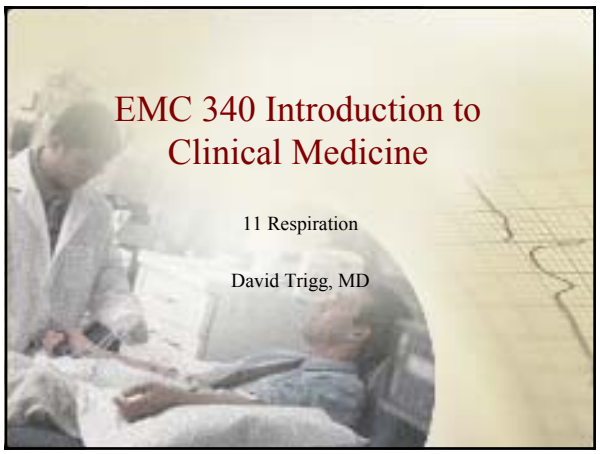


EMC 340 Introduction to Clinical Medicine

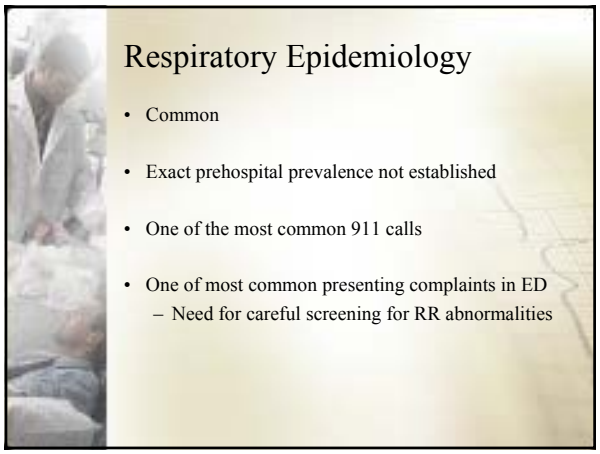
11 Respiration

David Trigg, MD

Outcomes

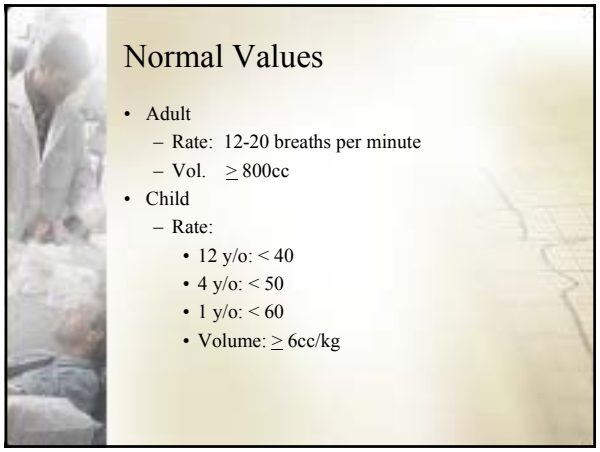
The learner will:

- Review respiratory definitions
- Define normal and abnormal respirations
- Relate respiration measurements to
  - Normal and disease states
  - Evaluate respirations in relation to other clinical measurements



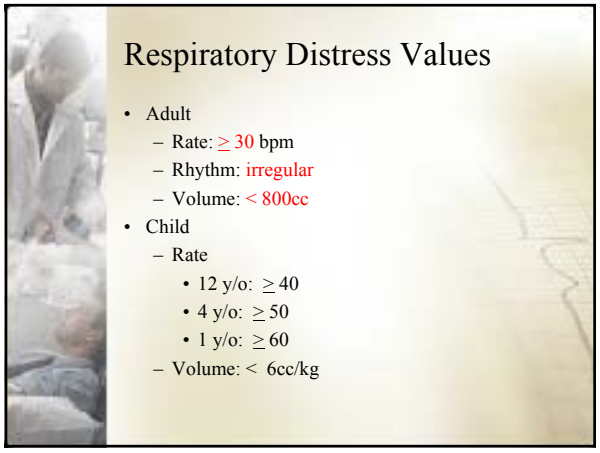
Respiratory Epidemiology

- Common
- Exact prehospital prevalence not established
- One of the most common 911 calls
- One of most common presenting complaints in ED
  - Need for careful screening for RR abnormalities



