

# Physiologic Dead Space (VD)

The physiologic dead space represents the amount of air that is inspired but does not take part in gas exchange. Two areas of the lung contribute to the physiologic dead space: one is the space in the conductive airway, also called anatomic dead space, and the other is the alveoli that are not well perfused, such as the apex of the lung, also called functional dead space. Physiologic dead space can quickly provide insight into how patients' gas exchange in the lungs is functioning. Causes of an increase in physiologic dead space include shunt or diseases that damage the alveoli. Physiologic dead space can be calculated by multiplying the tidal volume (TV) with the difference between the arterial partial pressure of CO2 (PaCO2) and the partial pressure of CO2 in the expired air (PECO2) and divided by the arterial partial pressure of CO2 (PaCO2). In other words, it is the volume of air that is proportional to the percentage of CO2 that entered the lungs but did not get exchanged.



**PLAY PICMONIC** 

# Tidal Volume (Vt)

## Volume-Cup Tidal-wave

#### Partial Pressure of Arterial CO2 (PaCO2)

Partial Pressure-Gauge Artery-Archer with CO2

This is the partial pressure of CO2 in the arteries. It can be obtained and measured with an arterial blood gas (ABG).

# Partial Pressure of CO2 in Expired Air (PECO2)

Partial Pressure-gauge Exhaust with CO2

The partial pressure of CO2 in the expired air is an important piece of information for calculating the physiologic dead space. This can be obtained from capnometry clinically.

## $VD = VT \times (PaCO2-PECO2) / PaCO2$

Volume-cup and Dead-space-man EQUALS Artery-Archer with CO2 SUB-Tract Exhaust CO2 OVER Artery-Archer with CO2

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