

# Vital signs

By

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# 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

- All measurements are made while the patient is seated.





# Pulse

# Pulse Measurement - An Overview

- Equipment for accurate pulse measurement
  - Watch or clock with second hand or digital second counter
  - Stethoscope for apical pulse (optional)
  - Pen or pencil
  - Flowsheet, chart, or medical record
  - Clean hands and fingers!
- Waited 5 minutes if patient was active
- Patient in a comfortable & relaxed position
- Enough time to count the pulse



# Pulse Procedure

1. Wash hands & put on gloves, if appropriate
2. Provide privacy
3. Assist patient to a comfortable & relaxed position



# Pulse Procedure - Radial

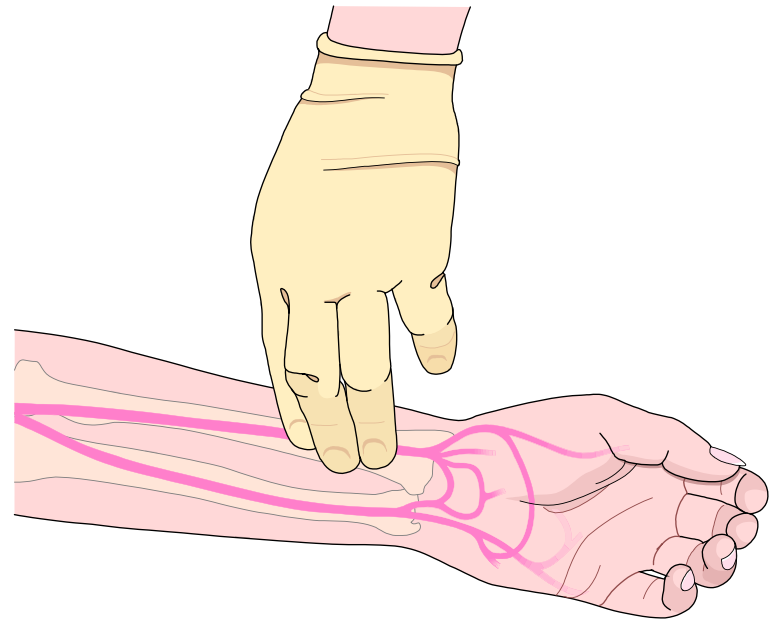
4. Do NOT use your thumb

Thumbs have a pulse, which  
can be mistaken for a  
patient's pulse

5. Place fingertips of first 2 or  
middle 3 fingers over the radial  
pulse area

Thumb side of patient's  
forearm at the wrist

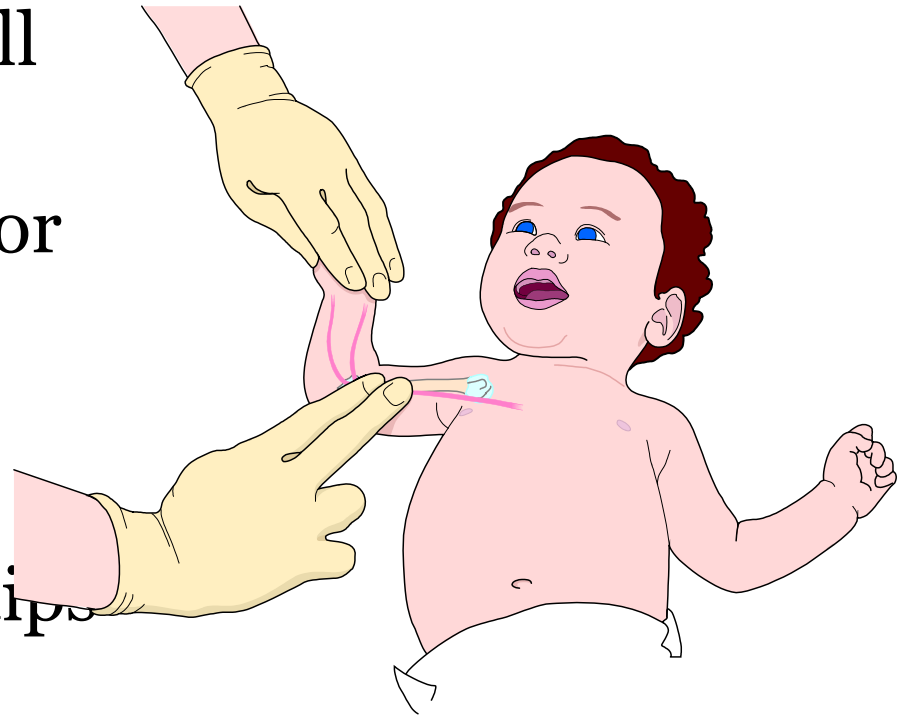
6. Lightly press your fingertips  
on the pulse area





