Non Invasive Ventilation

Causes of Hypoxia

Causes of Hypoxia

1. ↓ FiO_2

Causes of Hypoxia

1. ↓ FiO_2
2. Hypoventilation

Causes of Hypoxia

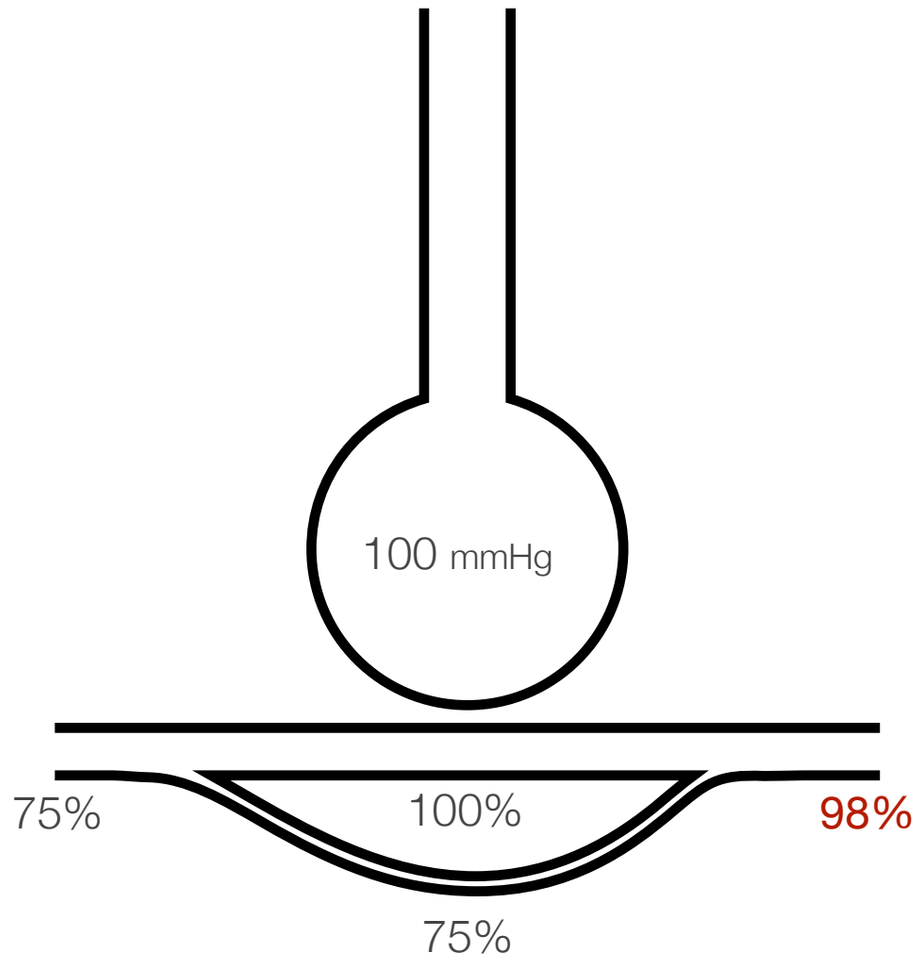
1. ↓ FiO_2
2. Hypoventilation
