



Vital Signs

Dr. Gary Mumaugh – Western Physical Assessment

Become a Data Gathering Machine



- The exam begins as soon as you see the patient
 - Appearance, demeanor, dress
 - Well groomed, neat, disheveled, work clothing
 - Sad, happy, angry, in pain?
- The gait when walking into office
- Accompanied? By whom?
- Carrying things?
- When waiting
 - Reading, sleeping, pacing, etc.

Vital Signs



- Vital signs are physical signs such as heart beat, breathing rate, temperature, blood pressures and recently oxygen saturation



Vital Signs

- These signs may be observed, measured, and monitored to assess an individual's level of physical functioning.



Vital Signs



- Normal vital signs change with age, sex, weight, exercise tolerance, and condition.



Purpose of Vitals



- Screening for disease
- Assure good health
- Develop relationship with patient
- Identify cause of symptoms
- Guide use of needed testing
- Follow course of disease and adjust treatment
- Part of the art and science of medicine with power of touch and observation

Guidelines for Obtaining Vital Signs



- You must be able to do all of the following:
 - Measure vital signs correctly
 - Understand and interpret the values
 - Communicate findings appropriately
 - Begin interventions as needed

The physical examination is inextricably linked to the history



Introduction



- Vital signs
 - Temperature
 - Pulse
 - Respirations
 - Blood pressure
- Body measurements
 - Height
 - Weight
 - Head circumference

Vital signs and body measurements are used to evaluate health problems. Accuracy is essential.



Vital Signs

Temperature

Temperature



- **Febrile** – body temperature above patient's normal range
 - Fever – sign of inflammation or infection
 - Hyperpyrexia – extremely high temperature
- **Afebrile** – normal body temperature
- Body temperature varies with time of day

Temperature

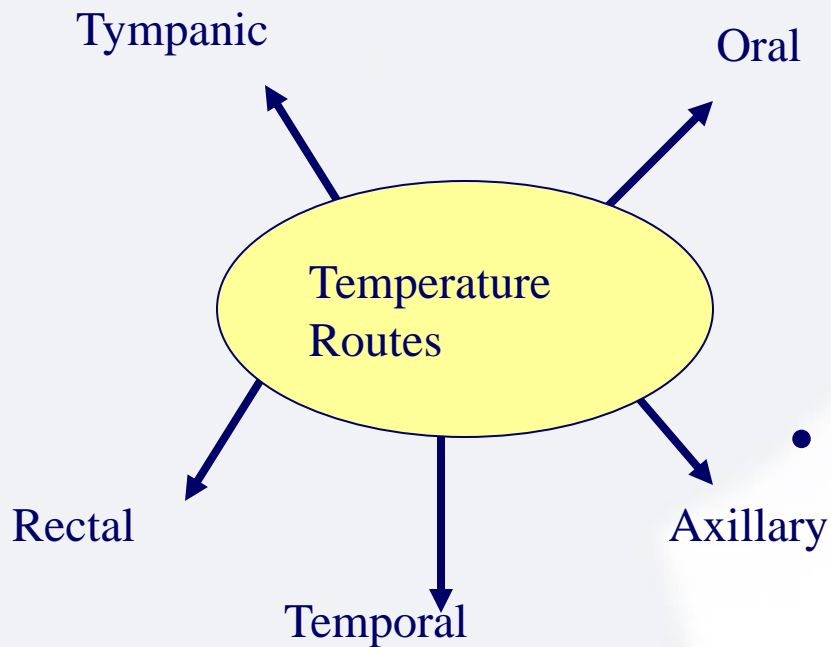


- Measurements

- Degrees **Fahrenheit** ($^{\circ}\text{F}$)
- Degrees **Celsius** (centigrade; $^{\circ}\text{C}$)

- Normal adult oral temperature

- 98.6°F
- 37°C



Temperature



- Measured using either electronic or disposable
 - Electronic digital
 - Accurate, fast, easy to read
 - Comfortable for the patient
 - Tympanic
 - Temporal
 - Disposable
 - Single use
 - Less accurate



Disposable sheaths are used with electronic thermometers to prevent cross-contamination.

Temperature



Route	Normal Range °F / °C	Sites
Oral	98.6 °F / 37.0 °C	Mouth
Tympanic	99.6 °F / 37.6 °C	Ear
Rectal	99.6 °F / 37.6 °C	Rectum
Axillary	97.6 °F / 36.6 °C	Axilla (armpit)

Temperature



- Measure to nearest tenth of a degree
- Oral temperatures
 - Wait at least 15 minutes after eating, drinking, or smoking
 - Place under tongue in either pocket just off-center in lower jaw



Taking an Oral Temperature

- RINSE WITH COLD WATER
- CHECK THE THERMOMETER FOR BREAKS AND CHIPS
- SHAKE DOWN THE THERMOMETER SO THE MERCURY IS BELOW THE LINES AND NUMBERS
- PLACE A DISPOSABLE COVER ON THE THERMOMETER
- PLACE THE THERMOMETER UNDER THE PERSON'S TONGUE
- LEAVE THE THERMOMETER IN PLACE FOR 2 – 3 MINUTES
- IF THE PERSON HAS BEEN EATING, DRINKING, OR SMOKING, WAIT 15 MINUTES BEFORE TAKING TEMPERATURE



Fig. 19-3 The thermometer is held at the stem. It is read at eye level.

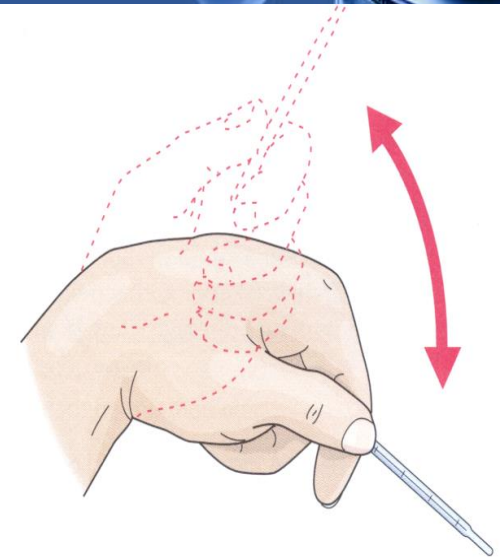


Fig. 19-4 The wrist is snapped to shake down the thermometer.

