Chapter 9
Vital Signs

- Health Care Science Technology

Objectives

- Recognize normal and abnormal values and characteristics of temperature, pulse, respirations, and blood pressure for infants, children, and adults.
- Recognize common terminology and abbreviations used in documenting and discussing vital signs.

Objectives (cont.)

- Compare the methods and contraindications of measuring oral, tympanic, axillary, and rectal temperatures.
- Convert temperatures between the Fahrenheit and Celsius measurement scales.

Objectives (cont.)

- Identify the sites for assessing the pulse and blood pressure.
- List the effects of high and low blood pressure on the body.
- Successfully complete 9 vital signs procedures.

Signs 9-1

- Temperature
- Pulse
- Respiration
- Blood Pressure

Vital Signs

- **Vital Signs (VS)** are the most important measurements you will obtain when you evaluate or assess a client's condition.

Temperature

- **Body temperature (T)** is one of the first assessments done.
- Temperature Ranges
  - Normal adult temperature is 98.6ºF, or 37ºC.
  - Normal range can be from 96.8ºF to 100.4ºF, or 36ºC to 38ºC.

Temperature (cont.)

- Temperature Ranges (cont.)
  - Temperatures can vary due to:
    - Time of day.
    - Allergic reaction.
    - Illness.
    - Stress.
    - Exposure to heat or cold.

Temperature (cont.)

- Temperature Sites
  - Oral – within the mouth or under the tongue.
  - Axillary – in the armpit.
  - Tympanic – in the ear canal.
  - Rectal – through the anus, in the rectum.
  - Other sites include on the skin or in the blood.

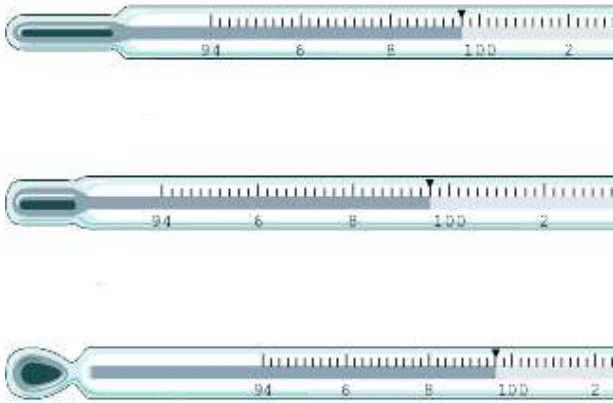
Temperature (cont.)

- Types of Thermometers
  - Electronic Thermometers
    - Measure temperature through a probe at the end of the device.
    - Hold as close as possible to the area where you wish to measure the temperature.

Temperature (cont.)

- Types of Thermometers (cont.)
  - Glass Thermometers
    - Mercury rises in a glass tube until its level matches the temperature.

- **Bulb shapes**
  - **Long tip** – for oral use.
  - **Security tip** – for oral and rectal use.
  - **Rounded tip** – for rectal.