3. Shunt

Causes of Hypoxia

1. ↓ FiO_2
2. Hypoventilation
3. Shunt

Normal Oxygen Exchange

O_2

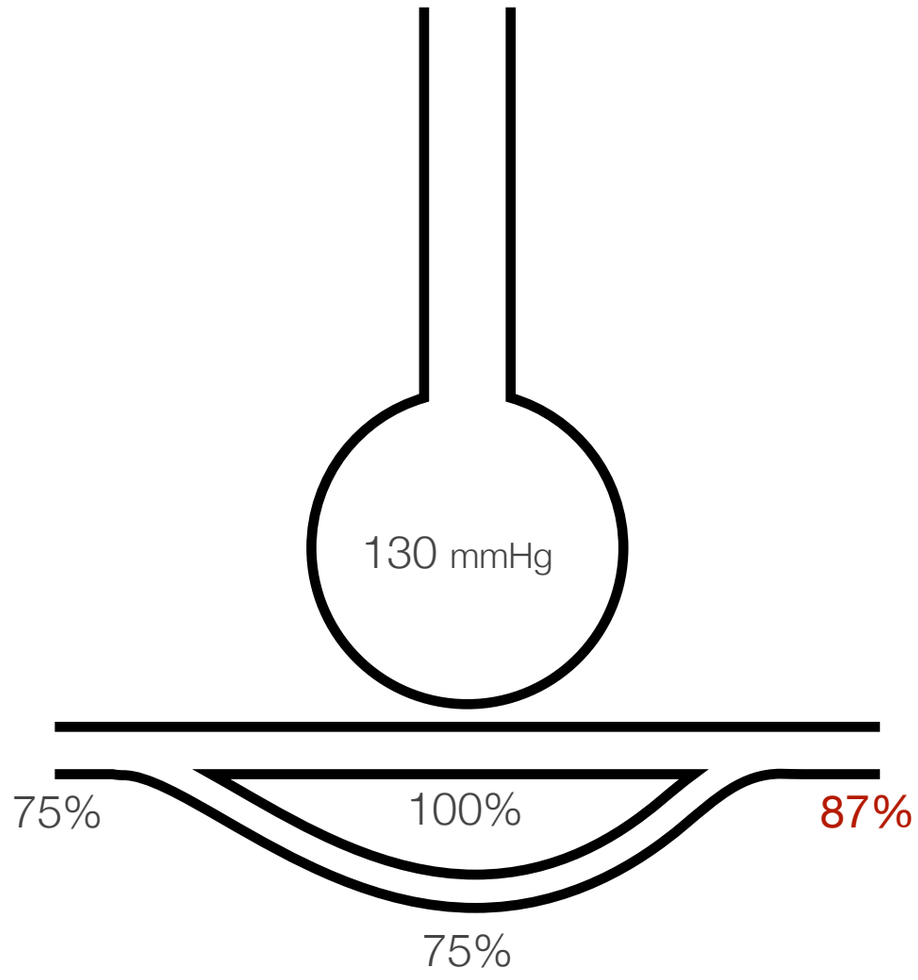


Venous

Arterial

Shunt

O_2

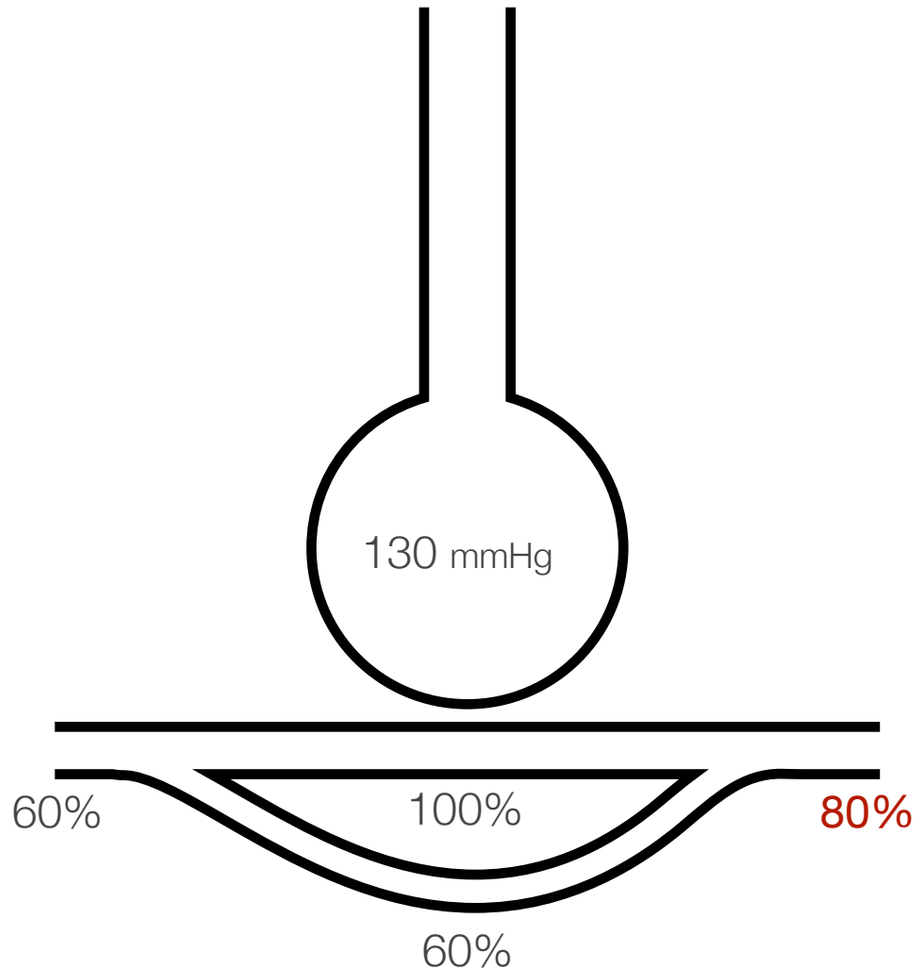


