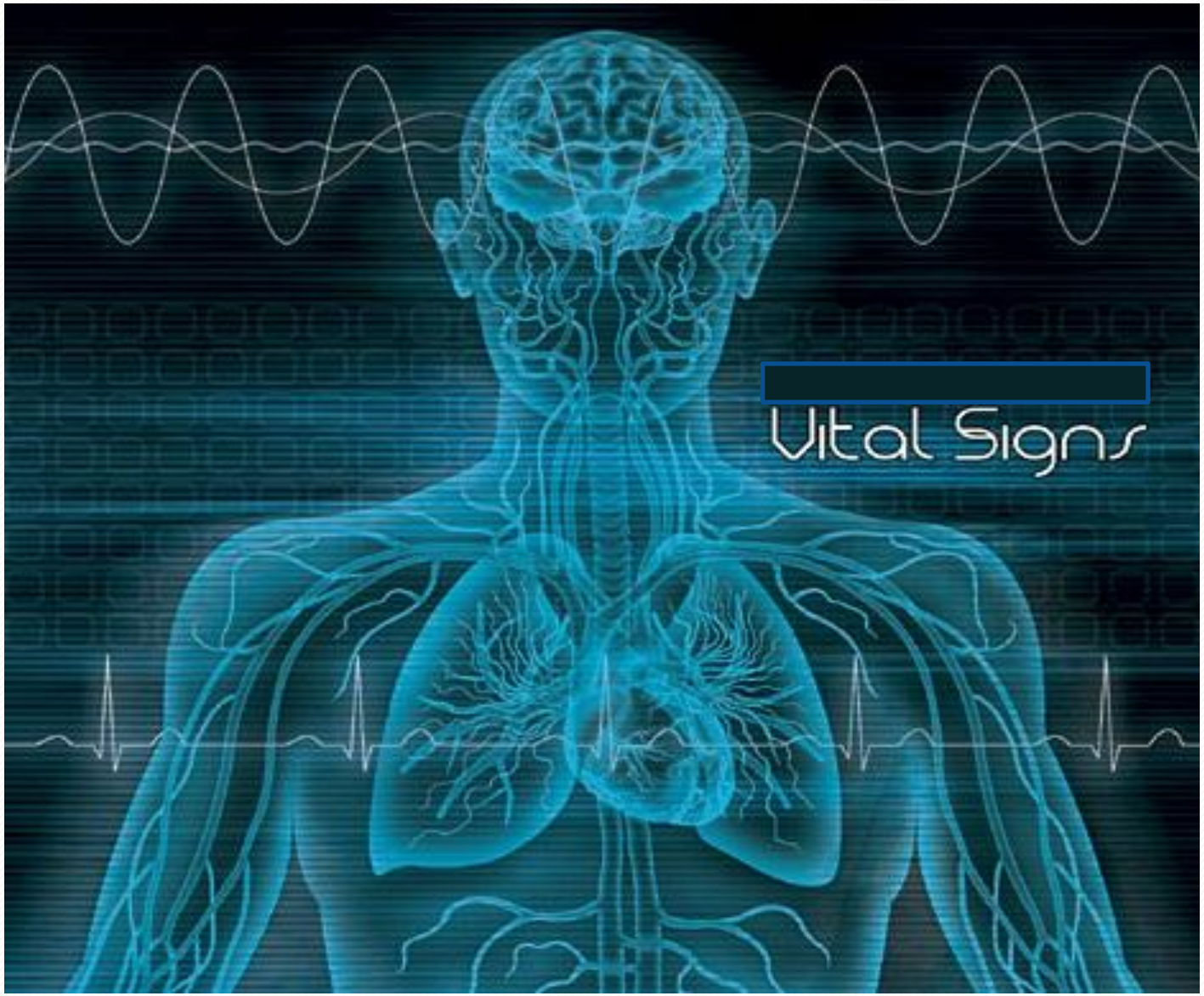

Vital Signs

Vital signs

Body Temperature
Pulse
Respirations
Blood pressure
Pain

Measured

- Health Professional's judgement
- Agencies policies
- Physician's order
- Ordered assessments
- Client's health status

Times To Assess Vital Signs

- On admission to health care agency to obtain baseline data
- Change in client's health status
- Before or after surgery or invasive procedure
- Before and after administration of medication that could affect the respiratory or cardiovascular systems
- Before or after nursing intervention/activities that could affect vital signs

General

Vital signs

Vital sign

- Vital signs are physical signs that indicate an individual is alive, such as heart beat, breathing rate, temperature, blood pressures and recently oxygen saturation.

Vital sign

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

Vital sign

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

Vital sign

- All measurements are made while the patient is seated.

Vital sign

- Prior to measuring vital signs, the patient should have had the opportunity to sit for approximately five minutes.

Observation

- Before diving in, take a minute or so to look at the patient in their entirety.

Observation

- Does the patient seem anxious, in pain, upset? What about their dress and hygiene? Remember, the exam begins as soon as you lay eyes on the patient.

Temperature

Vital signs

Temperature

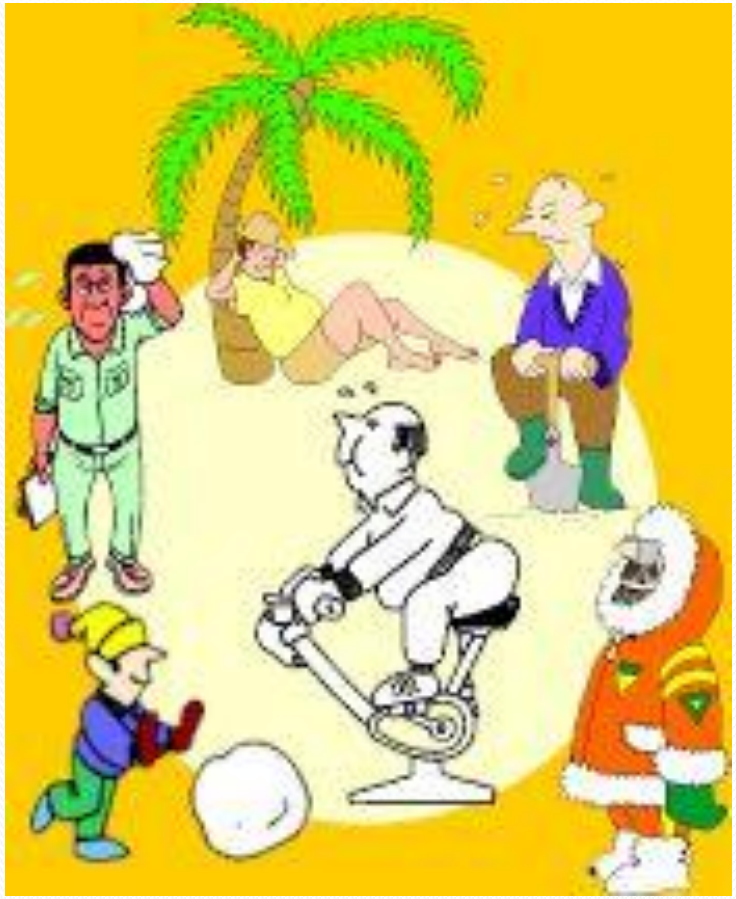
- Old people, people with disabilities, babies and young children typically feel more comfortable at higher temperatures.

Temperature

- Women notice that they are feeling cool quicker than men, which may be related to their different body size.

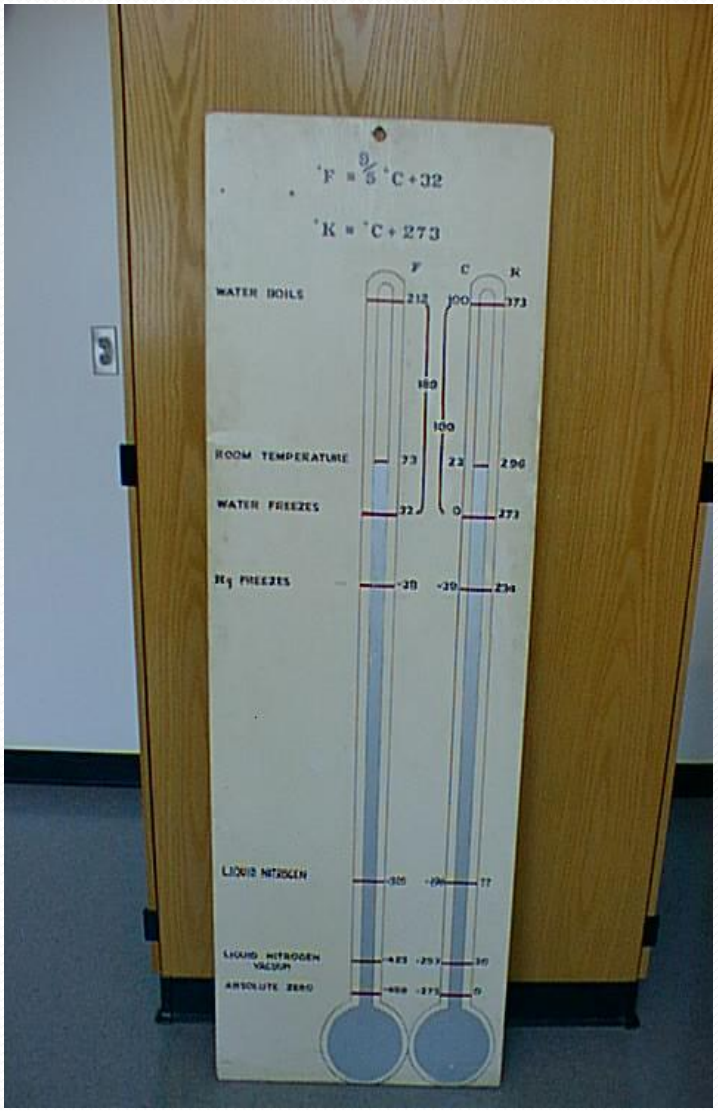
Temperature

- The normal body temperature of a person varies depending on gender, recent activity, food and fluid consumption, time of day, and, in women, the stage of the menstrual cycle.



