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SPIROMETRY IN BIOPHYSICS CLASSES

Spirometry is a standard test doctors use to measure how well your lungs are functioning. A spirometer is an apparatus for measuring the volume of air inspired and expired by the lungs. A spirometer measures ventilation, the movement of air into and out of the lungs. The study of spirometry is an important part of the biophysics teaching of medical students. Investigation of the principle of the spirometer work is proposed to be carried out in the form of the next laboratory work.

Laboratory work: «Measure the volume of lungs with a spirometer».

Instruments and equipment: spirometer, alcohol for disinfection.

The order of work execution:

1. Get acquainted with the device of the spirometer. Prepare it for work (disinfect the tip, set the scale to the beginning of the countdown).

2. Take a deep breath and exhale the air to the maximum exhalation in the spirometer. Record the volume of lungs (in liters). Repeat measurement 5 times.

3. Calculate the average lung volume by formula $a \approx \langle a \rangle$, where $\langle a \rangle = \frac{a_1 + a_2 + a_3 + ... + a_n}{N}$.

4. Calculate the absolute error of each measurement: $\Delta V_i = |V_i - V_{av}|$.

5. Find the instrument error δ_{dev}. Calculate the absolute and the relative error of measurements using formulas $\Delta a = \sqrt{(\Delta \tilde{a})^2 + (\delta_{dev})^2}$

7. Record the final result in the standard form $a = \langle a \rangle \pm \Delta a$, $\alpha = 0.05$ (or $\alpha = 0.01$).

Normal results for a spirometry test vary from person to person. They're based on your age, height, race, and gender. To compare the reliability of the results obtained, the volume of the lungs should be calculated from the surface area of the human body.