Chapter 11
Vital Signs

Vital Signs
- Includes temperature, pulse, respirations, and blood pressure
- Ability to obtain accurate measurements is critical
- Often provide the basis for problem-solving
- Many facilities are using fifth vital sign—pain level or comfort level (see Chapter 16)

Guidelines for Obtaining Vital Signs
- The nurse must be able to do the following
  - Measure vital signs correctly
  - Understand and interpret the values
  - Communicate the findings appropriately
  - Refer to Box 11-1
When Vital Signs Are Assessed

- Temperature, pulse, respirations, and blood pressure are usually assessed at the same time at set intervals
- A set of vital signs is taken when the patient is admitted to the facility, and then as prescribed by the health care provider or as policy dictates
- Example: every 4 hours, once a shift, weekly

When Vital Signs Are Assessed (Cont.)

- The more ill the patient, the more frequently vital signs are taken
- Vital signs are interrelated
  - A rise in temperature of 1° F may cause an increase in the pulse rate by 4 beats per minute
  - Respiratory rate and blood pressure readings increase with a rise in temperature
  - Blood pressure falls because of hemorrhage, the pulse and respirations increase, and the temperature usually decreases

Recording Vital Signs

- Graphic flow sheet
  - Used for charting vital signs
  - “R” indicates a rectal temperature
  - “Ax” indicates an axillary temperature
  - Blood pressures are always written with the systolic first and the diastolic beneath
    • Example: 120/80
  - Apical pulse is indicated with an “ap” next to the number
    • Example: 78 ap
Recording Vital Signs (Cont.)

- Any abnormal findings are reported to the nurse manager or health care provider immediately
- Any accompanying signs and symptoms such as chest pain, vertigo, shortness of breath, flushing, and diaphoresis should be documented as well
- The nurse should document any interventions initiated as a result of vital sign readings, such as tepid bath

Temperature

- The body’s regulation of temperature
  - A relative measure of sensible heat or cold
  - The body strives to maintain a temperature of 98.8°F (37°C), which is normal
  - Normal range is 97° to 98.8°F (36.1° to 37.5°C)
  - Many factors can cause body temperature variances
    - Environment, time of day, patient’s state of health, activity levels, and stage of monthly menstrual cycle
  - The hypothalamus helps maintain a balance between heat lost and heat produced by the body

Temperature (Cont.)

- The body’s regulation of temperature
  - Two types of body temperature
    - Core temperature
      - Temperature of the deep tissues of the body
      - Remains relatively constant unless exposed to severe extremes in environmental temperature
      - Assessed by using a thermometer
    - Surface temperature
      - Temperature of the skin
      - May vary a great deal in response to the environment
      - Assessed by touching the skin
Temperature (Cont.)

- The body’s regulation of temperature
  - Temperature elevations are frequently the first sign of illness (Box 11-5)
  - Define terms
    - Pyrexia, febrile, hyperthermia, and hypothermia
  - Fever is a body defense and can destroy invading bacteria
    - Fevers are classified as constant, intermittent, or remittent

Temperature (Cont.)

- Obtaining temperature measurements
  - Temperature measurements are obtained by several methods
    - Heat-sensitive patches
    - Electronic thermometers
    - Tympanic thermometer
    - Temporal artery method

Auscultating Using the Stethoscope

- The nurse uses a stethoscope when assessing the apical heart rate
- Major parts of the stethoscope
  - Earpieces
    - Should fit snugly and comfortably in the nurse’s ears
  - Binaurals
    - Should be angled and strong enough that the earpieces stay firmly in the ears without causing discomfort
Auscultating Using the Stethoscope (Cont.)

- Major parts of the stethoscope
  - Tubing
    - Should be flexible and 12-18 inches long
    - Can have single or dual tubes
  - Chest piece
    - Diaphragm: circular, flat-surfaced portion of the chest piece; transmits high-pitched sounds created by the high-velocity movement of air and blood
    - Bell: bowl-shaped chest piece, usually surrounded by a rubber ring; transmits low-pitched sounds created by the low-velocity movement of air and blood

- Auscultate—listen for sounds within the body to evaluate or detect potential abnormalities
- When using the stethoscope, it is best for the nurse and patient to remain quiet
- Important to clean stethoscope between patients to maintain infection control

Pulse

- The body’s regulation of pulse
  - Pulse is a rhythmic beating or vibrating movement
  - The pulse is the regular, recurrent expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the last ventricle of the heart as it contracts
  - The nurse notes the rate, rhythm, and volume of the pulse
  - Adult pulse rate is normally between 60 and 100 beats per minute
Pulse (Cont.)

- The body's regulation of pulse
  - Tachycardia
  - Bradycardia

Pulse (Cont.)