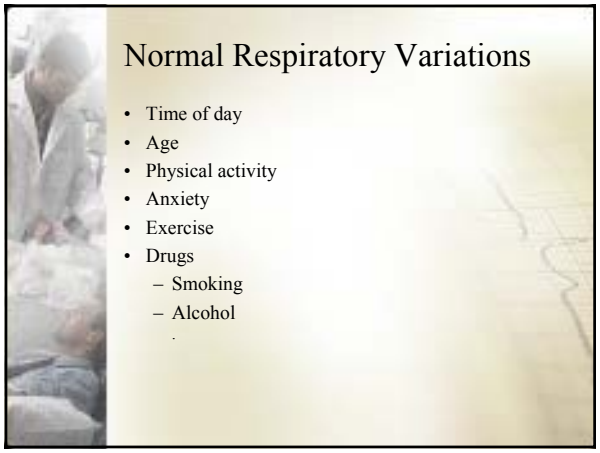
Normal Values

- Adult
  - Rate: 12-20 breaths per minute
  - Vol. ≥ 800cc
- Child
  - Rate:
    - 12 y/o: < 40
    - 4 y/o: < 50
    - 1 y/o: < 60
    - Volume: ≥ 6cc/kg



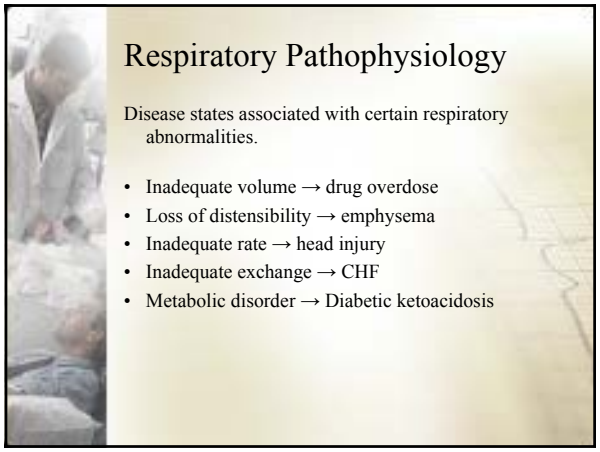
Respiratory Distress Values

- Adult
  - Rate: ≥ 30 bpm
  - Rhythm: irregular
  - Volume: < 800cc
- Child
  - Rate
    - 12 y/o: ≥ 40
    - 4 y/o: ≥ 50
    - 1 y/o: ≥ 60
  - Volume: < 6cc/kg



Normal Respiratory Variations

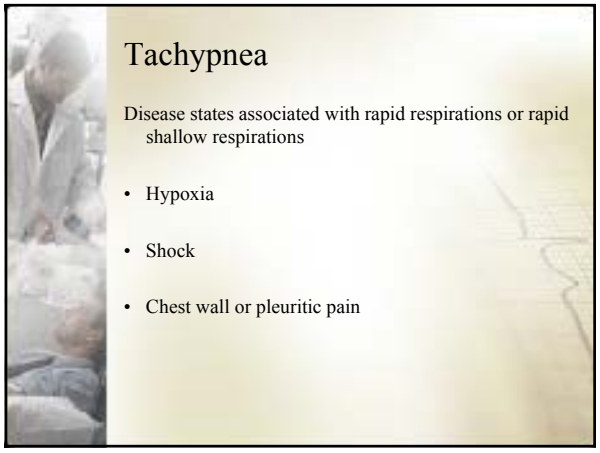
- Time of day
- Age
- Physical activity
- Anxiety
- Exercise
- Drugs
  - Smoking
  - Alcohol



Respiratory Pathophysiology

Disease states associated with certain respiratory abnormalities.

