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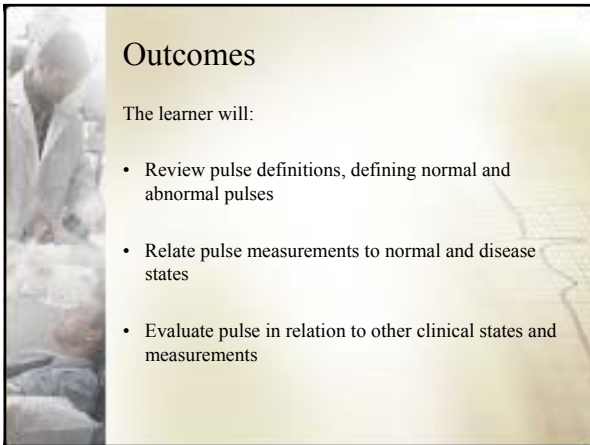
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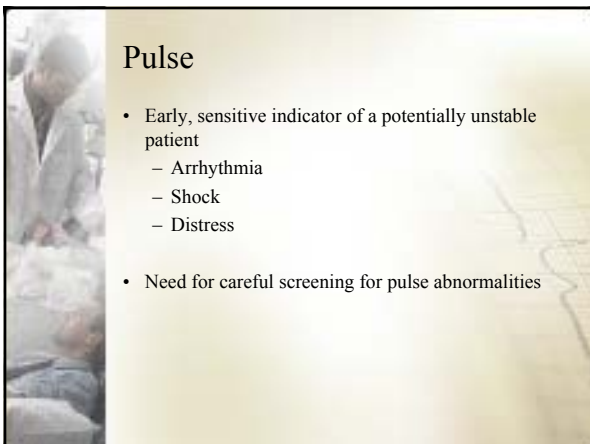
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## Normal Values

- Adult
  - Rate: 60-100 beats per minute
- Child
  - Rate:
    - 12 yo : should be < 120 bpm
    - 4 yo : should be < 140 bpm
    - 1 yo : should be < 160 bpm



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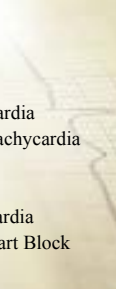


## Pulse Disorders

[Bates](#)

Adult rate: >100 or < 60

- Rate: fast or slow
- Fast
  - Sinus in origin      Sinus Tachycardia
  - Not sinus in origin      Ventricular Tachycardia
- Slow
  - Sinus in origin      Sinus Bradycardia
  - Not sinus in origin      3<sup>rd</sup> Degree Heart Block



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## Pulse Disorders

- Rhythm:
  - irregular
- Volume
  - Quality (Thready / full / bounding)



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## Normal Pulse Variations

- Physical activity
- Pain
- Anxiety
- Exercise
- Drugs:
  - Smoking
  - Alcohol

## Abnormal Pulse Pathophysiology

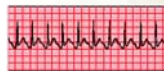
Some e.g.'s of disease states associated with certain pulse abnormalities:


- |                |                     |                        |
|----------------|---------------------|------------------------|
| • Hemorrhage   | → inadequate vol.   | → ↑ HR                 |
| • Coronary dz. | → arrhythmia        | → rapid+/or irreg. HR  |
| • Coronary dz. | → heart block       | → slow +/-or irreg. HR |
| • Head injury  | → ↑ intracranial P. | → ↓ HR                 |
| • CHF          | → inadeq. art. vol. | → ↑ HR                 |
| • DKA          | → inadequate vol.   | → weak, thready        |

## Disease states

**Tachycardia** (rapid pulse)

- Respiratory disease / hypoxia
- Coronary disease
- Hemorrhage





## Disease States

**Bradycardia** (slow pulse)

- Severe hypoxia
- Drug overdose
- Brain injury (increased intracranial pressure)
- Hypothermia

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## Disease States

**Irregular**

- An occasional sporadic-beat “escaping” from an underlying rhythm that is not irregular (PAC, PVC)
- A totally irregular rhythm (Atrial Fibrillation)

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## Disease States

**Hemorrhage**

- Inadequate vol.
- Weak, thready pulse

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## Disease States

**Bounding**

- Hyperthermia (heat stroke)
- Hypertension
- Hyperthyroid disease
- Pregnancy
- Drugs

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## Disease States

**Weak or Thready**

- Shock
- Heart failure
- Decreased peripheral flow
  - Cold
  - Blood vessel disease
    - (Raynaud's vasoconstriction)

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## Stable vs. Unstable

Any abnormal assessment (of the pulse rate, rhythm, or quality findings) will require aggressive management:

- O<sub>2</sub>
- Aggressive airway management
- IV to support Blood Pressure

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## Summary

We have reviewed:

- Basic pulse definitions.
- Normal and abnormal pulse rhythms.
- Relating pulse measurements to normal and certain disease states.
- And we have evaluated abnormal pulses in relation to the need for aggressive intervention.

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