PATIENT CARE ACTIVITIES:

VITAL SIGNS ASSESSMENT I

OBSERVATION, TEMPERATURE, HEART RATE

PTA1010

OBJECTIVES:

Through these vital signs presentations the student will learn:

- Vital signs used in the physical therapy setting (Pain, HR, BP, Resp Rate, gait speed).
- Understand the need for measuring, monitoring and recording vital signs.
- Accurately measure pain, blood pressure, pulse, heart rate, respiratory rate, and gait speed.
- Explain the normal and abnormal responses in vital signs as related to therapy programs.
- Describe and auscultate normal and abnormal heart and lung sounds.
- Describe and define blood pressure.
- Discuss normal breathing patterns.

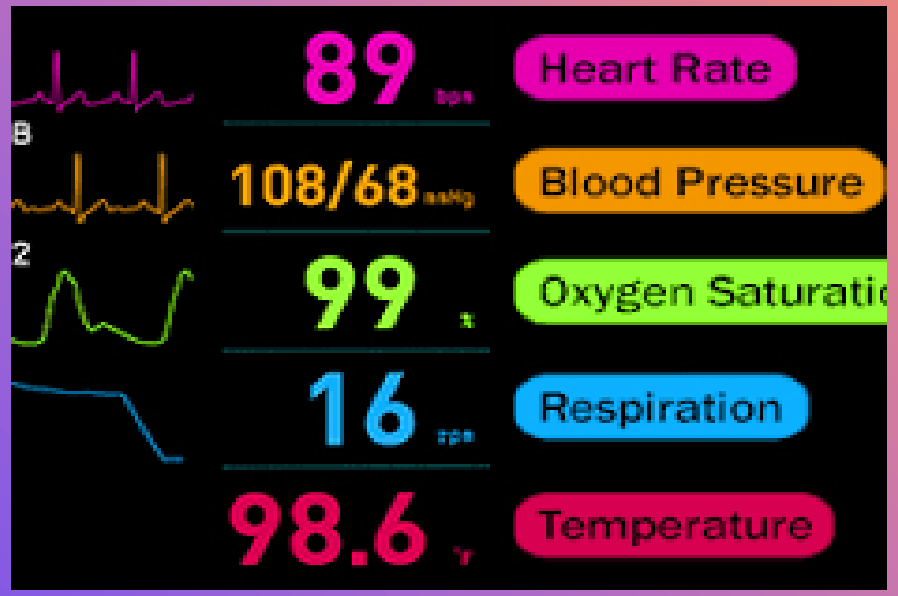
KEY TERMS

Anoxia
Apical pulse
Apnea
Arrhythmia
Auscultation
Bradycardia
Cardiac output
Cyanosis
Diaphoresis
Diastole
Dyspnea
Dysrhythmia
Ectopic
Ecchymosis
Expiration
Fever
Hypertension
Hypotension
Inguinal
Inspiration
Intubation
Jaundice
Korotkoff sounds
Occlude
Orthopnea
Pallor
Petechiae
Pulse
Pulse oximeter
Pyretic
Rale
Rectal
Respiration
SOB
Sphygmomanometer
Stethoscope
Stridor
Syncope
Systole
Tachycardia
Triangle of auscultation
Vital signs

VITAL SIGNS ARE INDICATORS OF GENERAL HEALTH

A LOGICAL SEQUENCE OF OBSERVATION AND VITAL SIGNS

MONITORING PROVIDES INSIGHT TO THE MEDICAL STABILITY OF A PATIENT PRIOR TO TREATMENT



PATIENT OBSERVATION

Patient distress
Pain
SOB- wheezing
Diaphoresis
Body odor
Skin color
Fingernails
Posture

Box 2.1 Common Skin Color Changes

•**Cyanosis:** In patients with light skin tones, may present as a bluish-gray discoloration of the skin and mucous membranes. In patients with dark skin tones, cyanosis may present as gray or whitish discoloration. In patients with yellow-toned skin, cyanosis may be grayish-greenish in appearance.