Temperature

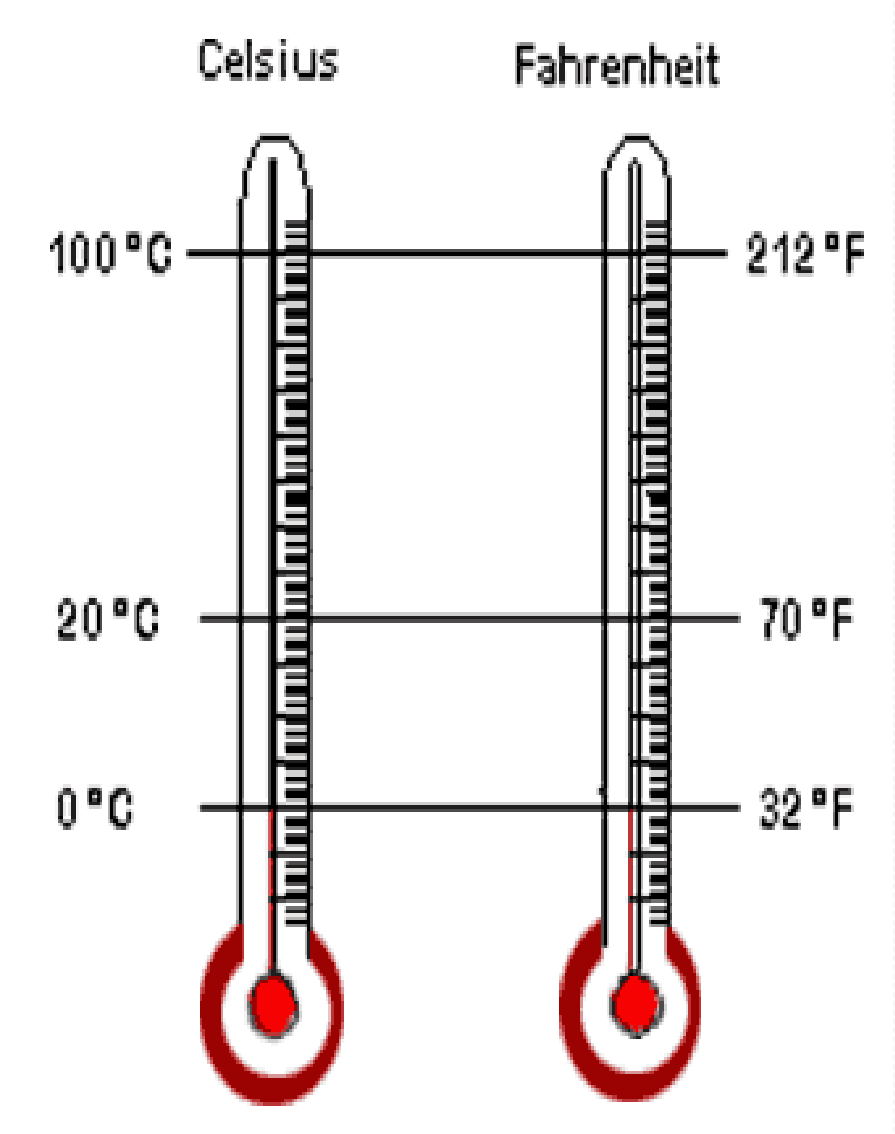
- Temperature is measured in either Celcius or Farenheit, with a fever defined as greater then 38-38.5 C or 101-101.5 F.



Conversion

- °Degree Celsius
- C = (°F - 32) * 5 / 9

- Degree Fahreheit
- °F = (°C * 1.8) + 32

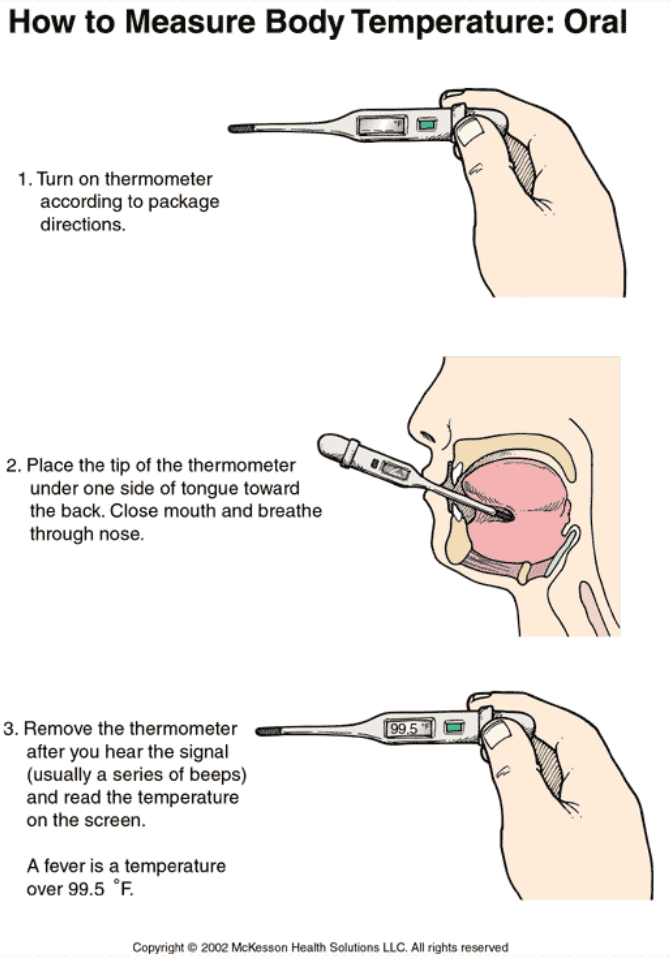


Temperature

- **Rectally** temperatures taken rectally (using a mercury or digital thermometer) tend to be 0.5 to 0.7° (Fahrenheit) higher than when taken by mouth.

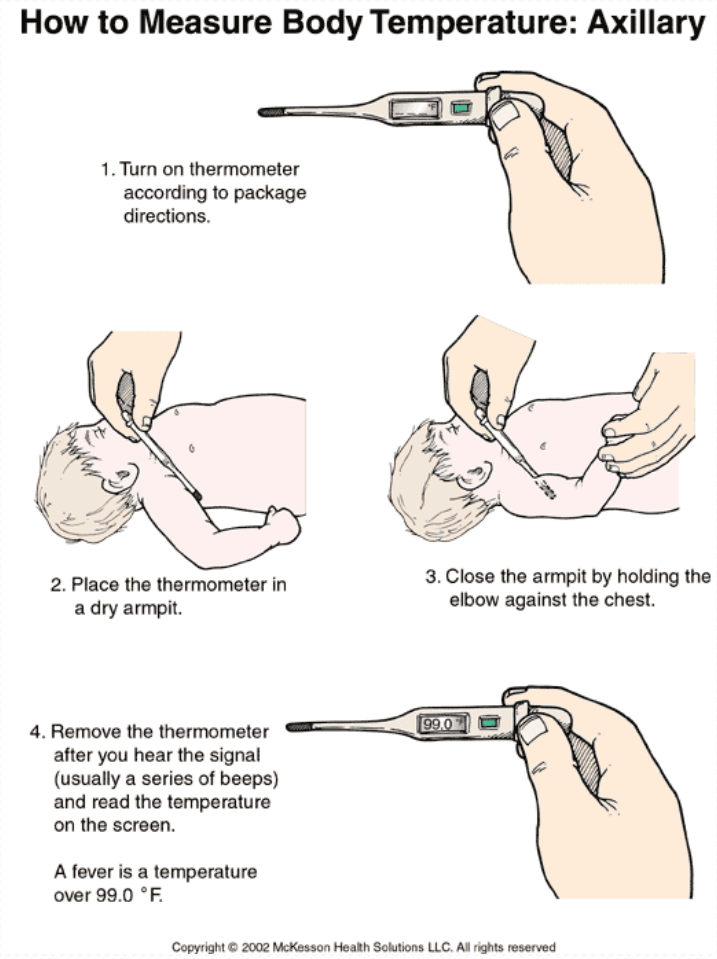
Temperature

- **Oral temperature** can be taken by mouth using classic glass mercury-filled or digital thermometers.



Temperature

- **Axillary temperatures** can be taken under the arm. Temperatures taken by this route tend to be 0.3 to 0.4° (Fahrenheit) lower than those temperatures taken by mouth.



Temperature

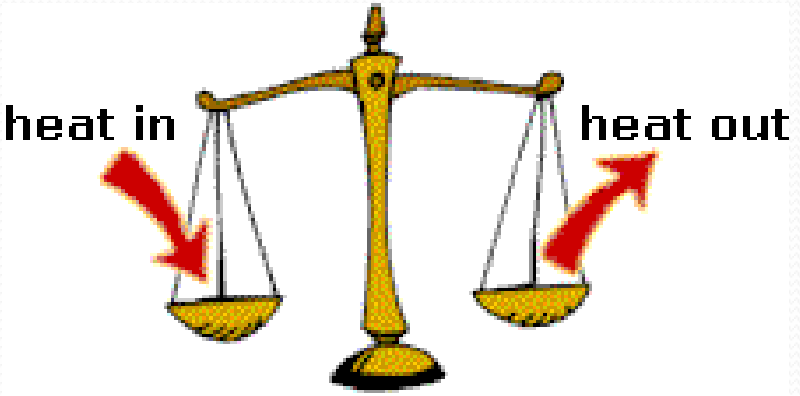
- **By ear a** special thermometer can quickly measure the temperature of the ear drum, which reflects the body's core temperature.

Fever

- A fever is indicated when body temperature rises above 98.6° F orally or 99.8° F rectally.

Hypothermia

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



Remember:

Ask the patient if:

- Has recently smoked
- Has been chewing gum
- Eating or drinking
- Wait for 15-30 minutes before taking an oral temperature

Rectal temperature is contraindicated:

- Newborns
- Small children
- Have diarrhea/disease of the rectum

Sample Documentation

- 10/20/09 0800 Tymphanic temperature assessed. Temperature 102.5 F. Physician notified. Received order to give 650 mg PO acetaminophen now. ---M. Evans, RN

Respiration rate

Vital signs

What is the respiration rate?

