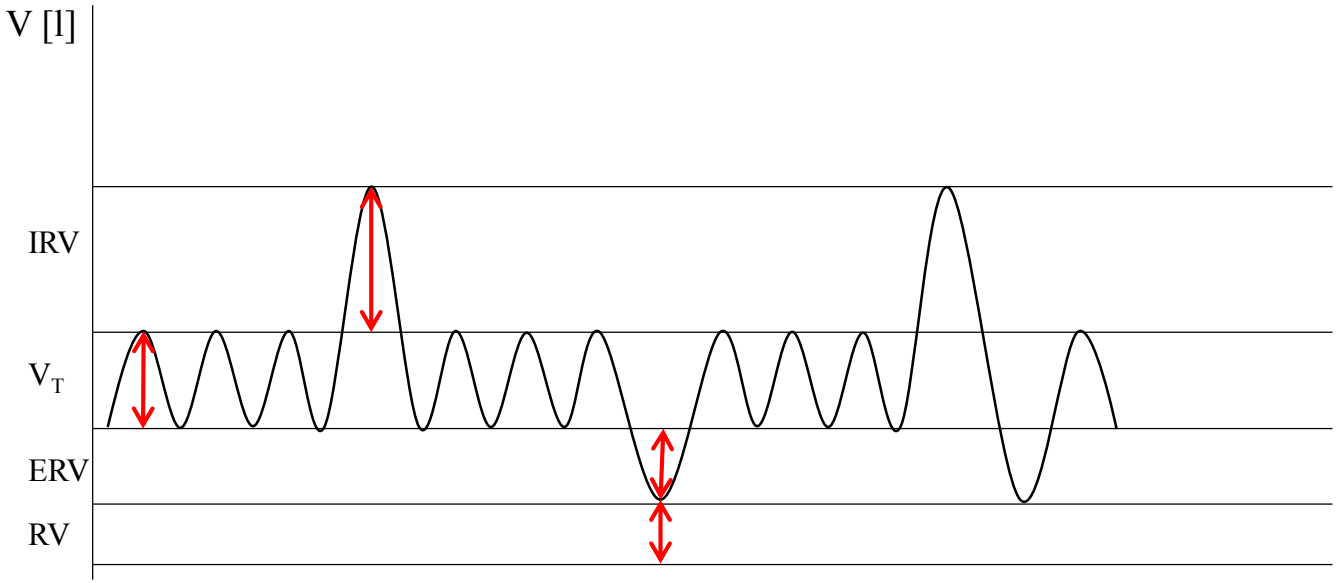
SPIROMETRY (XVIII).
RECORDING OF THE FORCED VITAL CAPACITY (XIX).

Static lung volumes



V_T – 0.5 l

IRV – 2.5 l

ERV – 1.5 l

RV – 1.5 l

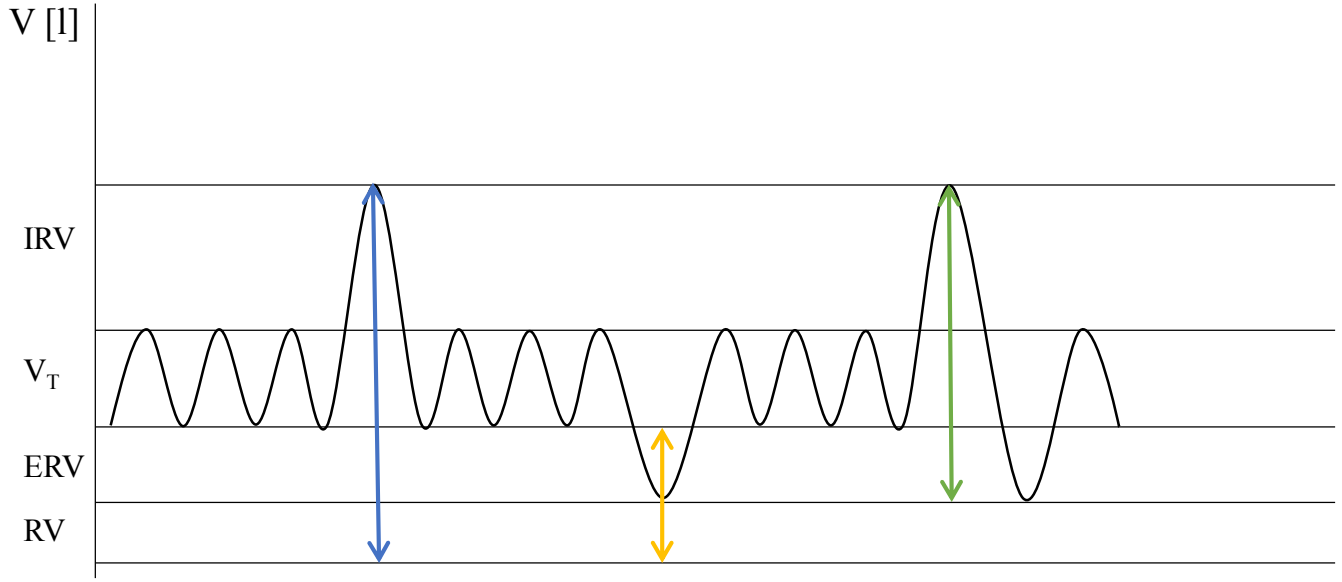
V_T: Tidal volume – volume of air inspired during quite inspiration (after quite expiration)