•**Central cyanosis:** Caused by hypoxia and results in color changes in central aspects of body and mucous membranes; associated with diseases of the cardiovascular and pulmonary system and CNS disorders that impair respiration.

•**Peripheral cyanosis:** Caused by hypoxia with color changes in the nailbeds and lips; associated with decreased cardiac output, exposure to cold (extreme vasoconstriction), and arterial (peripheral vascular disease) or venous obstruction (deep vein thrombosis).

•**Acute cyanosis:** Caused by hypoxia from a blocked airway (asphyxiation or choking), with rapid onset of skin color changes initially in the face, lips, and nailbeds.

•**Ecchymosis:** Caused by bruising (bleeding under the skin) and may be seen anywhere on the body; new bruises appear bluish purple whereas older bruises are greenish yellow; often caused by trauma (e.g., falls, sports injury, physical abuse); patients on blood thinning agents (e.g., Coumadin) tend to bruise more easily. In patients with dark skin tones, new bruises may be purple, dark brown, or black.

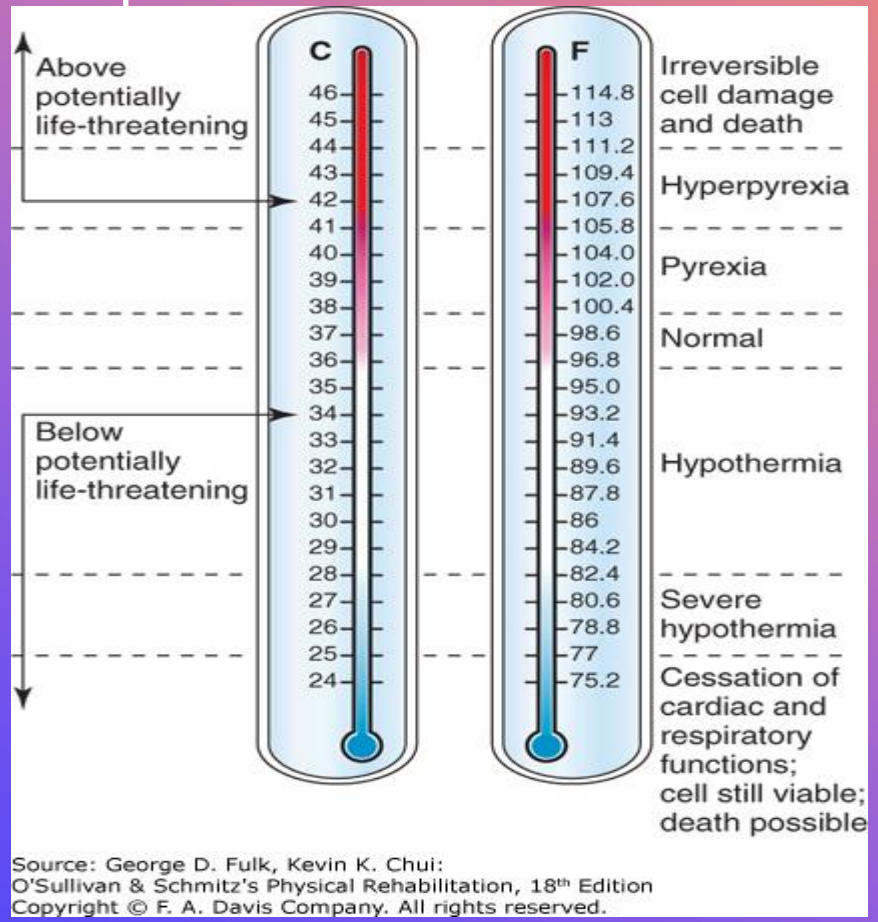
•**Erythema:** Reddened area of skin caused by increased blood flow (hyperemia); associated with skin irritation or injury, infection, and inflammation; redness over a bony prominence warns of the potential development of a decubitus ulcer. In patients with dark skin tones, erythema may appear as hyperpigmentation.