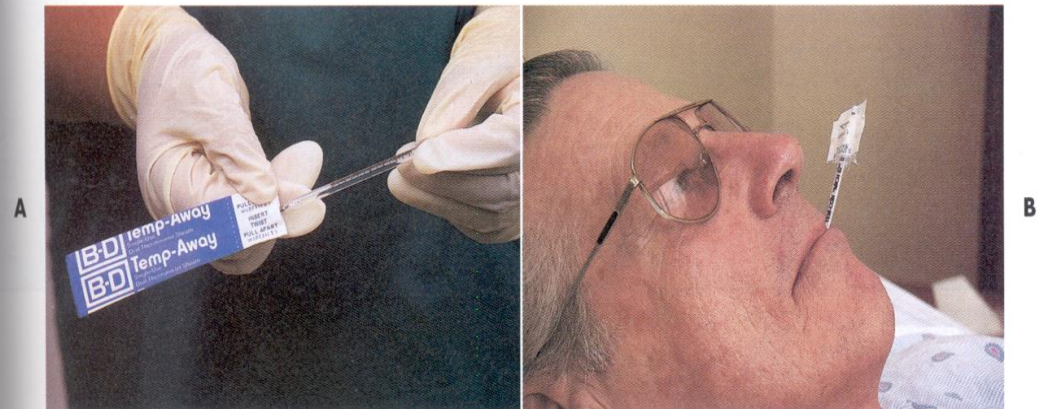


Fig. 19-5 A, The thermometer is inserted into a plastic cover. B, The person's temperature is taken with the thermometer in the plastic cover.

Oral Temperature Guidelines



- Do not take an oral temperature on:
 - An infant or young child under 5
 - An unconscious patient
 - A patient that has had oral surgery or an injury to the face, neck, nose or mouth
 - A person who is confused or restless
 - A person with unilateral paralysis

Temperature

- Tympanic temperatures
 - Proper technique essential
 - Adult – pull ear up and back
 - Child – pull ear down and back
 - Fast, easy to use, and preferred in pediatric offices



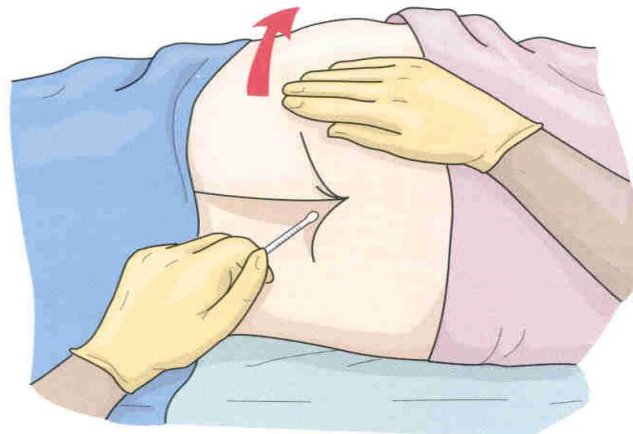
Temperature



- Rectal temperatures
 - Standard precaution – gloves
 - Patient is positioned on side (left side preferred) or stomach
 - Lubricate tip of thermometer
 - Slowly and gently insert tip into anus
 - ½ inch for infants
 - 1 inch for adults
 - Hold thermometer in place while temperature is taken

Taking a Rectal Temperature

- Lubricate the thermometer before inserting into the rectum
- Place patient side lying
- Insert the thermometer 1” into the rectum for two minutes
- Remove the disposable cover and read





DO NOT TAKE A RECTAL TEMPERATURE ON:

- A PERSON WHO HAS HAD RECTAL SURGERY OR RECTAL INJURY
- IF THE PERSON HAS DIARRHEA
- IF THE PERSON IS CONFUSED OR AGITATED
- IF THE PERSON HAS HEART DISEASE (STIMULATES THE VAGUS NERVE WHICH SLOWS THE HEART RATE)

Temperature



- Axillary temperatures

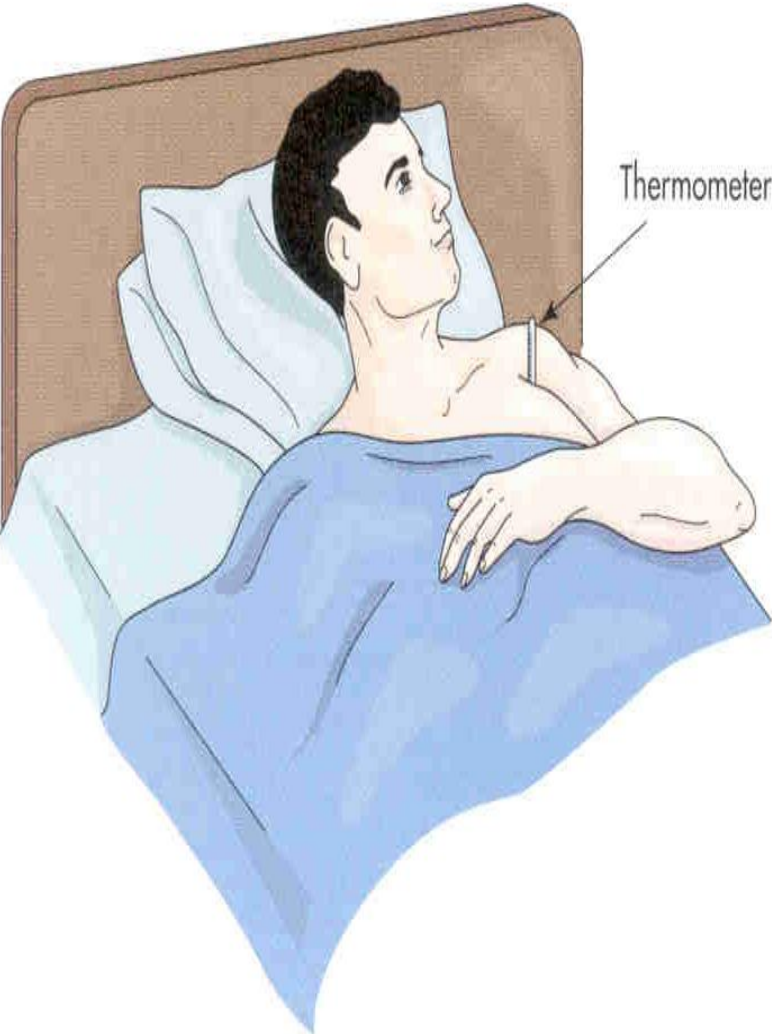
- Place patient in seated or lying position
- Place tip of thermometer in middle of axilla with shaft facing forward
- Probe must touch skin on all sides

- Temporal temperatures

- Temporal scanner
- Noninvasive, quick
- Stroke scanner across forehead, crossing over the temporal artery



Taking an Axillary Temperature



- TAKEN ONLY WHEN NO OTHER SITE CAN BE USED
- MAKE SURE THE UNDERARM IS CLEAN AND DRY
- THE ARM IS HELD CLOSE TO THE BODY
- YOU NEED TO HOLD THE THERMOMETER IN PLACE WHILE THE TEMPERATURE IS BEING TAKEN
- THE THERMOMETER IS LEFT IN PLACE FOR 10 MINUTES

