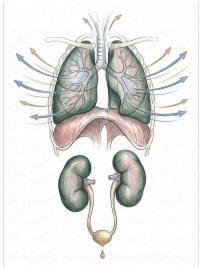
Respiratory Opposite, Metabolic Equal

four words that sort every blood gas — then one question about who is compensating.



The four disorders, and the causes that name them

FUNDAMENTALS 15.5

Read the pH first. Then ask which value moved the wrong way.

PH < 7.35 · CO_2 > 45

Respiratory acidosis

Not breathing enough. Asthma exacerbation, **COPD**, heart failure with pulmonary oedema — and **decreased ventilation from anaesthesia, alcohol, opioids and sedatives**.

PH > 7.45 · CO_2 < 35

Respiratory alkalosis

Breathing too much. **Hyperventilation** from anxiety, panic, pain, fear, head injury, mechanical ventilation; **salicylate overdose initially**; early asthma or **pulmonary embolism**.

PH < 7.35 · HCO_3 < 22

Metabolic acidosis

Diabetic ketoacidosis, lactic acidosis from impaired tissue oxygenation, **bicarbonate loss from severe diarrhoea**, renal disease, salicylate excess.

PH > 7.45 · HCO_3 > 26

Metabolic alkalosis

Prolonged vomiting or nasogastric suctioning — losing acid. Also diuretics, IV sodium bicarbonate, and **hypokalaemia**.

ROME: if **respiratory** is the cause, the $PaCO_2$ moves **opposite** to the pH. If **metabolic** is the cause, the HCO_3 moves in the **same** direction as the pH. Check the CO_2 at step two; if it does not explain the pH, the bicarbonate will.

Compensation is read off the pH, not off the effort

F §15.5 TABLE 15.5B

A normal pH with two abnormal gases is not a normal patient.

FULLY

pH is NORMAL — and BOTH the $PaCO_2$ and the HCO_3 are out of range

compensated

PARTIALLY

pH abnormal, both values abnormal — the other system is moving but has not caught up

in progress

UNCOMPENSATED

pH abnormal, and only ONE of the two values is abnormal — nothing has answered yet

not started

A normal pH does not mean a normal blood gas. It means the body is holding the line, and holding it costs something. Read all three values before you decide anyone is stable — and if the gas is **uncompensated**, remember the second system may simply not have started: the kidneys "take longer to compensate for respiratory disorders."