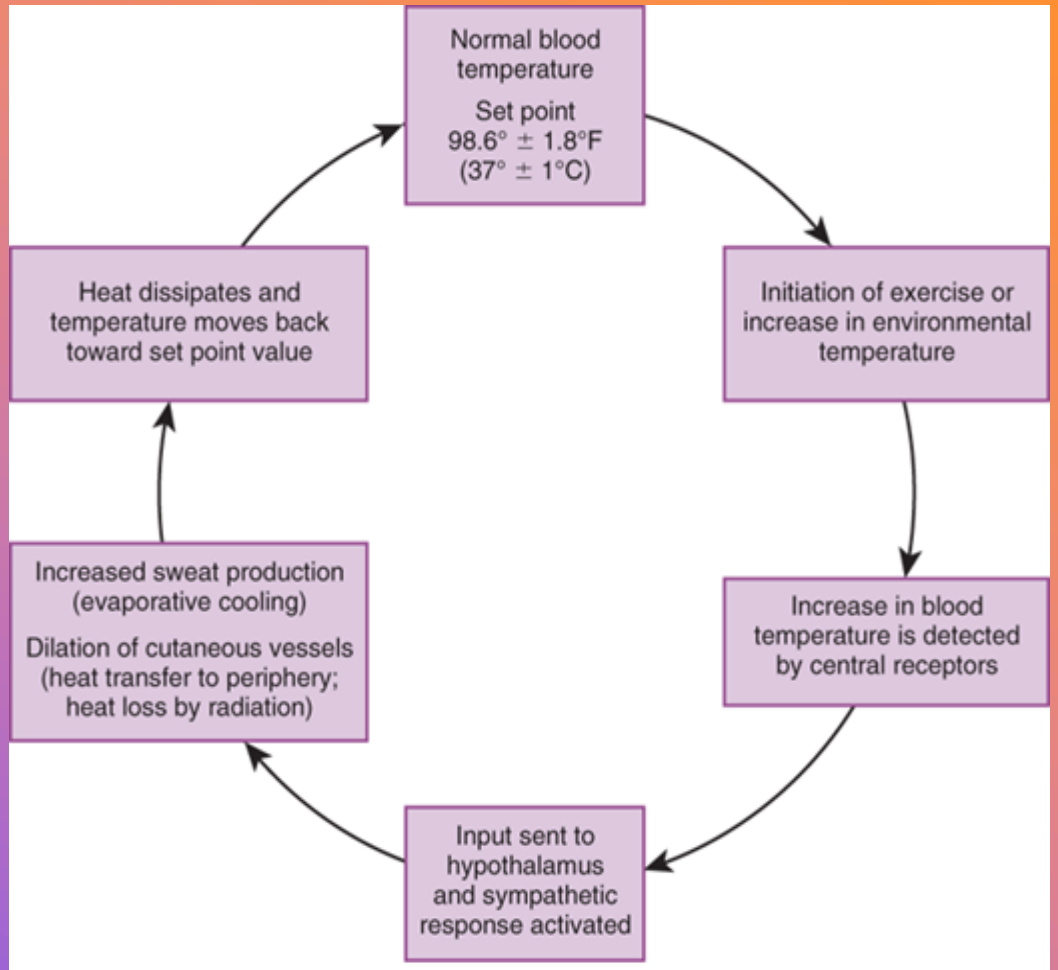
•**Flushing**: Diffuse redness of face; may involve other body areas; related to emotions (embarrassment, anger), physical exertion, fever, and increased temperature of environment.

•**Jaundice:** Caused by impaired liver function (e.g., hepatitis, liver cancer), the skin takes on a yellow-orange hue; it is best observed in the sclera, mucous membranes, and palm of hands and sole of the feet.