Temperature



- Children
 - Take temperature last if child cries or becomes agitated
 - Agitation will cause pulse, respiration, and blood pressure to elevate
 - Oral not appropriate for children under 5 years old



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

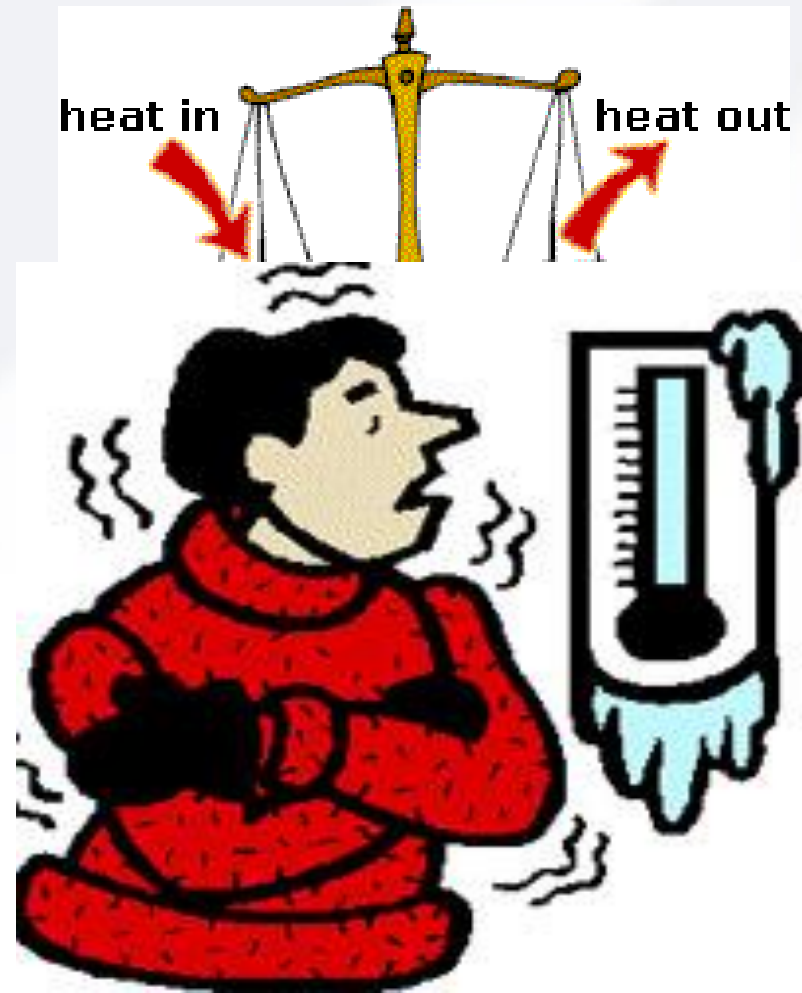


- Pyrexia, Febrile, or Hyperthermia
 - When the temperature is above normal
 - Fever is actually a body defense; it will destroy invading bacteria.
- Classification of Fevers
 - Constant: remains elevated consistently
 - Intermittent: rises and falls
 - Remittent: temperature never returns to normal until the patient becomes well
- Hypothermia
 - An abnormally low body temperature

Hypothermia



- Hypothermia is defined as a drop in body temperature below 95° F.





Vital Signs

Pulse

Pulse Rate



- The normal pulse for healthy adults ranges from 60 to 100 beats per minute.

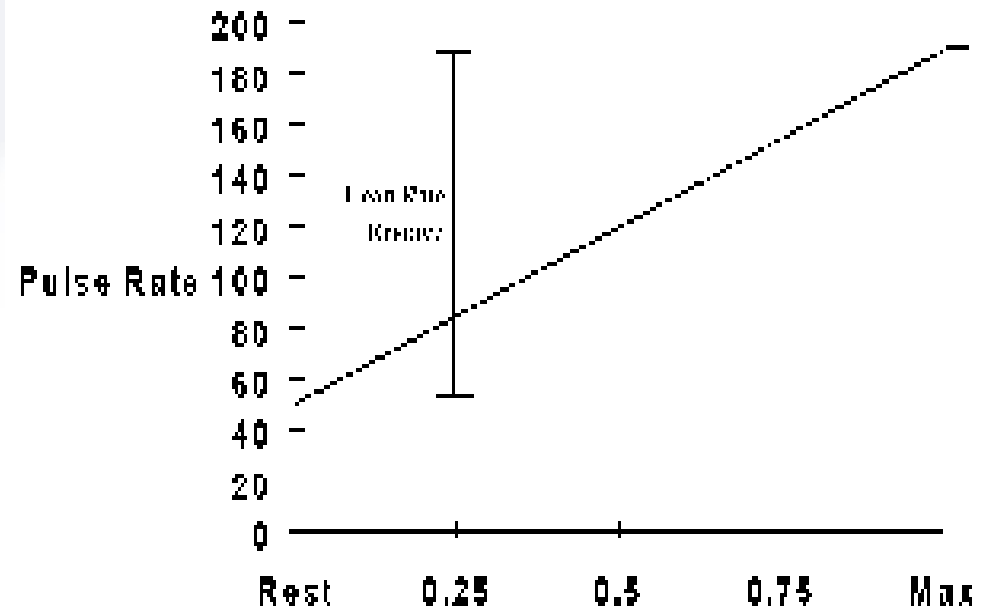


Pulse Rate



- The pulse rate may fluctuate and increase with exercise, illness, injury, and emotions. Girls ages 12 and older and women, in general, tend to have faster heart rates than do boys and men.

Typical Pulse Rate Response to Aerobic Exercise



Taking a Pulse



THE PULSE IS:

- THE BEAT OF THE HEART FELT AT AN ARTERY AS A WAVE OF BLOOD PASSES THROUGH THE ARTERY
- A PULSE IS FELT EVERY TIME THE HEART BEATS
- MORE EASILY FELT IN ARTERIES THAT COME CLOSE TO THE SKIN AND CAN BE GENTLY PRESSED AGAINST A BONE
- THE PULSE SHOULD BE THE SAME IN ALL PULSE SITES ON THE BODY
- THE PULSE IS AN INDICATION OF HOW THE CARDIOVASCULAR SYSTEM IS MEETING THE BODY'S NEEDS
- THE PULSE RATE IS AFFECTED BY MANY FACTORS – AGE, FEVER, EXERCISE, FEAR, ANGER, ANXIETY, EXCITEMENT, HEAT, POSITION, AND PAIN.
- MEDICATIONS CAN BE TAKEN THAT EITHER INCREASE OR DECREASE A PERSON'S PULSE RATE.

