



# METABOLIC ACIDOSIS



## Definition

- An accumulation of acid in the body caused by either increased acid generation, loss of bicarbonate, or diminished renal acid excretion
- Excess acid and decreased bicarbonate lead to pH imbalance.

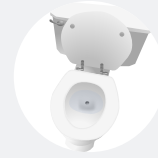
## Common causes



Renal failure



ASA/antifreeze overdose



Diarrhea

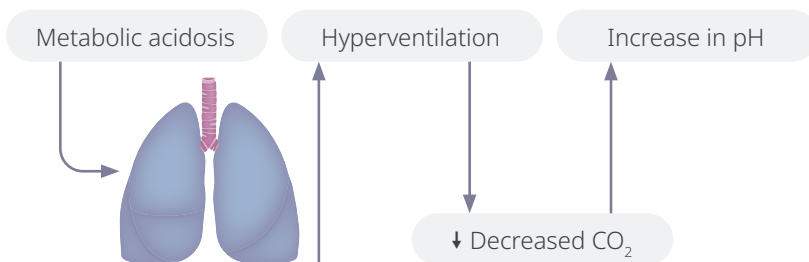


Diabetic ketoacidosis

## Lab values

Disturbance	pH	CO <sub>2</sub>	HCO <sub>3</sub> <sup>-</sup>	Cause	Compensation
Metabolic acidosis	↓ Decreased	Normal or ↓ decreased	↓ Decreased	Kidneys control HCO <sub>3</sub> <sup>-</sup>	Lungs excrete CO <sub>2</sub>
Normal values	7.35–7.45	35–45 mm Hg	22–26 mmol/L	O <sub>2</sub> levels are not part of ABG imbalance determination	

## Compensation



**Kussmaul breathing:** an abnormal rapid, deep breathing pattern that helps the body blow off extra CO<sub>2</sub>; often seen in DKA

### Uncompensated:

Opposite system is not responding, pH remains imbalanced.

### Partial compensation:

Opposite system is working to correct imbalance, pH not yet normalized.

### Full compensation:

Homeostasis achieved, all lab values return to normal.

## Example

### Steps:

1. Identify pH (acidosis or alkalosis).
2. Identify CO<sub>2</sub> (↑, ↓, normal).
3. Identify HCO<sub>3</sub> (↑, ↓, normal).
4. Which label matches pH?
5. Look at opposite system, evaluate if it is bringing pH back to normal.

Disturbance	pH	CO <sub>2</sub>	HCO <sub>3</sub> <sup>-</sup>
???	7.25	32	18

### Answer:

Metabolic acidosis partially compensated – CO<sub>2</sub> level (32 mmHg) is low, which is an attempt by the respiratory system to compensate for the metabolic acidosis. The body “blows off” CO<sub>2</sub> (an acid) to raise the pH closer to the normal range.

## Treatment



Fix the underlying cause.



Consider sodium bicarbonate IV.



Body increases respiratory rate to decrease CO<sub>2</sub>.