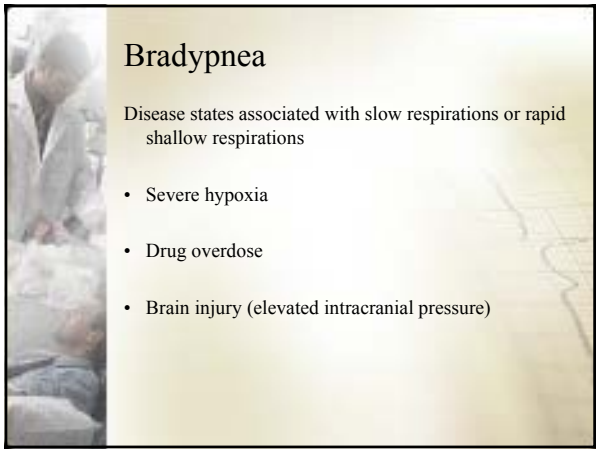
- Inadequate volume → drug overdose
- Loss of distensibility → emphysema
- Inadequate rate → head injury
- Inadequate exchange → CHF
- Metabolic disorder → Diabetic ketoacidosis



Tachypnea

Disease states associated with rapid respirations or rapid shallow respirations

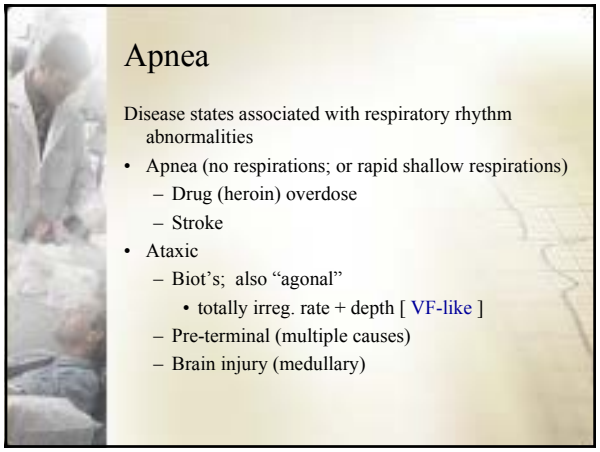
- Hypoxia
- Shock
- Chest wall or pleuritic pain



Bradypnea

Disease states associated with slow respirations or rapid shallow respirations

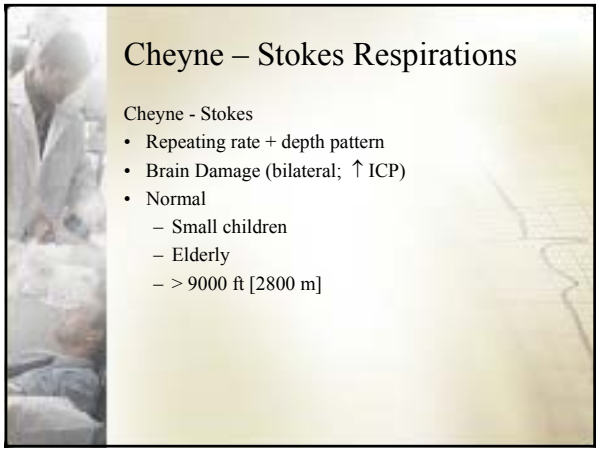
- Severe hypoxia
- Drug overdose
- Brain injury (elevated intracranial pressure)



