

EXPLORING A NEW GENERATION OF ENVIRONMENTAL HEALTH OUTCOME INDICATORS FOR ASTHMA

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Background and Aims: In response to the call for a new generation of outcome-based environmental health indicators for asthma, we investigated the feasibility of combining existing environmental monitoring and state-wide health survey data (California Health Interview Survey (CHIS)) to develop a comprehensive set of health outcome indicators, such as asthma-related emergency department (ED) visits, absences from school/work, medication use, and frequency of asthma symptoms for those with asthma. The current U.S. EPA outcome-based indicators for asthma are limited to prevalence of asthma and asthma attack.

Methods: Linking 2003 CHIS respondents' residential address with ambient air pollution monitoring data within 5-miles, we assessed whether health outcome indicators (e.g., ED visits) are associated with annual average air pollution exposures for criteria air pollutants for CHIS 2003 adults using logistic regression. The analyses were adjusted for age, sex, race/ethnicity, and poverty level.

Results: Higher exposures to O₃, PM₁₀, and PM_{2.5} were associated with taking daily asthma medication (O₃: OR, 1.27, 95% CI, 1.04-1.43; PM₁₀: OR, 1.12, 95% CI, 1.01-1.24; PM_{2.5}: OR, 1.263, 95% CI, 1.045-1.52) and ED visits for asthma (O₃: OR, 1.19, 95% CI, 0.96-1.47; PM₁₀: OR, 1.20, 95% CI, 1.00-1.43; PM_{2.5}: OR, 1.22, 95% CI, 0.96-1.56). An association was also observed for missed work days due to asthma and PM₁₀, as well as frequent asthma symptoms (daily or weekly symptoms) and PM_{2.5}.

Conclusions: Taking daily asthma medication and ED visits due to asthma may be new health outcome indicators for ozone and particulate matter exposures. Further investigation is needed to see whether missed work days due to asthma or frequency of asthma symptoms could serve as useful indicators.