

The College of St. Scholastica
Department of Nursing
NSG 3200

Blood gas analysis

R.M. is a 70 year old male with diabetes who has a history of not taking his insulin. He is admitted to your unit with the following ABG results: pH 7.26, PaCO₂ 42, HCO₃⁻ 17.

To interpret a blood gas report, three questions need to be answered:

- 1) Does the pH indicate acidosis or alkalosis?
- 2) Is the cause of the pH imbalance respiratory or metabolic?
- 3) Is there compensation for the acid-base imbalance?

To answer the questions, set up a grid like this:

Acid	Normal	Alkaline

Next, compare the patient's values to the normal parameters.

Write "pH" under the appropriate column head.

Write "PaCO₂" under the appropriate column head.

Write "HCO₃⁻" under the appropriate column head.

Acid	Normal	Alkaline

Analysis:

- 1) The column the pH is in tells you whether the patient has acidosis or alkalosis.
- 2) Look at the positions of the pH, PaCO₂, and HCO₃⁻ in the grid. These will tell you the origins of the acid-base imbalance: if the pH and PaCO₂ fall in the same column (other than normal), the problem is respiratory; if the pH and HCO₃⁻ fall in the same column (other than normal), the problem is metabolic.
- 3) Next, to determine if compensation is present, look at the value not associated with the pH. If that value is normal, there is no evidence of compensation.

Let's do another one:

A 30 year old woman comes into the emergency room with a temperature of 103 degrees F. For the last 4 days she has had a productive cough and has experienced dyspnea increasing in severity. Her serum lab results are as follows:

WBC	20,000
pH	7.59
PaCO ₂	26
PaO ₂	40
SaO ₂	80
HCO ₃	20

Acid	Normal	Alkaline

Let's do one more:

G.G. is 45 and was diagnosed with a muscle-wasting disease 5 years ago. She is admitted to your unit complaining of increasing dyspnea, even at rest. Her ABG results are as follows: pH 7.36, PaCO₂ 50, HCO₃⁻ 34

Acid	Normal	Alkaline

What do you notice that is different?...and why?

We need to do one extra step in this situation to determine the origin of the imbalance....

Acid	Normal	Alkaline