

Non Invasive Ventilation

Causes of Hypoxia

Causes of Hypoxia

1 ↓ FiO_2

Causes of Hypoxia

- 1 ↓ FiO_2
- 2 Hypoventilation

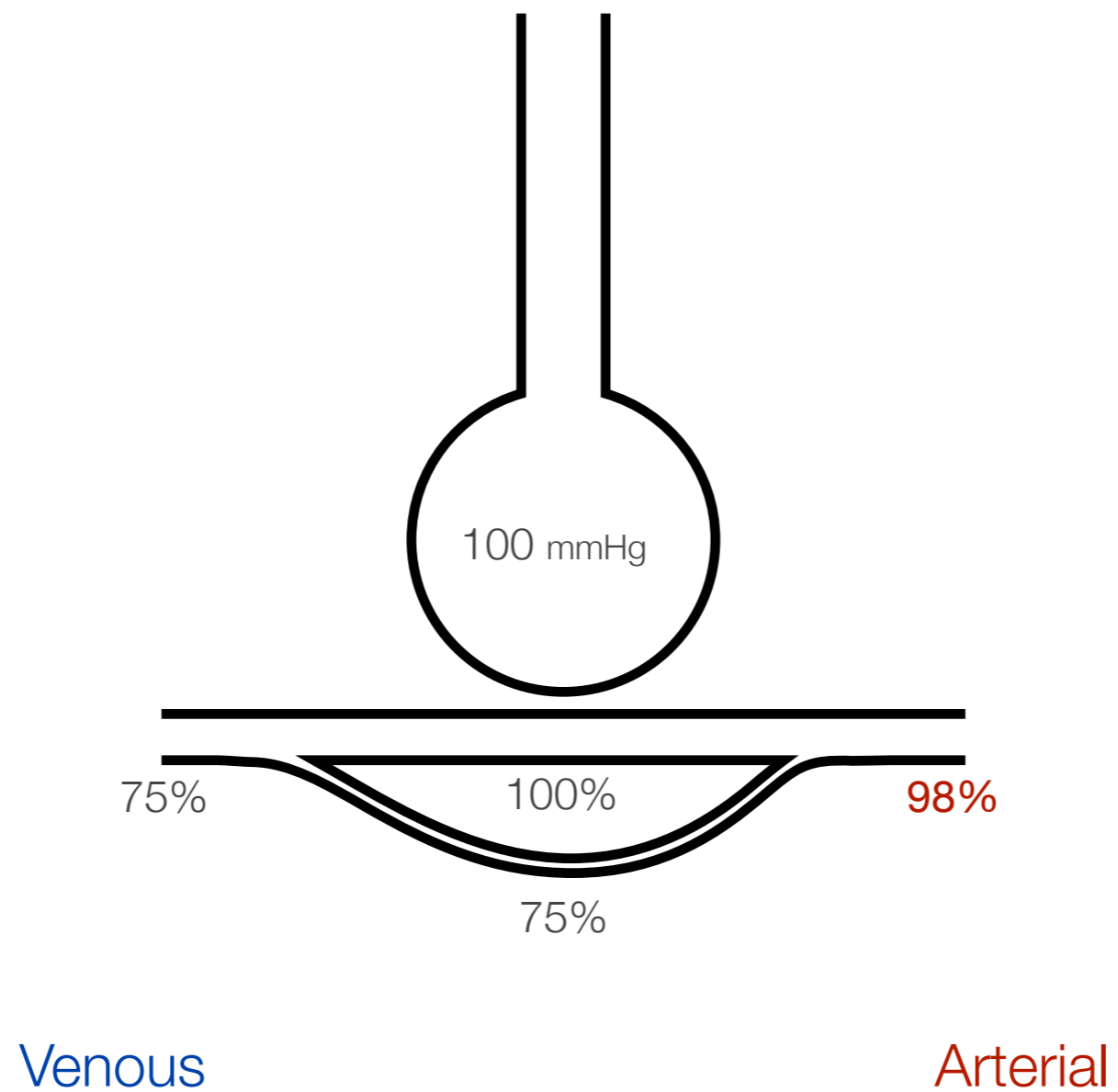
Causes of Hypoxia

- 1 ↓ FiO_2
- 2 Hypoventilation
- 3 Shunt

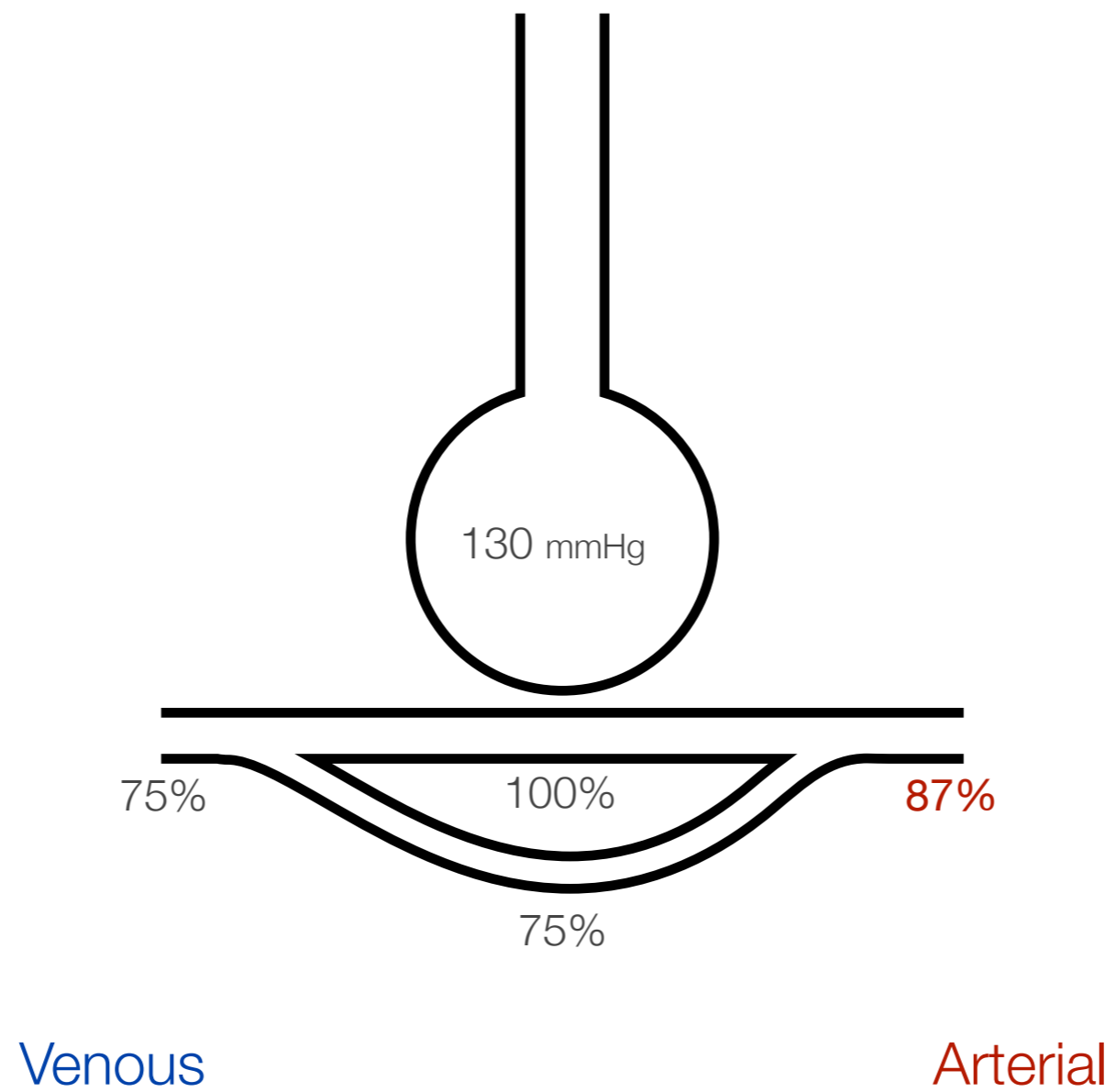