•**Pallor (pale):** The skin takes on a lighter tone (whiter, with decreased pink hue) than normal for the individual (a normally “fair” skin color should be ruled out); for darker skin, pallor is apparent by loss of red tones; associated with anemia (low hemoglobin) and impaired circulation; observed in the face, palms, mucous membranes, and nailbeds.

•**Petechiae:** Tiny red or purple hemorrhagic spots caused by capillary bleeding with subsequent leakage of blood into the skin; tend to appear in clusters and are often seen on the ankles and feet, but can occur anywhere on body; may be a sign of thrombocytopenia (low platelet count); as platelets play a critical role in clotting, reduced counts impair clotting and increase the risk of bleeding; low platelet counts are associated with a variety of medications (e.g., anticoagulants, aspirin, steroids, and chemotherapy drugs) and disorders (e.g., acute and chronic infections, leukemia, systemic lupus erythematosus, and scleroderma).





Normal Body Temperature = 98.6F (96.8-100.4F)

TEMPERATURE

FACTORS INFLUENCING BODY TEMPERATURE:

Time of Day

Age

Emotional Stress

Infection

Exercise

External Environment

Medications

Measurement Site: oral= 98.6

rectal= 99.5

temporal= 98.1

tympanic=99.5

axillary=97.6

Types of Thermometers:

Glass mercury

Oral

Temporal

Non-contact infrared

Disposable skin surface

A

Source: George D. Fulk, Kevin K. Chui:
O'Sullivan & Schmitz's Physical Rehabilitation, 18th Edition

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PAIN

Acute: results from injury or disease causing tissue damage

a. superficial vs. deep

b. sharp, dull, throbbing

Chronic: ongoing injury or tissue damage >3 months

a. begins as acute pain, persists beyond normal healing time

b. not as biologically meaningful as acute pain

Referred: pain at site remote from source

PAIN Description, Duration, Location

Pain Descriptions and Related Structure

Type of Pain	Structure
Cramping, dull, aching	Muscle
Dull, aching	Ligament, joint capsule
Sharp, shooting	Nerve root
Sharp, bright, lightning	Nerve
Burning, pressure stinging, aching	Sympathetic nerve
Deep, nagging, dull	Bone
Sharp, severe, intolerable	Fracture
Throbbing, diffuse	Vasculature

Initial Pain Assessment Tool

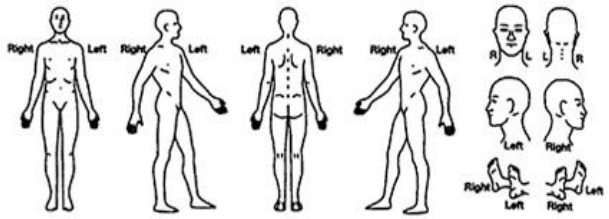
Date_____

Patient's name _____ Age _____ Room_____

Diagnosis_____ Physician_____

Nurse_____

I. Location: Patient or nurse marks drawing.



II. Intensity: Patient rates the pain. Scale used_____

Present:_____

Worst pain gets:_____

Best pain gets:_____

Acceptable level of pain:_____

III. Quality: (Use patient's own words, e.g., prick, ache, burn, throb, pull, sharp)

_____

IV. Onset, duration, variations, rhythms:_____

_____

V. Manner of expressing pain:_____

VI. What relieves the pain?_____

VII. What causes or increases the pain?_____

VIII. Effects of pain: (Note decreased function, decreased quality of life.)

Accompanying symptoms (e.g., nausea)_____

Sleep_____

Appetite_____

Physical activity_____

Relationship with others (e.g., irritability)_____

Emotions (e.g., anger, suicidal, crying)_____

Concentration_____

Other_____

IX. Other comments:_____

_____

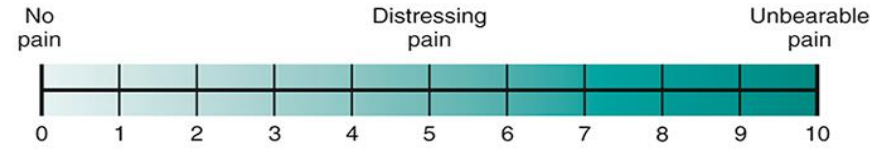
X. Plan:_____

_____

From McCaffery M, Beebe A: *Pain: clinical manual for nursing practice,* St Louis, 1989, Mosby.