Venous

Arterial

Shunt

O_2



Venous

Arterial

Difference Between O_2 and CO_2

CO_2

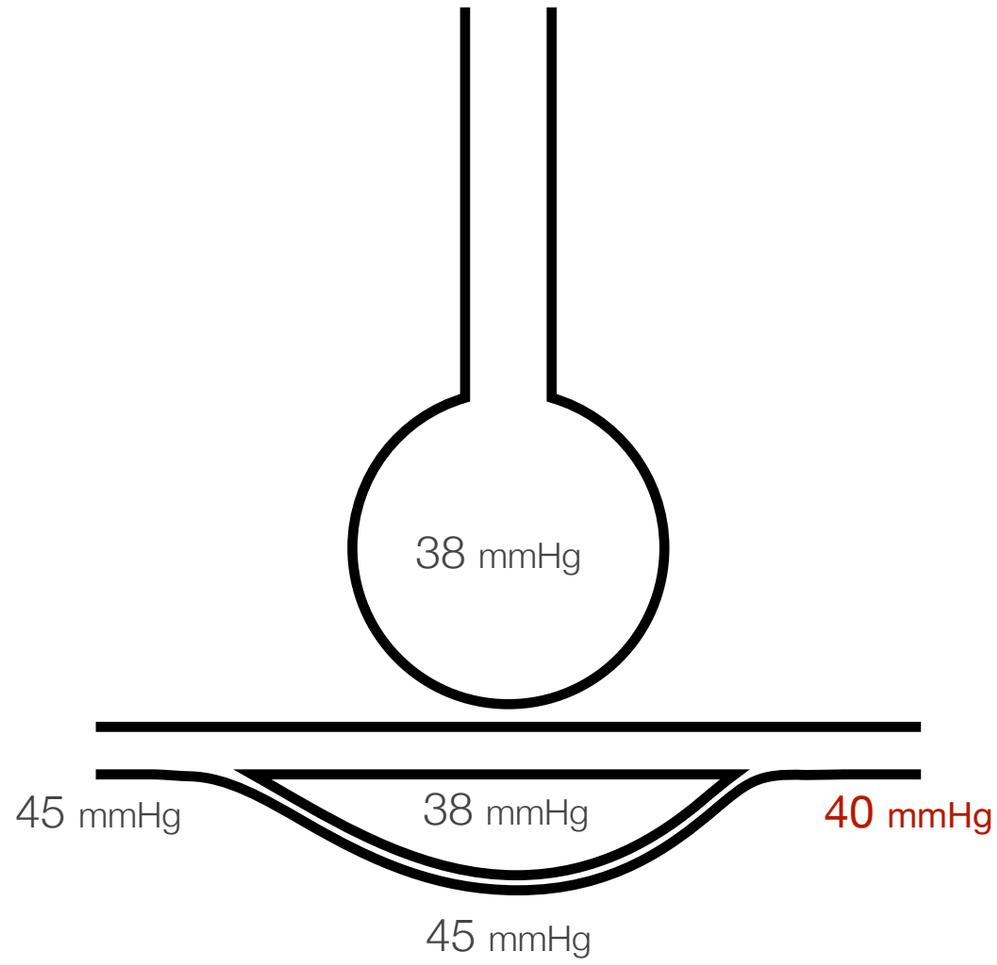
The limiting factor on CO_2 excretion is alveolar ventilation