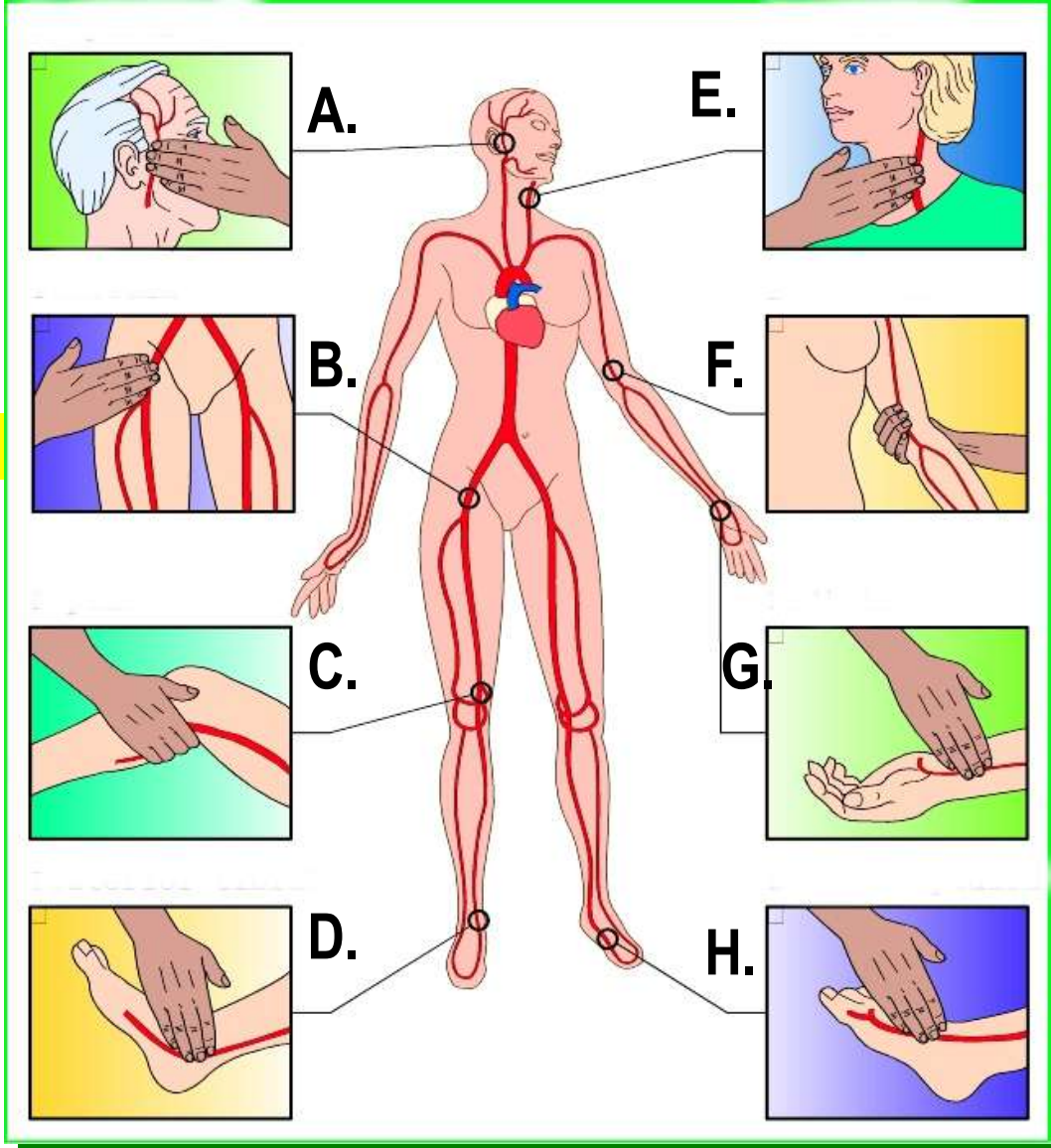


Temperature (cont.)

- Types of Thermometers (cont.)
  - Thermometer Handles
    - Blue – oral and axillary.
    - Red – rectal.
  - Use disposable plastic covers to prevent contamination.

Pulse

- A wave of blood flow created by a contraction of the heart.



Name these pulses.

Click HERE to check answers.

Pulse Sites (Answers)

A. Temporal

B. Femoral

C. Popliteal

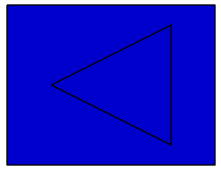
D. Posterior tibial

E. Carotid

F. Brachial

G. Radial

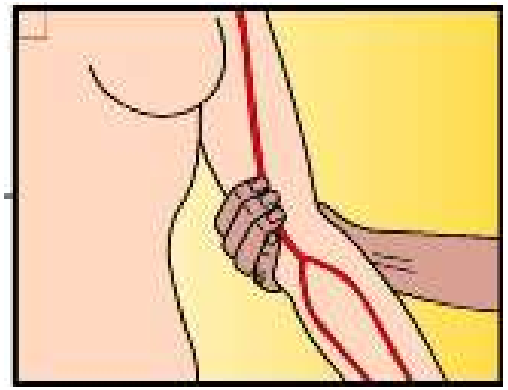
H. Dorsalis pedis



Back

Pulse (cont.)