- The body's regulation of pulse
  - Dysrhythmia
    - Any disturbance or abnormality in a normal rhythmic pattern of the heartbeat
    - Irregularity in the normal rhythm of the heart
  - Important to follow agency policy when documenting and describing the pulse

Pulse (Cont.)

- Obtaining pulse measurements
  - Note the rate, rhythm, and volume (or strength) of the pulse
  - Palpate pulses using the pads of your index and middle fingers (Skill 11-2)
  - Assess pulses on both sides of the peripheral vascular system
  - It is acceptable to assess all symmetric pulses simultaneously except the carotid pulse
Pulse (Cont.)

- Obtaining pulse measurements
  - Measure the carotid pulse in the patient’s neck on the side facing you
  - When a patient’s condition suddenly deteriorates, the carotid pulse is the best to assess first
  - Major pulses include temporal, facial, carotid, brachial, radial, femoral, popliteal, posterior tibial, and dorsalis pedis; the pulses provide both general and specific information

Pulse (Cont.)

- Obtaining pulse measurements
  - Auscultating the apical rate is essential on all cardiac patients
  - Apical refers to apex (the tip, end, or top) of the heart
  - Apical pulse is the actual beating of the heart
  - When auscultating the apical rate, the “lub-dub” that is heard represents one cardiac cycle, or heartbeat

Pulse (Cont.)

- Obtaining pulse measurements
  - Pulse deficit—difference between the radial and apical rates
  - Pulse deficit is confirmed by one nurse listening to the apical rate, and a second nurse palpating the radial pulse at the same time, using the same watch for 1 full minute
  - There is a deficit when the radial rate is less than the apical rate
Respiration

- Respiratory function
  - *Respiration* defined as the taking in of oxygen, its utilization in the tissues, and the giving off of carbon dioxide; the act of breathing (i.e., inhaling and exhaling)
  - Both internal and external
  - *Internal respiration* refers to the exchange of gas at the tissue level caused by the process of cellular oxidation
  - *External respiration* refers to the patient’s breathing movements that are observed

Respiration (Cont.)

- Respiratory function
  - The normal respiratory rate for an adult is between 12 and 20 respirations per minute
  - Tachypnea—rapid respiratory rate
  - Bradypnea—slow respiratory rate
  - Depth of respiration is determined by the amount of air taken in on inhalation

Respiration (Cont.)

- Assessment of respiration
  - When assessing respirations, note the rate, depth, quality, and rhythm
  - Assessment of respirations is done by observing the movement of the diaphragm and the intercostal muscles
  - Dyspnea—breathing with difficulty
Respiration (Cont.)

- Assessment of respiration
  - Assessing patterns of breathing is another part of checking respiratory status
  - Apnea—lack of spontaneous breathing
  - Cheyne-Stokes respirations—an abnormal pattern of respiration characterized by alternating periods of apnea and deep, rapid breathing
  - Hypoventilation—when the rate of ventilation entering the lungs is insufficient for metabolic needs

- A patient can experience hypoventilation after certain procedures such as surgery because deep breathing can cause pain or discomfort
- The best time to obtain respirations is immediately after counting a radial or apical pulse
- The patient will be unaware you are doing this and will be less likely to consciously alter respirations

Blood Pressure

- Factors determining blood pressure
  - Pressure exerted by the circulating volume of blood on the arterial walls, the veins, and the chambers of the heart
  - Measured in millimeters of mercury (mm Hg)
  - Systolic pressure
  - Diastolic pressure
Blood Pressure (Cont.)

- Factors determining blood pressure
  - Pulse pressure
  - Cardiac output
  - See Box 11-13 and Table 11-4 for factors influencing blood pressure
  - See Table 11-5, Recommendations for a follow-up on blood pressure readings

Blood Pressure (Cont.)

- Normal adult blood pressure is 120/80 mm Hg
- Hypertension—blood pressure elevated
- Hypotension—blood pressure below normal

Blood Pressure (Cont.)

- Orthostatic hypotension
  - A drop of 25 mm Hg in systolic pressure and a drop of 10 mm Hg in diastolic pressure when a person moves from lying to sitting or sitting to standing
  - The patient frequently will feel lightheaded and unstable
  - Advise the patient to rise slowly from lying to standing, thus preventing blood volume from shifting suddenly (Box 11-14)
- Conditions causing alterations in blood pressure (Table 11-6)
Blood Pressure (Cont.)

- Obtaining blood pressure measurements
  - Sphygmomanometer
    - A device for measuring the arterial blood pressure
    - Consists of an inflatable cuff and a gauge

- Be certain to inflate the cuff enough to hear the true systolic pressure before the auscultatory gap
- Palpation of the radial artery helps to determine how much to inflate the cuff
- Inflate the cuff 30 mm Hg above the pressure at which the radial pulse was palpated and disappeared
- Important for environment to be quiet and equipment to be in good working order

- If sounds are heard immediately after inflation of the cuff and the beginning of listening, the pressure should be immediately and completely released
- The cuff can then be reinflated to a point 30 mm Hg above where the sounds were heard the first time after a 60-second wait.
- If unable to auscultate sounds because of a weakened arterial pulse, a Doppler ultrasonic stethoscope may be needed
Blood Pressure (Cont.)

