



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> Catherine Soto	<b>Project Number</b> <b>J1531</b>
<b>Project Title</b> <b>How Does Living with a Smoker Affect Lung Functions in Children (Age 12-14) throughout the Four Seasons of the Year?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to determine how living with a smoker affects lung function in children throughout the four seasons of the year, in comparison to those who do not live with a smoker. I hypothesized that children exposed to ETS (Environmental Tobacco Smoke) in their homes would exhibit evidence of greater compromise in their lung functions (FVC and FEV1) when compared to students who do not live with a smoker.</p> <p><b>Methods/Materials</b> The experiment was conducted from June 2006 to March 2007, and I tested my participants during each of the four seasons. My study required 108 randomly selected middle school students, a medically certified spirometer, a digital scale, 2 yard sticks, and my log book. I created a survey that contained questions about exposure to environmental tobacco smoke, as well as other factors that might influence respiratory function, including: asthma, height, weight, gender and age. I entered the height, weight, age and gender of each student into the spirometer. This would allow the spirometer to calculate each student's expected lung function values. Then each participant would perform a series of exhalations into the spirometer until reproducibility was achieved, and I would print out and analyze their results.</p> <p><b>Results</b> According to my results, students who live with a smoker in their home experienced lung diagnoses of Mild Restriction to Very Severe Restriction from Summer through Spring. These students showed no sign of Normal Spirometry. Participants who do not live with a smoker experienced lung diagnoses that ranged from Normal Spirometry to Moderate Restriction, but diagnoses were predominantly Normal. Also, students exposed to ETS in their own homes exhibited experimental lung function values that were rarely close to their predicted values for either FVC (Forced Vital Capacity) or FEV1 (Forced Expiratory Volume in the 1ST Second). On the other hand, students who are not exposed to ETS in their homes displayed experimental lung function values that were very close to if not equal to their predicted values for both FVC and FEV1.</p> <p><b>Conclusions/Discussion</b> My results show that there was significant compromise in the lung functions of students who are exposed to ETS in their homes, and this compromise intensified during seasons with colder weather. Perhaps windows are closed during these seasons, and people stay indoors. These results support my hypothesis.</p>	
<b>Summary Statement</b> The effects of environmental tobacco smoke (in the home) on the lung functions of 12-14 year old children.	
<b>Help Received</b> Mr. Simonsen helped me edit my work and get me the supplies I needed.	