V. DATA ANALYSIS

FAST TRACK Data Analysis

I. Enter the Review Saved Data mode.

- Note channel number (CH) designations:
  
  **Channel** Displays
  
  CH 1 Airflow (hidden)
  CH 2 Volume

- Note the measurement box settings:

  **Channel** Measurement
  
  CH 2 P-P
  CH 2 Max
  CH 2 Min
  CH 2 Delta

Detailed Explanation of Data Analysis Steps

If entering Review Saved Data mode from the Startup dialog or Lessons menu, make sure to choose the correct file.

All measurements will be performed on the Volume (CH 2) data. The Airflow (CH 1) data, used to calculate volume, is hidden to avoid confusion. It can be shown by "Alt + click" (Windows) or "Option + click" (Mac) the channel number box.

The measurement boxes are above the marker region in the data window. Each measurement has three sections: channel number, measurement type, and result. The first two sections are pull-down menus that are activated when you click them.

**Brief definition of measurements:**

- **P-P** (Peak-to-Peak): Subtracts the minimum value from the maximum value found in the selected area.
- **Max**: Displays the maximum value in the selected area.
- **Min**: Displays the minimum value in the selected area.
- **Delta**: Computes the difference in amplitude between the last point and the first point of the selected area.

The selected area is the area selected by the I-Beam tool (including endpoints).

**Useful tools for changing view:**

- **Display menu**: Autoscale Horizontal, Autoscale Waveforms, Zoom Back, Zoom Forward
- **Scroll Bars**: Time (Horizontal); Amplitude (Vertical)
- **Cursor Tools**: Zoom Tool
- **Buttons**: Overlap, Split, Show Grid, Hide Grid, -, +

**Hide/Show Channel**: "Alt + click" (Windows) or "Option + click" (Mac) the channel number box to toggle channel display.
2. Review the measurements described in the Introduction to identify the appropriate selected area for each.

3. Calculate the Predicted Vital Capacity, then measure VC and then compare the two.

4. Take two measures on the third TV cycle:
   a) Use the I-beam cursor to select the inhalation of cycle 3 and note the P-P result (Fig. 12.26). The selected area should be from the valley to the peak of the third cycle.

4. B

b) Use the I-beam cursor to select the exhalation of cycle 3 and note the P-P result (Fig. 12.27). The selected area should be from the peak to the valley of the third cycle.

  4. B

Data Analysis continues…
5. Repeat TV measurements, as in Step 4, but on cycle 4 data. Calculate average value of all four TV measurements.

6. Use the I-beam cursor and measurement tools to record the volumes and capacities required by the data report (defined in Fig. 12.24).

7. Answer the questions at the end of the Data Report.

8. Save or Print the data file.

9. Quit the program.

Note that the Delta measurement requires precise placement of the selected area.

An electronically editable Data Report is located in the journal (following the lesson summary,) or immediately following this Data Analysis section. Your instructor will recommend the preferred format for your lab.

END OF DATA ANALYSIS

END OF LESSON 12
Complete the Lesson 12 Data Report that follows.
PULMONARY FUNCTION I

Volumes and Capacities

DATA REPORT

Student's Name: ________________________________
Lab Section: ________________________________
Date: ________________________________

Subject Profile

Name: ________________________________ Height: _______ Gender: Male / Female
Age: ________________________________ Weight: _______

I. Data and Calculations

A. Vital Capacity

i) Predicted: Use the equation below to calculate your Predicted Vital Capacity: __________

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male V.C. = 0.052H - 0.022A - 3.60</td>
<td>V.C.</td>
</tr>
<tr>
<td>Female V.C. = 0.041H - 0.018A - 2.69</td>
<td>H</td>
</tr>
<tr>
<td>A</td>
<td>Age in years</td>
</tr>
</tbody>
</table>

ii) Observed: Use the P-P result to note Observed Vital Capacity:

\[ \text{Observed} = \frac{2}{\text{P-P}} \]

iii) Observed vs. Predicted

What is Subject's observed Vital Capacity to predicted Vital Capacity as a percentage?

\[ \text{Observed/Predicted VC} = \frac{\text{_________}}{\text{_________}} \times 100 = \frac{\text{_________}}{\text{_________}} \% \]

Note: Vital capacities are dependent on other factors besides age and height. Therefore, 80% of predicted values are still considered normal.
B. Volume & Capacity Measurements

Complete Table 12.2 with the requested measurement results and calculate results per the formulas provided.

