

# Functional examination of the cardiorespiratory system

Functional examinations of the cardiorespiratory system include cardiac examinations and lung examinations.

## Functional examination of the heart

- **Echocardiographic examination** - ultrasound examination of the heart; is used to visualize heart walls and valves and to assess their function.
- **Oesophageal echocardiographic examination.**
- **Ergometry** - is performed on a specially modified bike (so-called ergometer). The subject is connected to an ECG device; ECG recording and blood pressure are monitored continuously. During the examination, the load gradually increases.
- **Outpatient 24-hour blood pressure measurement (ABPM), pressure Holter** - a small automatic pressure gauge is attached to the waist on the arm; blood pressure is measured at regular intervals; the patient is at home.

## Functional examination of the lungs

- **Spirometry** - allows to objectively evaluate lung function; distinguish obstructive and restrictive lung disorder; requires patient cooperation.
  1. **Examination of resting volumes and lung capacities (spirogram: volume / time curve).**
    - VT (also TV, tidal volume) - tidal volume; the volume of air inhaled or exhaled by one normal inhalation or exhalation.
    - ERC - expiration reserve volume; the amount of air that can still be exhaled after normal exhalation.
    - IRV - inspiratory reserve volume; the amount of air that can still be inhaled after a normal breath.
    - VC - vital capacity; the maximum volume of air that can be exhaled after maximum inhalation or inhaled after maximum exhalation (VT + IRV + ERV).
    - IC - inspiration capacity; the maximum volume of air that can be inhaled from resting exhalation (VT + IRV).
    - df - respiratory rate; number of breaths per minute.
  2. **Examination of forced expiration and inspiration (spirogram: flow / volume curve and volume / time curve).**
    - FVC - strenuous vital capacity; the maximum volume of air that can be exhaled sharply after maximum inhalation.
    - FEV1 - forced expiratory volume in the first second; the volume of air exhaled with the greatest effort in the first second after the maximum breath.
    - FEV1 / VC (%) - Tiffeneau index - about 80%.
    - PEF - peak expiratory flow; highest speed at the peak of forced exhalation (corresponds to air in the upper DC).
    - MEF - maximum exhalation flows (velocities) at different levels of the FVC that still need to be exhaled (most often at 75%, 50% and 25% FVC).
    - FEF - strenuous expiratory flows at various levels of exhaled FVC (25%, 50% and 75%).
    - PIF - maximum flow reached at the top of the breath.
    - MIF50 - mean inspiratory flow at 50% inhaled FVC.
- **Spiroergometry** - spirometry under load; oxygen consumption and exhaled carbon dioxide are measured; serves to assess the functional reserve of the cardiovascular system.
- **Whole body plethysmography (bodyplethysmography)** - to measure indirectly measurable lung volumes (ie the volume of gas in the chest) and airway resistance. It is possible to examine parameters in the cabin that cannot be determined spirometrically. Based on these measurements, it is possible to subsequently determine all static and dynamic lung volumes.

## Links

### related articles

- Lung volumes