Pulse: Quantity



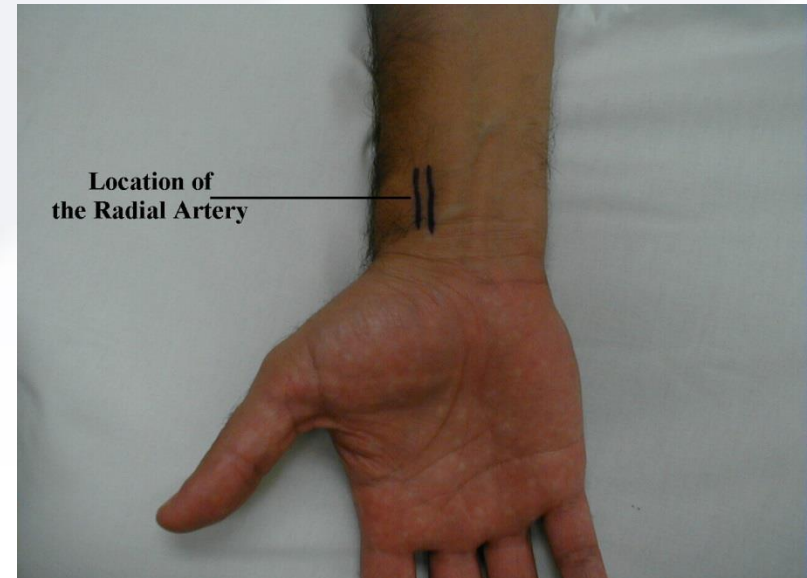
- If the rate is particularly slow or fast, it is probably best to measure for a full 60 seconds in order to minimize the error.



Pulse: Regularity



- Is the time between beats constant?. Irregular rhythms, are quite common.



Pulse: Volume



- Does the pulse volume feel normal? This reflects changes in stroke volume. In hypovolemia, the pulse volume is relatively low.

Pulse Rate



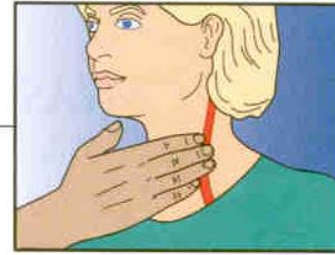
- Tachycardia
 - The pulse is faster than 100 beats per minute.
 - It may result from shock, hemorrhage, exercise, fever, acute pain, and drugs.
- Bradycardia
 - The pulse is slower than 60 beats per minute.
 - It may result from unrelieved severe pain, drugs, resting, and heart block.

PULSE SITES

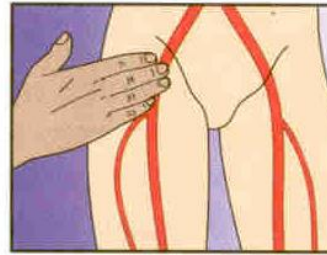
Temporal



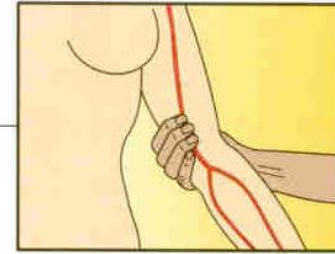
Carotid



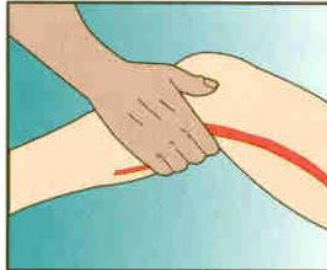
Femoral



Brachial



Popliteal



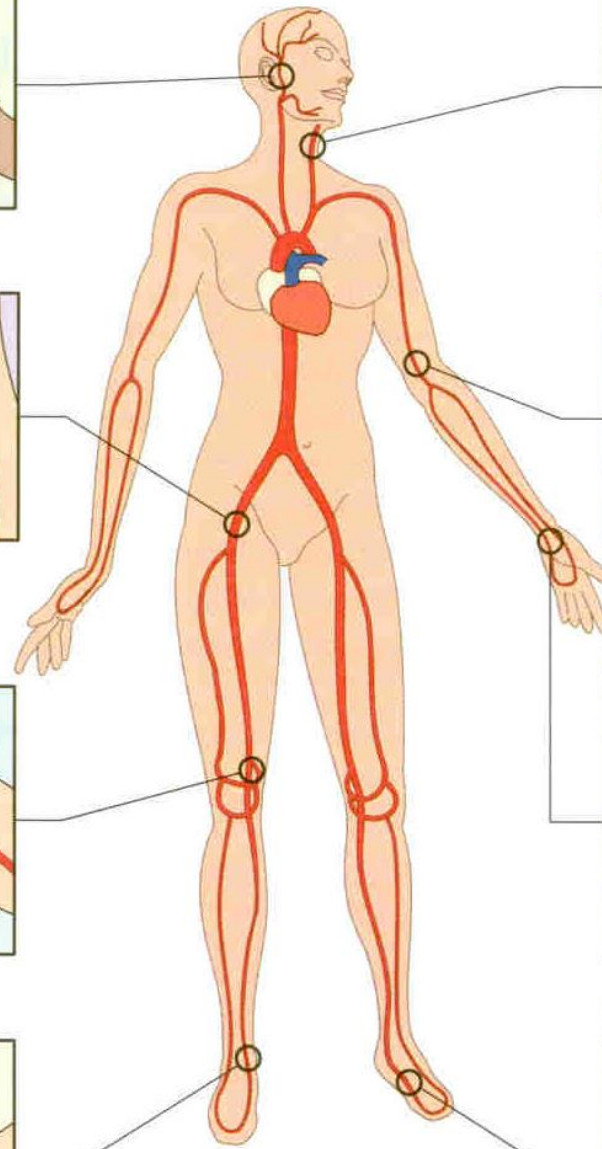
Radial



Posterior tibial



Dorsalis pedis



Counting a Pulse



WE USUALLY COUNT A PULSE FOR 30 SECONDS AND MULTIPLY THE NUMBER TIMES 2 TO GET THE PULSE RATE FOR 1 MINUTE



WE NOTE THE RHYTHM (PATTERN) OF THE HEART BEAT – IF THE HEART BEAT IS IRREGULAR WE COUNT THE PULSE FOR A FULL MINUTE

WE ALSO OBSERVE THE FORCE (STRENGTH) OF THE HEARTBEAT.