# Pulse Procedure - Brachial

4. Used for infants and small children
5. Place fingertips of first 2 or middle 3 fingers over the brachial pulse area  
Inside of the elbow
6. Lightly press your fingertips on the pulse area



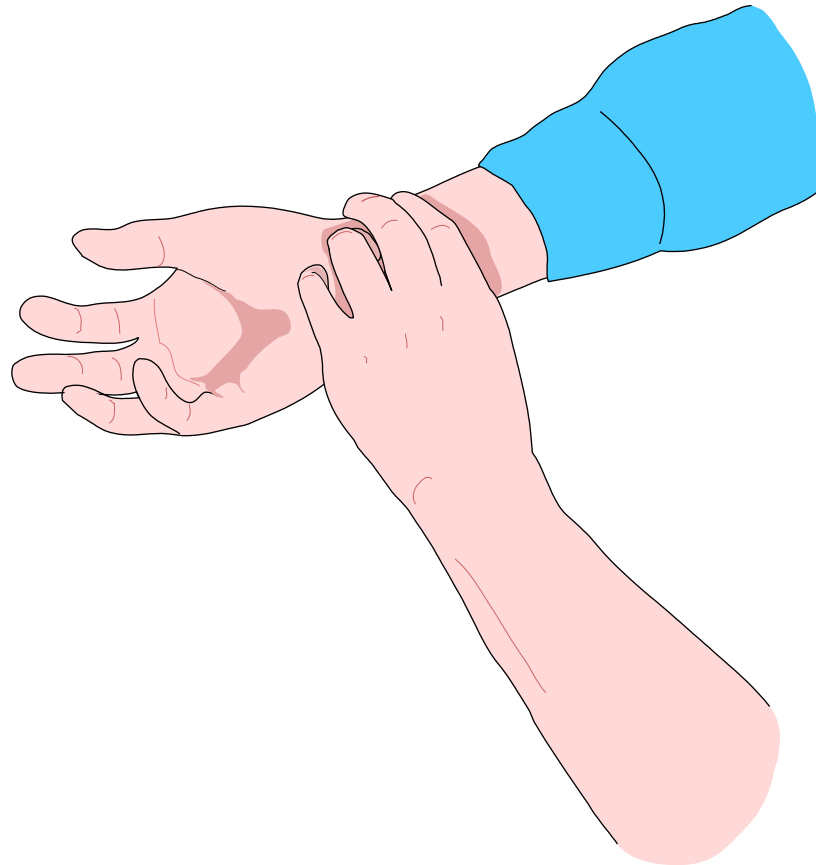
# Pulse Procedure

7. Begin to count rate when pulse is felt regularly
  8. Count for 60 sec
  9. Count for 30 sec and multiply X2
- Shorter time counts = inaccurate data



# Pulse Procedure

- If pulse irregular or skipping, count for 60 sec



# Pulse Procedure - Apical (Optional)

- Listen to the heart with a stethoscope to count the pulse if:
  - Pulse is difficult to feel or count
  - Pulse is very fast or very slow

