - ✓ Stand directly in front of the client. Lean the trunk forward from the hips. Flex the hips, knees, and ankles. Assume a broad stance, placing one foot forward and one back. Mirror the placement of the client's feet, if possible
 - ✓ Encircle the client's waist with your arms, and grasp the transfer belt at the client's back with thumbs pointing downward
 - ✓ Tighten your gluteal, abdominal, leg and arm muscles
 - Assist the client to stand, and then move together toward the wheelchair (on the count of three, move together with the patient)
 - Assist the client to sit and ensure safety
 - Ask the client to push back into the wheelchair seat
 - Lower the footplates, and place the client's feet on them
 - Apply a seat belt as required
- ❖ **NURSING CONSIDERATION**
 - **Angling the Wheelchair** – for clients who have difficulty walking, place the wheelchair at a 45-degree angle to the bed
 - ✓ Rationale: this enables the client to pivot into the chair and lessens the amount of the body rotation required
 - Transferring a Client with an Injured Lower Extremity- When the client has an injured lower extremity, movement should always occur toward the client's unaffected (strong) side. For example, if the client's right leg is injured and the client is sitting on the edge of the bed preparing to transfer to a wheelchair,

position the wheelchair on the client's left side. In this way, the client can use the unaffected leg most effectively and safely.

LOSS, GRIEVING AND DEATH

❖ LOSS

- Is an actual or potential situation in which something that is valued is changed or no longer available. People can experience the loss of the body image, a significant other, a sense of wellbeing, a job, personal possessions, or beliefs. Illness and hospitalization often produce losses
- **Types of loss**
 - ✓ **Actual loss** – recognized by others
 - ✓ **Perceived loss** – experienced by one person but cannot be verified by others
 - ✓ **Anticipatory loss** – experienced before the loss actually occurs
 - ✓ **Situational loss** – loss of one's job, the death of a child, or the loss of functional ability because of acute illness or injury
 - ✓ **Developmental loss** – losses that occur in the process of normal development such as the departure of grown children from the home retirement from a career. and the death of aged parents
- **Sources of Loss**
 - ✓ Loss of an aspect of oneself – a body part, a physiologic function, or a psychologic attribute
 - ✓ Loss of an object external to oneself
 - ✓ Separation from an accustomed environment
 - ✓ Loss of a loved or valued person

❖ Grief, Bereavement and Mourning

- **Grief** – total response to the emotional experience related to loss
 - ✓ Manifested in thoughts, feelings, and behaviors associated with overwhelming distress or sorrow
 - ✓ Essential for good mental and physical health. It permits the individual to cope with the loss gradually and to accept it as part of reality
- **Bereavement** – subjective response experienced by the surviving loved ones after the death of a person with whom they have shared a significant relationship
- **Mourning** – behavioral process through which grief is eventually resolved or altered: it is often influenced by culture, spiritual beliefs and custom
- ❖ **Types of Grief Responses**
 - **Abbreviated grief** – brief but genuinely felt. This can occur when the lost object is not significantly important to the grieving person or may have been replaced immediately by another, equally esteemed object
 - **Anticipatory grief** – experienced in advance of the event such as the wife who grieves before her ailing husband dies
 - **Disenfranchised grief** – occurs when a person is unable to disclose the loss to other persons
 - ✓ Situations in which this may occur often relate to a socially unacceptable loss that cannot be spoken about, such as suicide, abortion or relationships that are socially unsanctioned such as extramarital and homosexual relationships
 - **Complicated Grief** – unhealthy grief that is pathologic in nature. Exist when the strategies to cope with the loss are maladaptive
 - Different forms of complicated grief
 - **Unresolved or chronic grief** is extended in length and severity. The same signs are expressed as with normal grief, but the bereaved may also have difficulty expressing the grief, may deny the loss, or may grieve beyond the expected time
 - **Inhibited grief** - many of the normal symptoms of grief are suppressed, and other effects including somatic are experienced instead
 - **Delayed grief** - occurs when feelings are purposely or subconsciously suppressed until a much later time
 - **Exaggerated grief** - survivor who appears to be using dangerous activities as a method to lessen the pain of grieving

Kubler-Ross Stages of Grieving

STAGE	BEHAVIORAL RESPONSE	NURSING INTERVENTION
Denial	Refuses to believe that loss is happening. May assume artificial cheerfulness to prolong denial	Verbally support client but do not reinforce denial
Anger	Client or family may direct anger at nurse or staff about matters that normally would not bother them	-Help client understand that anger is a normal response to feelings of loss and powerlessness. Avoid withdrawal or retaliation -Deal with needs underlying any angry

		reaction
Bargaining	Seeks to bargain to avoid loss	-Listen attentively, and encourage client to talk to relieve guilt and irrational fear. If appropriate. Offer spiritual support
Depression	Grieves over what has happened and what cannot be	- Allow client to Express sadness - Communicate nonverbally by sitting quietly without expecting conversation - Convey caring by touch
Acceptance	-Comes to terms with loss- May have decreased interest in surroundings and support people May wish to begin making plans	-Help family and friends understand client's decreased need to socialize - Encouraged client to participates much as possible in the treatment program

DYING AND DEATH

Signs of Impending Clinical Death

- ❖ **Loss of Muscle Tone**
 - Relaxation of the facial muscles (e.g., the jaw may sag)
 - Difficulty speaking
 - Difficulty swallowing and gradual loss of the gag reflex
 - Decreased activity of the gastrointestinal tract, with subsequent nausea.
 - Accumulation of flatus abdominal distention and retention of feces especially if narcotics or tranquilizers are being administered
 - Possible urinary and rectal incontinence due to decreased sphincter control
 - Diminished body movement
- ❖ **Slowing of the Circulation**
 - Diminished sensation
 - Mottling and cyanosis of the extremities
 - Cold skin, first in the feet and later in the hands ears and nose (the client, however, may feel warm if there is a fever)
 - Slower and weaker pulse
 - Decreased blood pressure
- ❖ **Changes in Respirations**
 - Rapid shallow, irregular, or abnormally slow respirations
 - Noisy breathing, referred to as the death rattle, due to collecting of mucus in the throat
 - Mouth breathing. dry oral mucous membranes
- ❖ **Sensory Impairment**
 - Blurred vision
 - Impaired senses of taste and smell

Nursing Interventions for a Dying

- ❖ **Patients Helping the patients die with dignity**
 - Restore and support feelings of control — allow clients to choose the location of care times of appointment with health care providers, activity schedule, etc.
 - Support the client's will and hope
 - Focus on client's need
 - Help the client accept his or her losses
- ❖ **Meeting the Physiologic Needs of the Dying Clients**
 - Provide personal hygiene measures
 - Controlling pain
 - Relieving respiratory difficulties
 - Assisting with movement, nutrition, hydration and elimination
 - Provide measures related to sensory changes
- ❖ **Provide Spiritual Support**
 - Ensure that the client's **spiritual needs** are attended
 - Facilitate expressions of feeling, prayer, meditation, reading, and discussion with appropriate clergy or a spiritual adviser

❖ Supporting the Family

- Use therapeutic communication to facilitate their expression of feelings
- Provide empathetic and caring presence
- Explain what is happening and what the family can expect
- Repeat the provided information because they may not absorb it due to stress and grieving
- Encourage the family to participate in the physical care of the dying person
- After the client dies, encouraged the family to view the body

Definitions and Signs of Death

- ❖ **Heart-lung death** — cessation of pulse, respirations and blood pressure
- ❖ **Cerebral death (higher brain death)** —occurs when higher brain center, the cerebral cortex is irreversibly destroyed
- ❖ **Indications of death**
 - Total lack of response to external stimuli
 - No muscular movement, especially breathing
 - No reflexes
 - Flat encephalogram (brain waves)
- ❖ **Postmortem Care**
 - **Rigor Mortis**
 - ✓ Stiffening of the body that occurs about 2 to 4 hours after death
 - ✓ Results from a lack of adenosine triphosphate (ATP), which causes the muscles to contract, and in turn immobilizes the joints
 - **Algor Mortis**
 - ✓ Gradual decrease of the body's temperature after death
 - ✓ Body temperature falls about 1°C (1.8°F) per hour until it reaches room temperature
 - **Livor Mortis**
 - ✓ Discoloration of the body which appears in the lowermost or dependent areas of the body

