

Mechanistic Indicators of Childhood Asthma (MICA) Study

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As understanding of how to assess health risks resulting from exposures to individual environmental pollutants improves, environmental health scientists are turning attention toward characterizing relationships between multiple environmental factors and complex disease. The Mechanistic Indicators of Childhood Asthma (MICA) Study has been designed to incorporate state-of-the-art technologies to examine the physiological and environmental factors that interact to increase the risk of asthmatic responses. MICA is primarily a clinically-based observational children's study. Multiple measures of health status, asthma severity, environmental exposure, and gene expression have been collected in a case/control cohort of 200 children (aged 9-12 years). Environmental samples have also been collected with a focus on three broad classes of particulate-associated chemicals: VOCs, metals, and PAHs. We are applying advanced statistical and machine learning methods in combination with mechanistic information to evaluate and visualize the wide range of biomarker data collected in MICA. Using this approach we hope to: (1) evaluate utility of gene expression data collected from a children's cohort for understanding relationships between exposure, susceptibility, and early effects; (2) provide improved tools for interpreting results of large-scale biomonitoring in humans; and (3) advance a systems approach to evaluating the complex relationships between environmental factors and health outcomes.

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