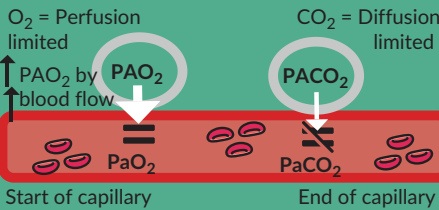


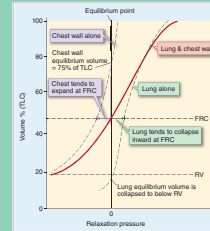
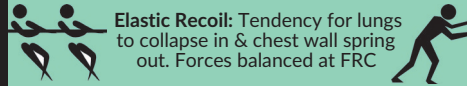
# Respiratory Physiology

## Pulmonary Circulation & Pulmonary Vascular Resistance (PVR)



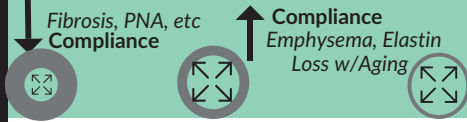
$$PVR = \frac{(PA \text{ Pressure} - LA \text{ Pressure})}{CO}$$

Low-Resistance, High-Compliance System



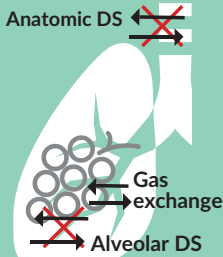
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**Compliance**  $\propto$  1/Wall stiffness  
"ability to fill with air"



## Dead Space (DS)

$$VD = \text{Anatomic DS} + \text{Alveolar DS} = VT \cdot \frac{(PaCO_2 - PECO_2)}{PaCO_2}$$



$$MV = VT \cdot RR$$

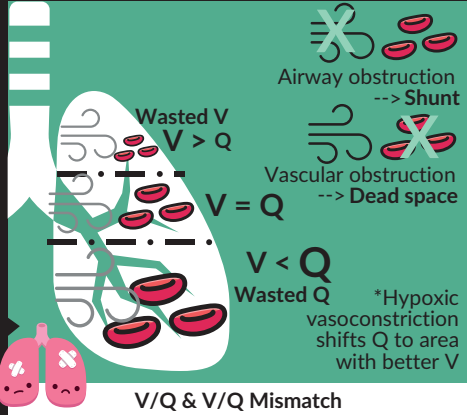
Air to lungs/min

$$AV = (VT - VD) \cdot RR$$

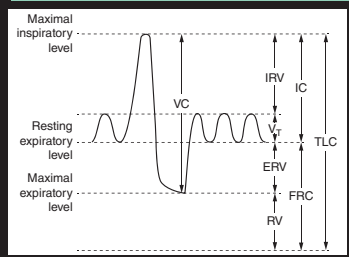
Air to alveoli/min

Pathologic DS = no gas exchange in part of respiratory zone

## Elasticity & Compliance



## V/Q & V/Q Mismatch



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- Q = Perfusion
- V = Ventilation
- AV = Alveolar ventilation
- MV = Minute ventilation
- CO = Cardiac output
- RR = Respiratory rate
- FRC = Functional residual capacity
- Pa(O<sub>2</sub> or CO<sub>2</sub>) = Arterial pressure
- PA(O<sub>2</sub> or CO<sub>2</sub>) = Alveolar pressure
- PA pressure  $\approx$  PCWP (pulmonary capillary wedge pressure)
- PE(O<sub>2</sub> or CO<sub>2</sub>) = Expired pressure
- R = Respiratory quotient = 0.8
- VD = Physiologic dead space
- VT = Tidal volume