DOES THE PULSE FEEL:

STRONG FULL BOUNDING

WEAK THREADY FEEBLE

Radial Pulse



- MOST COMMON SITE USED FOR TAKING A PULSE
- CAN BE TAKEN WITHOUT DISTURBING OR EXPOSING THE PERSON
- PLACE THE FIRST TWO OR THREE FINGERS OF ONE HAND AGAINST THE RADIAL ARTERY
- THE RADIAL ARTERY IS ON THE THUMB SIDE OF THE WRIST
- DO NOT USE YOUR THUMB TO TAKE A PERSON'S PULSE
- USE GENTLE PRESSURE
- COUNT THE PULSE FOR 30 SECONDS AND MULTIPLY BY TWO



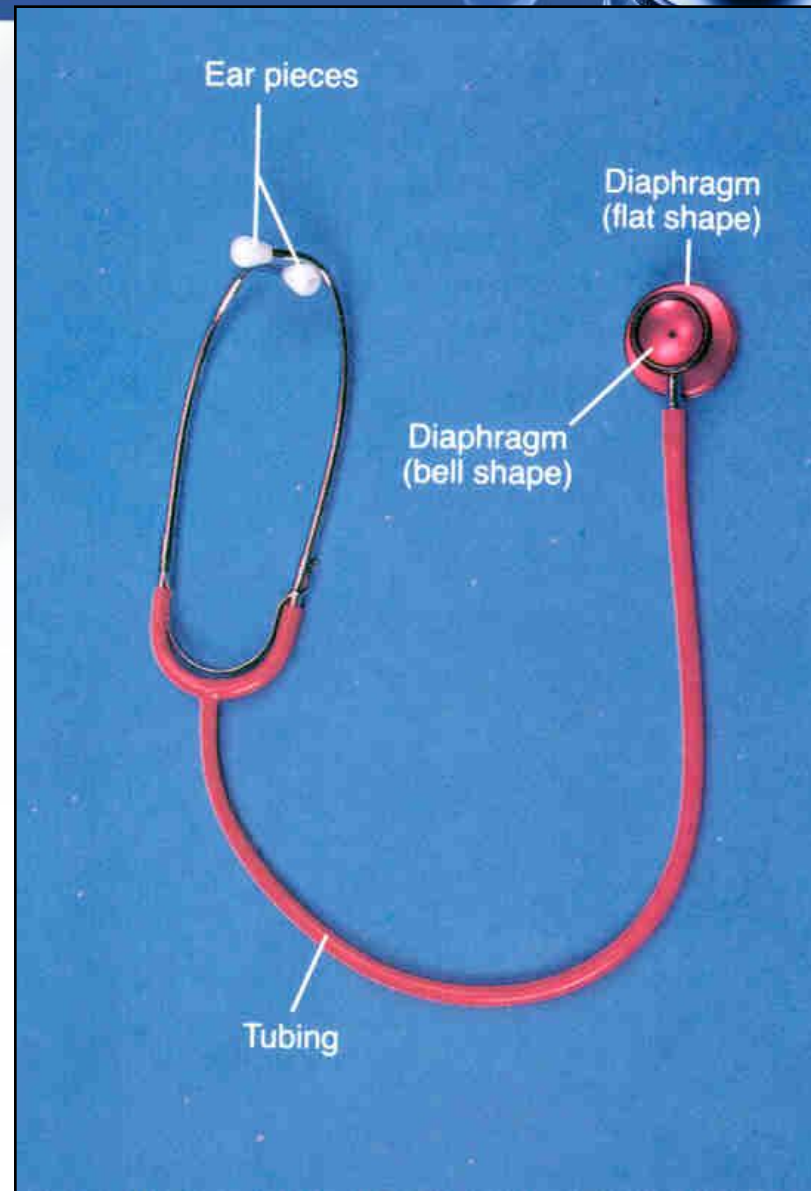
Using a Stethoscope

ALWAYS CLEAN THE EARPIECES OF THE STETHOSCOPE WITH ALCOHOL BEFORE AND AFTER USE

WARM THE DIAPHRAGM IN YOUR HAND BEFORE PLACING IT ON THE PERSON

HOLD THE DIAPHRAGM IN PLACE OVER THE ARTERY

DO NOT LET THE TUBING STRIKE AGAINST ANYTHING WHILE THE STETHOSCOPE IS BEING USED



Apical Pulse

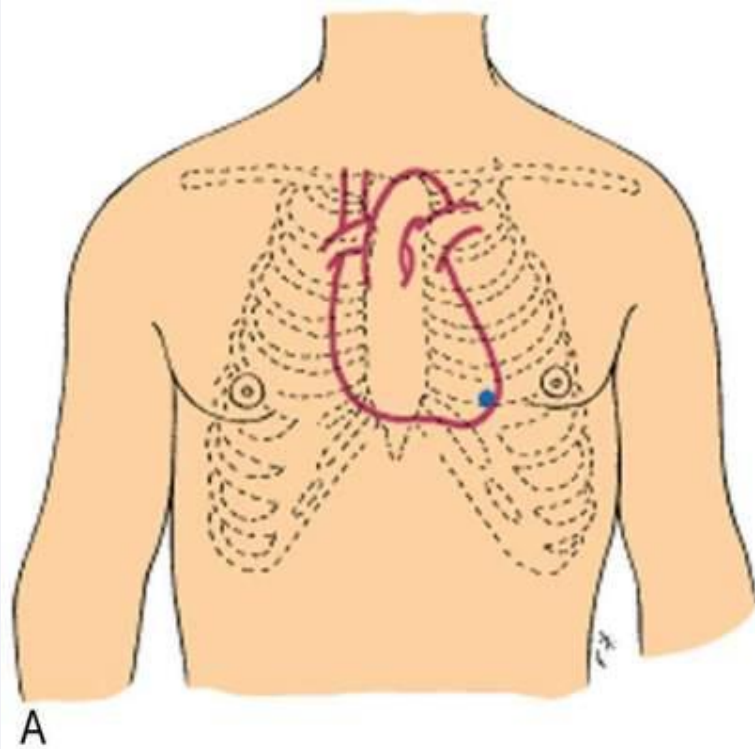


- TAKEN WITH A STETHOSCOPE
- COUNTED BY PLACING THE STETHOSCOPE OVER THE HEART
- COUNTED FOR ONE FULL MINUTE
- THE HEART BEAT NORMALLY SOUNDS LIKE A *LUB-DUB*. EACH *LUB-DUB* IS COUNTED AS ONE HEARTBEAT.
- **DO NOT COUNT THE *LUB* AS ONE HEARTBEAT AND THE *DUB* AS ANOTHER.**
- THE APICAL PULSE IS TAKEN ON PATIENTS WHO HAVE HEART DISEASE , AN IRREGULAR PULSE RATE, OR TAKE MEDICATIONS THAT CAN AFFECT THE HEART.





- Apical pulse represents the actual beating of the heart.
- Pulse deficit: difference between the radial and apical rates; signifies that the pumping action of the heart is faulty.



