Fall 2019

Testing Differences in Vital Lung Capacity Between Long-Term Cigarette Smokers, Vapers, and Non-Smokers

Madison Rea
Makayla Davis
Tatyana Green
Megan Curry

Follow this and additional works at: https://digitalcommons.longwood.edu/rci_fall

Part of the Biology Commons
Introduction

• Tobacco use is the #1 leading cause of lung disease in the United States, killing 1.5 million people yearly.
• Cigarettes have been linked to major problems with the respiratory system.
• Studies show that aerosols in vapes cause dysregulation in lung function.
• Another study showed that the vaping industry is worth $2 billion as of 2013.

Specific Aim

Scientific Question

- Will there be a significant difference between the vital lung capacity of cigarette smokers, vapers, and non-smokers?

Hypothesis

- The non-smokers lung capacity and lung volume would be significantly higher relative to cigarette smokers and vapers.
- The lung capacity and lung volume for cigarette smokers and vapers will be relatively the same.

Methods

Gather subjects
Complete Questionnaire
Breathe normal for 5 breaths
Deep inhale and exhale
Biopac Student Lab to gather data

Results

Table 1. Data on 5 subjects that are non-smokers

<table>
<thead>
<tr>
<th>Age</th>
<th>Height</th>
<th>Gender</th>
<th>Weight</th>
<th>Duration</th>
<th>Active</th>
<th>TV</th>
<th>VC</th>
<th>TV/Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>160 cm</td>
<td>F</td>
<td>160 lb</td>
<td>6 months</td>
<td>No</td>
<td>0.8L</td>
<td>3.7L</td>
<td>0.457L</td>
</tr>
<tr>
<td>23</td>
<td>180 cm</td>
<td>M</td>
<td>210 lb</td>
<td>2 months</td>
<td>No</td>
<td>1.0L</td>
<td>4.2L</td>
<td>0.434L</td>
</tr>
</tbody>
</table>

Table 2. Data on 5 subjects that Smoke Cigarettes

<table>
<thead>
<tr>
<th>Age</th>
<th>Height</th>
<th>Gender</th>
<th>Weight</th>
<th>Duration</th>
<th>Active</th>
<th>TV</th>
<th>VC</th>
<th>TV/Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>185 cm</td>
<td>M</td>
<td>215 lb</td>
<td>3 months</td>
<td>No</td>
<td>0.8L</td>
<td>3.5L</td>
<td>0.432L</td>
</tr>
<tr>
<td>28</td>
<td>180 cm</td>
<td>M</td>
<td>180 lb</td>
<td>2 months</td>
<td>No</td>
<td>0.7L</td>
<td>2.8L</td>
<td>0.383L</td>
</tr>
<tr>
<td>48</td>
<td>183 cm</td>
<td>M</td>
<td>225 lb</td>
<td>3 months</td>
<td>No</td>
<td>0.7L</td>
<td>2.8L</td>
<td>0.383L</td>
</tr>
<tr>
<td>62</td>
<td>183 cm</td>
<td>M</td>
<td>210 lb</td>
<td>1 month</td>
<td>Yes</td>
<td>0.8L</td>
<td>3.0L</td>
<td>0.462L</td>
</tr>
<tr>
<td>61</td>
<td>178 cm</td>
<td>M</td>
<td>180 lb</td>
<td>1 month</td>
<td>Yes</td>
<td>0.8L</td>
<td>3.0L</td>
<td>0.462L</td>
</tr>
</tbody>
</table>

Table 3. Data on 5 subjects that Vape

<table>
<thead>
<tr>
<th>Age</th>
<th>Height</th>
<th>Gender</th>
<th>Weight</th>
<th>Duration</th>
<th>Active</th>
<th>TV</th>
<th>VC</th>
<th>TV/Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>175 cm</td>
<td>F</td>
<td>170 lb</td>
<td>6 months</td>
<td>No</td>
<td>0.8L</td>
<td>3.7L</td>
<td>0.457L</td>
</tr>
<tr>
<td>21</td>
<td>180 cm</td>
<td>M</td>
<td>210 lb</td>
<td>3 months</td>
<td>Yes</td>
<td>0.7L</td>
<td>2.8L</td>
<td>0.383L</td>
</tr>
<tr>
<td>23</td>
<td>173 cm</td>
<td>F</td>
<td>165 lb</td>
<td>6 months</td>
<td>Yes</td>
<td>0.8L</td>
<td>3.5L</td>
<td>0.432L</td>
</tr>
<tr>
<td>23</td>
<td>173 cm</td>
<td>M</td>
<td>210 lb</td>
<td>3 months</td>
<td>Yes</td>
<td>0.8L</td>
<td>3.5L</td>
<td>0.432L</td>
</tr>
<tr>
<td>23</td>
<td>175 cm</td>
<td>M</td>
<td>210 lb</td>
<td>3 months</td>
<td>Yes</td>
<td>0.8L</td>
<td>3.5L</td>
<td>0.432L</td>
</tr>
</tbody>
</table>

Discussion

Data is not mathematically significant

Shows clear trend that would likely lead to significant data if larger sample size

Found that control group subjects were taller than other groups

• Vaping may not be a “better” alternative to cigarettes

Importance

• Visually and scientifically show the damage that these tobacco products can have on lung capacity and lung volume
• Teenagers may rethink the idea that vaping is “better” and “not as bad” as smoking cigarettes
• One study showed that the higher the nicotine in a vape the more likely an adolescent user will start smoking cigarettes.

Potential Pitfalls

Sample consisted of only 15 subjects

Inconsistent testing area

Delay on IRB approval

Subjects only tested once

References


Acknowledgments

We would like to take this time to thank Dr. Ludwar and Dr. Holiday for their support and contributions to our study.