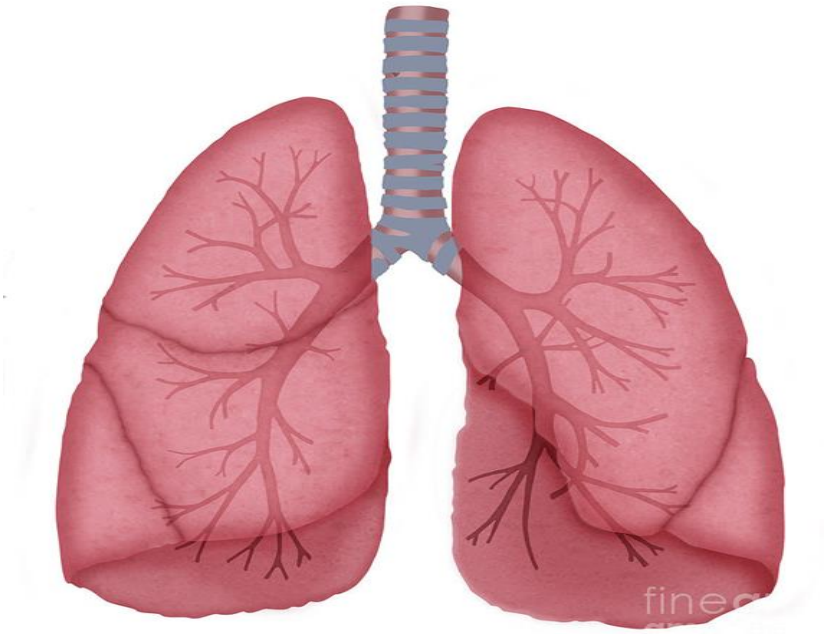
Lung Volumes and Capacities

Lung volumes

are also known as respiratory volumes. It refers to the volume of gas in the lungs at a given time during the respiratory cycle.

Lung capacities

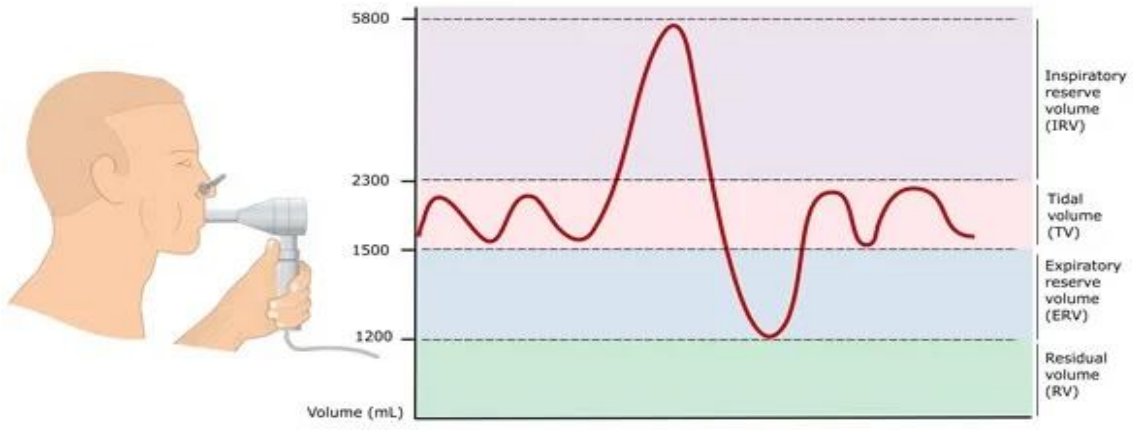
are derived from a summation of different lung volumes. The average total lung capacity of an adult human male is about 6 litres of air.



Email (البريد الالكتروني للتدريسي)

- Lung volumes measurement is an integral part of pulmonary function test.
- These volumes tend to vary, depending on the depth of respiration, ethnicity, gender, age, body composition, and in certain respiratory diseases.
- A number of the lung volumes can be measured by Spirometry-Tidal volume, Inspiratory reserve volume, and Expiratory reserve volume.
- However, measurement of Residual volume, Functional residual capacity, and Total lung capacity is through body plethysmography, nitrogen washout and helium dilution technique.