Causes of Hypoxia

- 1 ↓ FiO_2
- 2 Hypoventilation
- 3 Shunt

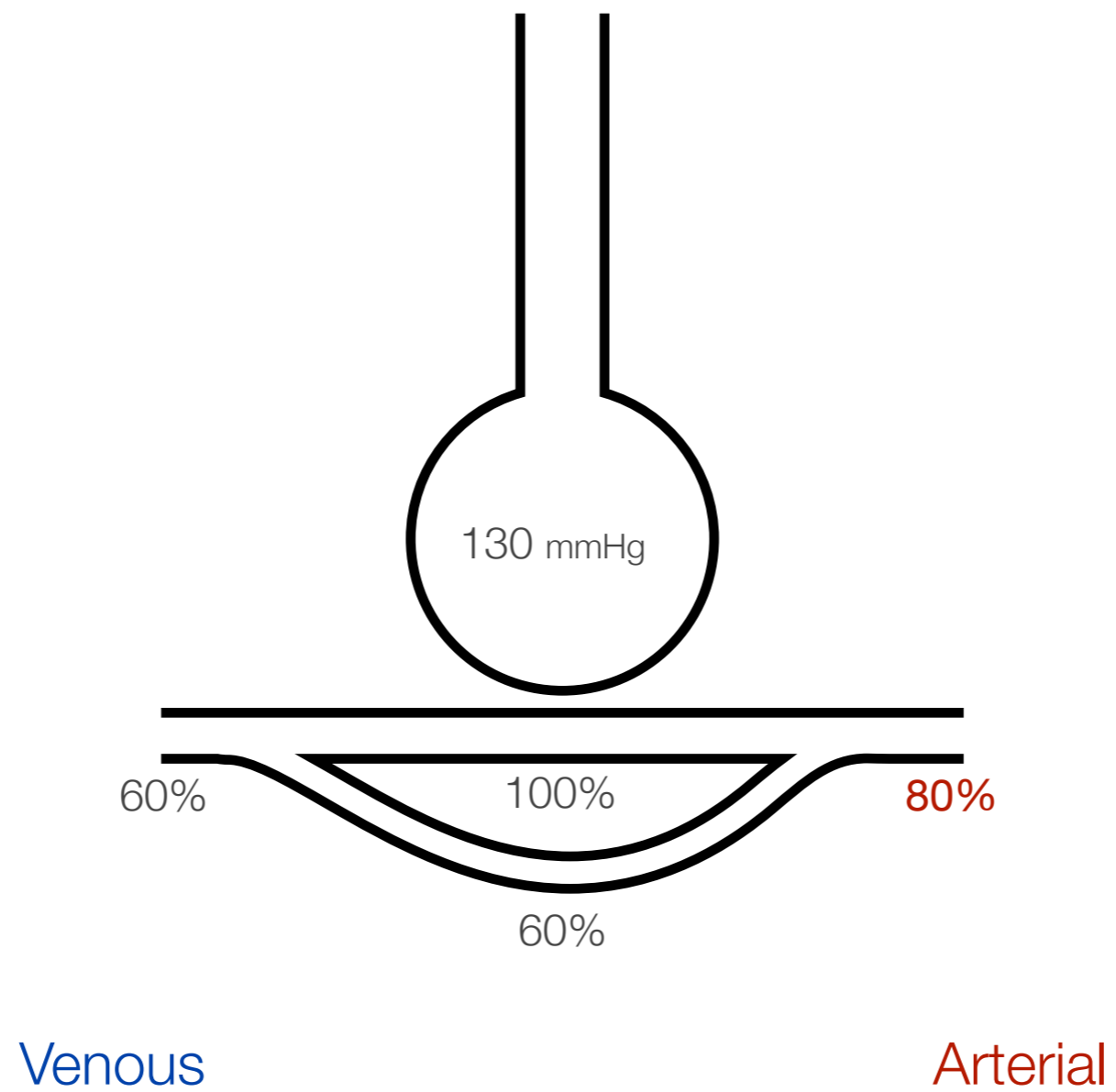
Normal Oxygen Exchange



Shunt



Shunt



