Lung volumes and capacities

The total lung capacity may be expressed as the sum of four volumes (fig. 18.9). These are the tidal volume, the volume of air moved into and out of the lungs during normal breathing; inspiratory reserve, the maximum volume beyond the tidal volume that can be inspired in one deep breath; expiratory reserve, the maximum volume beyond the tidal volume that can be forcefully exhaled following a normal expiration; and residual volume, the air that remains in the lungs following a forceful expiration. Respiratory air volumes are measured with the spirometer.

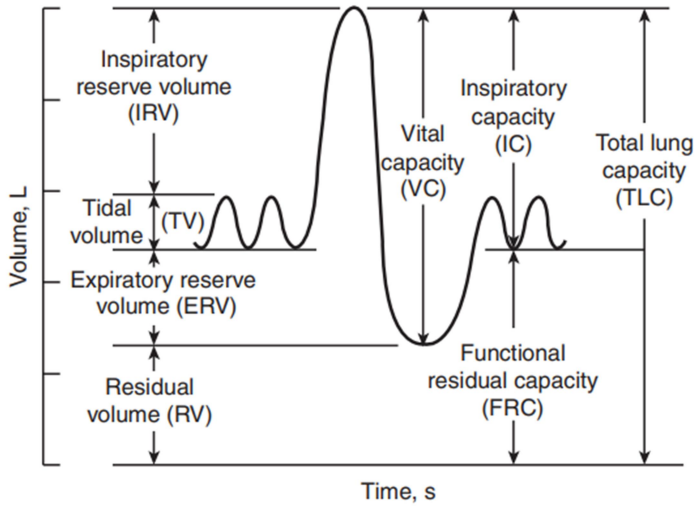

Figure1: Lung volumes and capacity measurements. Lung volumes recorded by a spirometer. Lung capacities are determined from volume recordings.

Account for the variability of respiratory air volumes-

Clinically speaking, it is important to know the amount of air that is breathed in at a given time and to be aware of difficulty in breathing. The amount of air exchanged during pulmonary ventilation varies from person to person according to age, sex, activity, and general health.

Calculate the minute respiratory volume of an individual who has a tidal volume of 500 mL and a respiratory rate of 12 breaths per minute.

Minute respiratory volume is the volume of air moved in normal ventilation in 1 minute. Therefore, Minute respiratory volume= (tidal volume) x (respiratory rate) = (0.500 L) x (12 min^{-1}) = 6 L/min

Lung Volumes and Capacities

i)Important quantitation of lung function can be gleaned (সংগ্রহ করা) from the displacement of air volume during inspiration and/or expiration.

ii)Lung capacities refer to subdivisions that contain two or more volumes.

iii)Volumes and capacities recorded on a spirometer from a healthy individual are shown in Figure1. Diagnostic spirometry is used to assess a patient's lung function for purposes of comparison with a normal population, or with previous measures from the same patient.

iv)The amount of air that moves into the lungs with each inspiration (or the amount that moves out with each expiration) during quiet breathing is called the tidal volume (TV). Typical values for TV are on the order of 500-750 mL. The air inspired with a maximal inspiratory effort in excess of the TV is the inspiratory reserve volume (IRV; typically -2 L).