O_2

The limiting factor on O_2 uptake is shunt

Normal CO_2 Exchange

CO_2



Venous

Arterial

CO_2 Excretion

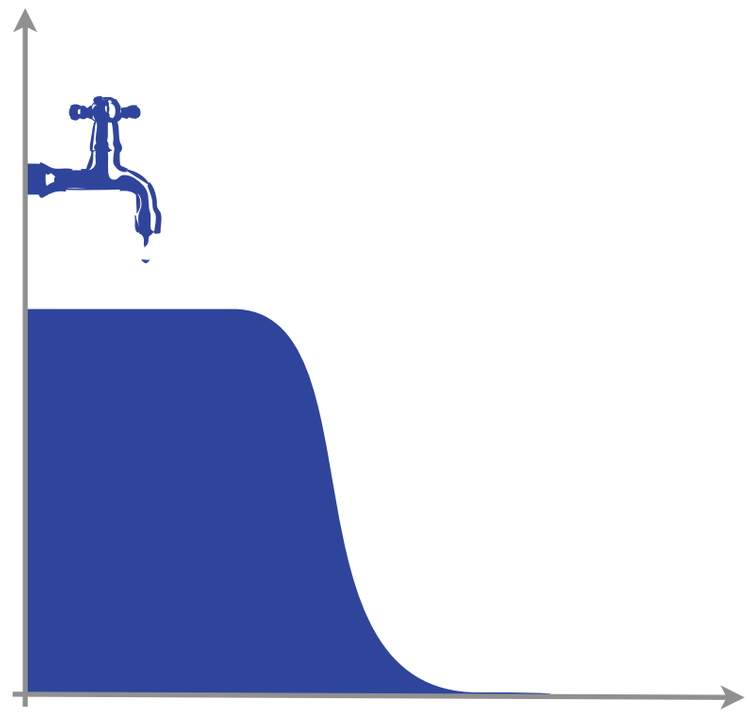
CO_2

CO_2 excretion is very simple

CO_2 is produced in the tissues and excreted in the lungs