Difference Between O_2 and CO_2



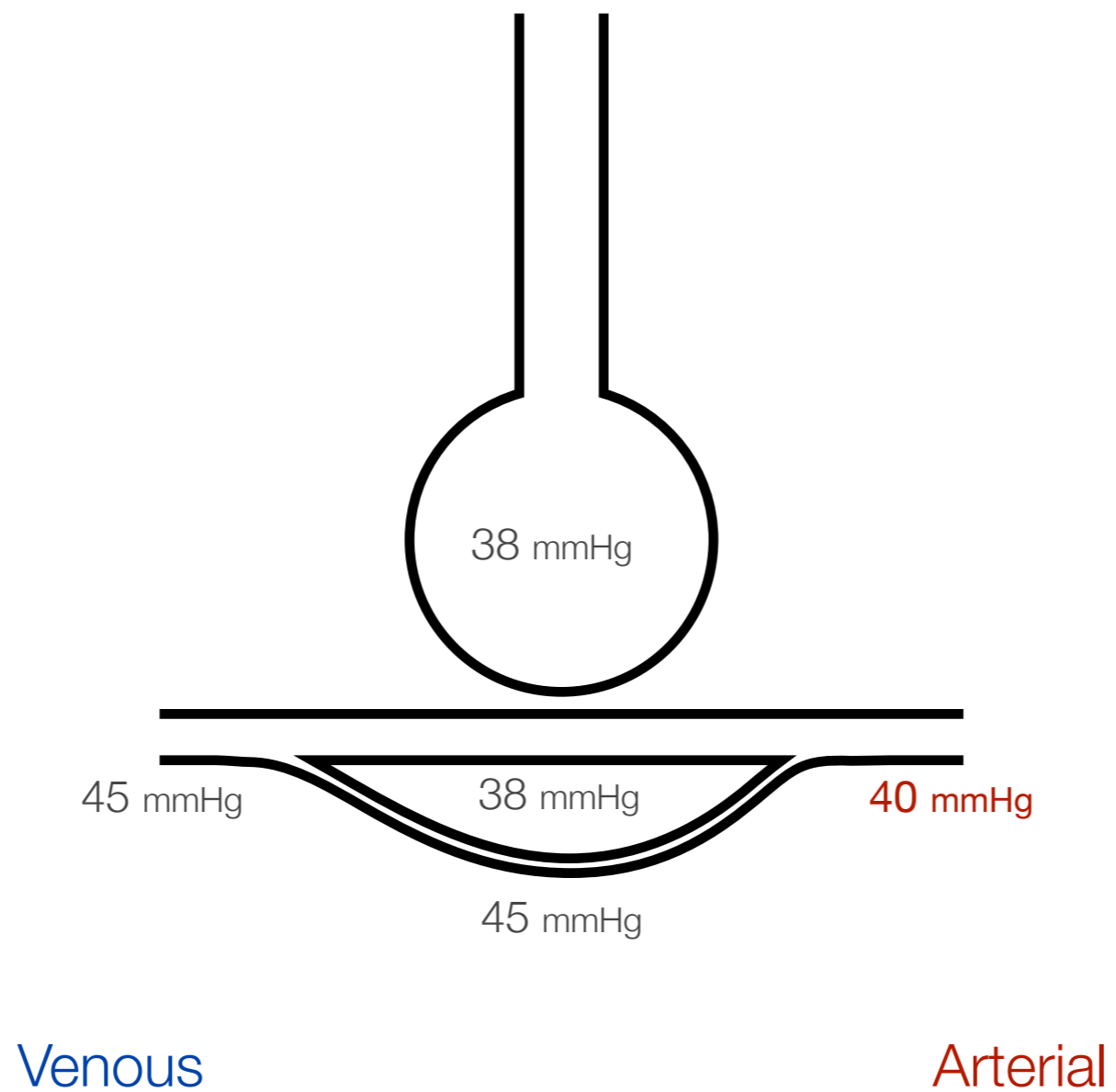
The limiting factor on CO_2 excretion is alveolar ventilation