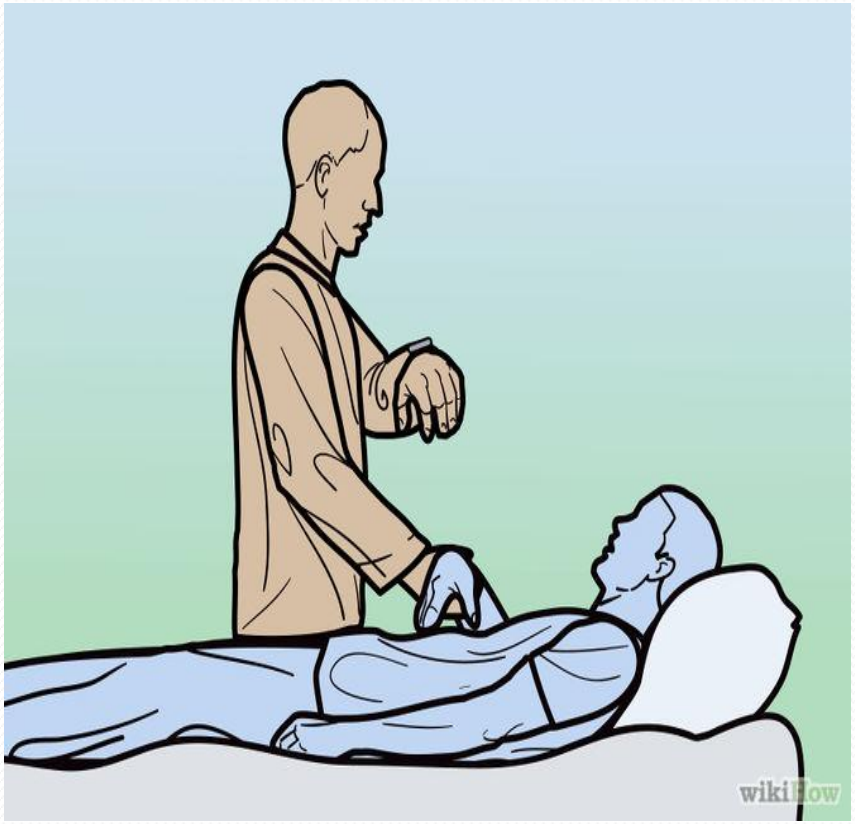
- The respiration rate is the number of breaths a person takes per minute.

Respiratory Rate

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

Respiratory Rate

- They should be counted for at least 30 seconds 15 second period is rather small and any miscounting can result in rather large errors when multiplied by 4.



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

Respiratory Rate

- Normal respiration rates at rest range from 15 to 20 breaths per minute. In the cardio-pulmonary illness, it can be a very reliable marker of disease activity.

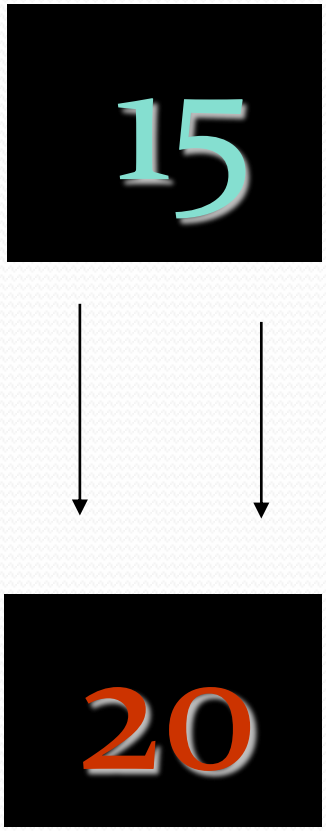


Table 1. Range of respiration rates[2]

Group	Age	Breaths/min
Newborn to 6 weeks	Newborn to 6 weeks	30 - 60
Infant	6 weeks to 6 months	25 - 40
Toddler	1 to 3 years	20 - 30
Young Children	3 to 6 years	20 - 25
Older Children	10 to 14 years	15 - 20
Adults	Adults	12 - 20

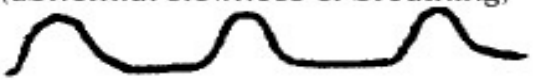
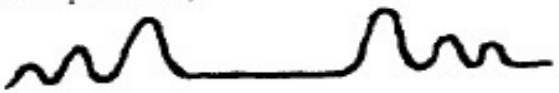
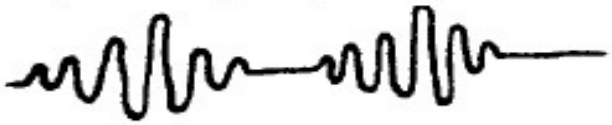
Factors affecting Respirations

- Exercise
- Medications
- Smoking
- Chronic illness or conditions
- Neurologic injury
- Pain
- Anxiety

What to assess?

- Signs and symptoms of respiratory distress
- Retractions
- Nasal flaring
- Grunting
- Orthopnea
- Tachypnea

Table 6. Respiration Patterns in Normal and Disease States

Respiration Pattern	Causes
normal inspiration and expiration 	
obstructive (prolonged expiration) 	asthma, COPD
bradypnea (abnormal slowness of breathing) 	drug-induced respiratory depression diabetic coma increased ICP
Kussmaul's (fast and deep) 	metabolic acidosis exercise anxiety
Biot's/ataxic (irregular with long apneic periods) 	drug-induced respiratory depression increased ICP brain damage, especially medullary
Cheyne-Stokes (changing rates and depths with apneic periods) 	drug-induced respiratory depression brain damage (especially cerebral) CHF uremia
apneustic (prolonged inspiratory pause) 	pontine lesion

Sample Documentation

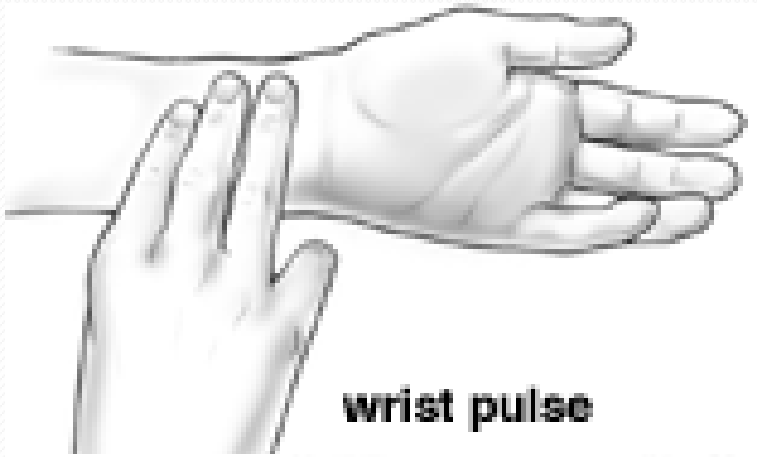
- 10/23/08 0830 Patient breathing at a rate of 16 respirations per minute. Respirations regular and unlabored ---M. Evans, RN

Pulse

Vital signs

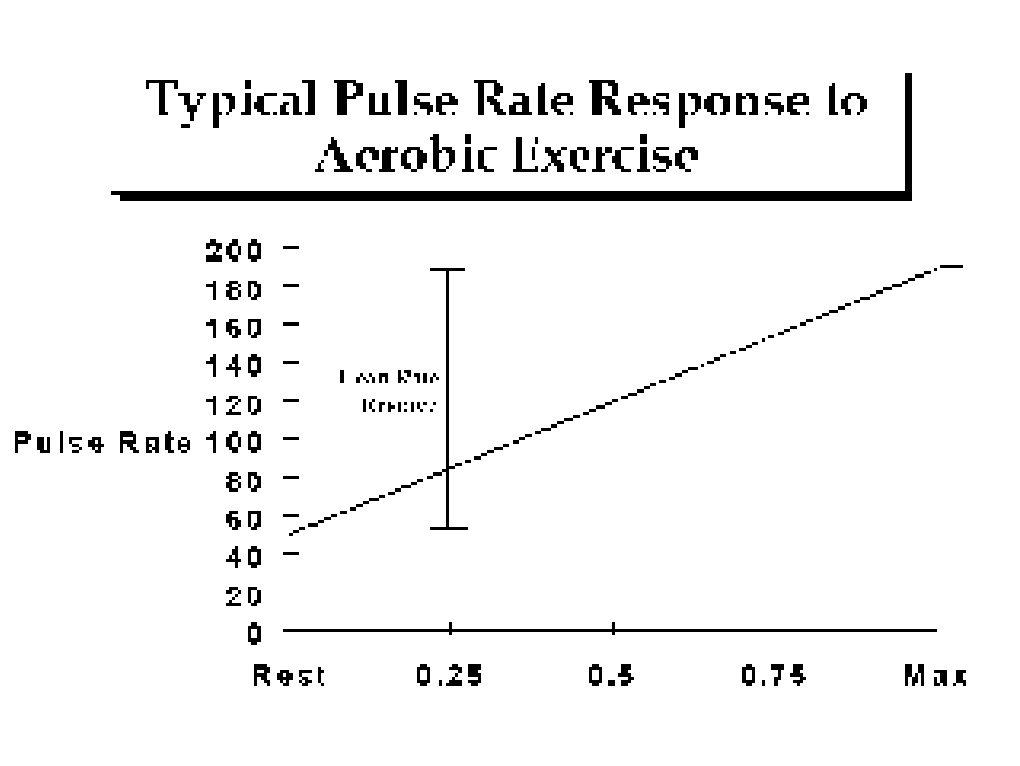
Pulse rate

- 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.



Pulse rate

- Athletes, such as runners, may have heart rates in the 40's and experience no problems.

How to check your pulse

- You feel the beats by firmly pressing on the arteries, which are located close to the surface of the skin at certain points of the body.

How to check your pulse

- The pulse can be found on the side of the lower neck, on the inside of the elbow, or at the wrist.

Pulse

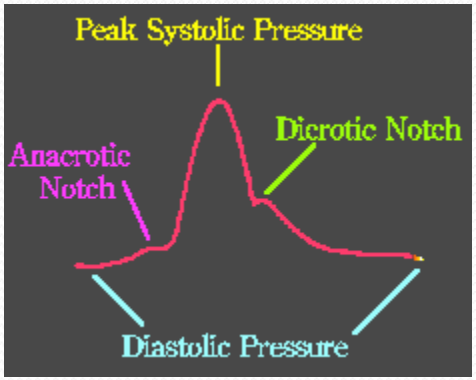
- Place the tips of your index and middle fingers just proximal to the patients wrist on the thumb side, orienting them so that they are both over the length of the vessel.

Pulse

- Push lightly at first, adding pressure if there is a lot of subcutaneous fat or you are unable to detect a pulse. If you push too hard, you might occlude the vessel and mistake your own pulse for that of the patient.