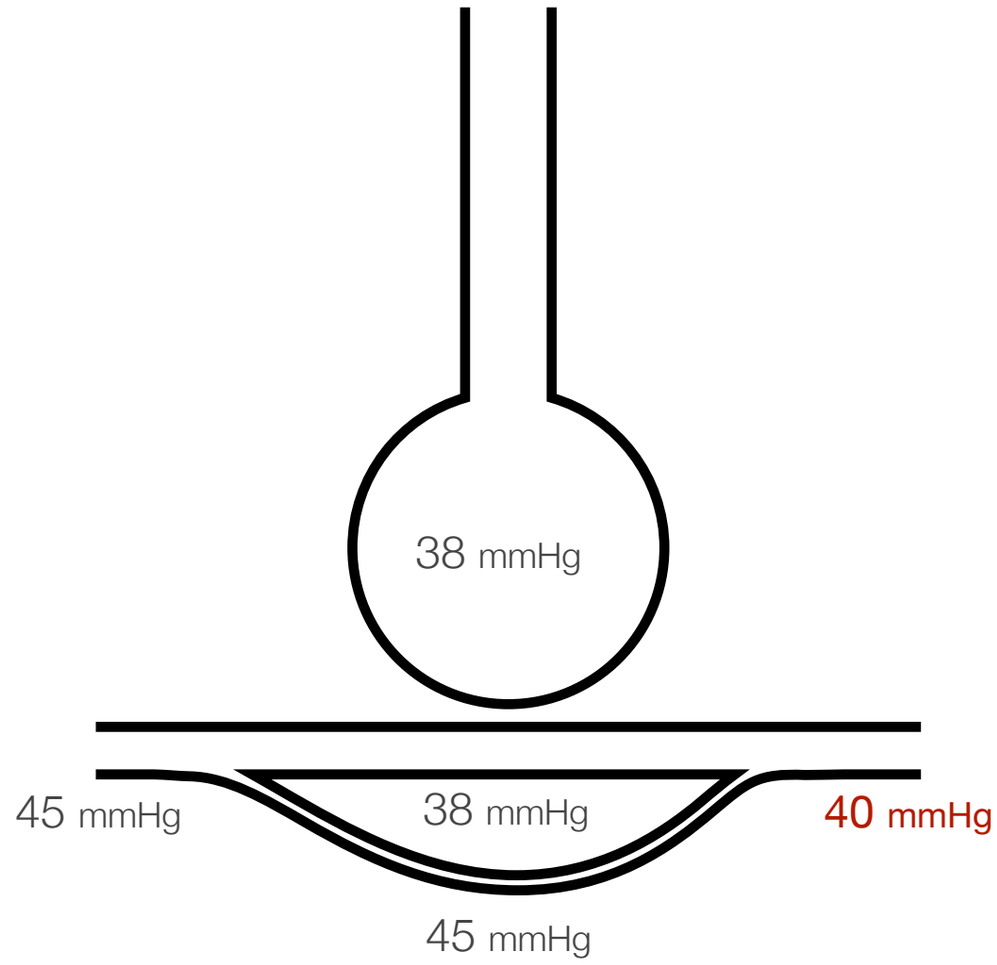
$$PaCO2 \sim Rate\ of\ Production$$

$$PaCO2 \sim \frac{1}{Alveolar\ Ventilation}$$



Normal CO_2 Exchange

CO_2

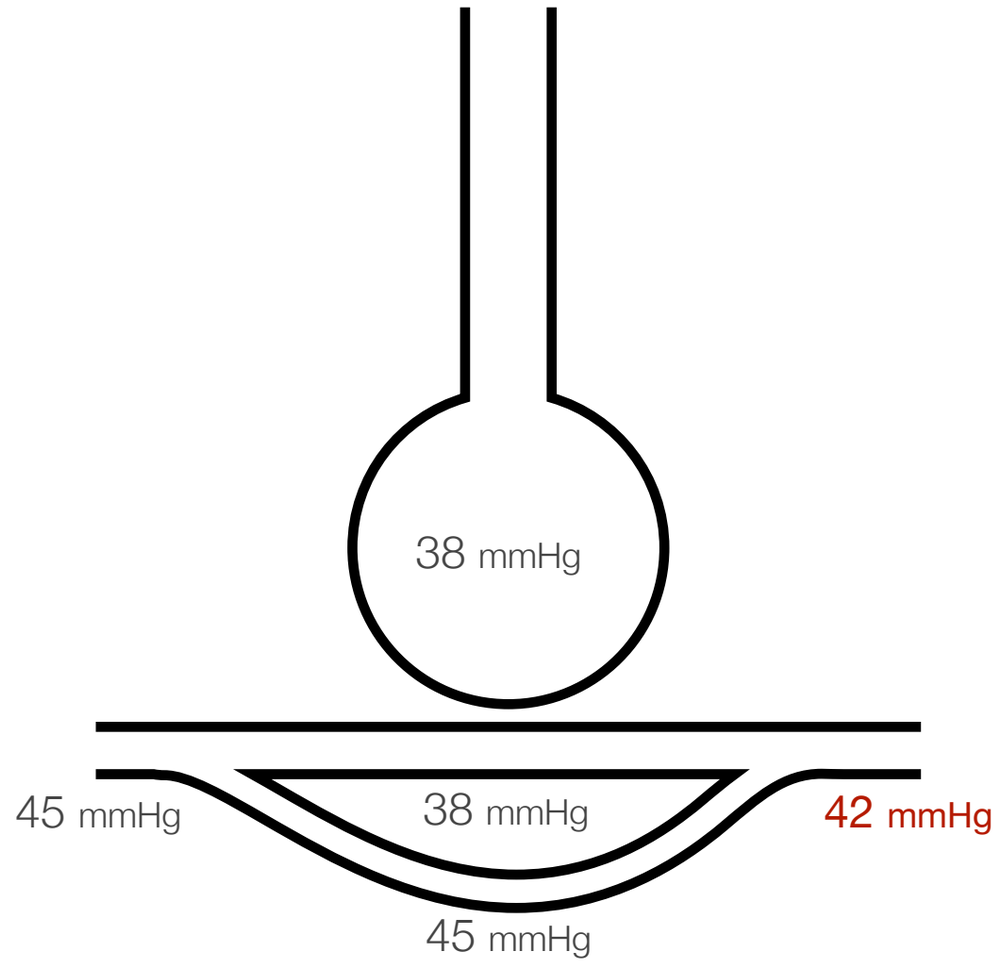


Venous

Arterial

Shunt & CO_2