The limiting factor on O_2 uptake is shunt

Normal CO₂ Exchange

CO₂



CO₂ Excretion

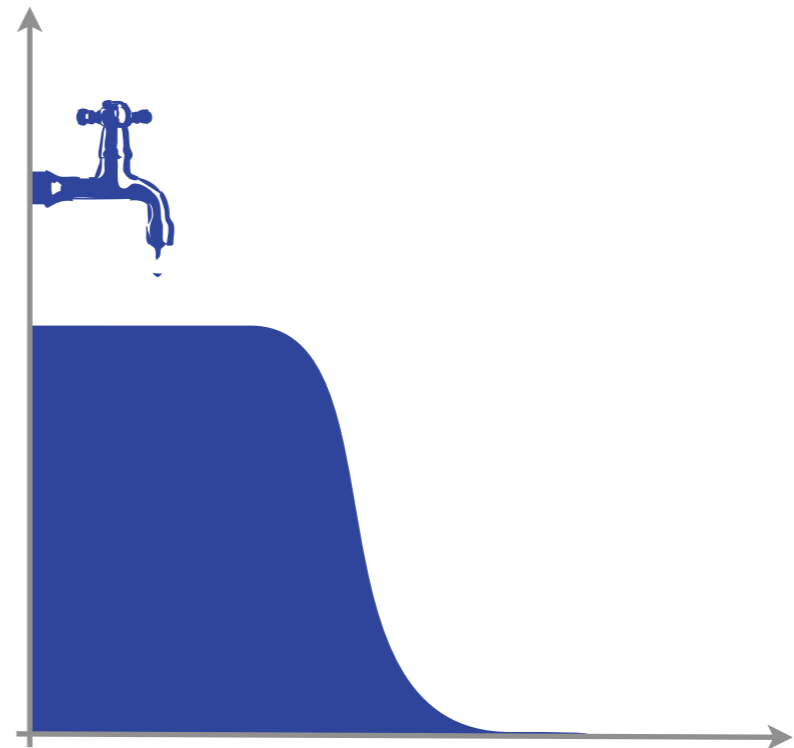


CO₂ excretion is very simple

CO₂ is produced in the tissues and excreted in the lungs

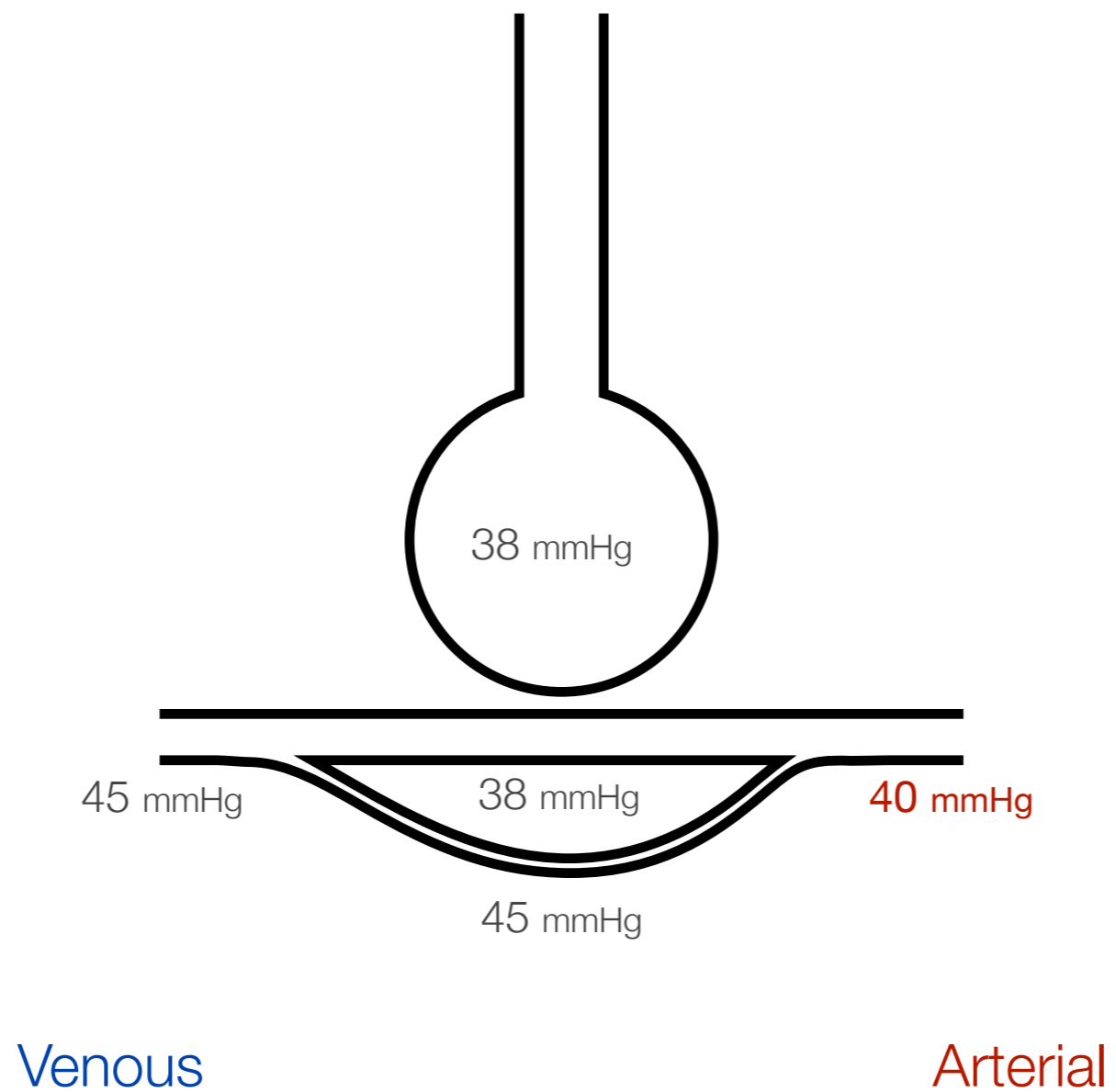
$$PaCO_2 \sim \text{Rate of Production}$$

