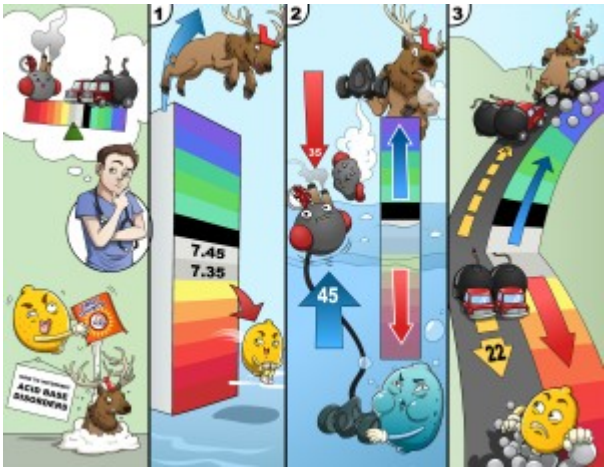
How to Interpret Acid Base Disorders

Interpreting Acid-Base disorders is an essential nursing skill that involves a three-step process: checking the pH, partial pressure of carbon dioxide in the blood (pCO_2), and bicarbonate levels (HCO_3). These indicators will allow you to determine the type of disorder.



PLAY PICMONIC

pH, pCO_2, HCO_3 (Bicarbonate)

pH-strip, Partial-pressure-gauge CO_2, and Bi-car-bomb

Mastering quick interpretation of acid-base lab values is a key element to the success of the Nurse. Three components are included in typical lab value assessment: pH, pCO_2, and HCO_3 (Bicarbonate).

Step 1

pH

pH-strip

The first step to acid-base lab value interpretation is to look at pH. Blood pH is normally 7.35-7.45. pH is determined by the amount of hydrogen ions contained in the blood.

Acidosis

Acidic-lemon

A pH of less than 7.35 is termed acidosis. Acidosis indicates a buildup of carbonic acid in the blood.

Alkalosis

Elk-loser

A pH higher than 7.45 is termed alkalosis. Alkalosis indicates a buildup of bicarbonate (bases) and/or a general decrease in carbonic acid in the blood.

Step 2

pCO_2

Partial-pressure-gauge CO_2

The second step is to examine the partial pressure of carbon dioxide in the blood. pCO_2 is normally 35-45 mmHg and is regulated primarily through respiration.

Opposite Direction as pH

Showing the Opposite Direction on pH-strip

Opposite Respiratory and pH directions indicate a respiratory disorder. If the pCO_2 is not in the opposite direction of the pH, then check the HCO_3 next.

Respiratory Acidosis

Respirator Acidic-lemon

Respiratory acidosis is often indicated by a pH of less than 7.35 and a pCO_2 of higher than 45 mmHg.

Respiratory Alkalosis

Respirator Elk-loser

Respiratory Alkalosis is indicated by a pH of more than 7.45 and a pCO_2 of less than 35 mmHg.

Step 3

HCO_3 (Bicarbonate)

Bi-car-bomb

The normal value of bicarbonate is 22-26 mmol/L. The amount of the base HCO_3, bicarbonate, in the blood is regulated in the kidneys.

Same Direction as pH

Showing the Same Direction as pH-strip

If the HCO_3 (bicarbonate) is going in the same direction as pH, then the problem is most likely a metabolic problem.

Metabolic Acidosis

Metal-ball Acidic-lemon

The patient with Metabolic acidosis can grossly be determined as Down, Down, Down (Decreased pH, Decreased pCO_2, Decreased HCO_3).

Metabolic Alkalosis

Metal-ball Elk-loser

Metabolic alkalosis can grossly be determined as UP, UP, UP (Increased pH, Increased pCO_2, Increased HCO_3).