IRV: Inspiratory reserve volume – the maximal volume of additional air that can be inspired by forced inspiration after normal inspiration

ERV: Expiratory reserve volume – the maximal volume of additional air that can be expired by forced expiration after normal expiration

RV: Residual volume – volume of air that remains in lungs after the maximal forced expiration

Static lung volumes - capacities



Vital capacity [VC] = IVR + V_T + ERV

Total lung capacity [TLC] = IRV + V_T + ERV + RV

Functional residual capacity [FRC] = ERV + RV

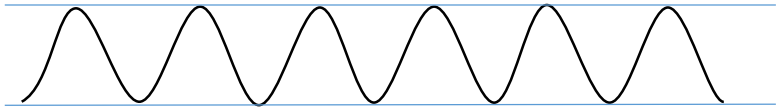
Dynamic lung volumes

Normal (resting) breathing:

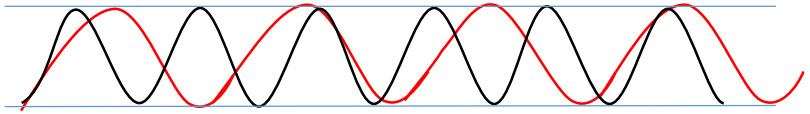
Frequency: 10 – 18 breaths/min
Tidal volume: 0.5 l
Minute ventilation: 5 – 9 l/min

