



# Lung Function Tests

## Control of ventilation

Measure by rebreathing bag technique

Administer controlled amount of CO<sub>2</sub> or O<sub>2</sub> and monitor response

Response to CO<sub>2</sub> is decreased by:  
Sleep  
Narcotic drugs  
Genetic, racial and personality factors

## Lung Elasticity

Measure by difference b/t mouth esophageal pressures whilst exhaling from TLC to RV in 1 liter increments

Increased with:  
interstitial fibrosis  
Interstitial edema

Decreased with:  
emphysema  
asthma (sometimes)  
increased age

## Topographic differences in lung function

Made more uniform by:  
Exercise  
pulmonary hypertension  
Left-to-right cardiac shunt

Regionally decreased by local lung diseases

Normally unevenly distributed with higher blood flow in dependent lung fields

Measured with a gamma camera following:  
IV injection of radioactive xenon  
IV albumin aggregates labeled with technetium

Can be reversed with exaggeration of airway closure at base of lung:  
Healthy lung inhaling small amount from RV  
Age with inhaling at FRC  
Emphysema  
Interstitial edema  
Obesity

## Exercise tests

Measured variables include:  
work load  
total ventilation  
respiratory frequency  
tidal volume  
Heart rate  
ECG  
Blood pressure  
O<sub>2</sub> uptake  
CO<sub>2</sub> output  
PaO<sub>2</sub>  
PaCO<sub>2</sub>  
pH

Measured by:

Body plethysmograph

Helium Dilution

Exaggerates abnormalities

## Airway resistance

Measured by the difference b/t alveolus and mouth pressures divided by flow rate

Body Plethysmography

Increased by:  
Chronic bronchitis  
asthma  
Emphysema  
Airway obstruction/collapse  
Inhaled irritants

Decreased by increased lung volumes

Increased w/ increased airway resistance:  
emphysema  
chronic bronchitis  
asthma

Decreased with decreased compliance:  
diffuse interstitial fibrosis

## Static lung volumes