

# Bloedgasanalyse

## Stap 1

### Bepaal pH

pH < 7.35: acidose  
pH > 7.45: alkalose

1kPa = 7.5 mmHg  
pH = 7.35-7.45  
PCO<sub>2</sub> = 35-45 mmHg (4.7-6 kPa)  
HCO<sub>3</sub> = 24-32 mEq/L

## Stap 2

### Bepaal de primaire stoornis →

Stoornis	Primaire verandering	Compensatie
Resp acidose	PaCO <sub>2</sub> ↑	HCO <sub>3</sub> ↑
Resp alkalose	PaCO <sub>2</sub> ↓	HCO <sub>3</sub> ↓
Met acidose	HCO <sub>3</sub> ↓	PaCO <sub>2</sub> ↓
Met alkalose	HCO <sub>3</sub> ↑	PaCO <sub>2</sub> ↑

## Stap 3

### Bereken de verwachte compensatie (mmHg)

Niet volledig = gecombineerde stoornis  
Bij metabole acidose: CO<sub>2</sub> = 1,5 x HCO<sub>3</sub> + 8 ± 2  
Bij metabole alkalose: CO<sub>2</sub> = 0,7x HCO<sub>3</sub> + 20 ±5  
Respiratoire stoornis: 1-2-4-5 regel; per 10 mmHg verandering pCO<sub>2</sub> de volgende verandering in HCO<sub>3</sub> (tabel)→

	1-2-4-5 regel metabole compensatie respiratoire stoornis	
	Acidose	Alkalose
<b>Acuut</b>	1 ↑	2 ↓
<b>Chronisch</b>	4 ↑	5 ↓

## Stap 4

### Bereken de aniongap (bij metabole acidose)

AG = Na – Cl – HCO<sub>3</sub> = 12 ± 4  
Bij laag albumine: 2.5 punt stijging aniongap per 10 g/L daling albumine <40 g/L

## Stap 5

### Bereken de deltagap (bij hoge aniongap metabole acidose)

Δgap:  $\frac{\text{aniongap} - 12}{(24 - \text{HCO}_3)}$

< 0,4 non AG-acidose  
0,4-0,8 co-existente AG- en non AG-acidose  
0,8-2 high AG metabole acidose  
> 2 co-existente metabole alkalose OF pre-existente gecompenseerde respiratoire acidose

## Stap 6

### Bereken de Aa-gradient (bij hypoxemie)

Aa-gradient = PAO<sub>2</sub> - PaO<sub>2</sub>  
PAO<sub>2</sub> = (713 x FiO<sub>2</sub>) - (pCO<sub>2</sub> x 1.25)  
Op zee niveau kamerlucht is (713 x 0.21) = 150 → PAO<sub>2</sub> = 150 - (pCO<sub>2</sub> x 1.25)

Normaal = <2.5 + (0,25 x leeftijd) mmHg



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## Differentiaal diagnose

### High aniongap metabole acidose

**C** carbon monoxide, cyanide  
**A** alcohol, alcoholic ketoacidosis  
**T** toluene  
**M** metformin, methanol  
**U** uremia  
**D** DKA  
**P** paraldehyde, phenformin, paracetamol, propylene glycol  
**I** iron, isoniazid  
**L** lactic acidosis  
**E** ethylene glycol  
**S** salicylates

### Non aniongap metabole acidose

**U** ureteroenterostomy  
**S** small bowel fistula  
**E** extra chloride, NaCl hydration  
**D** diarrhoea  
**C** carbonic anhydrase inhibitors  
**A** adrenal insufficiency  
**R** renal tubular acidosis  
**P** pancreatic fistula

### Metabole alkalose

**C** contraction (volume contraction)  
**L** licorice, diuretics  
**E** endocrine (hyperaldosteronism, cushing's, conn's, bartter's)  
**V** vomiting, NG suction  
**E** excess alkali (antacida, dialysis)  
**R** refeeding alkalosis  
**R** renal bicarbonate retention (hypochloreaemia, hypokalaemia, chronische hypercapnia)

### Respiratoire acidose

#### Acuut

airway obstruction  
bronchospasm  
aspiration  
CNS depression  
muscle weakness  
pulmonary disease

#### Chronisch

chronic lung disease  
neuromuscular disorders  
obesity

### Respiratoire alkalose

**C** CNS (raised ICP)  
**H** hypoxia (altitude, anaemia, VQ mismatch)  
**A** anxiety  
**M** mechanical hyperventilation  
**P** progesterone, pregnancy  
**S** sepsis, salicylates and other toxins (nicotine, xanthines)