Changes of frequency

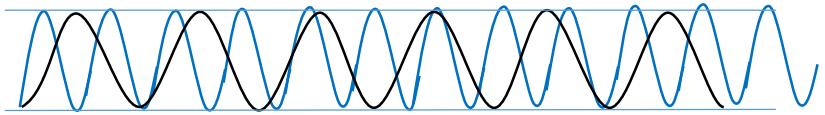
Eupnoea – normal (resting) breathing



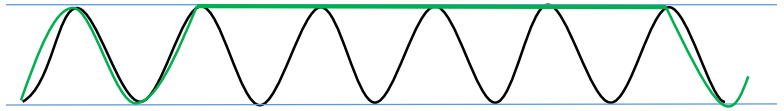
Bradypnoea – decreased frequency



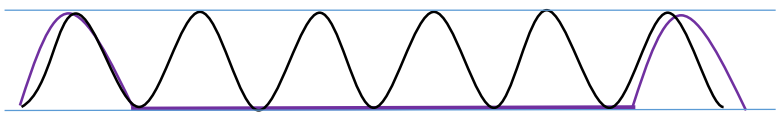
Tachypnoea – increased frequency



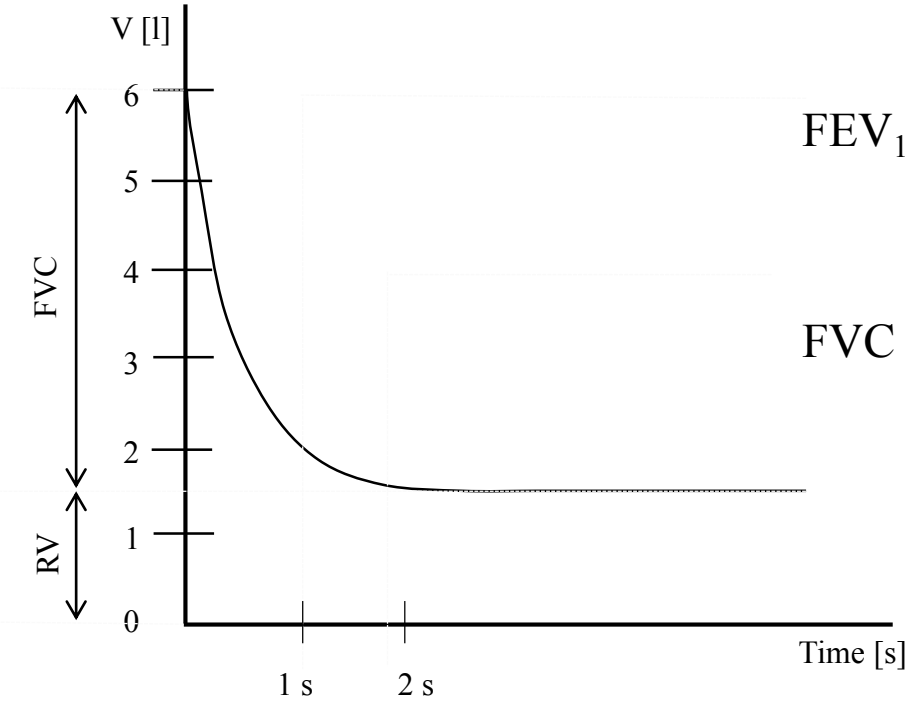
Apnoea in inspiration



Apnoea in expiration

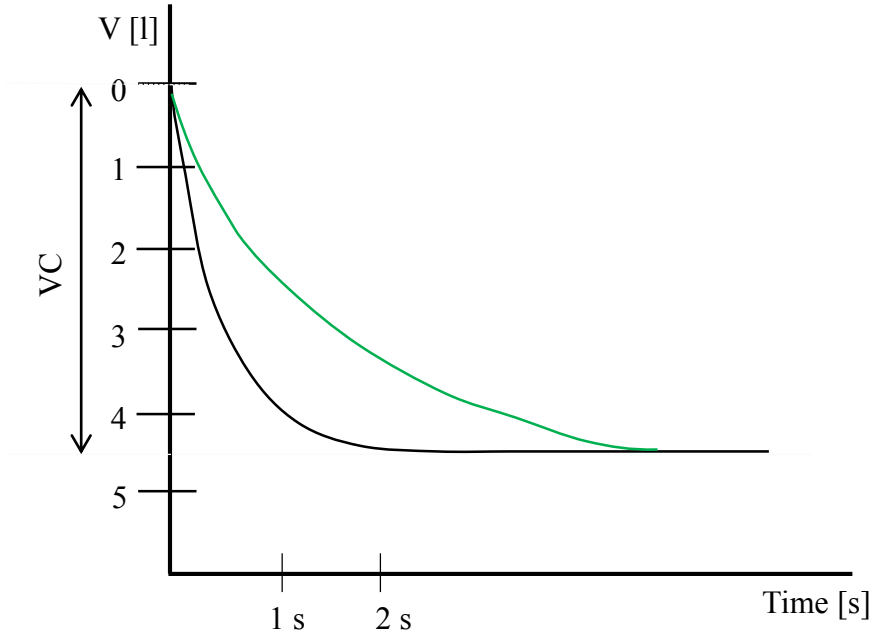


Recording of forced vital capacity



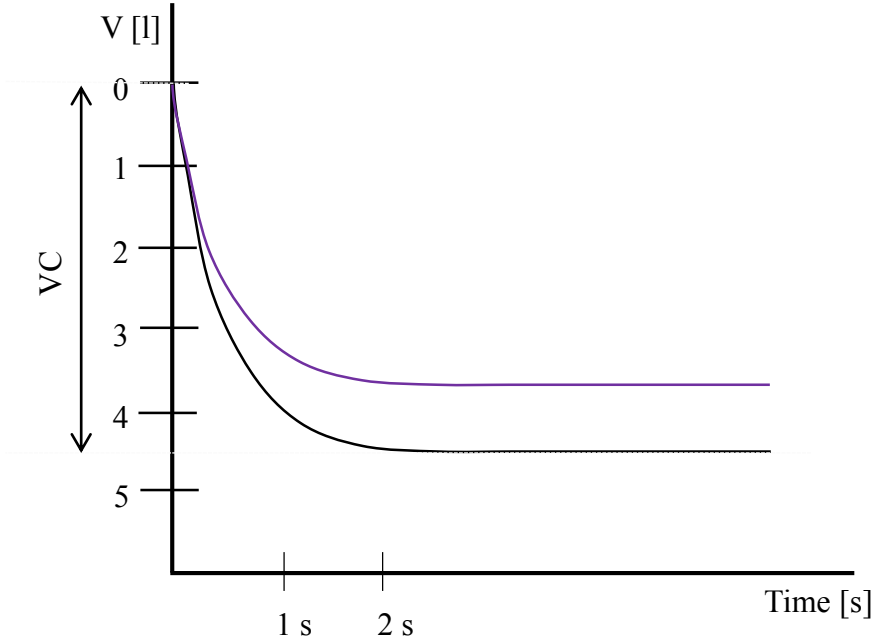
FEV_1 – amount of air expired after the maximal inspiration with the maximal effort in 1 s ($FEV_1 \geq 80\%$ od VC)

FVC – forced vital capacity



Obstructive diseases (↓FEV_1)