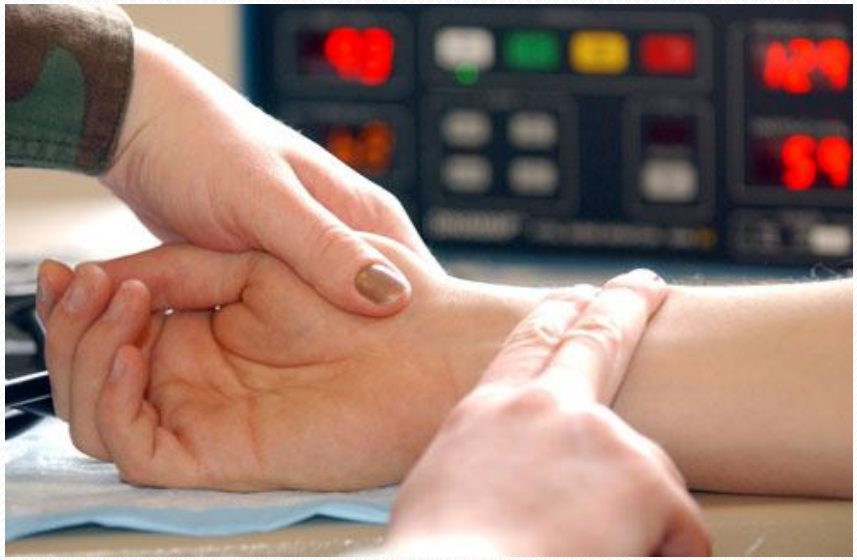
Pulse: Quantity

- Measure the rate of the pulse (recorded in beats per minute). Count for 30 seconds and multiply by 2 (or 15 seconds x 4).



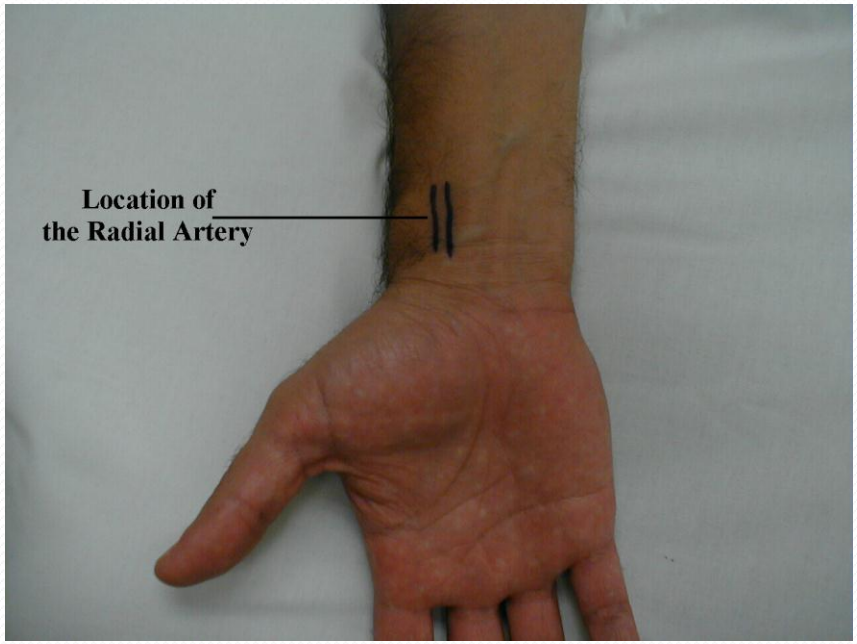
Pulse: Quantity

- 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.



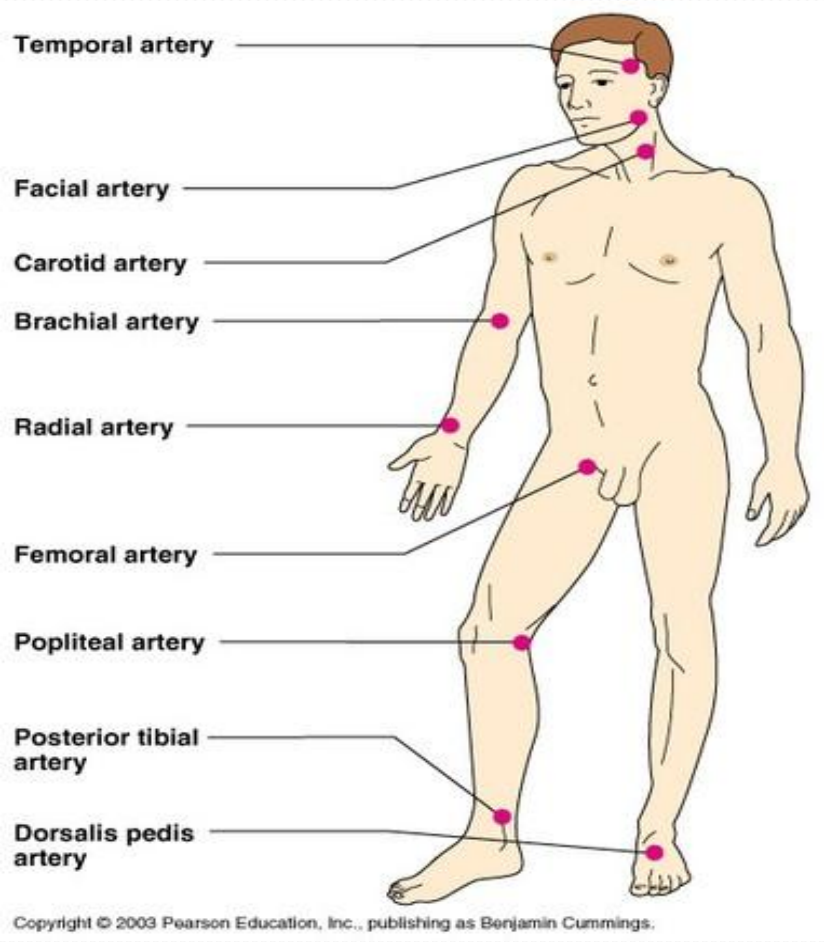
Pulse: Volume

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

Pulse Sites and Pulse Amplitude

Pulse amplitude typically is graded as 0 to 4

- 0 (absent pulse) cannot be felt, even with the application of extreme pressure
- 1 (Thready pulse) very difficult to feel, and applying slight pressure causes pulse to disappera
- 2+ (weak pulse); stronger than a thready pulse, but applying light pressure causes pulse to disappear
- 3+ (normal pulse) easily felt and requires moderate pressure to make it disappear
- 4+ (bounding pulse) strong does not disappear with moderate pressure



Note

- An apical pulse may be assessed by palpating peripheral arteries, by auscultating the apical pulse with a stethoscope, or by using a portable Dopler ultrasound.
- An apical pulse is assessed when giving medications that alter heart rate and ryhthm. If a peripheral pulse is difficult to assess accurately because it is irregular, feeble, or extremely rapid.
- If apical pulse is irregular, assess patients for other symptoms, such as lightheadedness, dizziness, SOB or palpitations.
- Most reliable for infants and small children.

Sample documentation

- 2/6/08 1000h Pulses regular, 2+ and equal in radial, popliteal, and dorsalis pedis sites.---M. Evans, RN

Blood pressure

Vital signs

Preparation for measurement

Preparation for measurement

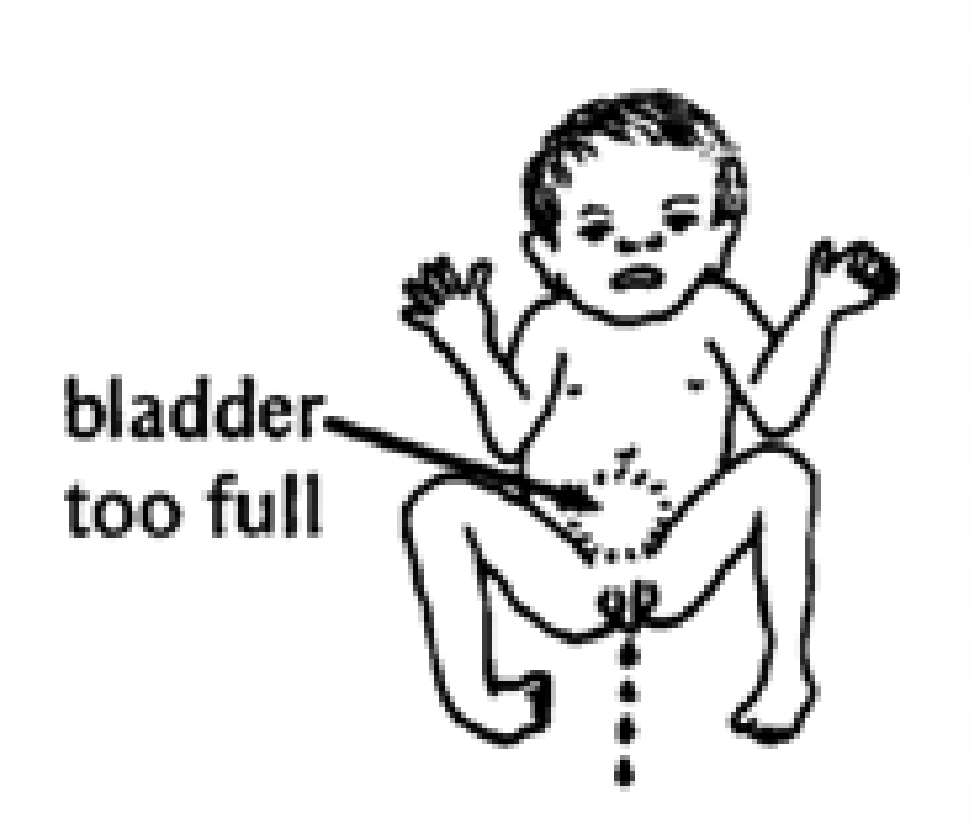
- Patient should abstain from eating, drinking, smoking and taking drugs that affect the blood pressure one hour before measurement.

