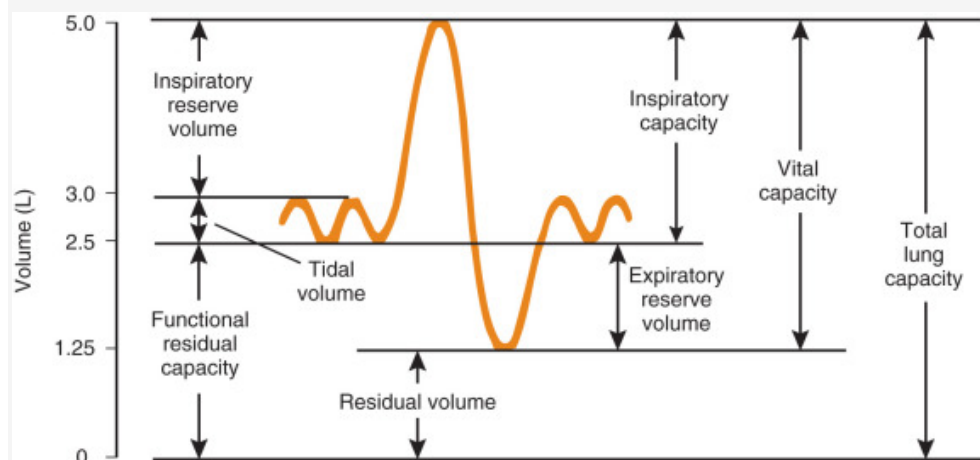


# FRC: definition

Functional Residual Capacity is the amount of volume remaining in the lung after a normal exhalation. Thus FRC is determined by the opposing elastic recoil of the lung and chest wall and the resting tone of the respiratory muscles. It is the volume at which the lung comes to rest after passive exhalation when the respiratory muscles are totally relaxed.

Mayo Foundation for Medical Education. Faust's Anesthesiology Review E-Book . Elsevier Health Sciences. Kindle Edition.

## Lung Volumes:



- TLC = Total Lung Capacity
- VC = Vital Capacity
- IC = Inspiratory Capacity
- FRC = Functional Residual Capacity
- V<sub>t</sub> = Tidal Volume

- RV = Residual Volume
- ERV = Expiratory Reserve Volume
- IRV = Inspiratory Reserve Volume

Dependent on the balance of the inward force of the lung and the outward force of the chest wall determines the volume. The inward force of the lung, or “elastic recoil,” consists of the elastic fibers of the lung tissue, as well as the contractile forces of airway smooth muscles and the surface tension of alveoli. The outward force of the chest wall is exerted by the ribs, joints, and muscles. A normal FRC = 1.7 to 3.5 L. Functional residual capacity is similar on a per-kilogram basis at all ages, but the mechanical factors on which it is based are different in infants and adults.

FRC is increased by:

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- Body size (FRC increases with height)
- Age (FRC increases slightly with age)
- Certain [lung diseases](#), including asthma and chronic obstructive [pulmonary disease](#) (COPD).

FRC is decreased by:

- Sex (women have a 10% decrease in FRC when compared to men)

- Diaphragmatic muscle tone (individuals with paralyzed diaphragms have less FRC when compared to normal individuals)
  - Posture (FRC greatest standing > sitting > prone > lateral > supine)
  - Certain lung diseases in which elastic recoil is diminished (e.g., [interstitial lung disease](#), thoracic burns, and kyphoscoliosis)
  - Increased abdominal pressure (e.g., obesity, ascites)
- FRC is of clinical significance for two reasons. First, FRC provides an important store of oxygen. For instance, an apneic patient who has been breathing 100% oxygen and who has an oxygen consumption of 300 ml/min and an FRC of [3000 ml](#) theoretically has 10 minutes of stored oxygen. The same patient breathing air has less than 2 minutes of stored oxygen. In practice, oxygen stores do not last this long because FRC never contains 100% oxygen and progressive consumption of oxygen results in clinically significant [hypoxemia](#) well before 10 minutes have passed. However, the example highlights the importance of thoroughly preoxygenating patients prior to inducing apnea for intubation. The second reason FRC is important is its relationship with closing capacity.