<table>
<thead>
<tr>
<th>Table 12.2 Measurements</th>
<th>Title</th>
<th>Measurement Result</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal Volume TV</td>
<td>a = 2</td>
<td>P-P</td>
<td>Cycle 3 inhale:</td>
</tr>
<tr>
<td></td>
<td>b = 2</td>
<td>P-P</td>
<td>Cycle 3 exhale:</td>
</tr>
<tr>
<td></td>
<td>c = 2</td>
<td>P-P</td>
<td>Cycle 4 inhale:</td>
</tr>
<tr>
<td></td>
<td>d = 2</td>
<td>P-P</td>
<td>Cycle 4 exhale:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(a + b + c + d) / 4 =</td>
</tr>
<tr>
<td>Inspiratory Reserve Volume IRV</td>
<td>2</td>
<td>Delta</td>
<td></td>
</tr>
<tr>
<td>Expiratory Reserve Volume ERV</td>
<td>2</td>
<td>Delta</td>
<td></td>
</tr>
<tr>
<td>Residual Volume RV</td>
<td>2</td>
<td>Min</td>
<td>Default = 1 (Preference setting)</td>
</tr>
<tr>
<td>Inspiratory Capacity IC</td>
<td>2</td>
<td>Delta</td>
<td>TV + IRV =</td>
</tr>
<tr>
<td>Expiratory Capacity EC</td>
<td>2</td>
<td>Delta</td>
<td>TV + ERV =</td>
</tr>
<tr>
<td>Functional Residual Capacity FRC</td>
<td></td>
<td></td>
<td>ERV + RV =</td>
</tr>
<tr>
<td>Total Lung Capacity TLC</td>
<td>2</td>
<td>Max</td>
<td>IRV + TV + ERV + RV =</td>
</tr>
</tbody>
</table>

C. Observed vs. Predicted Volumes

Using data obtained for Table 12.2, compare Subject’s lung volumes with the average volumes presented in the Introduction.

<table>
<thead>
<tr>
<th>Table 12.3 Average Volumes vs. Measured Volumes</th>
<th>Volume Title</th>
<th>Average Volume</th>
<th>Measured Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal Volume TV</td>
<td>TV</td>
<td>Resting subject, normal breathing: TV is approximately 500 ml. During exercise: TV can be more than 3 liters</td>
<td>greater than equal to less than</td>
</tr>
<tr>
<td>Inspiratory Reserve Volume IRV</td>
<td>IRV</td>
<td>Resting IRV for young adults is males = approximately 3,300 ml females = approximately 1,900 ml</td>
<td>greater than equal to less than</td>
</tr>
<tr>
<td>Expiratory Reserve Volume ERV</td>
<td>ERV</td>
<td>Resting ERV for young adults is males = approximately 1,000 ml females = approximately 700 ml</td>
<td>greater than equal to less than</td>
</tr>
</tbody>
</table>
II. Questions

D. Why does predicted vital capacity vary with height?

__________________________________________________________

E. Explain how factors other than height might affect lung capacity.

__________________________________________________________

F. How would the volume measurements change if data were collected after vigorous exercise?

__________________________________________________________

G. What is the difference between volume measurements and capacities?

__________________________________________________________

H. Define Tidal Volume.

__________________________________________________________

I. Define Inspiratory Reserve Volume.

__________________________________________________________

J. Define Expiratory Reserve Volume.

__________________________________________________________

K. Define Residual Volume.

__________________________________________________________

L. Define Pulmonary Capacity.

__________________________________________________________

M. Name the Pulmonary Capacities.

__________________________________________________________

End of Lesson 12 Data Report