$$PaCO_2 \sim \frac{1}{\text{Alveolar Ventilation}}$$



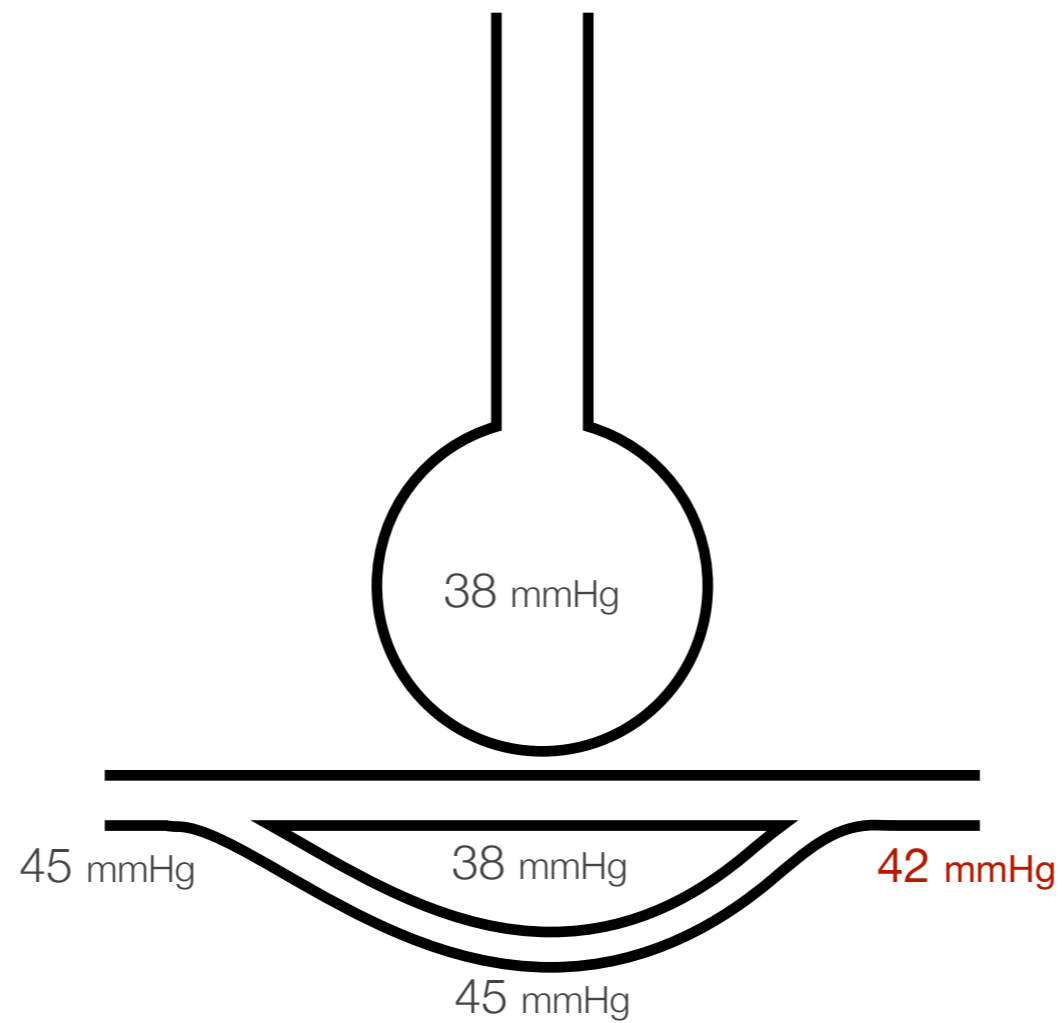
Normal CO₂ Exchange

CO₂



Shunt & CO₂

CO₂

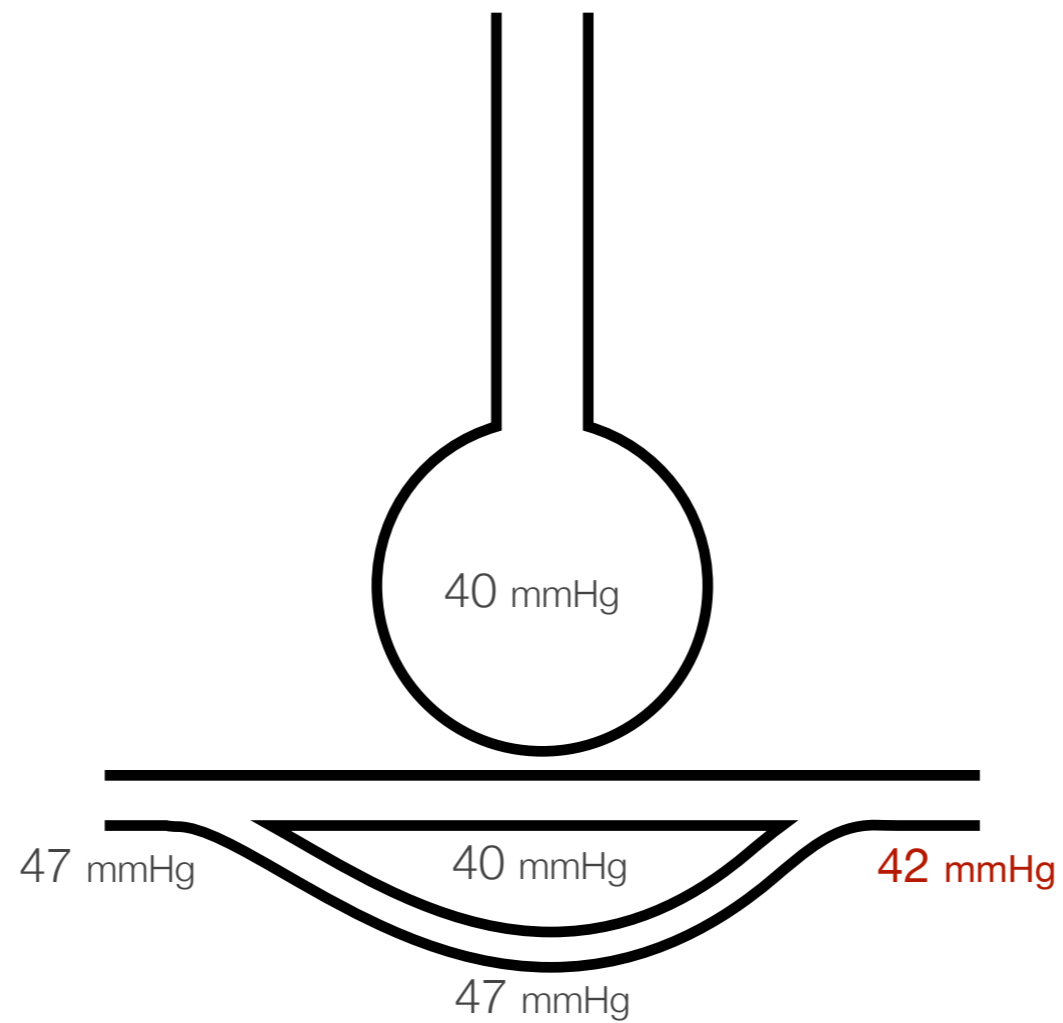


Venous

Arterial

Shunt & CO₂

CO₂



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