CO_2

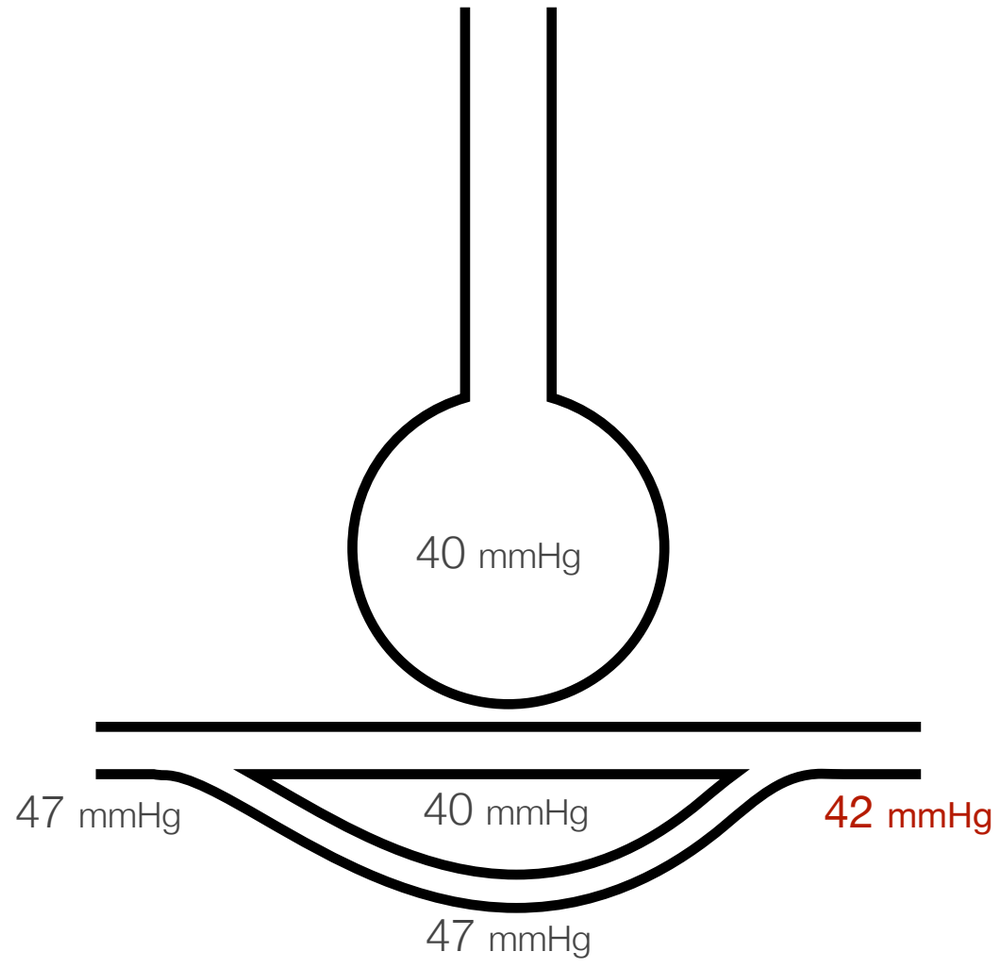


Venous

Arterial

Shunt & CO_2

CO_2



Venous

Arterial

Gas Exchange

↓ Alveolar Ventilation

Shunt

Diffusion Limitation

Gas Exchange

↓ Alveolar Ventilation → Hypercapnia (& Hypoxia)