- Pulse sites most commonly used:
  - Radial pulse – located inside the wrist, near the thumb.
  - Brachial pulse – found in the antecubital space of the arm (the bend of the elbow) in adults.



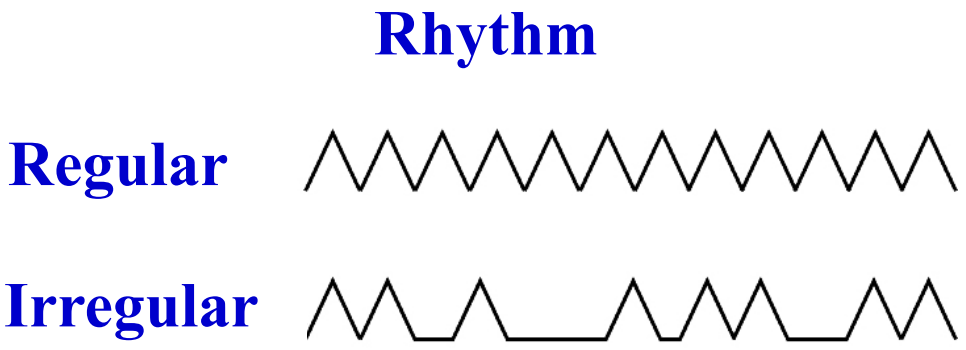
Pulse (cont.)

- **Pulse Sites (cont.)**
  - **Apical pulse – auscultated with a stethoscope on the chest wall. The pulse is found at the apex of the heart.**

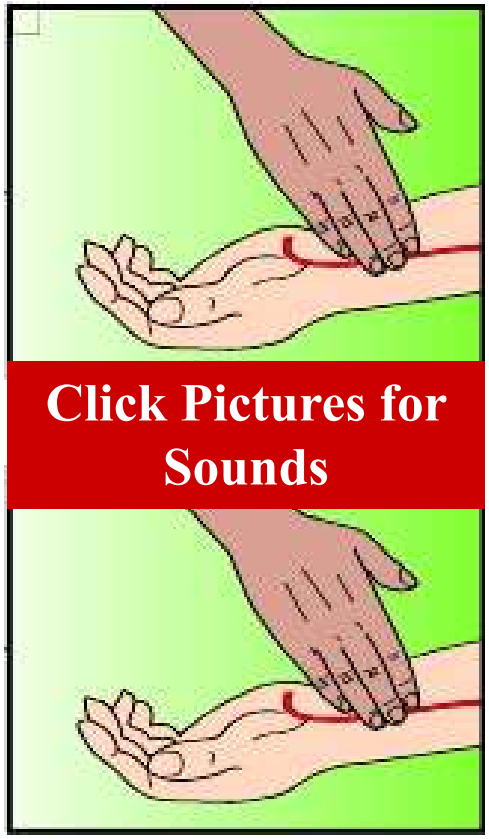
Pulse (cont.)

- Characteristics of the Pulse
  - Pulse Rate
    - Assessed as beats per minute, or BPM.
    - Counted for 15, 20, 30, or 60 seconds.
    - Tachycardia – a pulse rate faster than normal.
    - Bradycardia – a pulse rate slower than normal.

Pulse (cont.)



- Characteristics of the Pulse (cont.)
  - **Pulse Rhythm** – the pattern of the heartbeats.
    - A client with an irregular heartbeat (arrhythmia or dysrhythmia) must be measured a full minute to determine the average rate.
    - When documenting pulse rhythm, record as regular or irregular.



Pulse (cont.)

- Characteristics of the Pulse (cont.)
  - Pulse volume, or strength of the pulse, can be measured with the following scale:
    - 0 – absent, unable to detect.
    - 1 – thready or weak, difficult to palpate, and easily obliterated by light pressure from fingertips.

Pulse (cont.)

- Characteristics of the Pulse
  - Pulse Volume (cont.)
    - 2 – strong or normal, easily found and obliterated by strong pressure from fingertips.
    - 3 – bounding or full, difficult to obliterate with fingertips.
    - A thready or weak pulse may indicate decreased circulation. A bounding pulse may indicate high blood pressure.

Pulse (cont.)