- .)
- A**, Point of maximum impulse is at fifth intercostal space.
 - B**, Assessing apical pulse.



Vital Signs

Respiration Rate

Respiratory Rate

- Try to do this as surreptitiously as possible. Observing the rise and fall of the patient's clothing while you appear to be taking their pulse.



Respiratory Rate

- Respiration rates may increase with fever, illness,.....
When checking respiration, also note whether a person has any difficulty breathing.



Abnormal Respiratory Rate



- Respiration rates over 25 or under 12 breaths per minute (when at rest) may be considered abnormal

under 12 breaths

over 25 breaths



Vital Signs

Blood Pressure

Blood Pressure



- The pressure exerted by the circulating volume of blood on the arterial walls, veins, and chambers of the heart.
 - Systolic
 - The higher number; represents the ventricles contracting
 - Diastolic
 - The second number; represents the pressure within the artery between beats
 - Pulse Pressure
 - Difference between the systolic and diastolic

Blood Pressure



- If it is too small, the readings will be artificially elevated.
- The opposite occurs if the cuff is too large.



Remember the following for accuracy of your readings

- Instruct your patients to avoid coffee, smoking or any other unprescribed drug with sympathomimetic activity on the day of the measurement



- Reading Blood Pressure



Position of the Patient

- Sitting position
- Arm and back are supported.
- Feet should be resting firmly on the floor
- Feet not dangling.



Position of the Arm



- Raise patient arm so that the brachial artery is roughly at the same height as the heart. If the arm is held too high, the reading will be artificially lowered, and vice versa.

Technique of BP Measurement

- Listen for auditory vibrations from artery "bump, bump, bump" (Korotkoff)

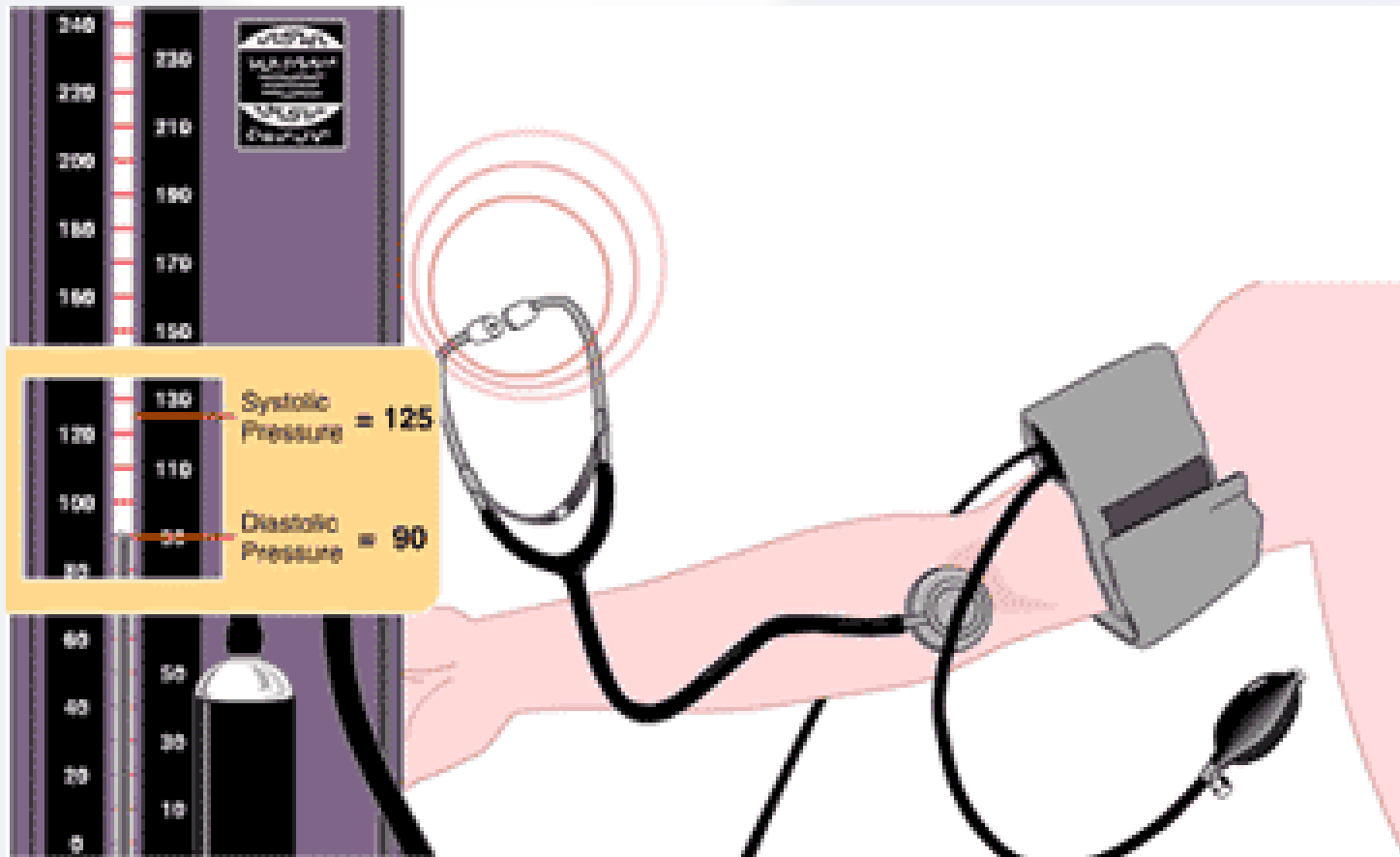


In order to measure the BP

- Systolic blood pressure is the pressure at which you can first hear the pulse.



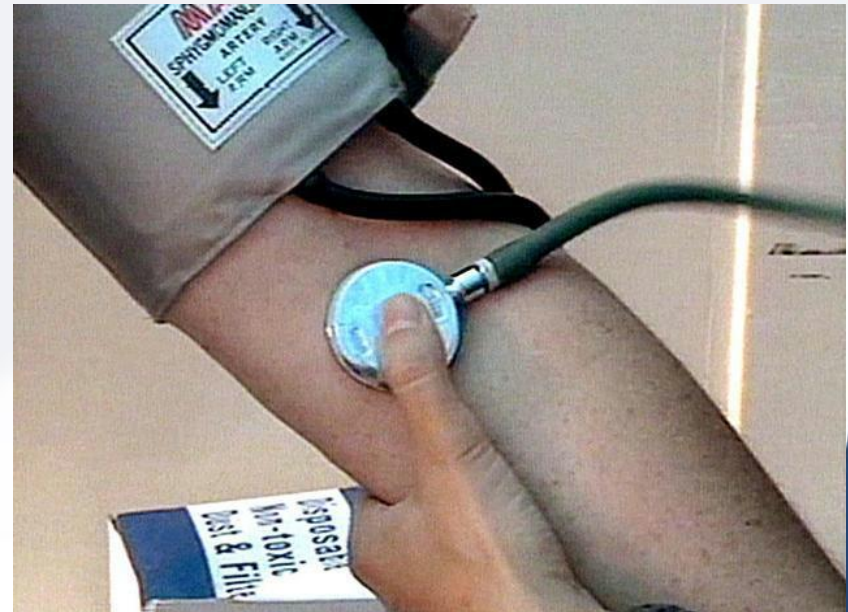
In order to measure the BP



- Diastolic blood pressure is the last pressure at which you can still hear the pulse

