BI 121, Lab 6 Pulmonary Function Testing (PFT)

I. Attendance

II. Pulmonary Function Test/PFT
   A. What? Measure of static & dynamic lung function
   B. Why? Picture of lung health; absence, presence, progression of disease (eg asthma, emphysema); effectiveness of drugs
   C. How? Complete PFT with computer or dinosaur spirometer

III. Crucial Clinical Measures
   A. VC vital capacity = FVC forced vital capacity amount of air exhaled after maximal inhalation
   B. $\text{FEV}_{1.0}$ = How much of VC in 1 second? $[\text{FEV}_{1.0}/\text{FVC}] \times 100$
      If $\geq 75$-80% (0.75-0.80) $\rightarrow$ clinically normal
      If $\leq 40$-50% $\rightarrow$ obstructive disease (eg, asthma)

IV. Your Goals
   A. Estimate your VC & $\text{FEV}_{1.0}$ from Nomogram pp 6-6 or 6-7 LLM
   B. Measure these values accurately w/computer PFT LabChart
   C. Compare *estimated* with actually *assessed* values to determine whether you're within a healthy range.
Respirometer $\rightarrow$ measures complete Pulmonary Function Test or PFT!.

NB: Should be able to blow out $\geq 75 - 85\%$ of VC/FVC in 1 second! That's $\text{FEV}_{1.0}/\text{FVC} \geq 0.75 - 0.85$. If less, may indicate asthma or other lung disease.
PFT measures all lung volumes & capacities (sum of ≥ 2 volumes). Subject relaxes & breathes normally into and out of tank.
Sample PFT from Collins 13.5 L Respirometer

\[ P_B = 760 \text{ mm Hg} \quad T = 22^\circ C \]

CHART SPEED = 480 mm/min

- INSPIRATORY RESERVE VOLUME (IRV)
- TIDAL VOLUME (TV)
- EXPIRATORY RESERVE VOLUME (ERV)
- VITAL CAPACITY (VC)
- EXPIRATORY CAPACITY (IC)
- INTRINSIC LIENALT
Spirogram graphing complete PFT from computer simulation.

**TV** = Tidal volume (500 ml)
**IRV** = Inspiratory reserve volume (3,000 ml)
**IC** = Inspiratory capacity (3,500 ml)
**ERV** = Expiratory reserve volume (1,000 ml)
**RV** = Residual volume (1,200 ml)
**FRC** = Functional residual capacity (2,200 ml)
**VC** = Vital capacity (4,500 ml)
**TLC** = Total lung capacity (5,700 ml)
e.g., Monica height = 5'6" = 66", age = 21 yr

FEV1.0 = 3.35 L
FVC 3.82 L
FEV1.0/FVC = 3.35/3.82 = 0.8769 ≡ 87.7 %

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How to put together?
Viola!!
Sample subject setup
Q about lab?

Sample data!