Simple Descriptive Pain Distress Scale*

0-10 Numerical Pain Distress Scale*



Visual Analog Scale (VAS)†

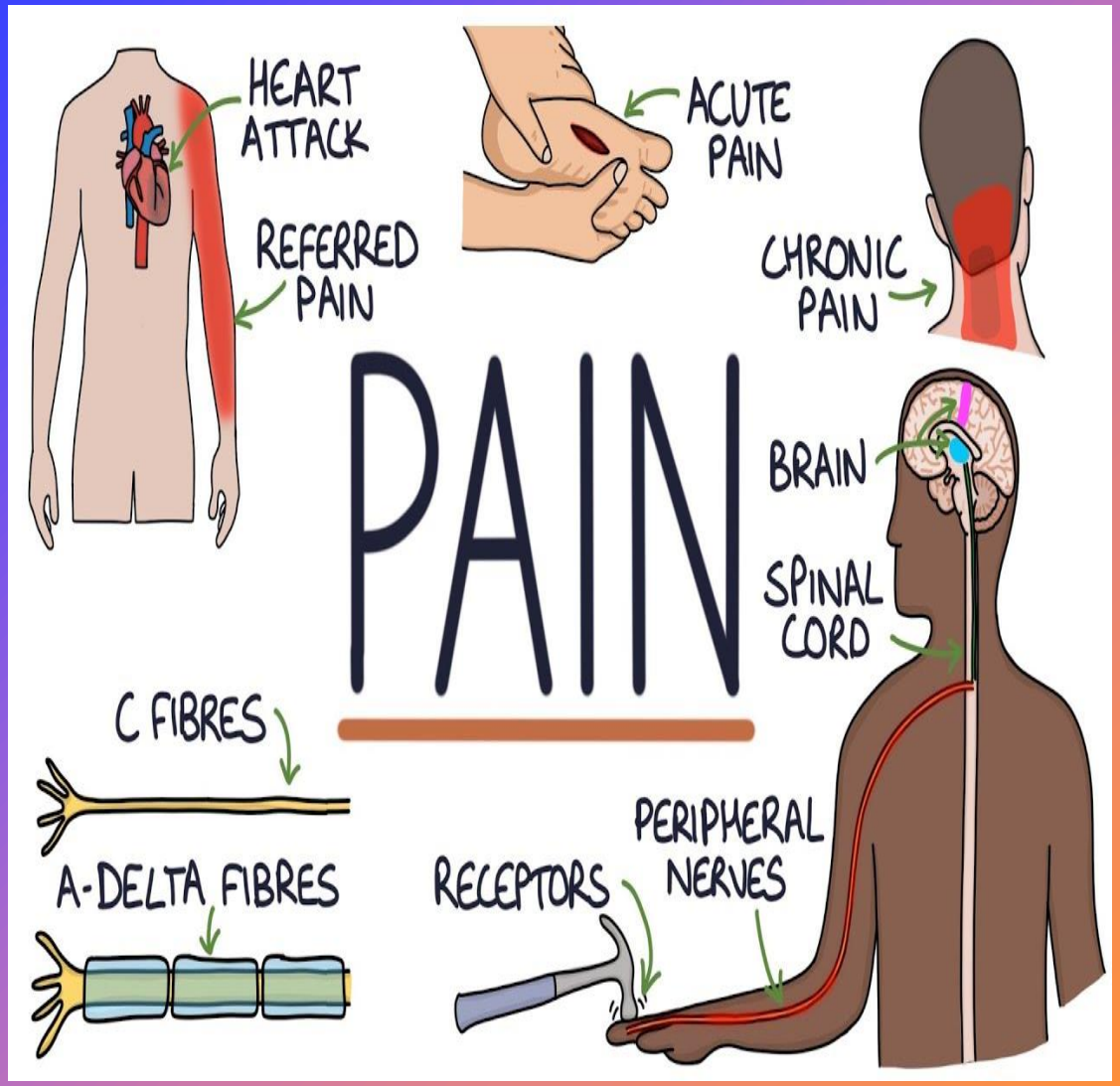
*If used as a graphic rating scale, a 10-cm baseline is recommended.
†A 10-cm baseline is recommended for VASs.