- Assessment of blood pressure in the lower extremities
  - Occasionally the upper extremities may be inaccessible, so blood pressure must be measured in the lower extremities
    - The popliteal artery, located behind the knee, is the site for auscultation
    - The cuff must be wide and long enough to allow for the larger girth of the thigh and is positioned with the bladder over the posterior aspect of the midthigh

Blood Pressure (Cont.)

- Electronic measurement devices
  - Many automatic devices can determine blood pressure automatically
  - Once the cuff is applied, the nurse can program the device to obtain and record blood pressure readings at preset intervals

- Self-measurement
  - Portable home devices
  - Stationary automated machines

Question 1

Which is true regarding body temperature?
(Select all that apply.)

1. Core temperature is the deep tissues of the body.
2. Surface temperature is the skin of the body.
3. Both core and surface temperatures stay relatively constant at all times.
4. Temperature elevations are frequently the first sign of illness.
Question 2

Which is known as the fifth vital sign?
1. Temperature
2. Pulse
3. Respirations
4. Blood Pressure
5. Pain

Question 3

Which statement is true regarding the apical pulse?
1. The apical pulse site is best for finding a pulse quickly.
2. The apical pulse is located on the thumb side of the inner wrist.
3. Apical refers to apex of the heart and the apical pulse refers to the actual beating of the heart.
4. The apical pulse can be found at the sternum.

Height and Weight

- Helps assess normal growth and development
- Aids in proper drug dosage calculation
- May be used to assess the effectiveness of drug therapy, such as diuretics
- Significant loss of weight may be a sign of an underlying disease
Height and Weight (Cont.)

• Obtaining weight measurements
  ➢ Patients should be weighed the same time of day, on the same scale, and in the same type or amount of clothing
  ➢ 1 liter of fluid = 1 kilogram (kg) = 2.2 pounds [lb]
  ➢ A significant loss or gain of weight can point to an underlying disease

Height and Weight (Cont.)

• Obtaining weight measurements
  ➢ Various types of scales
    • Standing scale (Skill 11-6)
    • Chair and sling scales for patient who cannot bear weight (Figure 11-16)
    • Bed scales for the very sick patient

Height and Weight (Cont.)

• Obtaining height measurements
  ➢ Patient should remove shoes and stand erect
  ➢ A measuring stick or tape may be attached vertically to the weight scales or wall
  ➢ Standing scales may have a metal rod, which is attached to the back of the scale and swings out over the top of the patient’s head
Nursing Process

- Role of the licensed practical nurse (LPN) or licensed vocational nurse (LVN) in the nursing process
  - Participate in planning care based on client needs
  - Review plan of care and recommend revisions as needed
  - Review and follow defined prioritization for patient care
  - Use clinical pathways, care maps, or care plans to guide and review patient care

Assessment

- Obtain baseline vital signs on initial contact with patient
- Baseline vitals help guide development of plan of care
- Assessment helps develop the following as part of plan of care
  - Normal daily fluctuations
  - Factors that could interfere with accuracy of vital signs readings
  - Medications that could influence vital signs
  - Factors that influence vital signs
  - Conditions that precipitate fever, such as infections
  - Previous history of vital signs from old records

Nursing Diagnosis

- Possible nursing diagnoses used related to vital signs
  - Deficient fluid volume
  - Hyperthermia
  - Hypothermia
  - Risk for imbalanced body temperature
  - Impaired gas exchange
Expected Outcomes and Planning

- A possible patient-centered goal is often “patient’s vital signs will be within normal range”
- Expected outcomes often include the following
  - Patient’s vital signs are within normal range for age group.
  - Baseline is established for patients with chronic diseases such as COPD

Implementation

- Severity of alteration in a vital sign will influence the priorities in the care of the patient
- Interventions used to treat patient are determined by individual patient needs
- See Boxes 11-6, 11-10, 11-12, and 11-15

Evaluation

- Evaluate all nursing interventions by comparing the patient’s actual responses to the outcomes in the care plan
Question 4

Which are true regarding obtaining weight measurements? (Select all that apply.)
1. Patient should be measured at the same time of day on the same scale.
2. Patient should weigh self in the morning before eating.
3. Patient should weigh self in the evening before bedtime.
4. Patient should weigh self with the same amount of clothing.

Question 5

When developing a care plan for a patient who has congestive heart failure, what would be the priority nursing intervention?
1. Daily weights
2. Weekly temperatures
3. Monthly blood pressure monitoring
4. Daily apical pulse monitoring