



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Charles O. Luke	Project Number 38550
Project Title Respiratory Impacts of Ultrafine Particulate in Preschools and Daycare Centers throughout Los Angeles County	
Abstract Objectives/Goals The objective of this study is to determine the correlation between distance from preschools to major highways and levels of ultrafine particulate matter in the surrounding air. Do these levels correlate to asthma rates in the tested communities. Asthma rates are high in Los Angeles, and air particulate is linked to reactive airway disorders with young children most vulnerable. Locations of preschools and daycare centers are often unregulated in the city, and low cost of land incentives the placement of these centers near highways. The study sought to determine if young children attending these preschools are inhaling high levels of ultrafine particulate matter at risk for developing asthma. Methods/Materials A TSI P-trak Ultrafine Particulate Scanner 8525 was employed to measure ultrafine particulate matter less than 2.5 micrometers in diameter, per cm ³ of air at 40 different preschools and daycare centers. This data was combined with rates gathered from area hospitals indicating specific numbers of emergency room visits for the targeted population of children. Analyzable charts were then constructed. Results Elevated levels of ultrafine particulate were found throughout Los Angeles, however levels were particularly elevated near major roads and highways, often well over the EPA standards for healthy air. Outcome suggests proximity to highways will increase air particulate levels dramatically. Asthma cases were determined to be prevalent throughout Los Angeles, but concentrated heavily in at risk communities where highways are clustered. Conclusions/Discussion The results, though inconsistent due to the prevalence of particulate and major roadways throughout the city, nevertheless suggests that asthma is linked to particulate levels. The data from this study leads one to the conclusion that reactive airway disorders are triggered or caused by elevated particulate levels and diesel exhaust. Other studies back up these conclusions. It is therefore likely that a preschooler's chance of developing asthma is significantly increased by attending a preschool near a highway.	
Summary Statement By testing ultrafine air particulate in the air surrounding preschools and daycare centers, I determined that high levels of particulate correlate with proximity to highways and elevated asthma rates.	
Help Received I used the P-Trak monitor and tested the air by myself, though my mother drove me to the locations around Los Angeles. I consulted with an industrial hygienist prior to commencing work in order to determine the feasibility of my study. I also consulted with the experts at Field Environmental in order to	