From Jacox A, et al: Management of cancer pain [Clinical Practice Guideline No. 9, AHCPR Publication No. 94-0592], Rockville, MD, March 1994, Agency for Health Care Policy and Research, US Department of Health and Human Services, Public Health Service.

Wong-Baker FACES® Pain Rating Scale

DOCUMENTING PAIN

- Pain onset
- Pattern of pain
- Exact location of pain
- Results of pain questionnaires
- Description: best/worst, intermittent, constant, time of day, presence at night, sharp/dull
- What activities are affected by pain?
- RATE pain



PULSE: IS THE INDIRECT MEASURE OF THE CONTRACTION

OF THE LEFT VENTRICLE OR STROKE VOLUME

Pulse is monitored according **to Rate, Rhythm and Force**(quality)

Table 2.2
Numerical Scale for Grading Pulse Quality (Strength)

0 Absent- No perceptible pulse even with maximum pressure
1+ Thready- Barely perceptible; easily obliterated with slight pressure; fades in and out
2+ Weak- Difficult to palpate; slightly stronger than thready; can be obliterated with light pressure
3+ Normal- Easy to palpate; requires moderate pressure to obliterate
4+ Bounding-Very strong; hyperactive; is not obliterated with moderate pressure

RATE AND RHYTHM

Rate: monitor at pulse sites

Norms:

Adult: 60 – 100 beat per minute (BPM)

Children 70-130 beats per minute

Newborn: 100 – 150 beats per minute

Tachycardia > 100 BPM

Bradycardia < 60 BPM

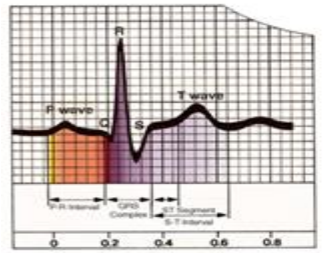
Rhythm:

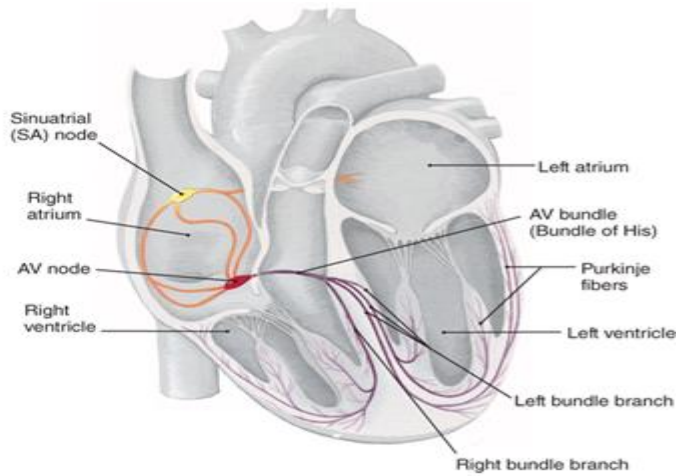
Regular

Irregular

Ectopic Beats

Fibrillation





FACTORS AFFECTING PULSE

- Age: > 65 decreased
- Gender: male generally lower than female
- Environmental temperature
- Infection: increases with infectious process
- Physical activity
- Emotional status
- Medications
- Cardiopulmonary disease
- Physical conditioning: regular exercise will lower pulse rate

MEASURING PULSE

- **Measuring Radial Pulse**

A.Assemble equipment: Watch with a second hand.