Nursing Interventions for the Body After Death

- ❖ Post-mortem care should be carried out according to hospital policy
- ❖ Check the client's religion and make every attempt to comply with their religious law
- ❖ Make the environment as clean and pleasant as possible and to make the body appear natural and comfortable
- ❖ All equipment, soiled linen, and supplies should be removed from the bedside
- ❖ Some agencies require all tubes in body remain in place
- ❖ Placed the body in a supine position with the arms either at the sides, palms down, or across the abdomen
- ❖ One pillow is placed under the head and shoulders to prevent blood from discoloring the face by settling in it
- ❖ Eyelids are closed and held in place for a few seconds so they remain closed
- ❖ Dentures are usually inserted to help give the face a natural appearance. The mouth is then closed
- ❖ Wash the soiled areas of the body
- ❖ Place absorbent pads under the buttocks to take up any feces and urine release
- ❖ Place a clean gown on the client and —brushed/combed the hair
- ❖ Removed all jewelries except wedding band that is taped to the finger
- ❖ Top bed linens are adjusted neatly to cover the client to the shoulders
- ❖ Provide soft lighting and chairs to the family
- ❖ Put deceased's wrist identification tag that is left on and additional identification tags are applied
- ❖ Body is wrapped in a shroud, a large piece of plastic or cotton material used to enclose a body after death
- ❖ Place an identification tag outside the shroud
- ❖ Take the body into the morgue

LABORATORY AND DIAGNOSTIC EXAMINATIONS

- ❖ Critical element of assessment
- ❖ Invasive or non-invasive
- ❖ Procedures that involve physical inspection of body structures and evidence of their function

PHASES OF DIAGNOSTIC TESTS

Pre-Test	<ul style="list-style-type: none"> Focus: Client preparation Thorough assessment and data collection
Intra-test	<ul style="list-style-type: none"> Focus: Specimen collection & performing or assisting with certain diagnostic testing Standard precautions& sterile technique are utilized. Provision of emotional & physical support
Post-Test	<ul style="list-style-type: none"> Provide nursing care and follow-up Monitor vital signs Assess for possible complications Provide comfort Specimen care Accurate documentation Prompt referral & reporting of result

NEUROLOGICAL STUDIES

Computed Tomography Scan

- ❖ Makes detailed images of structures within the body
- ❖ Uses a narrow x-ray beam to scan body parts in successive layers
- ❖ Contrast dye may be used

Uses

- Differentiate benign and malignant tumors
- Detect aortic aneurysms: infarctions: hydrocephalus: presence of stenosis
- Evaluate cysts masses. abscesses, renal calculi, GI bleeding and obstruction, trauma
- Monitor and evaluate the effectiveness of medical, radiation or surgical therapies

Contraindications

- Allergies to shellfish or iodinated dye
- Claustrophobic
- Pregnant client
- Chronically dehydrated
- Renal failure

Nursing Responsibilities

- Secure informed consent
- Assess allergies if dye is used
- NPO for at least 8 hours (to prevent aspiration)
- Assess VS before and after the procedure
- Remove any metal objects
- Check BUN & Creatinine

Post Test

- Observe for delayed allergic reactions (rash. urticaria. tachycardia. hyperpnea. palpitations. NN)
- Increase fluid intake to help eliminate the contrast medium
- Assess kidney functions
- Instruct client to apply cold compress to the puncture site (reduces discomfort)
- Instruct client to resume usual diet. Medications or activity as directed by the health care provider.

Magnetic Resonance Imaging (MRI)

- ❖ Uses a powerful magnetic field to obtain images of different areas of the body.
- ❖ Can be performed with or without contrast medium.

Uses

- Detect and locate presence of tumors
- Detect CVA, cerebral infarct or hemorrhage
- Evaluate the cause of seizures
- Evaluate demyelinating disorders

- Evaluate solid, cystic and hemorrhagic components of lesions
- Monitor and evaluate effectiveness of medical/surgical interventions, chemotherapy and radiation therapy.

Contraindications

- Presence of metal in their body
- Patients with pacemakers
- Intrauterine devices
- Claustrophobic
- Pregnant client

Nursing Responsibilities

- Secure informed consent
- Assess for allergies in contrast medium
- Obtain a list of medications the client is taking
- Explain to the client that no pain will be experienced during the test. However there may be moments of slight discomfort.
- Tell the client to expect to hear loud banging from the scanner and possibly to see flickering lights in the visual field.
- Explain that IV line may be necessary
- Remove dentures, jewelry, hairpins, credit cards, and other metallic objects
- Instruct the client to remain still throughout the procedure (movement produces unreliable results)
- Instruct patient to take slow, deep breaths if nausea occurs during the procedure

Post Test

- Observe for delayed allergic reactions
- Instruct client to immediately report symptoms such as fast heart rate difficulty breathing, skin rash, itching, decreased urinary output
- Apply cold compress to the punctured site
- Increased oral fluid intake to facilitate the excretion of the dye

Positron Emission Tomography (PET) Scan

- Uses positron emissions from specific radionuclides to produce detailed functional (physiologic) images within the body.

Uses

- Detect Parkinson's disease and Huntington's disease
- Detect the effectiveness of the therapy as evidenced by biochemical activity of normal and abnormal tissues
- Differentiate between tumor recurrence and radiation necrosis
- Identify cerebrovascular accident or aneurysm
- Identify focal seizure

Contraindication

- Pregnant clients unless the potential benefits of the procedure far outweigh the risks to the fetus and mother

Nursing Responsibilities

- Note any recent procedures that can interfere with test results including examinations using iodine-based contrast medium or barium.
- Obtain a list of medications the client is taking
- Client should restrict food for 4 hours
- Restrict alcohol, nicotine or caffeine-containing drinks for 24 hours
- Withhold medications for 24 hours before the test
- Remove dentures, jewelry, hairpins, credit cards and other metallic objects
- Record baseline vital signs and assess neurologic status.
- Observe standard precautions
- The client may be blindfolded or asked to use earplugs to decrease auditory and visual stimuli.
- Monitor the client for complications related to the procedure (allergic reaction, anaphylaxis, bronchospasm)

Post Test

- Increased oral fluid intake for 24 to 48 hours unless contraindicated
- Cold compress to the punctured site
- Flush the toilet immediately after each voiding
- No other radionuclide test should be scheduled for 24 to 48 hours after the procedure.
- Resume diet fluids, medications or activity, as directed by the health care provider.

- Advise the client to immediately report symptoms such as fast heart rate, difficulty breathing skin rash, itching, or decreased urinary output

Electroencephalography

- Represents a record of the electrical activity generated in the brain.
- Obtained through electrodes applied on the scalp or through microelectrodes placed within the brain tissue
- Provides an assessment of cerebral electrical activity
- Non-invasive

Uses

- Confirms brain death
- Detect cerebral ischemia
- Detect intracranial cerebrovascular lesions
- Detect seizure disorders
- Determine presence of tumors, abscesses blood clots and infection
- Evaluate the effect of drug intoxication on the brain
- Evaluate sleeping disorders

Results

• Normal Findings

- ✓ Normal occurrences of alpha, beta theta and delta waves (rhythms. varying depending on the client's age)
- ✓ Normal frequency. amplitude and characteristics of brain waves

• Abnormal Findings

- ✓ Abscess
- ✓ Brain death
- ✓ Cerebral infarct
- ✓ Encephalitis
- ✓ Head injury
- ✓ Hypocalcemia / hypoglycemia
- ✓ Intracranial hemorrhage
- ✓ Meningitis
- ✓ Migraine headaches
- ✓ Narcolepsy
- ✓ Seizure disorders
- ✓ Sleep apnea

Factors that may impair the results of the examination

- Inability of the client to cooperate or remain still during the procedure because of age significant pain, or mental status. Drugs and substances such as sedatives anticonvulsants, anxiolytics and alcohol and stimulants such as caffeine and nicotine.
- Hypoglycemic or hypothermic states
- Hair that is dirty, oily or sprayed or treated with hair preparations.