Shunt

Diffusion Limitation

Gas Exchange

↓ Alveolar Ventilation → Hypercapnia (& Hypoxia)

Shunt → Hypoxia

Diffusion Limitation → Hypoxia

BiPAP Settings

BiPAP Settings

1. FiO_2

BiPAP Settings

1. FiO_2
2. Mean airway pressure

BiPAP Settings

1. FiO_2
2. Mean airway pressure
3. Pressure difference

BiPAP Settings

1. FiO_2
2. Mean airway pressure
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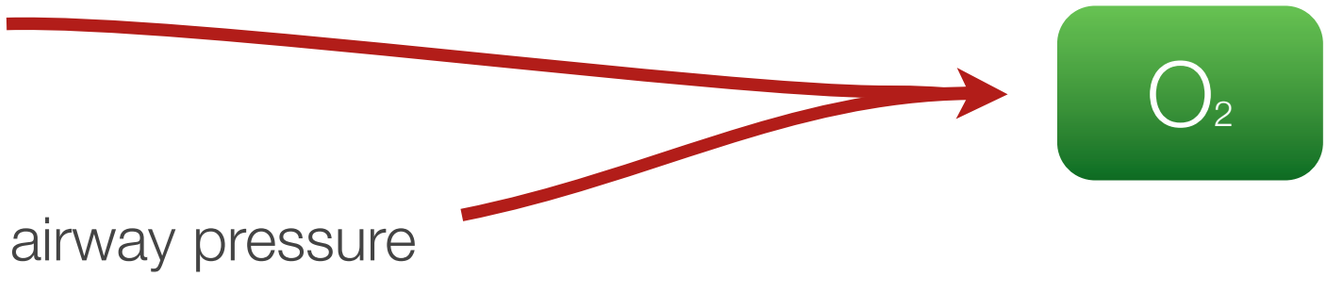


BiPAP Settings

1. FiO_2
2. Mean airway pressure
3. Pressure difference

Lung Pathology

Shunt	↓ Alveolar Ventilation	Diffusion limitation
Pneumonia	COPD	(Fibrosis)
Oedema	Bronchiectasis	(Oedema)
Lung Collapse	Fibrosis	
Asthma	Neuromusculoskeletal	
Pulmonary Embolism		

Lung Pathology

Shunt	↓ Alveolar Ventilation
Pneumonia	COPD
Oedema	Bronchiectasis
Lung Collapse	Fibrosis
Asthma	Neuromusculoskeletal
Pulmonary Embolism	

Lung Pathology

Type 1 Failure	Type 2 Failure
Pneumonia	COPD
Oedema	Bronchiectasis
Lung Collapse	Fibrosis
Asthma	Neuromusculoskeletal
Pulmonary Embolism	

BiPAP Efficacy

Oedema

Pneumonia

Pulmonary Embolism

Lung Collapse

Asthma

COPD

Fibrosis

Neuromusculoskeletal

BiPAP Efficacy

COPD

Oedema

Neuromusculoskeletal

Fibrosis

Asthma

Pneumonia

Pulmonary Embolism

Lung Collapse

BiPAP Efficacy

COPD

Oedema

Neuromusculoskeletal

Fibrosis

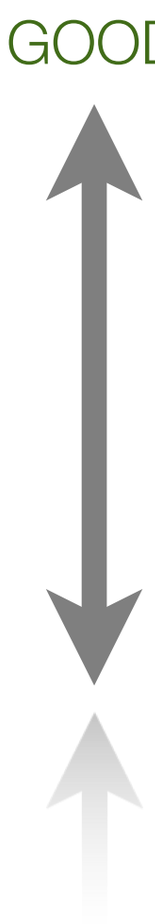
Asthma

Pneumonia

Pulmonary Embolism

Lung Collapse

BiPAP Efficacy



GOOD

BAD

COPD

Oedema

Neuromusculoskeletal

Fibrosis

Asthma

Pneumonia

Pulmonary Embolism

Lung Collapse