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**Anatomy and Physiology**

**NUTD341**

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**Introduction:**

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 liters of air. 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 [1] 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.

**Results:**

**Part 1:**

|  |  |
| --- | --- |
| Volumes & Capacities | Measured Result (L/s) |
| Tidal Volume (TV) | 0.9 |
| Inspiratory Reserve Volume (IRV) | 1.9 |
| Expiratory Reserve Volume (ERV) | 0.7 |
| Inspiratory Capacity (IC) | 2.8 |
| Vital Capacity (VC) | 4.2 |

**Part 2:**

**Using a Nomogram:**

Height: 170cm

Weight: 75kg

Derived Surface Area: 1.85 m2

**Equation: Surface Area X Gender Constant = Ideal VC** (Female standard constant = 2L/m2)

1.85\*2=3.7 L

**Discussion:**

* The standard value in healthy adults (women) for lung volume and capacity is:

Inspiratory reserve volume (IRV): 1.9 L

Expiratory reserve volume (ERV): 0.7L

Tidal volume (TV): 0.5 L

Residual volume (RV): 1.1L

Vital capacity(VC): 3.1 L

Inspiratory capacity(IC): 2.4L [2]

As seen in our results, IRV and ERV values were the same as standard values, but other values (TV, VC and IC) were different in varying proportions as a result of Physiological factors that influence lung volumes/capacities include age, gender, weight, height and ethnicity, physical activity, altitude and others, which should be considered while interpreting results of spirometry. [3] The VC from the spirometer recording paper result (4.2L) wasn’t similar to the calculated ideal VC from the nomogram(3.7L) maybe because vital capacity depends on age, sex, height, mass, and possibly ethnicity.so some of these factors influenced on it.

**References:**

1. Physiopedia, Lung Volumes, <https://www.physio-pedia.com/Lung_Volumes>.
2. Lung volumes. (2021, April 30). Retrieved from <https://en.m.wikipedia.org/wiki/Lung_volumes>
3. Lutfi, M. F. (2017, February 09). The physiological basis and clinical significance of lung volume measurements. Retrieved from https://mrmjournal.biomedcentral.com/articles/10.1186/s40248-017-0084-5