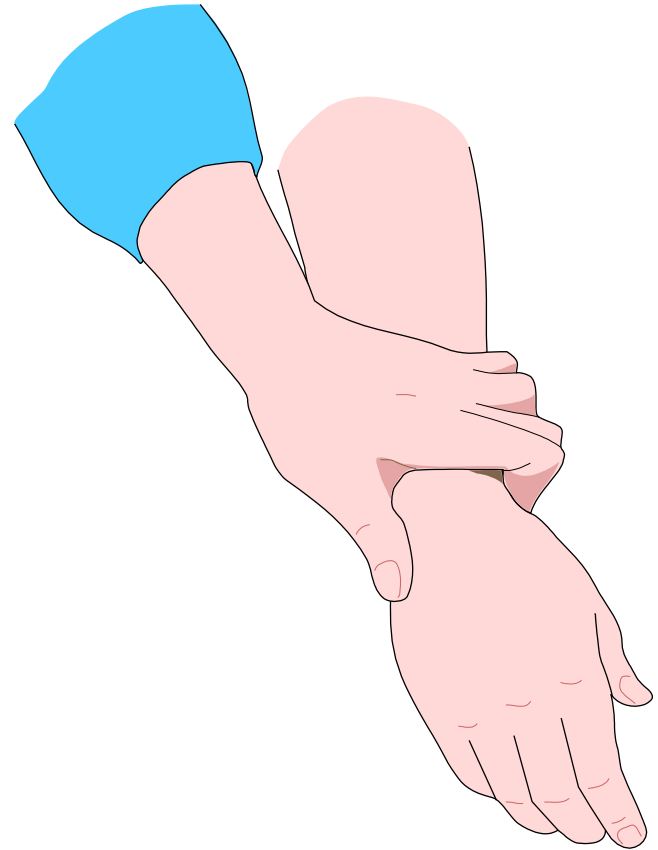
## Pulse Procedure - Machine Taken

- Automated BP machines can take pulse readings
- Accurate with strong, normal pulses
- Inaccurate with:
  - Very fast or very slow pulses
  - Weak, skipping or irregular pulses
  - Arm movement or agitation
- When in doubt – count it yourself!

# Pulse Procedure

10. Inform the RN or MD if pulse is:

- Difficult to feel or count
- Very fast or very slow
- Irregular or skipping
- An Apical pulse



# PULSE POINTS AND THEIR LOCATIONS

- **Temporal**
- **Carotid**
- **Apical**
- **Brachial**
- **Radial**
- **Femoral**
- **Popliteal**
- **Dorsal Pedalis**

# NORMS

- **Pulse norms are 60 - 100 beats per minute**
- **Pulses between 90 - 100 are in a gray area - high normal**
- **Faster than 100 - tachycardia**
- **Slower than 60 - bradycardia**



# Normal Pulse Rates

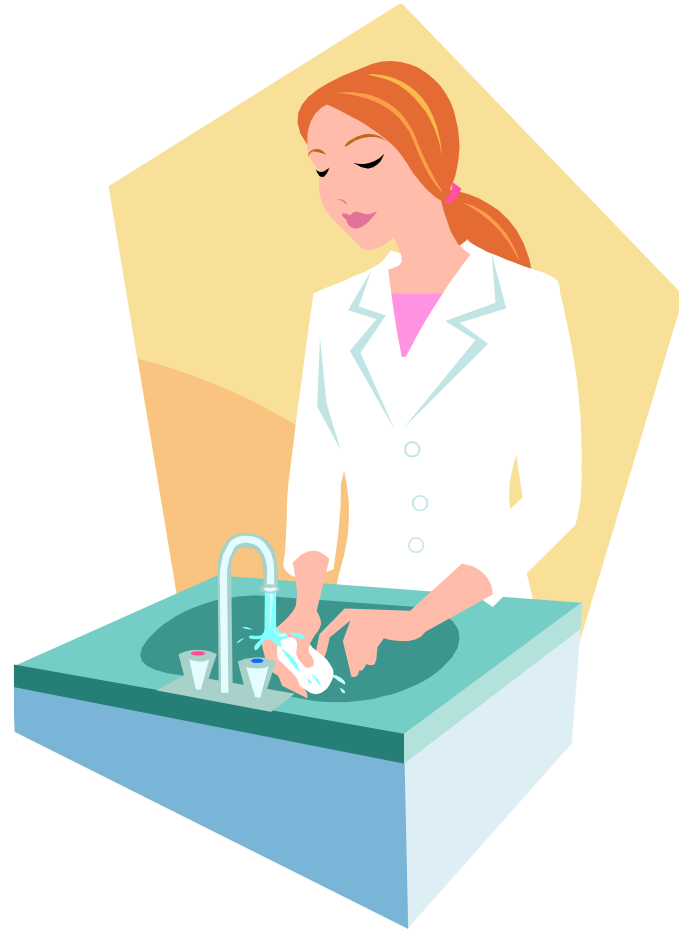
<b>Babies to age 1:</b>	<b>100–160</b>
<b>Children ages 1 to 10:</b>	<b>60–140</b>
<b>Children age 10+ &amp; Adults:</b>	<b>60–100</b>
<b>Well-conditioned Athletes:</b>	<b>40–60</b>

