

# Vital Signs

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

- The physical examination is inextricably linked to the history
- 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

## Vital Signs - 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

- Normal adult oral temperature
  - 98.6°F
  - 37°C
  - Measure to nearest tenth of a degree
- Measured using either electronic or disposable
  - Electronic digital
    - Accurate, fast, easy to read
    - Comfortable for the patient
  - Tympanic
  - Temporal
  - Disposable
    - Single use
    - Less accurate



## Oral Temperatures

- Wait at least 15 minutes after eating, drinking, or smoking
- Place under tongue in either pocket just off-center in lower jaw
- 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

## 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



## 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

### **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

### **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 is defined as a drop in body temperature below 95° F.

## 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.

## The Pulse Is

- The beat of the heart 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 of 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, excitement, heat, position and pain.
- Medications can be taken that either increase or decrease a person's pulse rate.



## 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.

## Counting a Pulse

- We usually count a pulse for 30 seconds and multiply times 2
- Note the rhythm (pattern) of the heart beat – if the heart beat is irregular we count for a full minute.
- We also observe the force (strength) of the heartbeat.
- Does the pulse feel strong or weak, full or thread, bounding or feeble?

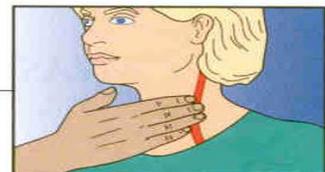
## Radial Pulse

- 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 on the radial artery
- Do not use your thumb
- Use gentle pressure
- Count the pulse for 20 seconds and multiple times two

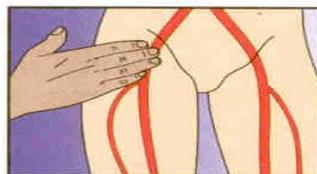
Temporal



Carotid



Femoral



Brachial



Popliteal



Radial



Posterior tibial

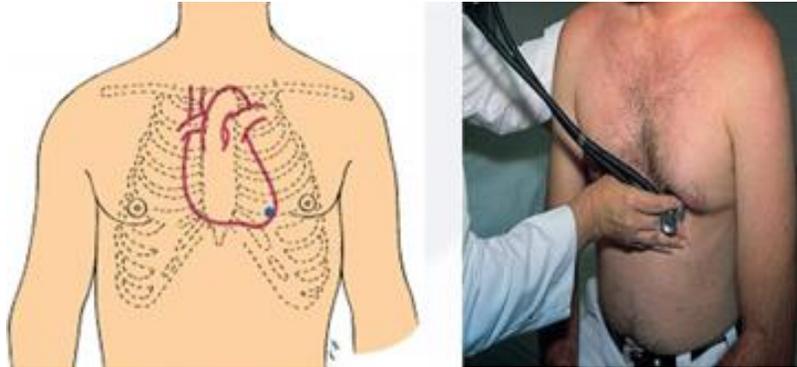


Dorsalis pedis



## Apical Pulse

- 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.
- Taken with a stethoscope, counted by placing the stethoscope over the heart counted for a full one minute.
- The heart beat normally sounds like a lub-dub, which is counted as one heart beat.
- The apical pulse is taken on patients who have heart disease, an irregular pulse rate or take medications that can affect the heart.



## Vital Signs - Respiration 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.
- 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

## Vital Signs - 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
- 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

### **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)
- Systolic blood pressure is the pressure at which you can first hear the pulse.
- Diastolic blood pressure is the last pressure at which you can still hear the pulse
- 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.
- 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
- Stage 2 high blood pressure:
  - systolic pressure consistently 160 or over, or diastolic 100 or over
- 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
- 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
- Pre eclampsia in pregnant women
- Psychological factors such as stress, anger, or fear

## **Orthostatic Hypotension**

- Remember the following for accuracy of your readings
  - Orthostatic (postural) measurements of pulse and blood pressure are part of the assessment for hypovolemia.
  - 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 measurement of gas exchange and red blood cell oxygen carrying capacity has become available in all hospitals and many clinics.
- Oxygen Saturation provide important information about cardio-pulmonary dysfunction and is considered by many to be a fifth vital sign.



## 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)