Nursing Responsibilities

- Make sure a written and informed consent has been signed prior to the procedure and before administering any medications.
- Inform the client that the procedure performed to measure electrical activity of the brain.
- Obtain a list of the medications the client taking
- Inform the client that he/she may be asked to alter breathing pattern
- Instruct the client to clean the hair and **refrain from using hair sprays, creams of solutions** before the test

Refrain from drinking caffeine-containing **beverages** for **8 hours** before the procedure

- Anti-seizure agents, tranquilizers, stimulants and depressants should be withheld 24 to 48 hours before an EEG.
- Inform the client that the standard EEG takes 45 to 60 minutes
- Sleep EEG requires 12 hours
- Inform the client that EEG does not cause electric shock.
- Limit sleep to 5 hours for an adult and 7 hours for a child at night before the study.
- Remind the client to relax and not to move any muscles or parts of the face or head.
- Recordings are made with the client at rest and with eyes closed
- Procedures may be done to bring out abnormal electrical activity or other brain abnormalities

Post Test

- Remove electrodes from the hair and remove paste by cleansing with oil
- Promote safety by raising the side rails Instruct the client to resume medications as directed by the health care provider.
- Instruct the client to report any seizure activity
- Recognize anxiety related to test results, and be supportive of perceived loss of independent function. Discuss the implications of abnormal test results on the client's lifestyle. Provide teaching and information regarding the clinical implications of the test results, as appropriate.
- Explain the importance of adhering to the therapy regimen and the use of any ordered medications.
- Reinforce information given by the client's health care provider regarding further testing, treatment or referral to another health care provider
- Depending on the results of this procedure, additional testing may be performed to evaluate or monitor progression of the disease process and determine the need for a change the therapy.

Lumbar Puncture

Also termed as Lumbar/Spinal Tap

Insertion of a needle into the lumbar subarachnoid space to withdraw CSF. Between L3 and L4 or L4 and L5

- ❖ Color
 - Normal: clear and colorless
 - Abnormal: pink, blood-tinged or grossly bloody CSF (subarachnoid hemorrhage)
- ❖ **Position:** Knee-chest position / C-shaped position I Fetal position I Shrimp
- ❖ Position Three test tubes - Collection (9 to 12 mL)

USES:

- Obtain CSF for examination
- Measure and reduce CSF pressure
- Determine the presence or absence of blood in the CSF
- Administer medications intrathecally (into the spinal canal)

Contraindications

- This procedure is contraindicated if infection is present at the needle insertion site_
- Degenerative joint disease or coagulation defects
- Extreme caution in patients with increased intracranial pressure

Results

Increase:

- Protein - Meningitis, Encephalitis
- Lactic acid - Bacterial, tubercular, fungal meningitis
- Myelin Basic Protein - trauma, stroke, tumor, multiple sclerosis, subacute, sclerosing panencephalitis
- RBC count - Hemorrhage

Decrease:

- **Glucose** - Bacterial and Tubercular Meningitis

Nursing Responsibilities

- Secure informed consent
- Obtain history of client's immune and musculoskeletal system
- Obtain a list of the medications the client is taking.
- There are no food, fluid or medication restrictions unless by medical direction Ensure that anticoagulant therapy has been withheld for the appropriate amount of days prior to the procedure.

Post Test

- Observe puncture site for bleeding, CSF leakage or hematoma formation.
- Monitor vital signs and neurologic status and for headache every 15 minutes for 1 hour, then every 2 hours for 4 hours, and then as ordered by health care practitioner.
- If permitted, administer fluids to replace lost CSF
- Position:
 - ✓ Prone (to relieve headache)
 - ✓ Supine (if more than 20 ml CSF was removed)

ELECTRONEUROGRAPHY

- It is performed to identify peripheral nerve injury, to differentiate primary peripheral nerve pathology from muscular injury and to monitor response of the nerve injury to treatment.

Indication

- Confirm the diagnosis of peripheral nerve damage or trauma

Normal: No evidence of peripheral nerve injury or disease.

Abnormal

- Carpal tunnel syndrome
- Diabetic neuropathy
- Guillain-Barre Syndrome
- Herniated Disk Disease
- Muscular Dystrophy
- Myasthenia Gravis
- Poliomyelitis

Nursing Responsibilities

- Make sure a written and informed consent has been signed prior to the procedure and before administering any medications.
- Inform the client that the procedure is performed to measure electrical activity of the muscles
- Obtain a history of neuromuscular and neurosensory status
- There are no food, fluid, or medication restrictions unless by medical direction
- Instruct the client to void before the procedure
- Position: supine / sitting
- Shave the extremity in the area to be stimulated

Post-Test

- When the procedure is complete, remove the electrodes and clean the skin where the electrodes were applied. -
- Monitor electrode sites for inflammation.
- Residual pain = warm compress & take analgesics
- Instruct the patient to resume usual diet, medication, and activity, as directed by the health care practitioner.

Electromyography (EMG)

Other Terms: • Electrodiagnostic study/ Neuromuscular Junction Testing

- Measures skeletal muscle activity during rest. Voluntary contraction and electrical stimulation.

Indications

- Assess primary muscle diseases affecting striated muscle fibers or cell membrane
- Detect anterior poliomyelitis, amyotrophic lateral sclerosis. Amyotonia and spinal tumors
- Detect Guillain-Barre syndrome, Herniated Disc, or Spinal Stenosis
- Differentiate secondary muscle disorders caused by polymyositis, sarcoidosis, hypocalcemia, thyroid toxicity, tetanus and other disorders
- Monitor and evaluate progression of myopathies or neuropathies

Results

- ❖ Normal Finding
 - Normal muscle electrical activity during rest and contraction states
- ❖ Abnormal Findings
 - Amyotrophic lateral sclerosis
 - Bell's palsy
 - Beriberi
 - Carpal tunnel syndrome
 - Diabetic Peripheral Neuropathy
 - Guillain-Barre syndrome
 - Multiple sclerosis
 - Muscular dystrophy
 - Myasthenia gravis
 - Myopathy
 - Polymyositis
 - Radiculopathy
 - Traumatic injury

Contraindications

- Extensive skin infection

- Anticoagulant therapy
- Infection at the sites electrode placement

Nursing Responsibilities

- Make sure a written and informed consent has been signed prior to the procedure and before administering any medications
- Inform the patient that the procedure performed to measure electrical activity of the muscles.
- Obtain a history of neuromuscular and neurosensory status
- Obtain a list of medications the client is taking especially medications known to affect bleeding including anticoagulants, aspirin and other salicylates
- Instruct the client to refrain from smoking and drinking caffeine-containing beverages for hours before the procedure.
- Under medical direction, the client should avoid muscle relaxants, cholinergics, and anticholinergics for 3 to 6 days before the test.
- Assess for the ability to comply with directions given for exercising during the test.
- Ask the client to remain very still and relaxed and to cooperate with the instructions given to contract muscles during the procedure.
- Place the client in a supine or sitting position depending on the location of the muscle to be tested.
- Administer mild analgesic (adult) or sedative (children), as ordered, to promote a restful state before the procedure
- Explain to the client that he/she will expect sensation similar to that of an intramuscular injection as the needle is inserted into the muscle.

Post Test

- Monitor electrode sites for bleeding hematoma or inflammation.
- Inform the client that the muscles may ache for a short time after the procedure.
- Residual pain = Apply warm compresses and take analgesics
- Instruct the client to resume usual diet medication and activity as directed by the health care practitioner.

RESPIRATORY DIAGNOSTIC STUDIES

Chest X-ray

- It is obtained to determine the size, contour and position of the thoracic organs such as heart, lungs, rib cage, etc.

Uses

- Aid in the diagnosis of diaphragmatic hernia, lung tumors, metastasis
- Evaluate known or suspected pulmonary disorders, chest trauma, cardiovascular disorder and disorder and skeletal disorders
- Evaluate positive PPD or Mantoux test
- Monitor resolution, progression or maintenance of disease
- Monitor effectiveness of the treatment regimen

Contraindications

- **Pregnant client**, unless the potential benefits of the procedure far outweigh the risks to the fetus and mother

Nursing Responsibilities

- Inform the client that if the procedure assesses cardiopulmonary status
- Obtain a list of the medications the client is taking
- Review the procedure with the client.
- There are no food, fluid or medical restrictions unless by medical direction.
- Instruct the client to remove dentures, jewelry, hairpins, credit card and other metallic object.
- Place the client in the standing position in the front of the x-ray film or detector
- Ask the client to inhale deeply and hold his or her breath while the x-ray images are taken, and then to inhale after the images are taken.

BRONCHOSCOPY

- ❖ Direct visualization of the larynx, trachea and bronchi through either a flexible fiberoptic bronchoscope or a rigid bronchoscope.

