**Pulmonary Health Impacts of Golden Tobacco Flavored Vuse Alto Aerosols in Vulnerable Populations of Young mice.**

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**Rationale**: Vuse Alto is a popular fourth generation electronic nicotine delivery system (ENDS), also known as “e-cigarette”, that uses nicotine salt-based formulas to deliver high doses of nicotine. With over 2 million American youth using ENDS and the paucity of data regarding their health effects, serious public health concerns are being raised. Hence, the goal of this study was to investigate the pulmonary health effects, such as lung function, structure, and biochemical changes, induced by golden tobacco flavored Vuse aerosol exposures in juvenile mice.

**Methods**: 4-week-old male BALB/c mice were exposed to either air or golden tobacco flavored Vuse Alto aerosols *via* whole-body exposures for 1-hr/day, 5 days/week, for 3 months. At the end of the study, lung function testing was assessed and serum, broncho-alveolar lavage fluid (BALF) and lung tissue were collected. All Biological outcomes were expressed as mean +/- Standard error and were compared either an ANOVA or *Student-T* test for statistical analysis. A p-value of < 0.05 was considered significant.

**Results**: Nicotine exposure was confirmed by significantly elevated serum cotinine levels (>33.2 ng/mL) in exposed mice compared to controls (<2.1 ng/mL). Also, Vuse exposure significantly decreased the body weight of mice, suggesting an effect on weight gain. While Vuse exposure significantly increased the mean linear intercept values on the lung tissue, indicating enlarging airspaces, this exposure significantly decreased the inspiratory capacity of the lung, demonstrating impaired lung function. Additionally, significantly elevated levels of BALF 8-isoprostane, a biomarker of oxidative stress, were found in exposed mice (9.1 pg/mL) compared to controls (3.6 pg/mL).

**Conclusion**: Exposures to golden tobacco flavored Vuse Alto aerosols in young mice result in lung structural, functional, and biochemical alterations that negatively impacted health.

**Significance/Impact:** This study provides laboratory-based evidence for future regulation of Vuse Alto products that are often used by American youth.

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