B.Wash hands.

C.Procedure:

A. Explain procedure and rationale.

B. Ensure patient understanding, modesty, safety, and comfort.

C. Place the patient's wrist in a neutral position. If measuring from supine, the forearm can be supported across the patient's chest or at their side with partial flexion of the elbow. From a sitting position, the forearm can rest across the patient's thigh, supported by a pillow or the therapist's arm. This **relaxed positioning** of the upper extremity (UE) generally facilitates artery palpation.

D. Place the **2nd & 3rdfingers squarely** and firmly over the radial pulse; use only enough pressure to feel the pulse accurately. .

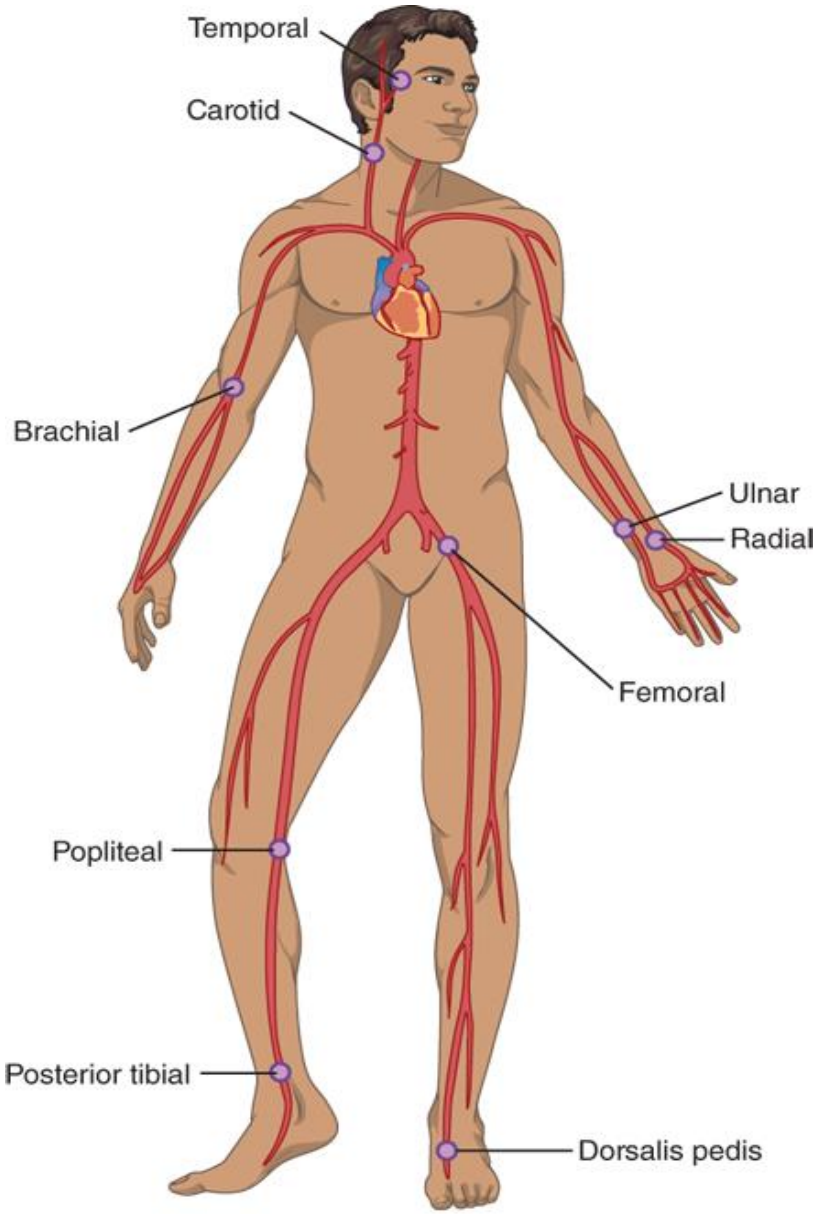
E. Once the strongest pulsation is located, determine the ***rate*** (number of beats per minute) by counting the pulse for 30 seconds and multiplying by 2; if any irregularities are noted, a full 60-second count should be taken to improve accuracy. Note the ***rhythm*** (time intervals between pulse beats) and the ***quality*** **(force**) of the pulse.