Use

- To examine tissues or collect secretions
- To determine the location and extent of the pathologic process and to obtain a tissue sample for diagnosis
- To determine whether a tumor can be resected surgically
- To diagnose bleeding sites

Contraindications

- Bleeding disorders, with uremia and cytotoxic chemotherapy
- Pulmonary hypertension
- Cardiac conditions
- Disorders that limit extension of the neck
- Severe obstructive tracheal conditions

Nursing Responsibilities

- Secure informed consent.
- Food and fluid are withheld for 6 hours before the test
- Administer preoperative medications
- Remove the dentures and other oral prostheses
- Local / general anesthesia may be used depending on the type of bronchoscopy

Post Test

- NPO until the cough/gag reflex returns
- For elderly patients, nurse assesses for confusion and lethargy
- Offer ice chips and fluids once cough reflex returns
- Monitor client's RR
- Observe for signs of hypoxia, hypotension, tachycardia, dysrhythmias, hemoptysis and dyspnea.
- Instruct the client and significant others to report any shortness of breath or bleeding immediately.

Pulse Oximetry

- ❖ It is a non-invasive study that provides continuous readings of arterial blood oxygen saturation using a sensor site

Area of application

- Earlobe
- Fingertip
- Forehead
- Toes
- Nose

Use

- Determine effectiveness of pulmonary gas exchange function
- Monitor oxygenation during testing for sleep apnea
- Monitor response to pulmonary drug regimens

Results

- ❖ Normal Findings
 - Greater than or equal to 95%
- ❖ Abnormal Findings
 - Abnormal gas exchange
 - Hypoxemia with levels less than 95%
 - Impaired cardiopulmonary function

Nursing Responsibilities

- Inform the patient that the procedure is used to monitor oxygenation of the blood.
- Obtain history of the client's respiratory and cardiovascular system
- Instruct the client not to smoke for 24 hours before the procedure
- If finger is used, instruct the client not to grip treadmill rail or bedrail tightly
- No food, fluid or medication restrictions, unless by medical direction
- Ensure that the patient does not have false fingernails and that nail polish has been removed.
- Massage or apply a warm towel to the upper earlobe or finger (increases blood flow)
- Place the photodetector probe over the finger in such a way that the light beams and sensors are opposite to each other.
- Perform the procedure in an area away from direct, intense light sources.

Thoracentesis

- ❖ Aspiration of fluid or air from the pleural space
- ❖ Takes about 20 minutes
- ❖ Position: Sitting while leaning over the table

Uses

- Removal of fluid and air from the pleural cavity
- Aspiration of pleural fluid for analysis, pleural biopsy, and instillation of medication into the pleural space

Pleural Effusion

Nursing Responsibilities

- Secure informed consent
- Shave the site before the procedure
- Cough suppressant may be given before the procedure
- Sedative or analgesia may be given since discomfort may be expected during needle insertion
- No food or fluid restriction unless by medical direction
- Anticoagulants and aspirin may be withheld.
- Have emergency equipment readily available (in case of laryngospasm)

Post Test

- Position: sitting or side-lying (**unaffected side**) for 1 hour
- Assess pulse rate and respiratory rate and skin color
- Don't remove more than 1.000 ml of fluid from the pleural cavity within the first 30 minutes
- Observe changes in the client's cough, sputum, respiratory depth, and breath sounds and note complaints of chest pain
- Observe the thoracentesis sit for bleeding, inflammation or hematoma formation
- Nausea & pain: administer antiemetic and analgesic medications as ordered by the physician

Arterial Blood Gases (ABG)

- Used to evaluate respiratory function and provide a measure for determining acid-base balance.

Use

- Assess conditions of asthma, COPD, embolism
- Assist in the diagnosis of respiratory failure
- Determine acid-base status, type of imbalance and degree of compensation

NORMAL VALUE	
pH	7.35 — 7.45
PaO ₂	80 — 100 mm Hg
PaCO ₂	35 — 45 mm Hg
HCO ₃	22 — 26 mEq/L
Base excess	-2 to +2 mEq/L
O ₂ saturation	95 — 100 %

Radial artery: most common site

If radial artery will be used, perform Allen's test

- Ensures that the client has adequate collateral circulation (ulnar artery)
- Extend client's wrist over a rolled towel
- Ask the client to make a fist
- Use the 2" and 3rd fingers to locate the pulses on the palmar surface of the wrist
- Nurse compresses the radial and ulnar arteries simultaneously
- After the client opens the fist, the nurse releases pressure on the ulnar artery
- If blood is restored within 6 seconds, the circulation to the hand may be adequate enough to tolerate placement of radial artery catheter.

Ultrasonic Doppler: Most accurate method for assessing arterial perfusion of the hand

Nursing Responsibilities

- Inform the client that the test is used to assess acid-base balance and oxygenation level of the blood.
- Obtain history of the client's respiratory system and any bleeding disorders
- Inform the client that the specimen collection usually takes 10 to 15 minutes
- Prepare an ice slurry in a cup or plastic bag to have ready for immediate transport of the specimen to the laboratory
- Instruct client to breathe normally and to avoid unnecessary movement

Post Test

- Pressure should be applied to the puncture site for at least 5 minutes (unanticoagulated client) and for at least 15 minutes (client receiving anticoagulant)
- Observe puncture site for bleeding or hematoma formation
- Observe client for signs or symptoms of respiratory disturbances
- Educate client on breathing exercises

PULMONARY FUNCTION STUDIES

- Performed to assess respiratory function and to determine the extent of dysfunction

Use

- Useful in monitoring the course of a client with an established respiratory disease and assessing the response to therapy
- Screening test in potentially hazardous industries
- Detect COPD and/or restrictive pulmonary diseases that affect the chest wall
- Evaluate pulmonary disability for legal or insurance claims
- Evaluate the respiratory system to determine the client's ability to tolerate procedures such as surgery or diagnostic studies

LUNG VOLUMES & CAPACITIES	
Tidal volume	Volume inhaled and exhaled during normal quiet breathing N: 500 mL
Inspiratory Reserve Volume	Maximum amount of air that can be inhaled over and above a normal breath N: 3000 mL
Residual Volume	Amount of air remaining in the lungs after maximal exhalation N: 1,200 mL
Vital Capacity	Total amount of air that can be exhaled after a maximal inspiration N: 4, 600 mL
Inspiratory Capacity	Total amount of air that can be inhaled following a normal quiet exhalation N: 3, 500 mL
Functional Residual Capacity	Volume left in the lungs after normal exhalation N: 2. 300 mL
Total Lung Capacity	Total volume of the lungs at the maximum inflation N: 5. 800 mL

Nursing Responsibilities

- Inform the client that the procedure assesses the function of the lungs
- Client should refrain from smoking or eating a heavy meal for 4 to 6 hours prior to the study
- Client should avoid bronchodilators for at least 4 hours before the study
- Position: sitting
- Instruct the client to inhale deeply and then quickly exhale as much air as possible into the mouthpiece

Post Test

- Assess the client for dizziness or weakness after the testing
- Instruct the client to resume usual diet and medications as directed by the health care practitioner
- Allow the client to rest as long as needed to recover

MANTOUX TEST

Other Terms: Purified Protein Derivative (PPD), Tuberculin Skin Test

Done to determine past or present exposure to *Mycobacterium tuberculosis*.

Intradermal injection

This is read after 48 to 72 hours.

Uses

- Evaluate cough, weight loss, fatigue, hemoptysis, and abnormal x-rays to determine if the cause of symptoms is tuberculosis
- Evaluate known or suspected exposure to tuberculosis, with or without symptoms

Nursing Responsibilities

- Inform the client that the test is used to indicate exposure to tuberculosis here are no food, fluid, or medication restrictions, unless by medical direction Emphasize the client that the area should not be scratched or disturbed after the injection and before the reading.
- Mantoux Test Preparation:**
 - ✓ Prepare PPD or old tuberculin in a tuberculin syringe with a short, 26-gauge needle attached.
 - ✓ Prepare the appropriate dilution and amount for the most commonly used intermediate strength (5 tuberculin units in 1 ml)
 - ✓ Inject the preparation infra-dermally at the prepared site as soon as it is drawn up into the syringe.
- Evaluation: at least 10 mm induration (positive exposure for regular patients)
at least 5 mm induration (positive exposure for HIV clients)

PULMONARY ANGIOGRAPHY

- ❖ X-ray visualization of the pulmonary vasculature after injection of an iodinated contrast medium into pulmonary artery.

