EXPOSURE TO AMBIENT NITROGEN OXIDES AND RESPIRATORY DISEASES IN CHILDREN BELOW FIVE YEARS

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Background and Aims: Acute lower respiratory illness causes more deaths in children below five years than any other disease and recent studies suggest a possible link between air pollution and respiratory illnesses. In this study, we investigated the association between ambient NOx with increased episodes of bronchitis and croup.
Methods: This longitudinal study was conducted in Teplice and Prachatice districts of the Czech Republic, between 1994 and 2003. Children were followed-up from birth to four and half years of age. Data were compiled from medical records at delivery and at follow-up, and from self-administered questionnaires from the same two time points. Ambient monitoring data for NOx was used as exposure averaged over five periods ranging from three – 45 days prior to an episode. To quantify the association between exposure and outcome, while accounting for the correlation between repeated measures we conducted logistic regression analysis using generalized estimating equations. Selection of covariates was facilitated by using a directed acyclic graph.
Results: The adjusted rate ratio (RR) for bronchitis in children <two year old associated with inter-quartile range increase (approximately 35 $\mu g/m^3$) in the 30-day average NOx was 1.31 (95% CI: 1.07, 1.61) and the same for two to 4.5 year olds was 1.23 (95% CI: 1.01, 1.49). Interestingly, the association between bronchitis and NOx increased with child's age in the <two years group. The RR for bronchitis associated with 30-day average NOx exposure in children ≤3 months was 0.61 (95% CI: 0.35, 1.07), >3 to ≤6 months, 1.17 (95% CI: 0.77, 1.79), >6 to ≤12 months, 1.32 (95% CI: 1.02, 1.71) and >12 months, 1.48 (95% CI: 1.11, 1.97). The association between NOx and croup was slightly smaller than bronchitis.
Conclusions: The evidence, if causal, can be of serious public health concern because the current regulatory air standards are much higher than the levels demonstrated to be associated with increased rates of respiratory illnesses in preschool children in this study.