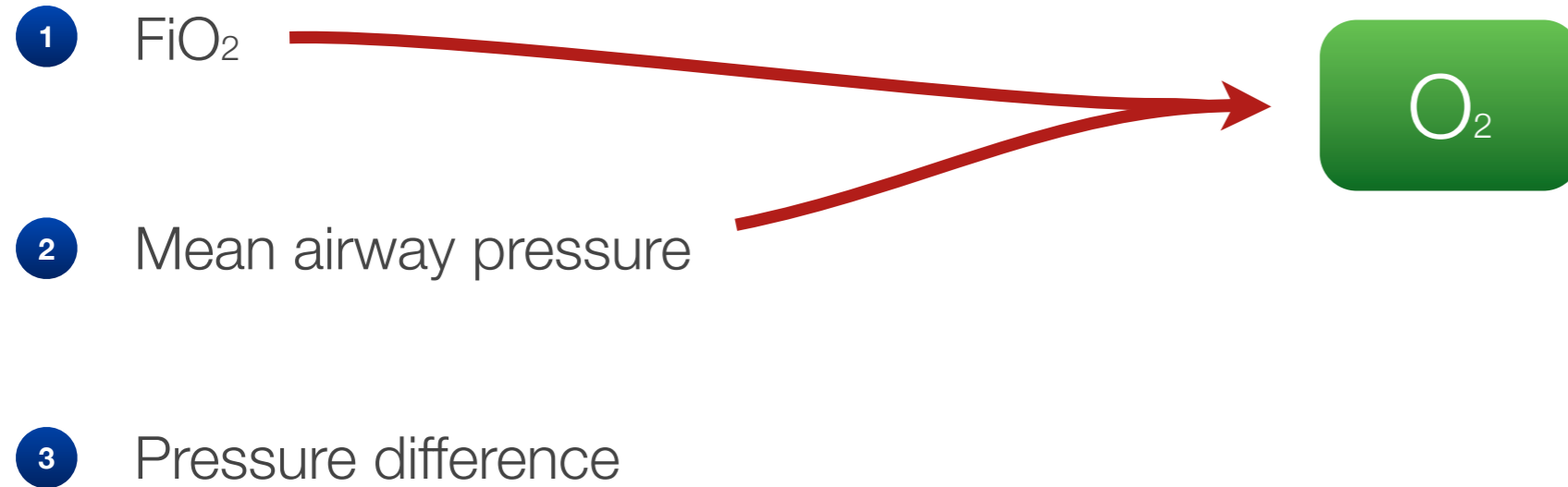
BiPAP Settings

- 1 FiO_2
- 2 Mean airway pressure

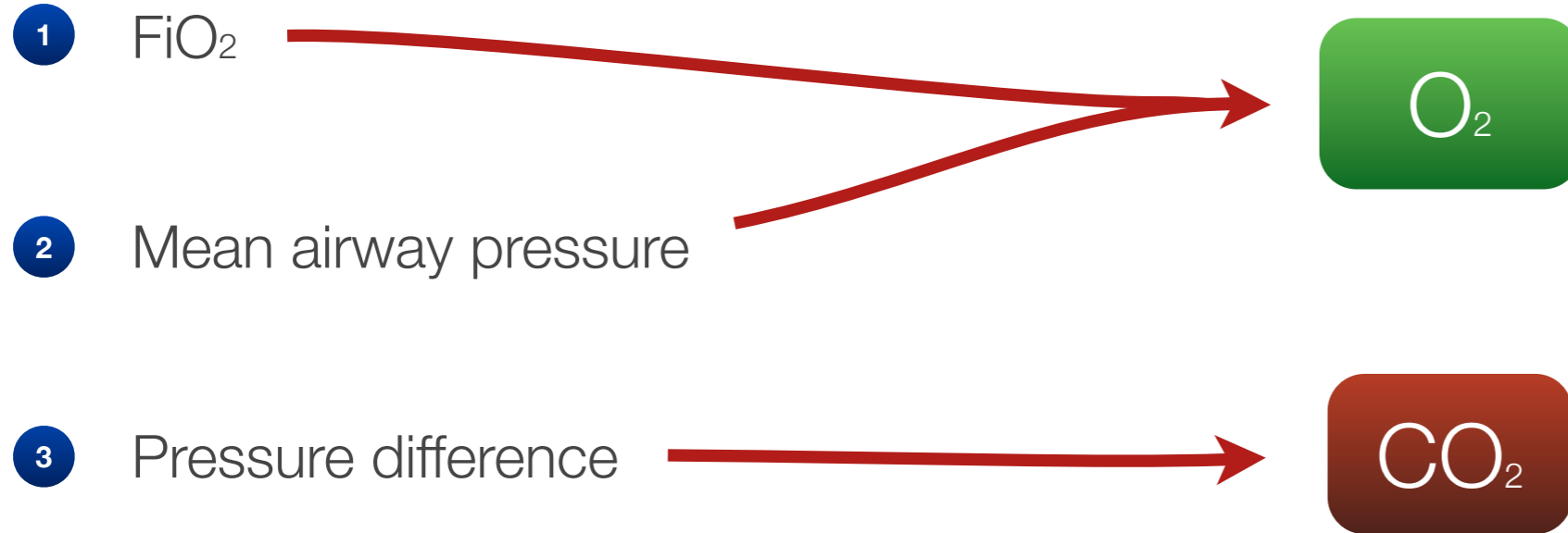
BiPAP Settings

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

BiPAP Settings



BiPAP Settings



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

Pneumonia

Oedema

Lung Collapse

Asthma

Pulmonary Embolism

Type 2 Failure

COPD

Bronchiectasis

Fibrosis

Neuromusculoskeletal

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