Uses

- ❖ Detect acute pulmonary embolism
- ❖ Detect arteriovenous malformations, tumors, aneurysm, congenital defects
- ❖ Determine the cause of recurrent or severe hemoptysis

Contraindications

- Allergies to shellfish or iodinated dye
- Bleeding disorder
- Elderly, chronically dehydrated before the test
- Renal failure

Nursing Responsibilities

- Secure informed consent
- Note any recent procedures that can interfere with test results, including examinations using iodine-based contrast medium
- Inform the client that a burning and flushing sensation may be felt throughout the body during injection of the contrast medium
- Client may experience an urge to cough, flushing, nausea or a salty metallic taste
- NPO for 8 hours
- Avoid any anticoagulant medication prior to the procedure
- Remove dentures, jewelry, hairpins, credit cards and other metallic objects
- Have emergency equipment readily available
- The client has a history of severe allergic reactions to any substance or drug, administer ordered prophylactic steroids or antihistamines before the procedure.
- Position: Supine
- Mark the site of the client's peripheral pulses before angiography using pen
- Instruct the client to take slow, deep breaths if nausea occurs during the procedure

Post Test

- Monitor vital signs and neurologic status every 15 minutes for 1 hour, then every 2 hours for 4 hours, and as ordered.
- Observe for delayed allergic reactions, as rash, urticaria, tachycardia, hyperpnea hypertension, palpitations, nausea, et. Vomiting.
- Advise the patients to immediately re, symptoms such as fast heart rate, difficulty breathing, skin rash, itching, or decreased urinary output.
- Instruct the client to apply cold
- Maintain bed rest for 4 to 6 hours

GASTROINTESTINAL STUDIES

Upper GI

Barium swallow

- ❖ Other terms:
 - Esophagram
 - Esophagography

Use

- Confirm the integrity of esophageal anastomoses in the postoperative patient.
- Detect esophageal reflux, tracheoesophageal, fistulas, and varices.
- Determine the cause of dysphagia heartburn or regurgitation
- Determine the type and location of foreign bodies within the pharynx and esophagus

Contraindications

- Intestinal obstruction or suspected esophageal rupture, unless water- soluble iodinated contrast medium is used
- Suspected tracheoesophageal, fistula, unless barium is used.

Nursing Responsibilities

- Inform the patient that the procedure assesses the esophagus.
- Explain to the client that some pain may be experienced during the test, and there may be moments of discomfort

- Inform the client that the procedure is performed in a radiology department, usually by physician and support staff takes approximately 15 to 30 mins.
- NPO for 8 hours prior to the procedure
- Instruct to remove jewelry and other metallic objects
- The client is asked to swallow a barium solution with or without a straw.

Post Test

- Instruct the client to resume usual diet, fluids, medications or activity as directed by the health care practitioner
- If iodine is used, monitor for reaction to iodinated contrast medium
- Monitor for fluid and electrolyte imbalance
- Instruct the patient that stools will be white or light in color for 2 to 3 days.
- Report to the physician if stool does not return to normal color

Lower GI

BARIUM ENEMA

- Radiologic examination of the colon, distal small bowel and occasionally the appendix
- Visualization can be improved by using air or barium as the contrast medium

Uses:

- Determine the cause of rectal bleeding, pus or mucus in feces
- Evaluate suspected inflammatory process congenital anomaly, motility disorder
- Evaluate unexplained weight loss, anemia or change in bowel pattern
- Identified and locate benign or malignant polyps or tumors

Contraindications

- Allergy to shellfish or iodinated dye
- Pregnant or suspected of being pregnant, unless the potential benefits of the procedure far outweigh the risks to the fetus and mother.
- Intestinal obstruction, acute ulcerative colitis, acute diverticulitis, megacolon, or suspected rupture of the colon.

Nursing Responsibilities

- Inform the client that the procedure assesses the colon
- Ensure that this procedure is performed before an upper gastrointestinal study or barium swallow.
- Low-residue and clear-liquid diet 2 days before the procedure
- NPO 8 hours
- Laxatives are given before the procedure
- Remove jewelries, credit cards and other metallic objects

Post Test

- Instruct the patient to resume usual diet, fluids, medications, or activity as directed by the health care practitioner,
- Monitor for delayed allergic reaction (rash, urticaria, tachycardia, hyperpnea, hypertension, palpitations, nausea or vomiting
- Carefully monitor the client for fatigue and fluid and electrolyte imbalance
- Laxatives are then again given after the procedure to aid in the elimination of barium
- Instruct the patient that stools will be white or light in color for 2 to 3 days.
- Increase oral fluid intake

PROCTOSIGMOIDOSCOPY

- ❖ Viewing of the rectum and distal sigmoid colon

Uses:

- Diagnosis of diverticular disease
- Diagnosis of Hirschprung's disease
- Determine the cause of pain and rectal prolapse
- Determine the cause of rectal itching, pain, or burning
- Reduce volvulus of the sigmoid colon
- Remove hemorrhoids by laser therapy
- Screen for colon cancer

Contraindications

- Clients with bleeding disorders, especially disorder associated with uremia and cytotoxic chemotherapy
- Clients with cardiac conditions or arrhythmias

- Clients with bowel perforation, acute peritonitis, ischemic bowel necrosis, toxic megacolon, diverticulitis, recent bowel surgery, severe cardiac or pulmonary disease.

Nursing Responsibilities

- Secure informed consent
- Informed the client that the test is primarily used to examine the rectum and the distal portion of the colon.
- Low residue diet several days before the procedure
- Position: left lateral decubitus position/ knee-chest position
- WOF: abdominal pain, tenderness or distention; pain on defecation; fever
- Encourage the client to drink several glasses of water to help replace fluid lost.

Colonoscopy

- ❖ Allows inspection of the mucosa of the entire colon, ileocecal valve and terminal ileum using a flexible fiberoptic colonoscope inserted through the anus and advanced to the terminal ileum.
- ❖ Procedure may take up to 1 hour.

Uses

- Assess GI function in a patient with a personal or family history of colon cancer, polyps, or ulcerative colitis
- Confirm diagnosis of colon cancer and inflammatory bowel disease
- Determine cause of lower GI disorders, especially when barium enema and proctosigmoidoscopy are inconclusive
- Evaluate stools that show a positive occult blood test, lower GI bleeding, or change in bowel habits
- Remove colon polyps
- Reduce volvulus and intussusception

Contraindications

- Bleeding disorders or cardiac conditions
- Bowel perforation, acute peritonitis, acute colitis, ischemic bowel necrosis, toxic colitis, recent bowel surgery. advanced pregnancy, severe cardiac or Pulmonary disease, recent myocardial infarction
- Colon anastomosis within the past 14 to 21 days.

Nursing Responsibilities

- Secure informed consent
- Inform the patient that the procedure assesses the colon.
- Note intake of oral iron preparations within 1 week before the procedure because these cause black, sticky feces that are difficult to remove with bowel preparation.
- Instruct the patient to eat a low- residue diet for several days before the procedure
- Advise client to limit the intake of liquids for 24 to 72 hours before the examination.
- NPO for 8 hours prior to the procedure
- Laxative may be ordered two nights before the examination (Fleet or Saline enema)
- Have emergency equipment readily available
- Position: Sim's position / Left side with knees flexed
- Administer opioid analgesic or a sedative to provide moderate sedation and relieve anxiety during the procedure

Post Test

- Monitor the patient for signs of respiratory depression.
- Maintain on bed rest until fully alert.
- Observe for signs and symptoms of bowel perforation (rectal bleeding, abdominal pain or distention, fever, focal peritoneal signs)
- Observe the client for indications of chest pain, abdominal pain or tenderness, or breathing problems.
- Inform the patient that belching, bloating, or flatulence is the result of air insufflation.
- WOF: severe pain, fever, difficulty breathing, GI bleeding.

Fecalalysis

Guaiac stool exam

- Used to assess gastro-intestinal bleeding
- Increase fiber diet 48 to 72 hours
- **False Positive Results**
 - ✓ Red meat (beef, lamb, liver, and processed meats)
 - ✓ Raw vegetables or fruits (radishes, turnips horseradish, and melons)
 - ✓ Aspirin or other NSAIDS, iron preparations and anticoagulants
- **False Negative Results**
 - ✓ If client has taken more than 250 mg per day of Vitamin C up to 3 days before the test.

- Taken in 3 consecutive days (3 stool specimens)

Stool for Ova and Parasites

- Specimen should be **sent immediately** (fresh and warm) usually done to detect amoebiasis

Stool for Lipids

- To assess stool for steatorrhea
- Include fats in the diet.
- Avoid alcohol for 3 days (alcohol metabolize fats)
- Avoid mineral oil and other oily medications.
- 72-hour stool specimen is collected.