- Tracheal stenosis
- Asthma, bronchitis
- COPD
- Tumors in airways



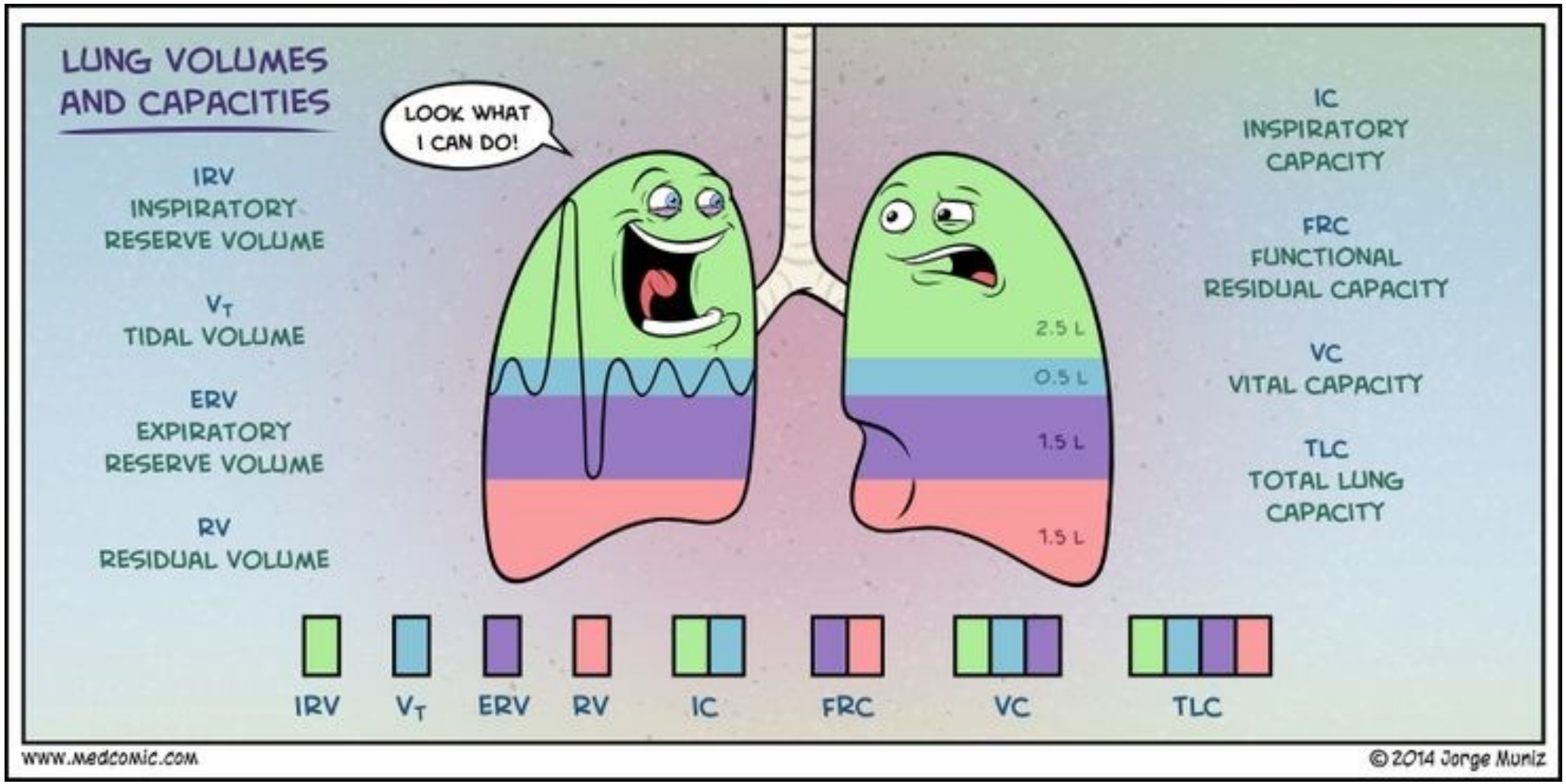
Restrictive diseases (↓FVC)

Pulmonary causes

- Pulmonary fibrosis
- Resection of lungs
- Pulmonary edema
- Pneumonia

Extrapulmonary causes

- Ascites
- Kyfoscoliosis
- Serious burn


LUNG VOLUMES AND CAPACITIES
IRV
INSPIRATORY RESERVE VOLUME
V_T
TIDAL VOLUME
ERV
EXPIRATORY RESERVE VOLUME
RV
RESIDUAL VOLUME
LOOK WHAT I CAN DO!
2.5 L
0.5 L
1.5 L
1.5 L
IC
INSPIRATORY CAPACITY
FRC
FUNCTIONAL RESIDUAL CAPACITY
VC
VITAL CAPACITY
TLC
TOTAL LUNG CAPACITY
IRV
V_T
ERV
RV
IC
FRC
VC
TLC
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