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

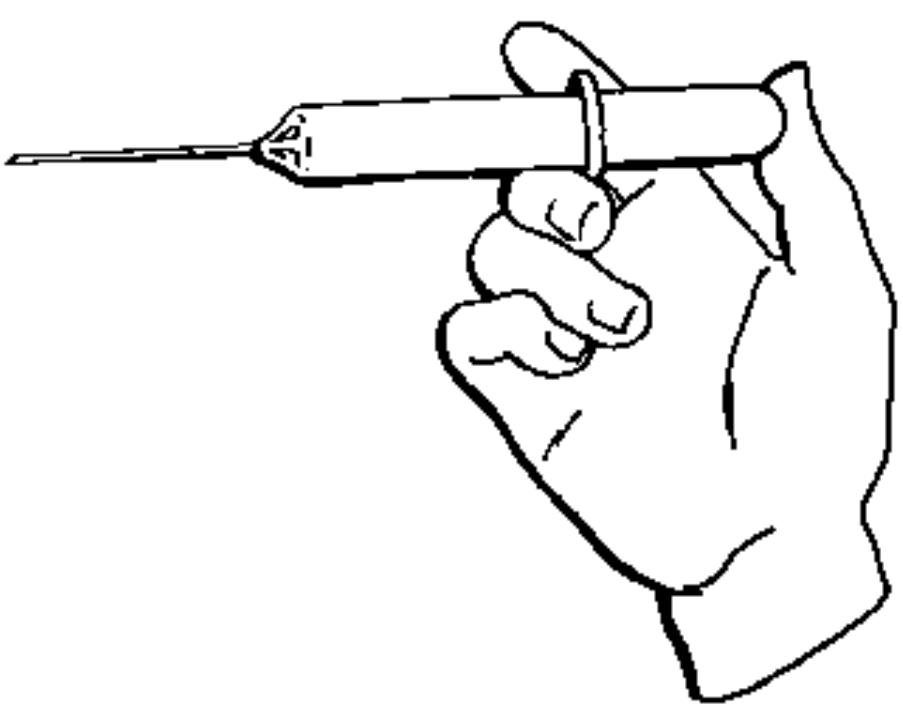
Preparation for measurement

- Because a full bladder affects the blood pressure it should hav been emptied.



Preparation for measurement

- Painful procedures and exercise should not have occurred within one hour.
- Patient should have been sitting quietly for about 5 minutes.



Preparation for measurement

- BP take in quiet room and comfortable temperature, must record room temperature and time of day.

Position of the Patient

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

- The measurements should be made on the right arm whenever possible.
- Patient arm should be resting on the desk and raised (by using a pillow)

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 artifactually lowered, and vice versa.

Position of the arm

- Palm is facing up.
- The arm should remain somewhat bent and completely relaxed

Equipment

In order to measure the Blood Pressure (equipment)

- Pediatric Cuff size
  - Minimum Cuff Width: 2/3 length of upper arm
  - Minimum Cuff length: Bladder nearly encircles arm

In order to measure the Blood Pressure (equipment)

- Adult Cuff size
  - Cuff Width: 40% of limb's circumference
  - Cuff Length: Bladder at 80% of limb's circumference

In order to measure the Blood Pressure (equipment)

- Adult Cuff size
  - Indications for large cuff or thigh cuff
    - Upper arm circumference >34 cm
  - Indications for forearm cuff (with radial palpation)
    - Upper arm circumference >50 cm

Blood Pressure

- If it is too small, the readings will be artificially elevated. The opposite occurs if the cuff is too large. Clinics should have at least 2 cuff sizes available, normal and large.

Cuff Position

In order to measure the Blood Pressure (Cuff Position)

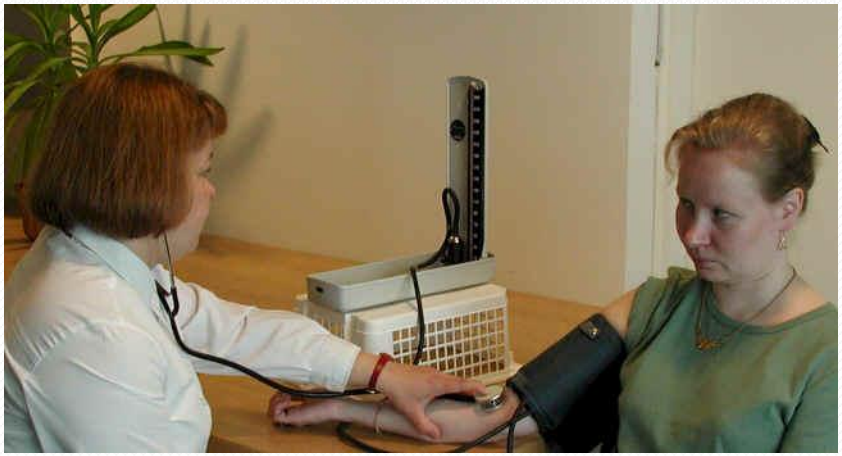
- Patient's arm slightly flexed at elbow
- Push the sleeve up, wrap the cuff around the bare arm

In order to measure the Blood Pressure (Cuff Position)

- Cuff applied directly over skin (Clothes artificially raises blood pressure)
- Position lower cuff border 2.5 cm above antecubital
- Center inflatable bladder over brachial artery

Measurement of the pulse rate

- The manometer scale should be at eye level, and the column vertical. The patient should not be able to see the column of the manometer



Technique of BP measurement

In order to measure the BP

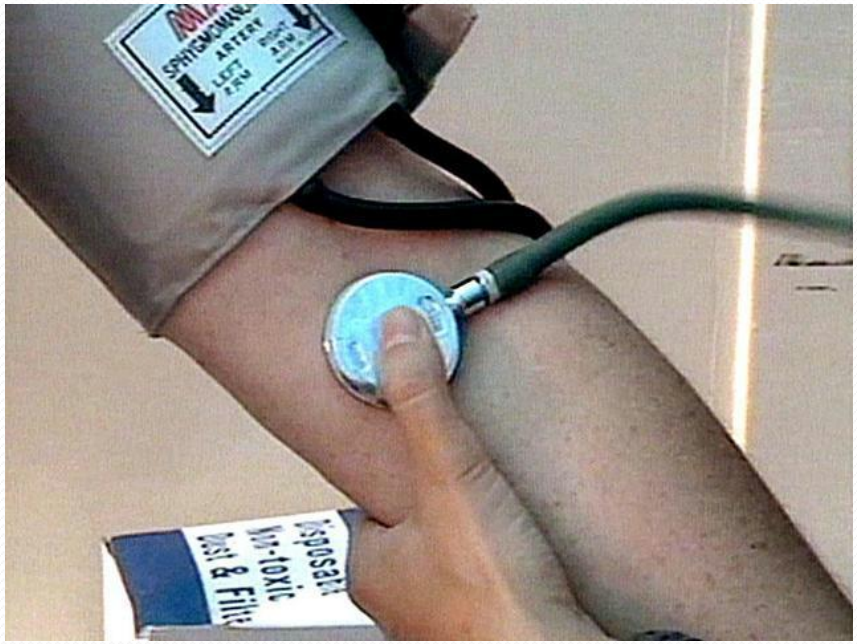
- Feel for a pulse from the artery coursing through the inside of the elbow (antecubital fossa).

In order to measure the BP

- Wrap the cuff around the patient's upper arm
- Close the thumb-screw.

In order to measure the BP

- With your left hand place the stethoscope head directly over the artery you found. Press in firmly but not so hard that you block the artery.

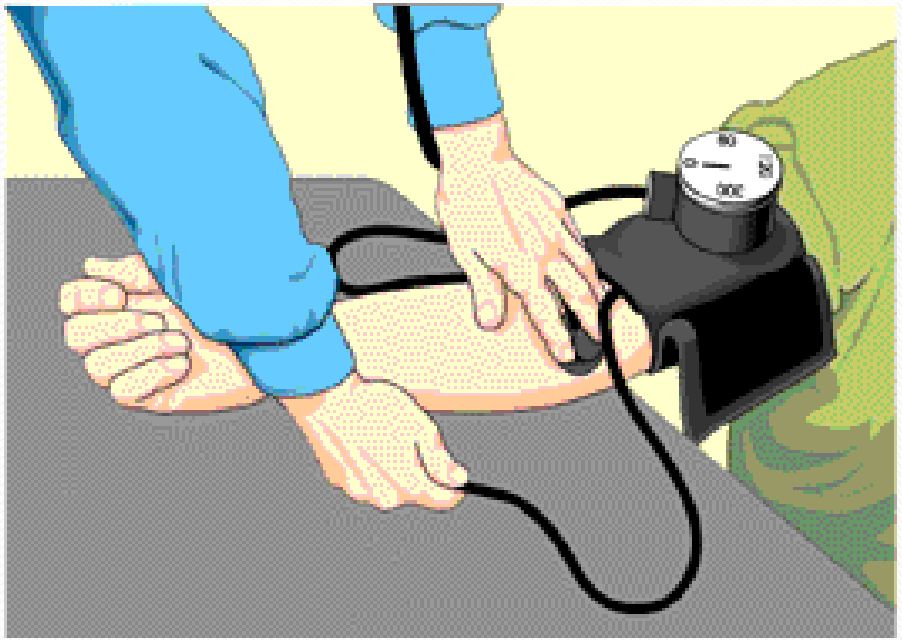


Technique of BP measurement

- Use your right hand to pump the squeeze bulb several times and Inflate the cuff until you can no longer feel the pulse to level above suspected SBP

Technique of BP measurement

- If you immediately hear sound, pump up an additional 20 mmHg and repeat



Technique of BP measurement

- Deflate cuff slowly at a rate of 2-3 mmHg per second until you can again detect a radial pulse

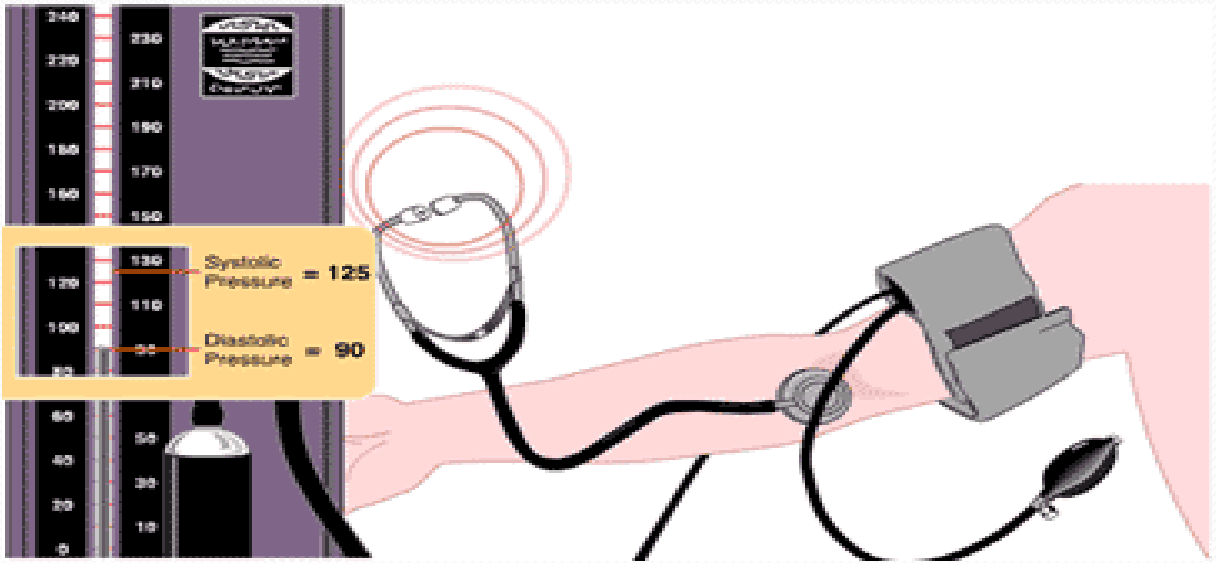
Technique of BP measurement

- 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.

