Respiratory Acidosis
Occurs when CO2 is poorly exchanged by the lungs due to inadequate ventilation or perfusion

1. Clinical Findings: ↓ pH ↑ pCO2 ↑ tCO2 (HCO3)

2. Causes:
   a. Lung disease
   b. Respiratory center injury or depression
   c. Cardiac disease

3. Compensation:
   a. Kidneys: excrete more H+ and NH4+ and retain HCO3-
   b. Respiratory system: hyperventilation (if possible)

Respiratory Alkalosis
Occurs when CO2 decreases, usually due to a form of hyperventilation

1. Clinical Findings: ↑ pH ↓ pCO2 ↓ tCO2 (HCO3)

2. Causes: Hyperventilation

3. Compensation:
   a. Kidneys: retain H+ and NH4+ and excrete more HCO3-
   b. Respiratory system: hypoventilation (if possible)

Metabolic Acidosis
Occurs when an overproduction of organic acids consumes excess base (i.e. lactic acidosis) or when bicarbonate (base) is lost (diarrhea)

1. Clinical Findings: ↓ pH ↓ HCO3-

2. Causes:
   a. Increased production of organic acids and increased anion gap
   b. Decreased excretion of acids
   c. Excessive HCO3- loss

3. Compensation:
   a. Respiratory system: hyperventilation
   b. Kidneys: excrete more H+ and NH4+ and retain more HCO3-

Metabolic Alkalosis
Occurs with a primary HCO3- excess, loss of acid or K+ depletion

1. Clinical Findings: ↑pH ↑ HCO3-

2. Causes:
   a. Excessive loss of H+
   b. Administration of excess alkali
   c. K+ depletion

3. Compensation:
   a. Respiratory system: hypoventilation
   b. Kidneys: retain H+ and NH4+ and excrete more HCO3-