In order to measure the BP

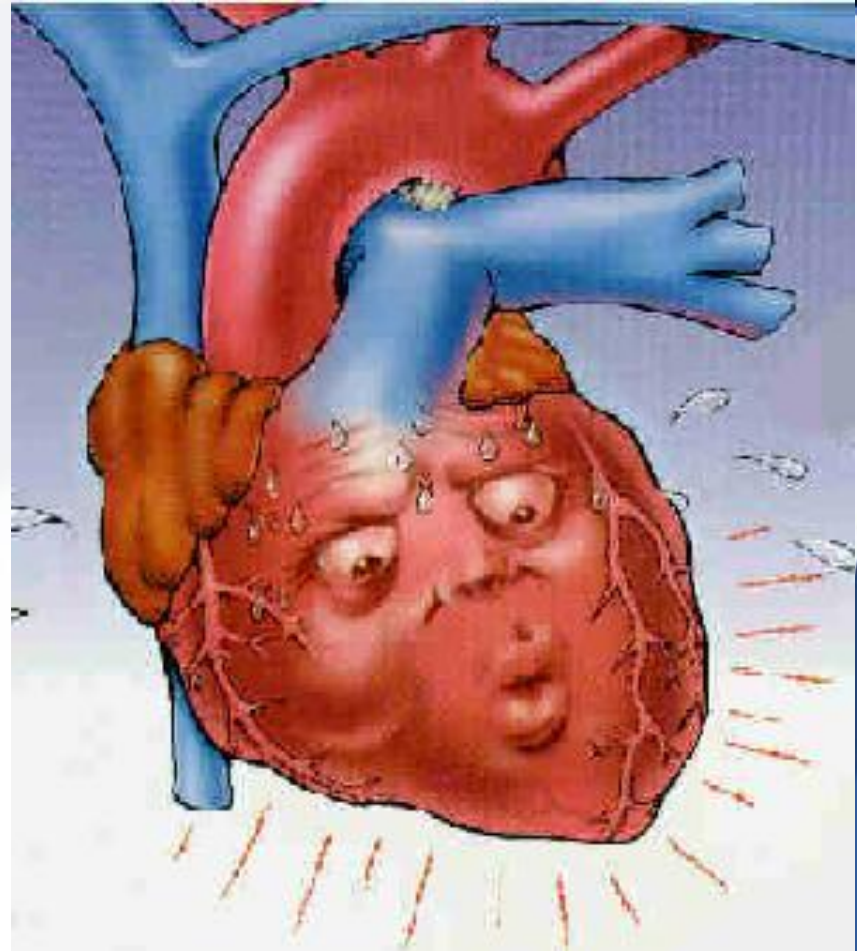
- Avoid moving your hands or the head of the stethoscope while you are taking readings as this may produce noise that can obscure the Sounds of Korotkoff.



Remember the following for accuracy of your readings



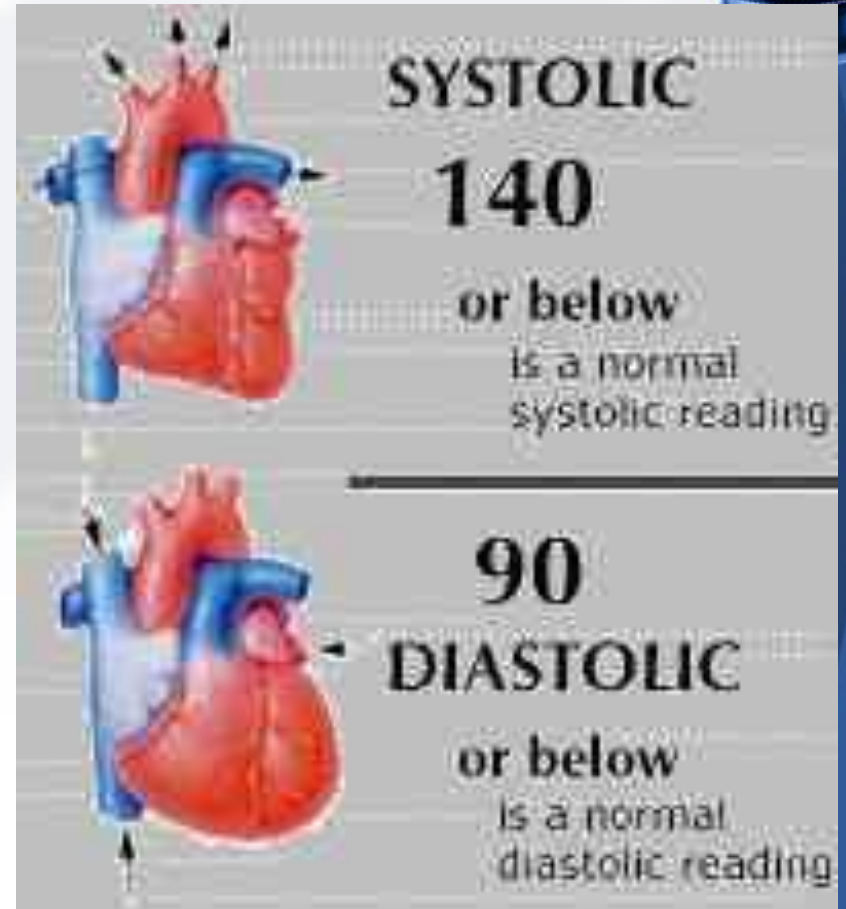
- If the BP is surprisingly high or low, repeat the measurement towards the end of your exam (Repeated blood pressure measurement can be uncomfortable).



Blood Pressure



- The minimal SBP required to maintain perfusion varies with the individual. Interpretation of low values must take into account the clinical situation.



Blood pressure for adult



- Physician will want to see multiple blood pressure measurements over several days or weeks before making a diagnosis of hypertension and initiating treatment.