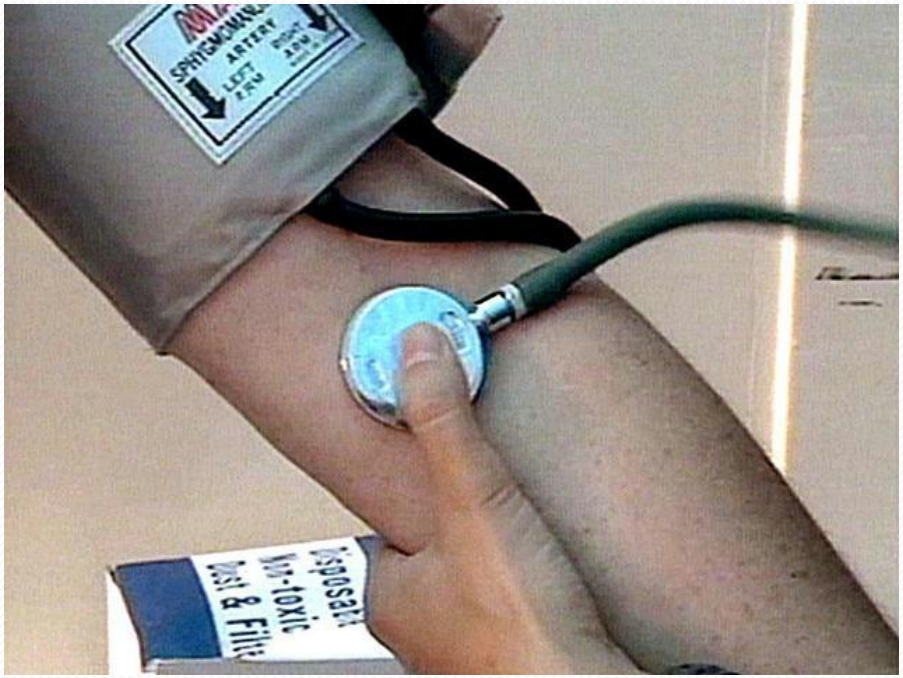
In order to measure the BP



- 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 stethescope while you are taking readings as this may produce noise that can obscure the Sounds of Koratkoff.



Technique of BP measurement

- BP must take in both arms and one lower extremity.

In order to measure the BP

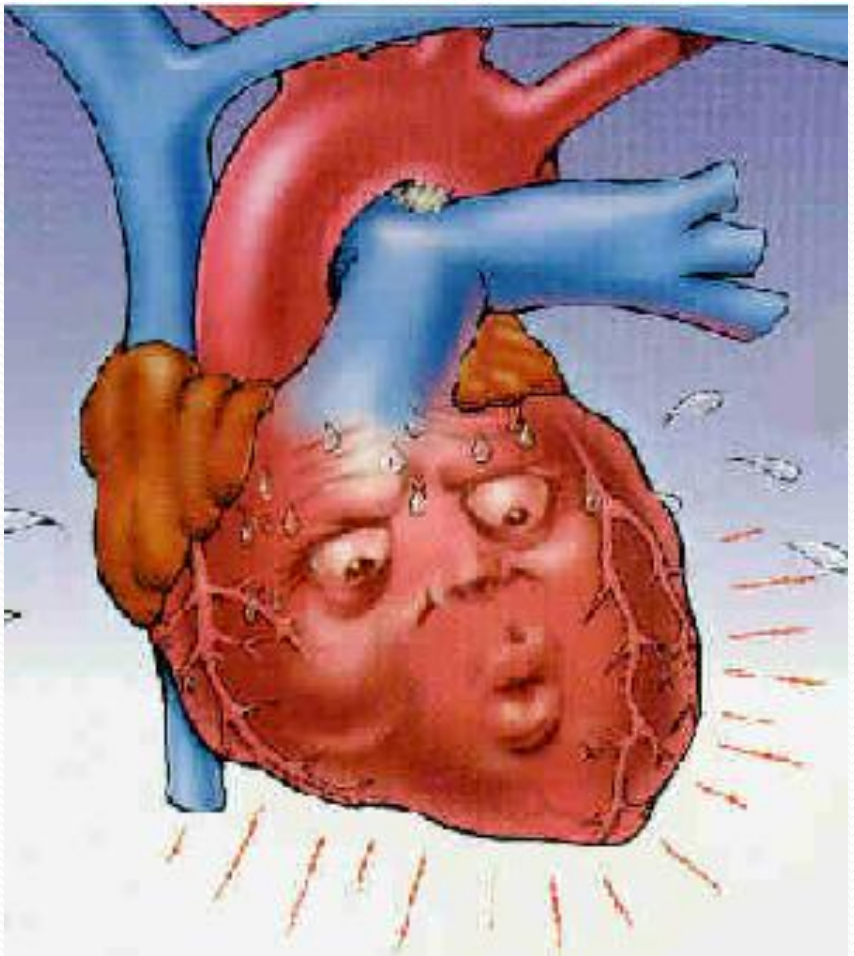
- The two arm readings should be within 10-15 mm Hg. Differences greater then 10-15 imply differential blood flow.

In order to measure the BP

- If you wish to repeat the BP measurement you should allow the cuff to completely deflate, permit any venous congestion in the arm to resolve and then repeat a minute or so later.

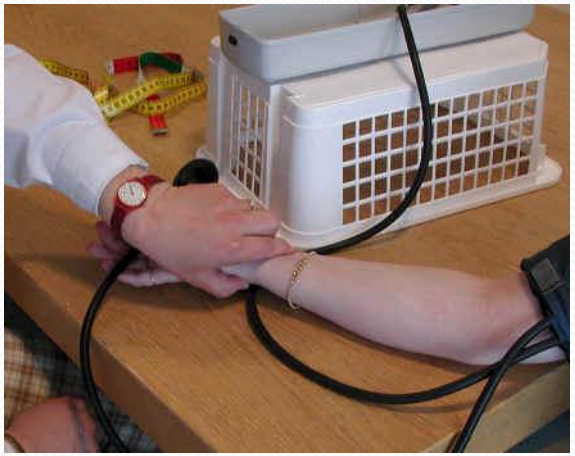
Remember the following for accuracy of your readings

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



In order to measure the BP

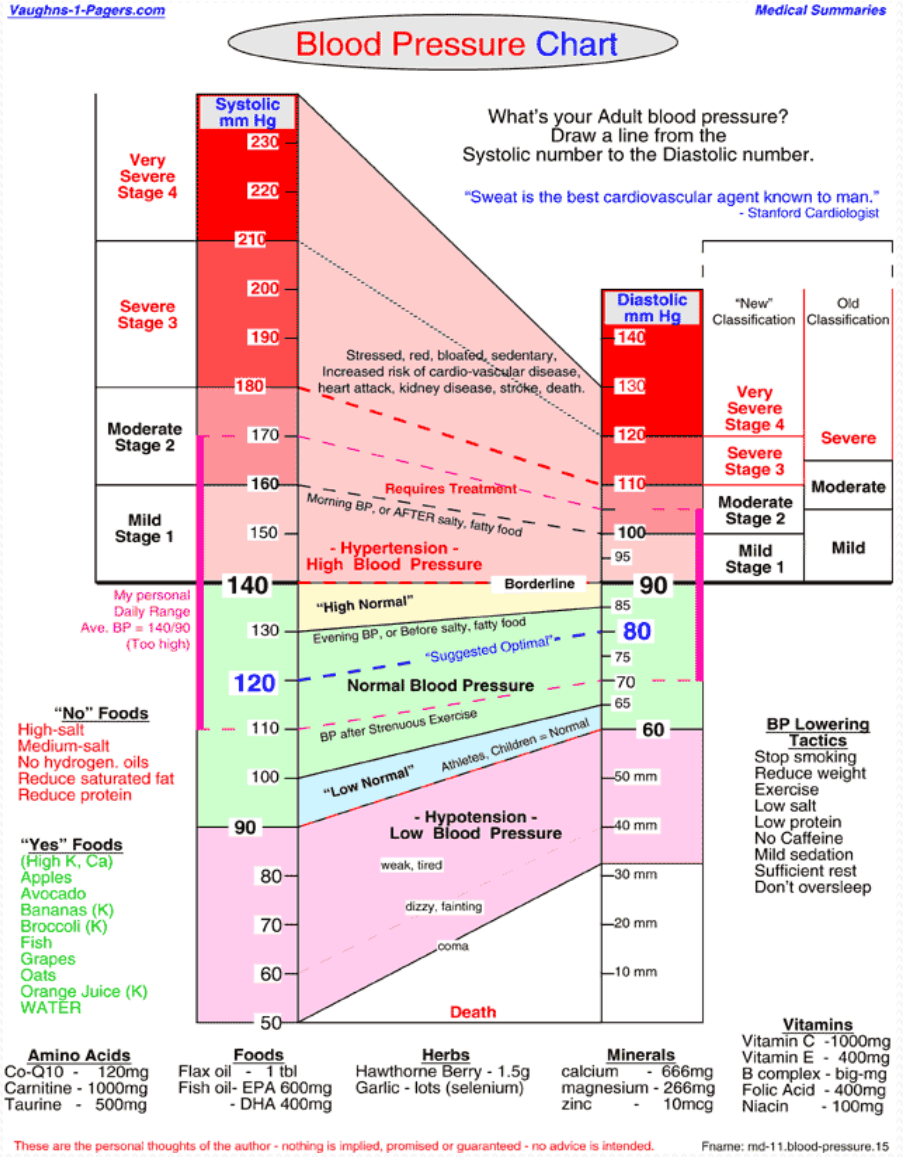
- You can verify the SBP by palpation. Place the index and middle fingers of your right hand over the radial artery.