CARDIOVASCULAR STUDIES

Electrocardiogram (ECG)

- ❖ Records electrical activity of the heart on paper

Uses

- Assess congenital heart disease
- Assess myocardial infarction or ischemia
- Assess function of heart valves
- Detect arrhythmias, pericarditis, and electrolyte imbalances

Nursing Responsibilities

- Inform the client that the procedure assesses cardiac function.
- Inform the client that there will be no discomfort in the procedure.
- Procedure will take 15 minutes approximately.
- Record baseline vital signs
- Shaving may be done to areas which are highly occupied with hair growth

Post test

- Monitor vital signs and compare with baseline values
- Report the following immediately: chest pain, change in pulse rate or shortness of breath

Echocardiography (2D Echo)

- ❖ Non-invasive ultrasound procedure
- ❖ Uses high-frequency sound waves
- ❖ Allows visualization of the size, shape, position, thickness, and movement of cardiac structures

Uses

- Detect arterial tumors
- Detect subaortic stenosis
- Detect ventricular or atrial mural thrombi Evaluate congenital heart disorders
- Evaluate endocarditis
- Monitor prosthetic valve function
- Evaluate the presence of shunt flow and continuity of the aorta
- Evaluate unexplained chest pain, electrocardiographic changes and abnormal chest x-ray

Nursing responsibilities

- Inform the client that the procedure assesses cardiac function
- Remove jewelry, body rings and other metallic objects
- Instruct the client to remain still throughout the procedure because movement produces unreliable results

Holter monitor

- ❖ Other terms:
 - Holter electrocardiography
 - Ambulatory monitoring
 - Ambulatory electrocardiography
- ❖ Records electrical cardiac activity on a continuous basis for 24 hours
- ❖ Non invasive
- ❖ Involves use of a portable device worn around the waist or over the shoulder that records electrical impulse on a magnetic tape

Uses

- Detect arrhythmias that occur during normal activities
- Evaluate activity intolerance related to oxygen supply and demand imbalance
- Evaluate chest pain, dizziness, syncope and palpitations

- Evaluate the effectiveness of anti-arrhythmic medications
- Evaluate pacemaker function

Nursing Responsibilities

- Inform the client that the procedure evaluates how the heart responds to normal activity or to a medication regimen.
- Avoid contact with electrical devices that can affect the strip tracings (shavers, toothbrush, massager, blanket) and to avoid showers and tub bathing.
- Wear loose-fitting clothes
- Instruct the client regarding recording and pressing the button upon experiencing pain or discomfort

Post Test

- Report immediately: fast heart rate or difficulty breathing
- Compare the activity log and tape recordings for changes during monitoring period
- Educate the client regarding access to counseling services

Cardiac Stress testing

Other Terms:

- Exercise electrocardiogram
- Graded Exercise Tolerance Test
- Exercise Stress Test
- Treadmill Test
- ❖ Non-invasive
- ❖ Measures cardiac function during physical stress

Uses

- ❖ Determine the following:
 - CAD
 - Cause of chest pain
 - Functional capacity of the heart after an MI or heart surgery
 - Effectiveness of anti-anginal or anti-arrhythmic medications
 - Dysrhythmias that occur during physical exercise
 - Specific goals for a physical fitness program

Contraindications

- Severe aortic stenosis
- Acute myocarditis / pericarditis
- Severe hypertension
- Suspected left main CAD
- Heart Failure
- Unstable angina

Nursing Responsibilities

- Secure informed consent
- NPO 4 hours before the test
- Avoid stimulants such as tobacco and caffeine
- Instruct not to take any certain cardiac medications before the test if ordered by the physician
- Attire: clothes which are suitable for exercising and sneakers or rubber-sole shoes
- Women are advised to wear bra that provides adequate support
- Educate client on the equipment that will be used as well as the sensation and experiences that the client may have during the test
- Instruct the client to report symptoms such as dizziness, sweating, breathlessness or nausea during the test (these are normal as speed increases)
- Test are terminated if pain or fatigue is severe

Post test

- Report any angina pain or other discomforts experienced after test
- Instruct the client regarding special dietary intake and medication regimen

Cardiac Catheterization

- ❖ It is an invasive diagnostic procedure in which radiopaque arterial and venous catheters are introduced into selected blood vessels of the right and left sides of the heart.

Uses

- Diagnose CAD
- Assess coronary artery patency
- Determine the extent of atherosclerosis
- Determine whether revascularization procedure
- Diagnose pulmonary arterial hypertension
- Treat stenotic heart valves via percutaneous balloon valvuloplasty

Complications

- Comorbid conditions -- including diabetes, heart failure, pre-existing renal disease, hypotension or dehydration.
- Elderly

Nursing Interventions

- Instruct to fast, usually for 8 to 12 hours, before the procedure.
- Secure informed consent
- Advise that it will involve lying on a hard table for less than 2 hours.
- Reassure that IV medications are given to maintain comfort.
- Inform about sensations that will be experienced during the catheterization
- Explain to the client that an occasional pounding sensation (palpitation) may be felt in the chest
- Ask to cough and to breathe deeply.
- Encourage to express fears and anxieties.

Post Procedure

- The catheter access site is observed for Bleeding or hematoma formation.
- Temperature, color and capillary refill of the affected extremity are frequently evaluated.
- Assess the apical and peripheral pulses for change in rate and rhythm
- Bed rest is maintained for 2 to 6 hours after the procedure
- Head of the bed no greater than 30 degrees
- Provide analgesics
- Instruct to report chest pain and bleeding or sudden discomfort from the catheter insertion sites
- Oral and IV hydration is used to increase urinary output and flush the contrast agent from the urinary tract.
- Provide client's safety by assisting him/her when getting out of bed for the first time after the procedure.

ENDOCRINE STUDIES

Radioactive Iodine Uptake

- ❖ Measures the ability of the thyroid gland to concentrate and retain circulating iodide for synthesis of thyroid hormone
- ❖ Used for evaluation of thyroid function.

Uses

- Evaluate hyperthyroidism and/or hypothyroidism
- Evaluate neck pain
- Evaluate as part of a complete thyroid evaluation for symptomatic clients
 - Swollen neck
 - Extreme sensitivity to heat or cold
 - Jitter
 - Sluggishness
- Evaluate thyroiditis, goiter or pituitary failure
- Monitor response to therapy for thyroid disease

Contraindication

- Pregnant or suspected of being pregnant, unless the potential benefits of the procedure far outweigh the risks to the fetus and mother

Nursing Responsibilities

- Inform the client that the procedure assesses thyroid function
- Inform the client that the procedure may take approximately 15 to 30 minutes.
- Instruct the client to remove dentures,
- jewelry, hairpins, credit cards and other metallic objects
- NPO for 8 to 12 hours before the procedure but the client may eat 4 hours after the test begins, unless otherwise indicated.

- Administer the I-123 orally
- Wear gloves during the radionuclide administration and while handling the client's urine
- drugs that may elevate results: barbiturates, estrogen, lithium
- Drugs that may decrease results. Lugol's solution, SSKI, anti-thyroid, antihistamines

Post Test

- Instruct the client to resume usual diet, as directed by the health care practitioner
- Increase OFI for 24 hours, unless contraindicated
- Educate client that radionuclide is eliminated from the body within 24 hours
- Flush toilet immediately for three times after each voiding following the procedure
- Wash hands meticulously with soap and water after each voiding for 24 hours after the procedure.

Thyroid Scan

- ❖ Other Terms:
 - Thyroid Scintiscan
 - Iodine Thyroid Scan
 - Technetium Thyroid Scan
- ❖ Assesses thyroid size, assisting in differential diagnosis of masses in the neck, base of the tongue and ruling out possible ectopic thyroid tissue.
- ❖ Performed after oral administration of radioactive iodine-123 or 1-131, or intravenous injection of technetium-99m.

Uses

- Assess palpable nodules
- Assess the presence of enlarged thyroid gland
- Detect malignant or benign thyroid tumors
- Detect causes of neck or substernal masses
- Detect forms of thyroiditis

Nursing Responsibilities

- Inform the client that the procedure assesses thyroid function and structure
- NPO for 8 to 12 hours prior to the procedure
- Remove jewelries, dentures and other metallic objects
- Administer sedative to a child or to an uncooperative adult, as ordered
- Oral I-123 should be administered 24 hours before scanning or IV technetium-99m 20 minutes before scanning

Post Test

- Increase OFI for 24 to 48 hours unless contraindicated
- Flush toilet immediately after each voiding following the procedure
- Wash hands after each voiding

Thyroid Stimulation Hormone Assay

- ❖ Other term: Thyrotropin

Uses

- Assist in the diagnosis of congenital hypothyroidism
- Assist in the diagnosis of hypo/hyperthyroidism.

