



## CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

<b>Name(s)</b> <p style="text-align: center;"><b>Rebecca D. Miller</b></p>	<b>Project Number</b>     <p style="text-align: right;">22285</p>						
<b>Project Title</b> <p style="text-align: center;"><b>What's Collecting in Your Lungs?</b></p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;"><b>Objectives/Goals</b></td> <td style="border: none; text-align: center;"><b>Abstract</b></td> </tr> <tr> <td style="border: none; vertical-align: top;"> <p>The objective of this project was to find whether first-hand or second-hand cigarette smoke has more tar and nicotine content as well as to compare filtered, non-filtered, and low tar cigarettes to determine which has the least amount of tar and nicotine residue that collects in peoples' lungs.</p> <p><b>Methods/Materials</b></p> <p>This experiment was tested by constructing two mechanical smokers, one for each smoke test and both measuring the tar and nicotine residue in the same way. These apparatuses artificially drew the residue from the end of the cigarette or from the smoke. For first-hand smoke testing, the cigarette butt was placed inside the rubber tubing and was directly inhaled. For second-hand smoke, the cigarette was placed inside a flask and the bulb pumped in the smoke collecting in the flask. For each piece of filter paper three cigarettes of the same type were used to make results easier to recognize. For both smoke tests, the pieces of filter paper were weighed on a scale and the weight of the filter paper was subtracted, then divided by three to find the result.</p> <p><b>Results</b></p> <p>These tests found that the amount of residue in second-hand smoke is greater than first-hand smoke for all three types of cigarettes. The comparison between the different types of cigarettes for first-hand smoke resulted with filtered cigarettes having the largest quantity of residue, then non-filtered, and low tar with the least amount. For second-hand smoke, filtered cigarettes had the least amount of residue, non-filtered had the second least, and low tar had the greatest amount.</p> <p><b>Conclusions/Discussion</b></p> <p>My test results of second-hand smoke having a larger amount of tar and nicotine residue than first-hand smoke may not be completely accurate because second-hand smoke contains both the smoke from the end of a burning cigarette and the smoke inhaled by the smoker, and then exhaled. The second part of second-hand smoke could not be tested but then again, this would only add to the amount of residue. Between filtered, non-filtered, and low tar cigarettes, low tar cigarettes have the least amount of residue from first-hand smoke but for second-hand smoke, low tar cigarettes have the greatest amount of residue.</p> <p>These results show that second-hand cigarette smoke has a worse affect on a human's lungs thp first-hand smoke does and may lead to the question of whether smokers have the right to introduce cigarette smoke to the environment.</p> </td> <td style="border: none; vertical-align: top;"> <p><b>Summary Statement</b></p> <p>My project tests whether first-hand or second-hand cigarette smoke leaves behind more tar and nicotine residue in a person's lungs, as well as a comparison between the tar residue in low tar, filtered, and non-filtered cigarettes.</p> </td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <p><b>Help Received</b></p> <p>Father helped cut plexi-glass for mechanical smoker; science teacher helped provide materials for part of the second-hand smoke mechanical smoker</p> </td> </tr> </table>		<b>Objectives/Goals</b>	<b>Abstract</b>	<p>The objective of this project was to find whether first-hand or second-hand cigarette smoke has more tar and nicotine content as well as to compare filtered, non-filtered, and low tar cigarettes to determine which has the least amount of tar and nicotine residue that collects in peoples' lungs.</p> <p><b>Methods/Materials</b></p> <p>This experiment was tested by constructing two mechanical smokers, one for each smoke test and both measuring the tar and nicotine residue in the same way. 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