What Abnormal Results Mean

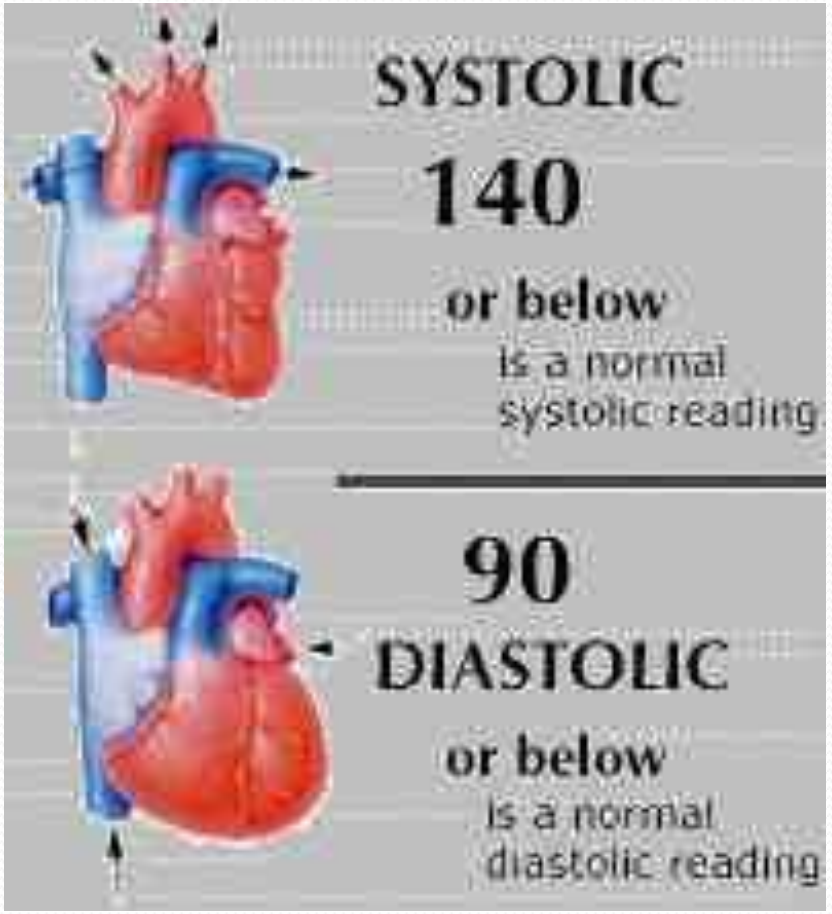
In order to measure the BP

- Diastolic blood pressure allow free flow of blood without turbulence and thus no audible sound. These are known as the Sounds of Koratkoff.



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

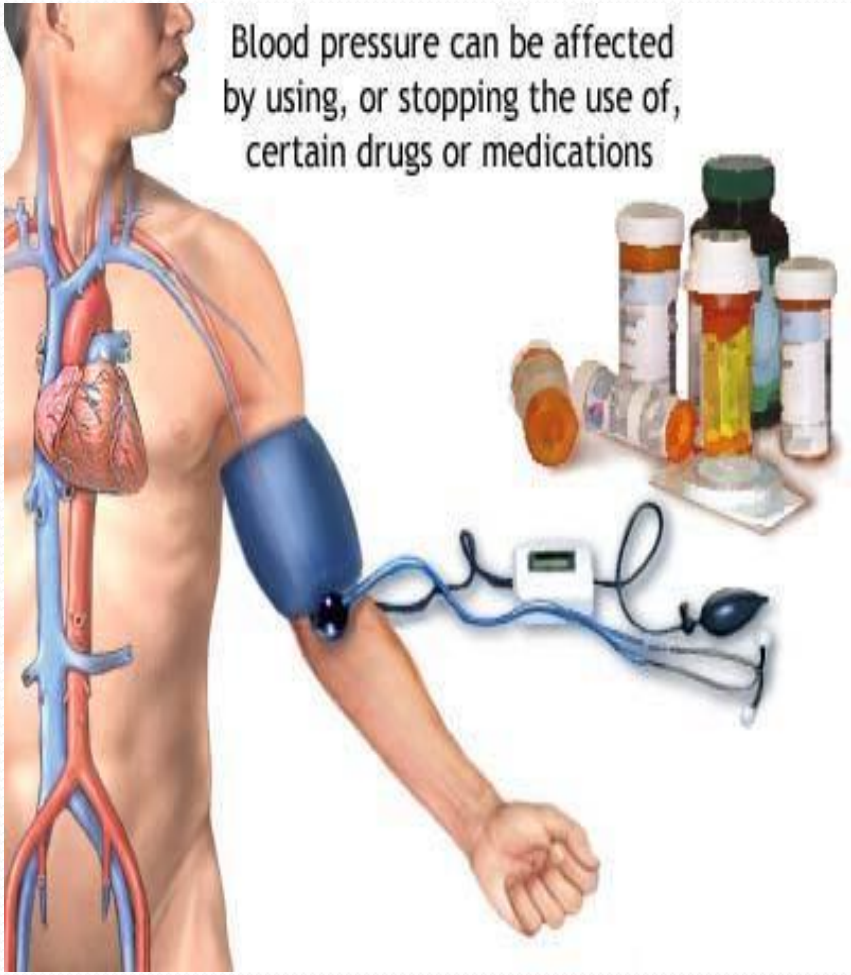
- Stage 1 high blood pressure: systolic pressure consistently 140 to 159, or diastolic 90 to 99

What Abnormal Results Mean

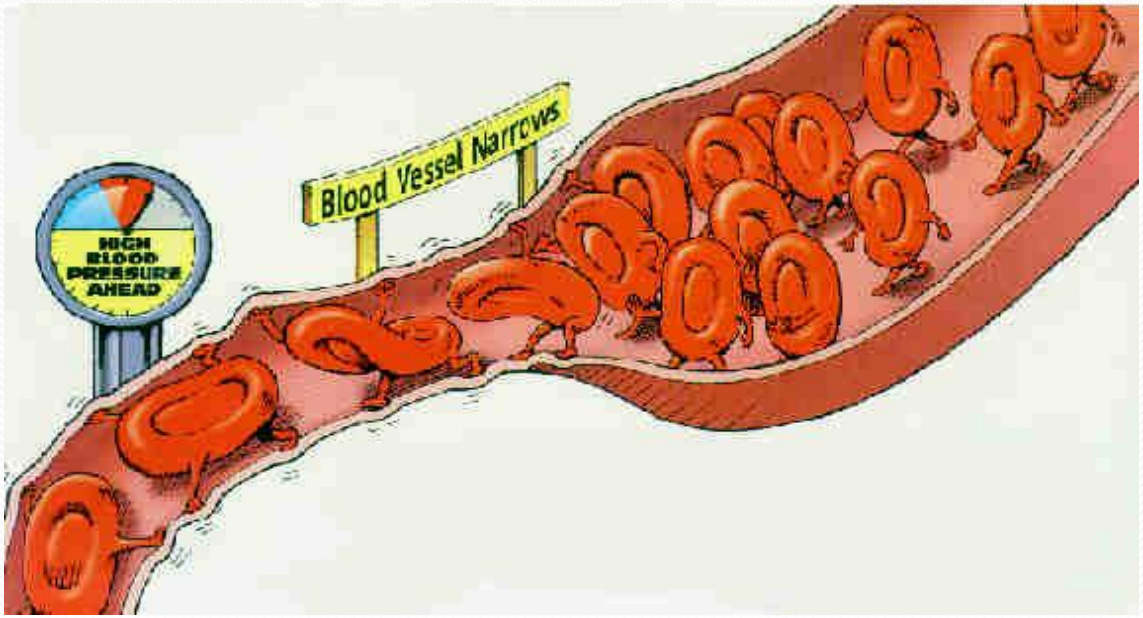
- Stage 2 high blood pressure: systolic pressure consistently 160 or over, or diastolic 100 or over

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..

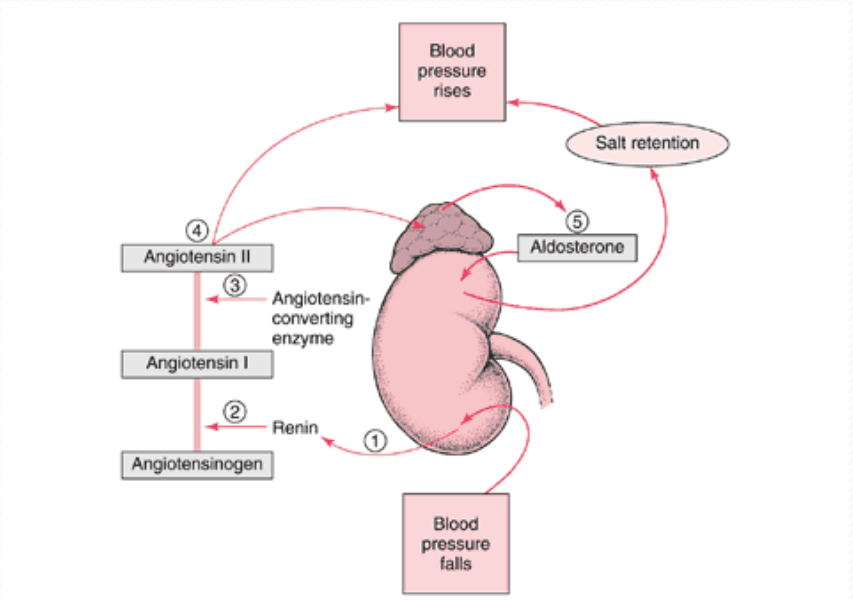
Blood pressure (mm Hg)