What Abnormal Results Mean



- **Pre-high blood pressure: systolic pressure consistently 120 to 139, or diastolic 80 to 89**

- **Stage 1 high blood pressure: systolic pressure consistently 140 to 159, or diastolic 90 to 99**

What Abnormal Results Mean

- Stage 2 high blood pressure: systolic pressure consistently 160 or over, or diastolic 100 or over

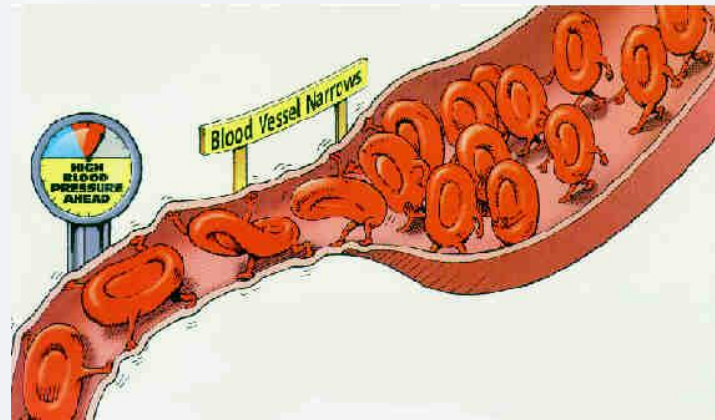


What Abnormal Results Mean



- Hypotension (blood pressure below normal): may be indicated by a systolic pressure lower than 90, or a pressure 25 mmHg lower than usual

Hypertension



- High blood pressure greater than 139-89..

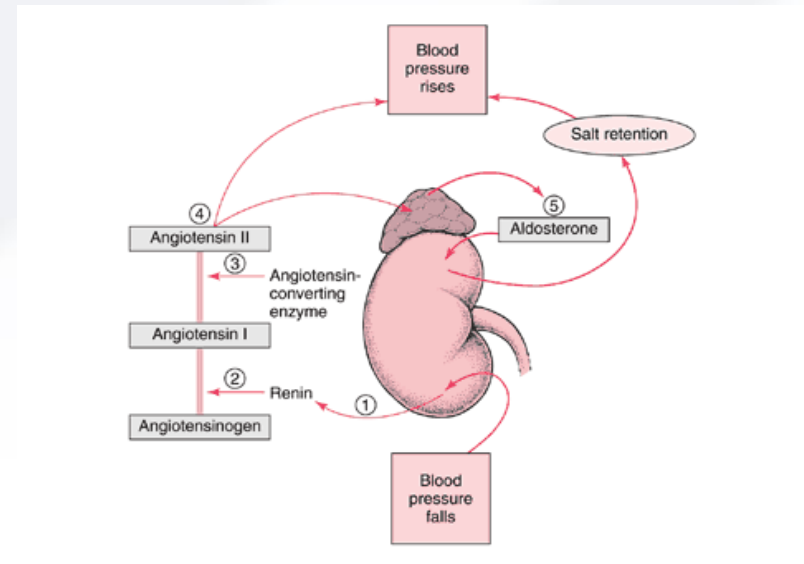
Blood Pressure (mm Hg)

- Normal blood pressure 100/60 and 139/89.
- Prehypertension 120, 139-80, 89....



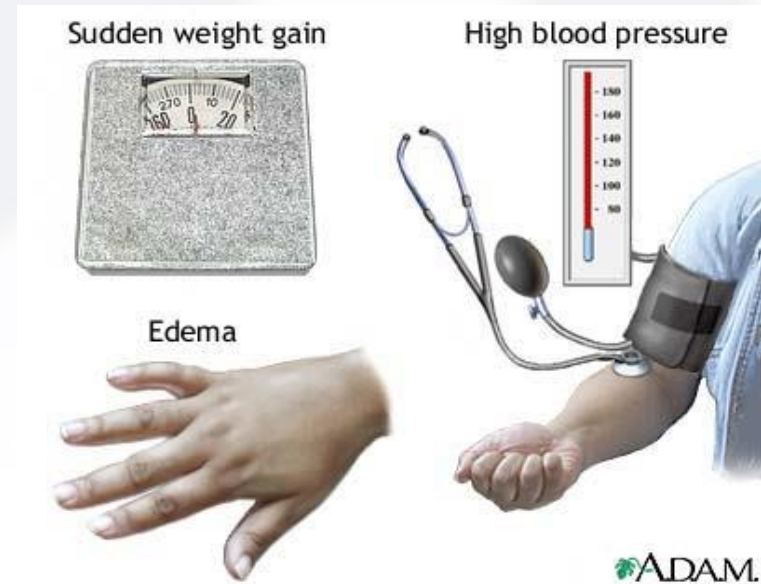
Blood pressure may be affected by many different conditions

- Cardiovascular disorders
- Neurological conditions
- Kidney and urological disorders



Blood pressure may be affected by many different conditions

- Pre eclampsia in pregnant women
- Psychological factors such as stress, anger, or fear



Eclampsia



Orthostatic Hypotention

Remember the following for accuracy of your readings



- Orthostatic (postural) measurements of pulse and blood pressure are part of the assessment for hypovolemia.



Remember the following for accuracy of your readings



- First measuring BP when the patient is **supine** and then repeating them after they have **stood for 2 minutes**, which allows for equilibration.



Measuring Height and Weight



- Standing, chair, and lift scales are used.
- Measuring weight and height
 - The person only wears a gown or pajamas.
 - The person voids before being weighed.
 - Weigh the person at the same time of day.
 - Use the same scale.
 - Balance the scale at zero before weighing the person.

Pain



- Pain means to ache, hurt, or be sore.
- Pain is a warning from the body.
- Pain is personal.
- Types of pain
 - Acute pain – felt suddenly from an injury, disease, trauma, or surgery
 - Chronic pain – lasts longer than 6 months. Pain can be constant or occur on and off.
 - Radiating pain – felt at the site of tissue damage and in nearby areas.
 - Phantom pain – felt in a body part that is no longer there.

• Signs and symptoms

- Location – Where is the pain?
- Onset and duration – When did the pain start?
- Intensity – Rate the pain on a scale of 1 to 10, with 10 as the most severe
- Description – Can you use words to describe the pain?
- Factors causing pain – What were you doing when the pain started?
- Vital signs – Take the person's vital signs when they complain of pain.
- Other signs and symptom
 - Body responses - ↑ vital signs, nausea, pale skin, sweating, vomiting
 - Behaviors – crying, groaning, holding affected body part, irritability, restlessness





Vital Signs

Oxygen Saturation

Oxygen Saturation

- Over the past decade, **Oxygen Saturation** measurement of gas exchange and red blood cell oxygen carrying capacity has become available in all hospitals and many clinics.



Oxygen Saturation

- **Oxygen Saturation** provide important information about cardio-pulmonary dysfunction and is considered by many to be a fifth vital sign.