Apnea

Disease states associated with respiratory rhythm abnormalities

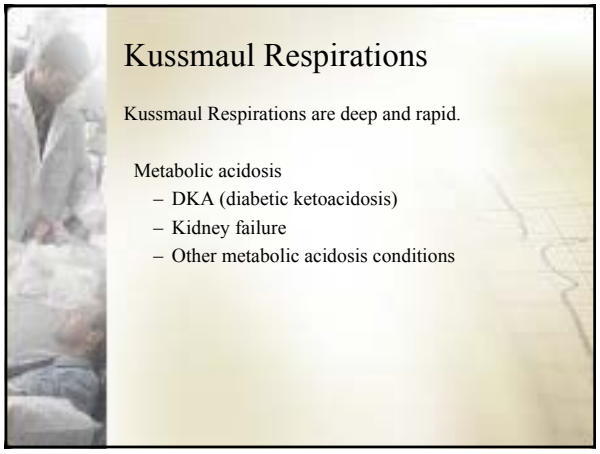
- Apnea (no respirations; or rapid shallow respirations)
  - Drug (heroin) overdose
  - Stroke
- Ataxic
  - Biot's; also "agonal"
    - totally irreg. rate + depth [VF-like]
  - Pre-terminal (multiple causes)
  - Brain injury (medullary)



Cheyne – Stokes Respirations

Cheyne - Stokes

- Repeating rate + depth pattern
- Brain Damage (bilateral; ↑ ICP)
- Normal
  - Small children
  - Elderly
  - > 9000 ft [2800 m]

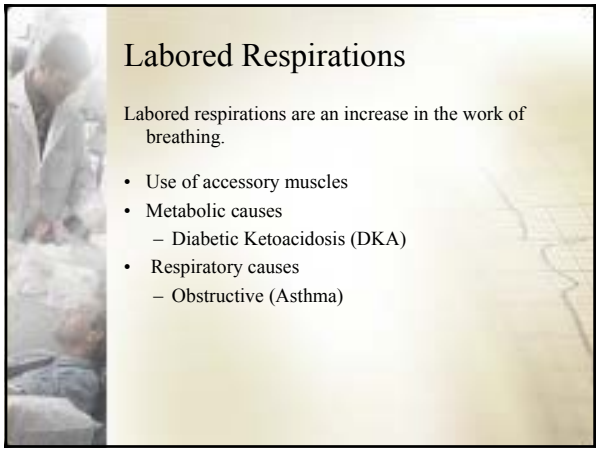


Kussmaul Respirations

Kussmaul Respirations are deep and rapid.

Metabolic acidosis

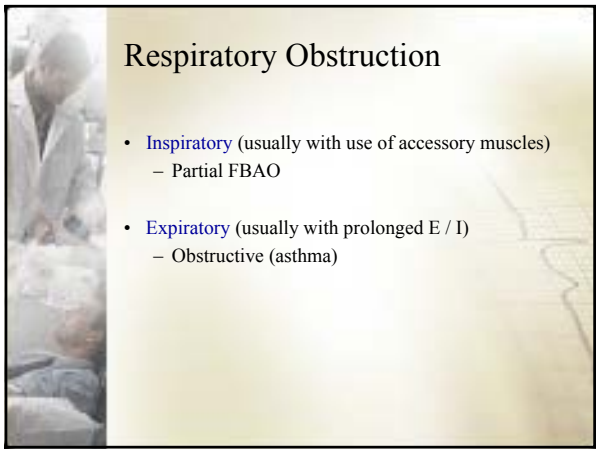
- DKA (diabetic ketoacidosis)
- Kidney failure
- Other metabolic acidosis conditions



Labored Respirations

Labored respirations are an increase in the work of breathing.

- Use of accessory muscles
- Metabolic causes
  - Diabetic Ketoacidosis (DKA)
- Respiratory causes
  - Obstructive (Asthma)



Respiratory Obstruction

- Inspiratory (usually with use of accessory muscles)
  - Partial FBAO
- Expiratory (usually with prolonged E / I)
  - Obstructive (asthma)

Stable vs. Unstable

Any abnormal assessment of the above respiratory rate, rhythm, quality findings will require aggressive airway and breathing management:

- O_2
- BVM
- ET

Summary

We have reviewed:

- Some basic respiratory definitions.
- Normal and abnormal respiratory patterns.
- Relating respiration measurements to normal and disease states.
- And we have evaluated abnormal respirations in relation to the need for aggressive intervention.