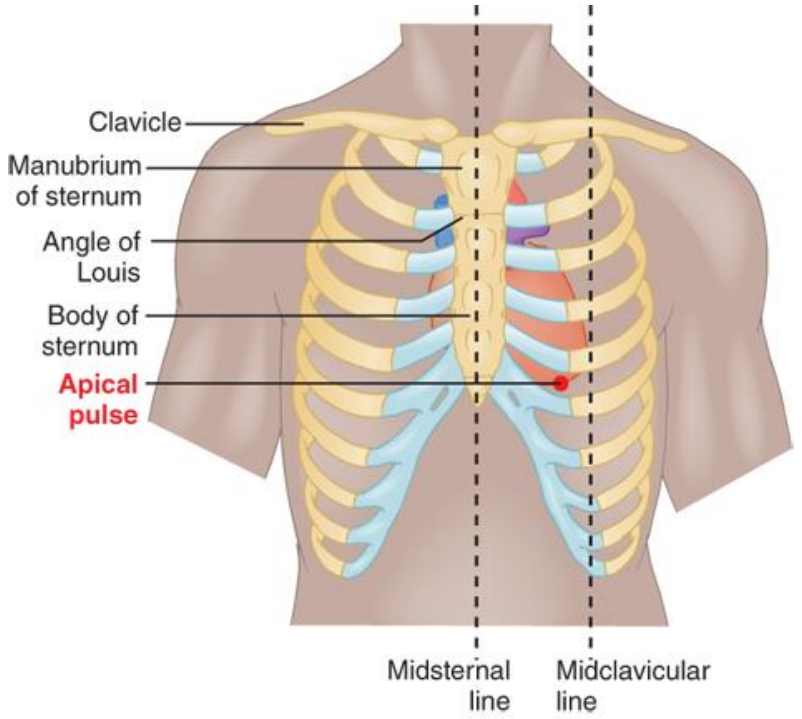
F. Wash hands.

PULSE SITES

Record

- Pulse site
- Patient position





ABNORMAL RESPONSE IN PULSE

- Pulse rate ***does not increase*** during active exercise
- Pulse rate ***continues to increase***/decrease as activity plateaus
- Pulse rate ***does not decrease as activity*** declines
- Pulse ***rate declines during*** exercise, before intensity of exercise declines
- Pulse ***rate increase exceeds*** expected level
- Rhythm ***becomes irregular*** during/after exercise

MEDICATION EFFECT ON HR AND PULSE:

Commonly associated with Beta-Adrenergic Blockers which lowers resting HR and HR response to exercise.

Medication ending in “lol”

BORG Perceived Rate of Exertion

6	No exertion
7	
8	
9	
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Very hard
18	
19	
20	Maximal exertion

PULSE OXIMETRY:

- **Pulse oximeter**: measures blood oxygen saturation levels, monitors pulse rate
  - Placed over index or ring finger
    (can be affected by nail polish)
- **Normal blood oxygen saturation: 95% to 100%**
- Three types of devices
  - Stationary digital pulse oximeter
  - Handheld oximeter
  - Finger pulse oximeter*

From Cuppett M, Walsh K: *General Medical Conditions in the Athlete*, St Louis, 2012, Elsevier.