- Characteristics of the Pulse (cont.)
  - **Bilateral Presence** – pulses should be found within the same areas on both sides of the body and have the same rate, rhythm, and volume.

Respiration

- **Respiration (R)** is the act of breathing.
- **Respiratory Rate (RR)**
  - Observe the client's chest movement upward and outward for a complete minute.
  - Children under 7 years of age use abdominal breathing.
  - Auscultation with a stethoscope may be necessary on clients who are aware that you are counting their respiratory rate.

Respiration (cont.)

- Characteristics of Respiration
  - **Rate of Respiration** – the number of breaths per minute.
    - Normal range is 12 to 20 breaths per minute for an adult.
    - Rate will vary with age and size of client.

Respiration (cont.)

- Characteristics of Respiration
  - Rate of Respiration (cont.)
    - An increased respiratory rate is called **hyperventilation**.
    - A decrease in respiratory rate and depth is called **hypoventilation**.
  - **Rhythm of Respiration** – should be regular.
  - Quality of Respiration
    - Can be shallow or deep.

Blood Pressure

- **Blood pressure (BP)** is the pressure or tension exerted on the arterial walls as blood pulsates through them.
- **Systolic blood pressure (SBP)** – pressure exerted on the arteries during the contraction phase of the heartbeat.
- **Diastolic blood pressure (DBP)** – the resting pressure on the arteries as the heart relaxes between contractions.

Blood Pressure (cont.)

- Expected Blood Pressure Values
  - **Expected SBP** – 100 to 140 mm Hg.
  - **Expected DBP** – 60 to 90 mm Hg.
  - **Hypotension** – when the blood pressure drops below expected levels.
  - **Hypertension** – high blood pressure.
  - **Prehypertension** – classified by the American Heart Association as SBP 120 to 139 mm Hg or DBP 80 to 89 mm Hg.

Blood Pressure (cont.)

- Sites for Blood Pressure Assessment
  - **Brachial** – taken on the upper arm; most common site.
  - **Radial** – taken on the lower arm; possible site for infants or clients who have very large upper arms.
  - **Popliteal** – taken on the thigh.
  - **Dorsalis pedis and posterior tibial** – taken on the lower leg.

Blood Pressure (cont.)

- Equipment for Measuring Blood Pressure
  - Blood pressure is measured using a sphygmomanometer, also called a BP cuff, or cuff.

Blood Pressure (cont.)

- Equipment for Measuring Blood Pressure
  - Types of Sphygmomanometers
    - **Mercury** – has a calibrated glass tube containing mercury.
    - **Aneroid** – has a calibrated dial with a needle that points to numbers on the face of the dial.
    - **Electronic** – uses a digital display and usually includes the pulse rate.

Mercury

Aneroid

Electronic

Section 9-1
Apply Your Knowledge

Where would one measure tympanic temperature?

Answer:

Tympanic temperature is measured in the ear canal.

Vital Signs Procedures 9-2

- Order of Performance
- Documenting and Reporting

Order of Performance

- Perform the least invasive vital sign first.
- Use this order if possible:
  - Respiratory rate.
  - Pulse.
  - Temperature.
  - Blood pressure.

Documenting and Reporting

- Check for common abbreviations in chart.
  - VS (vital signs)
  - T P R BP (temperature, pulse, respiratory rate, blood pressure)
  - RR (respiratory rate)
- Record results properly.
- Report information to your supervisor.
  - Vital signs outside the expected range.
  - Vital signs significantly different from previous results.

Section 9-2
Apply Your Knowledge

List the order for taking vital signs.

Answer:

1. **Respiratory rate.**
2. **Pulse.**
3. **Temperature.**
4. **Blood pressure.**

Procedures in Student Text

- 9A Measuring and Recording Oral Temperature with a Glass Thermometer
- 9B Measuring and Recording Tympanic Temperature
- 9C Measuring and Recording Axillary Temperature
- 9D Measuring and Recording Rectal Temperature
- 9E Measuring and Recording Temperature with an Electronic Thermometer
- 9F Measuring and Recording Pulse and Respirations
- 9G Measuring and Recording Apical Pulse
- 9H Measuring and Recording Blood Pressure
- 9I Measuring and Recording Vital Signs Electronically

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