Mosby's Critical Care Nursing Reference, 2002; Perry & Potter (2006)

# Pulse Procedure

11. Inform patient that you are taking pulse.

12. Remove gloves & wash hands



# Pulse Procedure

## 13. Document the Results

Flowsheet, clinic record, or clinic chart

## 14. Communicate the Results

RN

MD



# EVALUATION

- Rate
- Rhythm
- Volume
- Character
- Vessel wal
- Radio radial , brachio femoral, brachio brachial delay
- Grade the palpability
- Bruit over artery
- Peripheral pulses
- Allens test

# RATE

- Count the pulse for 1 min / atleast 30sec
- Normal : 60 – 100 / min
- Tachycardia : HR > 100/min
- Bradycardia : HR < 60/min
- Pulse <40/min – Myxoedma, heart block, digitalis toxicity
- Marked tachycardia : heart failure, paroxysmal tachycardia, myocarditis, fever, thyrotoxicosis, Tb, sympathomimetics

# PULSE DEFICITIE

- Diff b/w HR & pulse rate by simultaneous auscultation of heart & palpation of pulse by 2 persons.

# TACHYCARDIA & BRADYCARDIA

- Rapid regular pulse : Sinus tachycardia, SVT, Paroxysmal atrial tachycardia, atrial tachycardia with fixed block.
- Sinus Tachycardia – Anxiety, emotion, fever, septicaemia with /without fever, pregnancy
- Slow pulse : Sinus bradycardia ( atheletes, sleep, vasovagal episodes, acute.inf.wall MI ) complete heart block

# RELATIVE BRADYCARDIA

- Normal/slow pulse rate with fever
- Eg : typhoid fever , viral infections, hag'ic fevers, lassa fever, lymphocytic choriomeningitis, intracranial infection with IC htn, meningitis, encephalitis, brain abscess



# RHYTHM

- Normally pulse is regular on palpation.
  - It can be irregular in healthy – Sinus Arrhythmia
    - acceleration – inspiration
    - slowing down – expiration
- caused by alterations in vagal tone .
- children, young adults.

# ABNORMAL RHYTHMS

- Irregularly irregular – Atrial fibrillation
- If irregularity is predictable, as in freq premature ventricular contractions – Regularly irregular pulse.
- Extrasystole / ectopic beats : Compensatory pause – hallmark
- Atrial Flutter : atrium contracts regularly 250 – 300/min. ventricle contracts much slower rate due to associated AV Block.
- Heart Block : pulse – regularly irregular.
- Irregularity changes with exertion – extrasystole
- Irregularity doesn't change with exertion – heart block

# VOLUME

- Amplitude of movement of vessel wall due to passage of pulse wave
- Correlates with stroke volume.
- **High vol** – elderly, emotional excitability, anxiety, high C.O states ( thyrotoxicosis, anaemia), sys.htn
- **Low vol ( pulsus parvus )**– shock, low C.O, myocardial ds, valvular ds, pericardial ds, hypovolemia

# CHARACTER

- **Dicrotic Pulse:** exaggeration of normal pattern. Related to reflection wave from periphery. Seen in Typhoid, cardiomyopathy, myocarditis, cardiac tamponade.
- **Anacrotic Pulse/pulsus tardus:** AS
- **Collapsing Pulse:** Corrigan's / Water hammer Pulse – cond with high stroke vol, PR low – AR
- Also in hyperkinetic circ states, aortic run off

# CHARACATER

- Pulsus parvus et tardus: slow rising small pulse  
– severe AS
- Pseudo collapsing pulse – high vol pulse which abruptly falls – mitral incompetence

# CHARACTER

- **Bisferiens pulse:** 2 positive peaks during systole( both percussion & tidal wave appreciable ) eg: Severe AR, AS+AR, HOCM.
- Best palpable – major arteries – carotid, brachial, femoral.
- **Diff b/w bisferiens & dicrotic** – dicrotic pulse – second wave occurs after S2.

