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Early life exposure to air pollution and incidence of childhood asthma, allergic rhinitis and eczema

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This study found that exposure to total oxidants at birth increased the risk of developing asthma by 17% and eczema by 7%. Adverse impacts of exposure to air pollutants, particularly ozone and nitrogen dioxide, may have their origins in early life. <http://bit.ly/33PCIYN>

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ABSTRACT

Rationale: There is growing evidence that air pollution may contribute to the development of childhood asthma and other allergic diseases. In this follow-up of the Toronto Child Health Evaluation Questionnaire (T-CHEQ) study, we examined associations between early life exposures to air pollution and incidence of asthma, allergic rhinitis and eczema from birth through adolescence.

Methods: 1286 T-CHEQ participants were followed from birth until outcome (March 31, 2016) or loss to follow-up, with a mean of 17 years of follow-up. Concentrations of nitrogen dioxide (NO₂), ozone (O₃) and particulate matter with a 50% cut-off aerodynamic diameter of 2.5 µm (PM_{2.5}) from January 1, 1999 to December 31, 2012 were assigned to participants based on their postal codes at birth using ground observations, chemical/meteorological models, remote sensing and land-use regression models. Study outcomes included incidence of physician-diagnosed asthma, allergic rhinitis and eczema. Cox proportional hazard regression models were used to estimate hazard ratios per interquartile range of exposures and outcomes, adjusting for potential confounders.

Results: Hazard ratios of 1.17 (95% CI 1.05–1.31) for asthma and 1.07 (95% CI 0.99–1.15) for eczema were observed for total oxidants (O₃ and NO₂) at birth. No significant increase in risk was found for PM_{2.5}.

Conclusions: Exposures to oxidant air pollutants (O₃ and NO₂) but not PM_{2.5} were associated with an increased risk of incident asthma and eczema in children. This suggests that improving air quality may contribute to the prevention of asthma and other allergic disease in childhood and adolescence.