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. $\text{FEV}_{1.0} = \text{How much of VC in 1 second?} \ [\text{FEV}_{1.0}/\text{FVC}] \times 100$
      If $\geq 75\text{-}80\% \ (0.75\text{-}0.80) \rightarrow$ clinically normal
      If $\leq 40\text{-}50\% \rightarrow$ obstructive disease (eg, asthma)

IV. **Your Goals**
   A. Estimate your VC & $\text{FEV}_{1.0}$ from Nomogram pp 6-5 or 6-6 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.
**NB:** Should be able to blow out ≥ 75 - 85% of VC/FVC in 1 second! That's FEV$_{1.0}$/FVC ≥ 0.75 – 0.85. If less, may indicate asthma or other lung disease.

**Respirometer** measures complete **Pulmonary Function Test** or **PFT**!
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)
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%

**SPIROMETRY IN NORMAL FEMALES PREDICTION NOMOGRAMS**

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

- e.g., Monica height = 5’6” = 66”, age = 21 yr
How to put together?
Viola!!
Sample subject setup
Sample data!

Q about lab?