Environmental Risks for Pediatric Asthma and Obesity: The Effects of Air Pollution in Ontario

Background:
The prevalence of both asthma and obesity has dramatically increased in pediatric populations over the last three decades. In addition, high levels of association between the two conditions suggests that the same causal factors may be responsible for the increasing rates in both pediatric asthma and obesity.

Objectives:
To examine the role of air pollution levels in Ontario on the simultaneous development of asthma and obesity in adolescents aged 12-18 years.

Methods:
National Pollution Release Inventory and local meteorological data were combined and modelled in Aermod to produce estimates of particulate matter concentration values for 2006 at the postal code centroid in Ontario. Exposure data was linked to 2007 and 2010 Canadian Community Health Survey outcome data through the corresponding individual postal code and census subdivision residence of each subject. Path analysis and multilevel modelling were used to analyze the association of interest at the individual- and group-level.

Results:
The risk of developing asthma and obesity simultaneously was higher in individual subjects and census subdivisions exposed to high levels of air pollution compared to those exposed to lower levels.

Conclusions:
Results indicate that air pollution is a plausible causal mechanism for the increasing rates of pediatric asthma and obesity. This provides evidence that can aid in the implementation of environmental strategies/policies focused on the reduction of air pollution. Specifically, the geographic regions with overall high air pollution levels, which also present high prevalence of asthma and obesity, should be prioritized and targeted for intervention to reduce emission levels.