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

Blood pressure may be affected by many different conditions

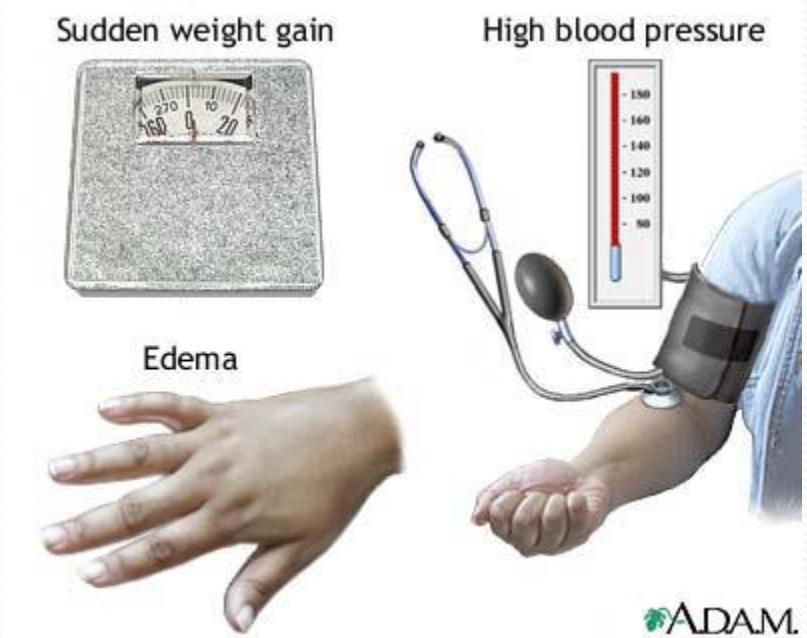
Blood pressure may be affected by many different conditions

- 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

Blood pressure may be affected by many different conditions

- Various medications
- "White coat hypertension" may occur if the medical visit itself produces extreme anxiety

Common problems that account for inaccurate blood pressure measurement

When the patient has ...	*BP can appear higher by ...* [1,2]
A full bladder	10-15 mmHg
An unsupported back	5-10 mmHg
Unsupported feet	5-10 mmHg
Crossed legs	2-8 mmHg
Cuff over clothing	10-40 mmHg
Unsupported arm	10 mmHg
A conversation or is talking	10-15 mmHg

1. Pickering, et al. Circulation 2005
2. O'Brien, et al. Blood Press Mon. 2002

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.

BP Measurement to Assess for Orthostatic Hypotension

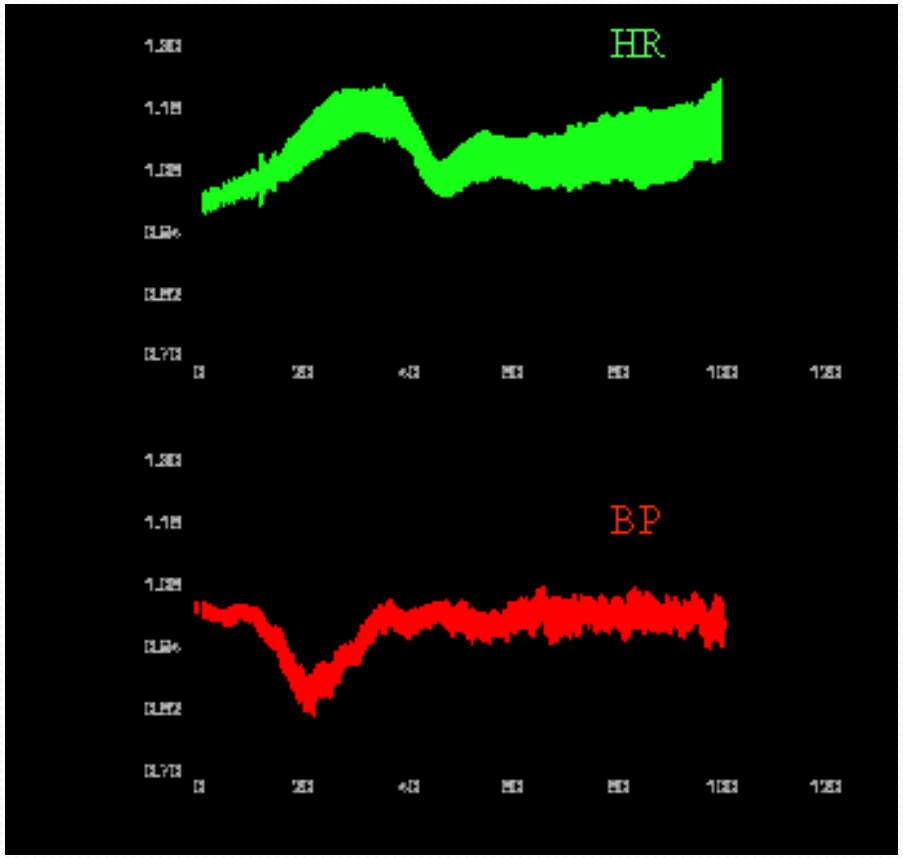
- Assess for s/s of hypotension
- Dizziness
- light-headedness
- Pallor
- Diaphoresis
- syncope

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.
- An Increase of 40 beats in the pulse rate or a decrease in BP of 30 mm Hg are abnormal

Remember the following for accuracy of your readings

- Systolic blood pressure does not vary by more then 20 points when a patient moves from lying to standing.



Remember the following for accuracy of your readings

- Orthostatic measurements may also be used to determine if postural dizziness (diabethic autonomic nervous system dysfunction) is the result of a fall in blood pressure.

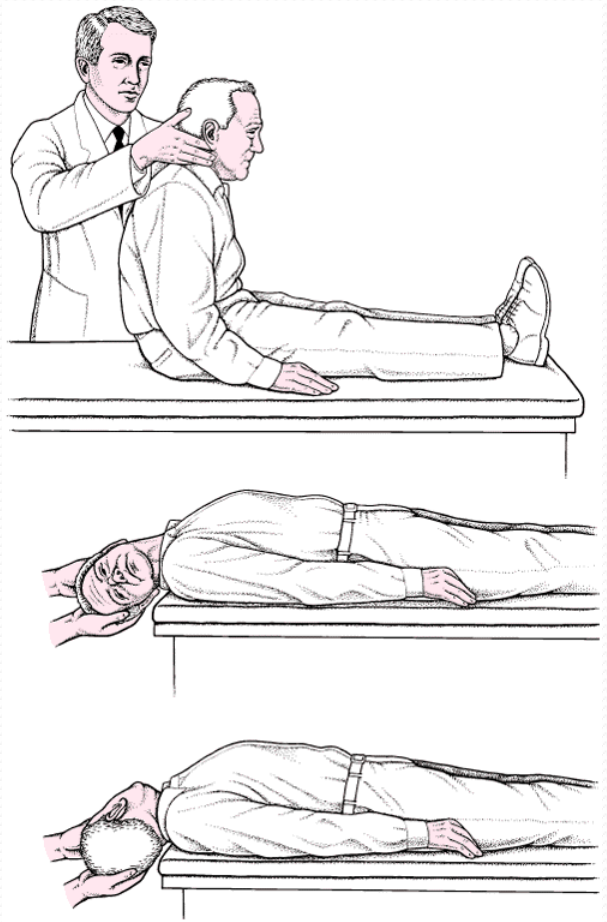


FIGURE 19–3. Hallpike maneuver. Each position is held for at least 10 seconds.

Blood Pressure Category	Systolic (mmHg)		Diastolic (mmHg)
Normal	less than **120**	and	less than **80**
Prehypertension	**120 - 139**	or	**80 - 89**
Stage 1 Hypertension	**140 - 159**	or	**90 - 99**
Stage 2 Hypertension	**160** or higher	or	**100** or higher

Oxygen Saturation

Vital signs

Oxygen Saturation

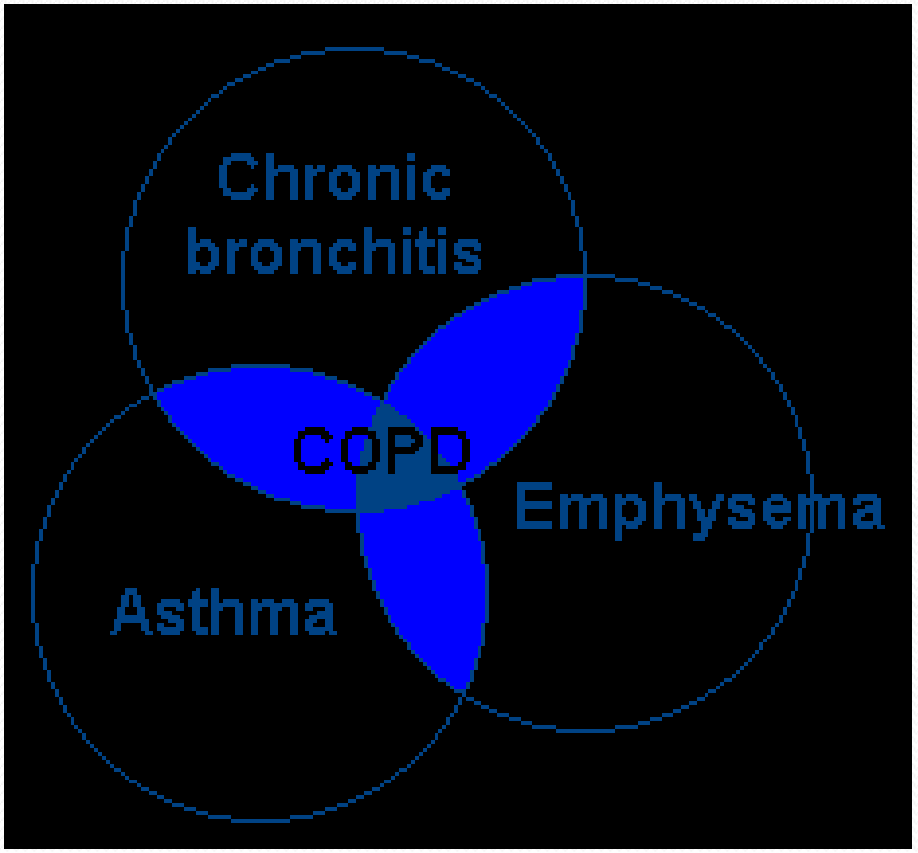
- Over the past decade, **Oxygen Saturation** measurement of gas exchange and red blood cell oxygen carrying capacity has become available in all hospitals and many clinics.

Oxygen Saturation

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

Oxygen Saturation

- For those suffering from either acute or chronic cardio-pulmonary disorders, **Oxygen Saturation** can help quantify the degree of impairment.



Assessment

- Patient's skin temperature
- Color
- Color of nail beds
- Capillary refill (prolonged capillary refill indicates a reduction in blood flow)

Sample Documentation

- 9/03/08 Pulse oximeter placed on patient's index finger on right hand. Radial pulse present with brisk capillary refill. Pulse oximeter correlates with the radial pulse measurement—C. Bausler, RN

THANK YOU