Nursing Responsibilities

- Inform the client that the procedure may take approximately 5 to 10 minutes
- Inform the client that there may be some discomfort during the venipuncture
- Observe venipuncture site for bleeding or hematoma formation

Result

Increased	Congenital hypothyroidism Primary hypothyroidism Thyroid hormone resistance thyroiditis
Decreased	Excessive thyroid hormone replacement Grave's disease primary hyperthyroidism

Free Thyroxine Concentration

- ❖ Used to evaluate signs of hypothyroidism or hyperthyroidism
- ❖ Also used to monitor response to therapy for hypo/hyperthyroidism

Result

Increased	Hyperthyroidism Hypothyroidism treated with T ₄
Decreased	Hyperthyroidism Hyperthyroidism treated with tri-iodothyronine (T ₃) Pregnancy (late)

Vanillylmandelic Acid (VMA) Test

- ❖ Vanillylmandelic acid is a major metabolite of epinephrine
- ❖ 24-hour urine specimen

Uses

- Assist in the diagnosis of neuroblastoma, ganglioneuroma or **pheochromocytoma**
- Evaluate hypertension of unknown cause

Nursing Responsibilities

- Inform the client that all urine **must** be saved during the 24-hour period.
- Abstain from smoking for 24 hours before the test
- Avoid foods high in amines for 48 hours (bananas, avocados, beer, aged cheese, chocolate, cocoa, coffee)
- Avoid foods or fluids high in caffeine for 48 hours before the test
- Avoid any food or fluids containing vanilla or licorice
- Avoid the following medications for 2 weeks: aspirin, pyridoxine, levodopa, amoxicillin, carbidopa
- Avoid excessive exercise and stress during the 24-hour collection of urine

Total Plasma Catecholamine Concentration

- ❖ Assist in the diagnosis of neuroblastoma, ganglioneuroma or dysautonomia
- ❖ Assist in the diagnosis of paragangliomas
- ❖ Assist in the diagnosis of pheochromocytoma
- ❖ Evaluate hypertension of unknown origin

RESULT	
Increased	Diabetic acidosis Ganglioblastoma Ganglioneuroma Hypothyroidism MI Neuroblastoma Pheochromocytoma
Decreased	Autonomic Nervous System Dysfunction Orthostatic Hypotension Parkinson's Disease

Nursing Responsibilities

- Normal-sodium diet for 3 days before testing
- Abstain from smoking tobacco 24 hours
- Avoid consumption of foods high in amines for 48 hours
- NPO for 10 to 12 hours

Post Test

- Assess client for increased pulse and blood pressure, hyperglycemia, shakiness and palpitations
- Observe venipuncture site for bleeding or hematoma formation.

Oral Glucose Tolerance Test (OGTT)

- ❖ Done to evaluate abnormal fasting or postprandial blood glucose levels that do not clearly indicate diabetes
- ❖ Identify impaired glucose metabolism
- ❖ Detection of gestational diabetes mellitus

Nursing Responsibilities

- NPO for 8 to 12 hours
- Take regular diet for at least 3 days before the test
- Avoid smoking before and during the test
- Series of blood specimen will be collected after ingestion of glucose

Glycosylated Hemoglobin

- ❖ Most accurate indicator of DM
- ❖ Reflects serum glucose levels up to 3 months
- ❖ Use: Assess long-term glucose control in diabetics

RESULT	
Increased	Diabetes (poorly controlled or uncontrolled)
Decreased	Chronic blood loss Chronic renal failure Conditions that decrease red blood cell lifespan Hemolytic anemia

Fasting Blood Glucose

- ❖ NPO for 8 to 12 hours before specimen collection
- ❖ Initial test for diabetes
- ❖ Normal: 70 — 110 mg/dL

2-hour Postprandial Blood Sugar Test

- ❖ Measures the blood glucose levels 2 hours after the client ingests food

HEPATOBIILIARY SYSTEM

Paracentesis

- ❖ Removal of fluid from the peritoneal cavity through a puncture or a small surgical incision through the abdominal wall under sterile conditions

Nursing Responsibilities

- Void before the procedure
- Position: sitting
- Maintain client's privacy
- Observe the client closely for signs of distress
- Observe for signs of hypotension and hypovolemic shock
- Place a small sterile dressing over the site of the incision

Post Test

- Observe for hypotension and hypovolemic shock
- Observe for scrotal edema
- Monitor VS
- Measure abdominal girth

Liver Biopsy

- ❖ Removal of small amount of liver tissue usually through needed aspiration
- ❖ Permits the examination of liver cells

Uses

- Evaluate diffuse disorders of the parenchyma
- Diagnose space-occupying lesions

Nursing Responsibilities

- Ascertain that results of coagulation tests and compatible donor blood are available
- Secure informed consent
- Obtain baseline vital signs
- Position: Supine; expose right side of the client's abdomen

Nursing Responsibilities

- Ascertain that results of coagulation tests and compatible donor blood are available
- Secure informed consent
- Obtain baseline vital signs
- Position: Supine; expose right side of the client's abdomen

- Instruct to inhale and exhale deeply several times and finally exhale and hold breath at the end of expiration
- Instruct client to resume breathing after the physician aspirates and withdraws the needle

Post Procedure

- Position: client is turned on the right side for several hours
- Place a pillow under the costal margin
- Avoid coughing or straining
- Monitor VS
- Avoid heavy lifting and strenuous activity for one week

Liver Function Test

Serum Aminotransferase Studies (AST and ALT)

AST

N: 10-40 units (4.8-19 U/L)

RESULTS	
Increased	Liver or Biliary Disorder MI CVA
Decreased	Pregnancy DKA Salicylates

ALT

N: 5-35 units (2.4-17 U/L)

RESULTS	
Increased	Liver Disorder Muscular Dystrophy Renal Failure Shock
Decreased	Salicylates

Pigment Studies

RESULTS	
Serum bilirubin (direct)	0 - 0.3 mg/dL
Serum bilirubin (total)	0 - 0.9 mg/dL
Urine urobilinogen	0.05 - 2.5 mg/24 hr
Fecal urobilinogen	50 - 300/24 hr

- These studies measure the ability of the liver to conjugate and excrete bilirubin.
- Results are abnormal in liver and biliary tract disease and are associated with jaundice clinically

Protein Studies

RESULTS	
Total serum protein	7.0 - 7.5 g/dL
Serum albumin	4.0 - 5.5 g/dL
Serum globulin	1.7 - 3.3 g/dL
Albumin / globulin (A/G ratio)	A > G or 1.5: 1 - 2.5:1

GENITO-URINARY STUDIES

RENAL CONCENTRATION TESTS	
Specific Gravity	<ul style="list-style-type: none"> • N: 1.010 - 1.025 Evaluates ability of the kidneys to concentrate solutes

Urine Osmolality	300-900 mOsm/kg/24 h This test may disclose early defects in renal function
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SERUM TESTS

Creatinine level	0.6 - 1.2 mg/dL Measures effectiveness of renal function
BUN	7 - 18 mg/dL Serves as index of renal function

Kidney, Ureter and Bladder Study (KUB)

- Provides information regarding the structure, size and position of abdominal organs

Uses

- Determine the cause of acute abdominal pain or palpable mass
 - Evaluate:
 - ✓ Effects of lower abdominal trauma
 - ✓ Known or suspected intestinal obstruction
 - ✓ Presence of renal, ureter, or other organ calculi
 - ✓ Suspected abnormal fluid, air, or metallic object

Nursing Responsibilities

- Inform the client that the procedure assesses the status of the abdomen
- Remove jewelries and other metallic objects
- Explain to the client that little or no pain is expected during the test
- Bowel preparation (laxative in the evening and enema in the morning as ordered)

Cystoscopy

- Provides direct visualization of the urethra, urinary bladder and ureteral orifices

Uses

- Coagulate bleeding areas
- Determine possible source of persistent urinary tract infections
- Determine source of hematuria of unknown cause
- Dilate urethra and ureters
- Evaluate the function of each kidney
- Evaluate the extent of prostatic hyperplasia
- Identify and remove polyps

Nursing Responsibilities

- Secure informed consent
- Done under local, general or spinal anesthesia
- NPO for 8 hours
- For local anesthesia, allow only clear liquids 8 hours before the procedure
- Obtain baseline Vital Sign
- Instruct to void before the procedure
- Position: lithotomy

Post Test

- Bed rest until vital signs are stable
- Urine may be blood-tinged for the first and second voiding after the procedure
- Report: persistent flank or suprapubic pain, fever and chills
- Dysuria, blood-tinged urine and urinary frequency can be expected after the procedure
- Increase OR after the procedure
- Monitor fluid intake and UO for 24 hours after the procedure
- Warm sitz bath

RETROGRADE URETEROPYELOGRAPHY

- Uses a contrast medium introduced through a catheter during cystography and radiographic visualization to view the renal collecting system.