Pulmonary Function Test

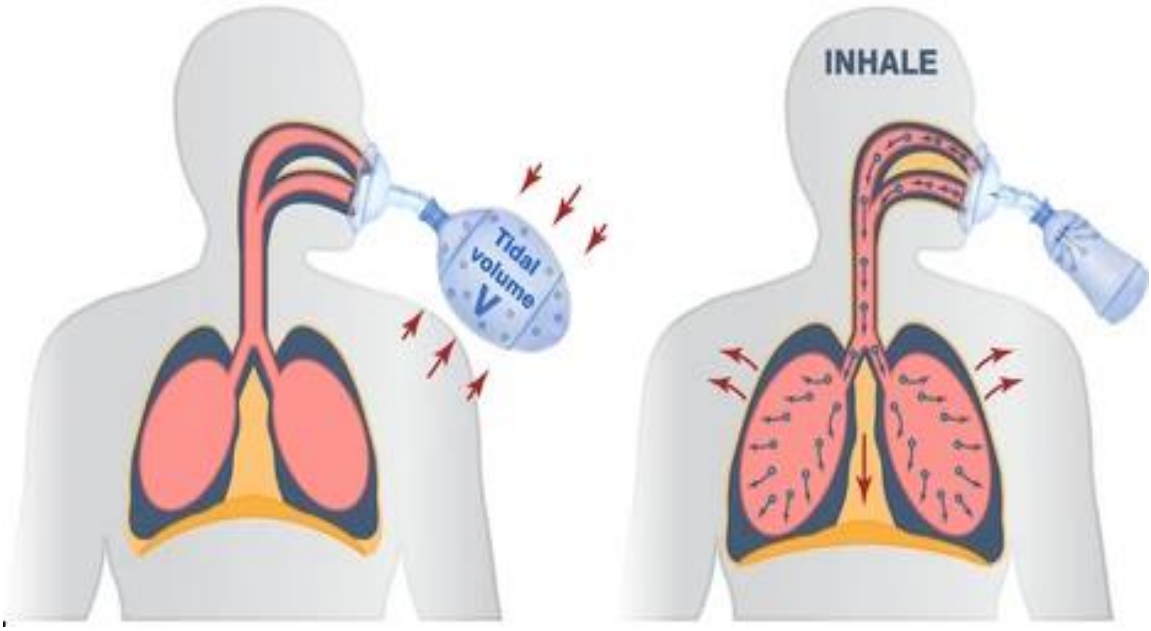


Male	Female
3000	1900
500	500
1100	700
1200	1100
5800 mL	4200 mL

Lung Volume

Tidal Volume (TV):

It is the amount of air that can be inhaled or exhaled during one respiratory cycle. This depicts the functions of the respiratory centres, respiratory muscles and the mechanics of the lung and chest wall.



- ## Inspiratory Reserve Volume (IRV)

It is the amount of air that can be forcibly inhaled after a normal tidal volume.IRVis usually kept in reserve, but is

used during deep breathing. The normal adult value is 1900-3300ml.

- ## Expiratory Reserve Volume (ERV)

It is the volume of air that can be exhaled forcibly after exhalation of normal tidal volume. The normal adult value is 700-1200ml. ERV is reduced with obesity, ascites or after upper abdominal surgery.

Residual Volume (RV)

• It is the volume of air remaining in the lungs after maximal exhalation.

• Normal adult value is averaged at 1200ml (20-25 ml/kg).

• It is indirectly measured from summation of FRC and ERV and cannot be measured by spirometry.

Lung Capacities

Inspiratory capacity (IC)

It is the maximum volume of air that can be inhaled following a resting state. It is calculated from the sum of inspiratory reserve volume and tidal volume.

IC = IRV+TV.

Total Lung Capacity (TLC)

It is the maximum volume of air the lungs can accommodate or sum of all volume compartments or volume of air in lungs after maximum inspiration. The normal value is about 6,000mL(4-6 L). TLC is calculated by summation of the four primary lung volumes (TV, IRV, ERV, RV).

Vital Capacity (VC)

It is the total amount of air exhaled after maximal inhalation. The value is about 4800mL and it varies according to age and body size. It is calculated by summing tidal volume, inspiratory reserve volume, and expiratory reserve volume. VC = TV+IRV+ERV.

Function Residual Capacity (FRC)

It is the amount of air remaining in the lungs at the end of a normal exhalation. It is calculated by adding together residual and expiratory reserve volumes. The normal value is about 1800 – 2200 mL.FRC = RV+ERV

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