# CHARACTER

- **Pulsus bigeminus:** bigeminal rhythm, alternating beats are strong & weak .
- Unlike pulsus alternans , these beats do not occur regularly. Eg:Ventricular bigeminy
- **Post-extrasystolic pulse:** increase in vol, due to long pause & more diastolic filling, extrasystolic potentiation of ventricular contraction. Eg: all forms of fixed obs to lt.ventricular outflow.

# CHARACTER

- Lack of rise of post-extrasystolic beat by 10mm Hg / actual fall in pulse – **Brockenbrough sign** – sign of dynamic obs to lt.ventricular outflow. Eg: HOCM
- **Pulsus alternans**: regular sinus rhythm with alternate beats strong & weak due to alteration in contraction of heart. Eg: AS with heart failure, Severe PS, dilated cardiomyopathy, myocarditis, ac.pul.embolism
- By light pressure & pt holding breath mid exp



# CHARACTER

- **Pulsus paradoxus:** exaggerated fall of systolic arterial pressure with inspiration.  $N < 8\text{mm Hg}$ . Any exaggeration  $> 8\text{mm Hg}$  – pulsus paradoxus.
- Seen in: Pregnancy, extreme obesity severe obs airway – ac.sev.asthma, upper airway obs, pericardial tamponade
- **Reversed pulsus paradoxus:** insp increase & exp decrease . Causes: positive pressure ventilation , HOCM

# VESSEL WALL THICKNESS

- Assess the state of medium sized arteries which are palpable.
- **Method:** palpate radial artery with middle 3 fingers.

Occlude proximally & with index finger empty artery by pressing out blood distally.

Applying pressure on either side – roll the artery over underlying bone using middle finger.

# VESSEL WALL THICKNESS

- Thickness, irregularity & cord like feel – arteriosclerosis – middle size arteries – Monckeberg sclerosis. ( medial coat )

# DELAY

- Usually 2 radial pulses come simultaneously & femoral comes 5msec before ipsilateral radial pulse.
- Delay in femoral pulse – obstruction of aorta – coarctation , aortoarteritis

# BRUIT

- Major arteries : carotid, femoral, vertebral, abd.aorta, renal arteries auscultated
- Bruit – increased blood flow thr Normal arteries / normal or reduced blood flow thr narrowed & roughened arterial lumen.
- Pistolshot sounds(AR), Duroziez murmur

# PERIPHERAL PULSES

- Carotid, brachial, radial, femoral, popliteal, posterior tibial, dorsalis pedis.
- Helpful in diagnosing – PVD, COA, Aortic dissection, embolic manifestation of AF, Inf.endocarditis.

# ALLEN TEST

- Result is normal when after compression of both radial & ulnar arteries – hand colour returns to normal within 10 sec after release of radial artery.
- Evaluation of patency of radial / ulnar arteries – cardiac catheterization/ arterial conduit for cabg.

# 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

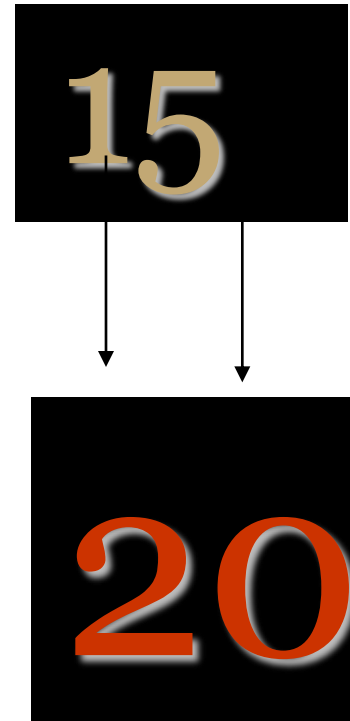
- Respiration rates over 25 or under 12 breaths per minute (when at rest) may be considered abnormal

**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.



THANK

YOU