Uses

- Evaluate:
 - ✓ Effects of urinary system trauma
 - ✓ Known or suspected ureteral obstruction
 - ✓ Placement of a ureteral stent or catheter
 - ✓ Presence of calculi in the kidneys, ureters or bladder

Contraindications

- Allergies to shellfish or iodinated dye.
- Elderly and other clients who are chronically dehydrated before the test
- Renal failure
- Renal insufficiency
- Multiple myeloma who may experience decreased kidney function

Nursing Responsibilities

- Secure informed consent
- Discontinue anticoagulant therapy and other salicylate substances
- Local anesthesia may be used
- NPO for 8 hours
- Assess for iodine allergy
- Remove dentures, jewelry, hairpins, and other metallic objects
- Record baseline vital signs and assess neurologic status

Post Test

- Observe for delayed allergic reactions
- Apply cold compress to the puncture site
- Monitor for signs and symptoms of sepsis and severe pain
- Increase oral fluid intake

Endoscopic Retrograde Cholangiopancreatography (ERCP)

- Permits direct visualization of structures that laparotomy previously could be seen only during

Uses

- Evaluate the presence and location of ductal stones
- Assess jaundice of unknown cause to differentiate biliary tract obstruction from liver disease
- Perform therapeutic procedures, such as sphincterotomy and placement of biliary drains

Results

- Normal Findings
 - ✓ Normal appearance of the duodenal papilla
 - ✓ Patency of the pancreatic and common bile ducts

Abnormal Findings

- Duodenal papilla tumors
- Pancreatic cancer
- Pancreatic fibrosis
- Pancreatitis
- Sclerosing cholangitis

Contraindications

- Pregnant or suspected of being pregnant, unless the potential benefits of the procedure far outweigh the risks to the fetus and mother.
- Allergies to shellfish or iodinated dye

Nursing Interventions

- Secure informed consent
- Inform the client that the procedure assesses the biliary ducts
- Ensure that this procedure is performed before an upper gastrointestinal study or barium swallow
- NPO for 8 hours prior to the procedure
- Assess for completion of bowel preparation according to the institution's procedure

- Instruct the client to remove jewelry, including watches, credit cards, and other metallic objects.
- Administer ordered sedation
- An x-ray of the abdomen is obtained to determine if any residual contrast medium is present from previous studies.
- Position: Left lateral position with left arm behind the back and right hand at the side with the neck slightly flexed.

Post Procedure

- Instruct the client to resume usual diet, fluids, medications, or activity after 24 hours or as directed by the health care practitioner.
- Do not allow the patient to eat or drink until the gag reflex returns, after which the patient is permitted to eat or drink until the gag reflex returns, after which the patient is permitted to eat lightly for 12 to 24 hours
- Monitor vital signs and neurologic status every 15 minutes for 1 hour, then every 2 hours for 4 hours, and as ordered. Take temperature every 4 hours for 24 hours. Compare with baseline values.
- Monitor for reaction to iodinated contrast medium, including rash, urticaria, tachycardia, hyperpnea, hypertension, palpitations, nausea, or vomiting.
- Tell the patient to expect some throat soreness and possible hoarseness.
- Inform the patient that any belching, bloating, or flatulence is the result of air insufflation.
- Emphasize that any severe pain, fever, difficulty breathing, or expectoration of blood must be reported to the physician immediately.

HEMATOLOGY STUDIES

Complete Blood Count

- ❖ Identifies the total number of white and red blood cells and platelets.
- ❖ Measures hemoglobin and hematocrit

	NORMAL VALUE
Hemoglobin	M: 13 - 18 g/dL F: 12 - 16 g/dL
Red Blood Cell	M: 4.7-6.1 million/mm ³ F: 4.2 - 5.4 million/mm ³
White Blood Cell	4,500 -11,000/mm ³
Mean Corpuscular (MCV)	81 – 96 fL
Mean Corpuscular Hemoglobin Concentration	33-36 g/dL
Prothrombin Time (PT)	9.5-12 seconds
Partial Thromboplastin Time (PTT)	60-70 seconds

Bone Marrow Biopsy

- ❖ Involves the removal of a small sample of bone marrow by aspiration, needle biopsy, or open surgical biopsy for a complete hematologic analysis

Uses

- Assess how an individual's blood cells are being formed
- Assess the quantity and quality of each type of cell produced within the marrow
- Used to document infection or tumor within the marrow
- Evaluate abnormal results of complete blood count or white blood cell count
- Evaluate hepatomegaly or splenomegaly
- Identify bone marrow hyperplasia or hypoplasia
- Monitor bone marrow response to chemotherapy or radiation therapy

Results

- ❖ Increased Reticulocytes:
 - Compensated red blood cell (RBC) loss
 - Response to Vitamin B12 therapy

- ❖ Decreased Reticulocytes:
 - Aplastic crisis of sickle cell anemia
- ❖ Increased Neutrophils:
 - Acute myeloblastic leukemia
- ❖ Decreased Neutrophils:
 - Aplastic anemia
 - Leukemias (Monocytic & Lymphoblastic)
- ❖ Increased Lymphocytes:
 - Aplastic anemia
 - Lymphatic leukemia
 - Lymphomas
 - Lymphosarcoma
 - Mononucleosis
 - Viral infections
- ❖ Increased Plasma Cells:
 - Cirrhosis of the liver
 - Connective tissue disorder
 - Hypersensitivity reactions
 - Infections
 - Ulcerative colitis
- ❖ Increased Megakaryocytes:
 - Hemorrhage
 - Increasing age
 - Infections
 - Myeloid leukemia
 - Pneumonia
 - Polycythemia vera
 - Thrombocytopenia
 - Increased Eosinophils:
 - Bone marrow cancer
 - Lymphadenoma
 - Myeloid leukemia

Interfering Factors

- Recent blood transfusions, iron therapy, or administration of cytotoxic agents may alter test results.
- Contraindicated in clients with bleeding disorders.
- Failure to follow dietary restrictions before the procedure may the procedure to be canceled or repeated=
Proximal

Nursing Interventions

- Secure informed consent.
- Inform the client that the test is used to establish a histologic diagnosis of bone marrow and immune system disease.
- Obtain a history of the client's complaints, including a list of known allergens
- Obtain a history of the client's hematopoietic and immune systems, any bleeding disorders and results of previously performed laboratory tests
- Obtain a list of medications the client is taking, including anticoagulant therapy, acetylsalicylic acid, and nutritional supplements, especially those known to affect coagulation.
- Inform the client that it may be necessary to shave the site before the procedure
- Explain that a sedative and/or analgesia may be administered to promote relaxation and reduce discomfort
- Explain that an intravenous line may be inserted to allow infusion of IV fluids, anesthetics or sedatives
- NPO for at least 4 hours prior to the procedure.
- Have emergency equipment readily available.
- Have the client void before the procedure.
- Assist the client to the desired position depending on the test site to be used.
 - ✓ Young children = L4
 - ✓ Adults = Sternum or iliac crest

- ✓ Side-lying position = iliac crest or tibial sites
- ✓ Supine = sternum

Post Test

- Instruct the client to resume preoperative diet, as directed by the health care practitioner.
- Monitor vital signs and neurologic status every 15 minutes for 1 hour, then every 2 hours for 4 hours and then as ordered by the health care practitioner.
- Observe for delayed allergic reactions such as rash, urticarial, tachycardia, hyperpnea, hypertension, palpitations, nausea or vomiting.
- Observe the biopsy site for bleeding, inflammation or hematoma formation.
- Instruct to report any redness, edema, bleeding or pain at the biopsy site.
- Instruct to report chills or fever.
- Assess for nausea and pain.
- Administer antibiotic therapy if ordered