

AIR POLLUTION AND LUNG HEALTH IN AUSTRALIAN SCHOOL CHILDREN: A PANEL STUDY

Bin Jalaludin, *Centre for Research, Evidence Management and Surveillance, Australia*

Gail Williams, *University of Queensland, Australia*

Guy Marks, *Woolcock Institute for Medical Research, Australia*

Lynette Denison, *EPA Victoria, Australia*

Background and Aims: We aimed to quantify the effect of ambient air pollution on lung function in a national sample of Australian school-children in a panel study.

Methods: We recruited children with asthma for the panel study from the cross-sectional component of the Australian Children's Health and Air pollution Study. Children were from 51 primary schools that were within 2.5km of 27 air monitoring sites in six cities. Children recorded lung function, asthma symptoms and asthma medication used twice a day in their asthma diary for a six week period. We used generalised linear models to examine associations between air pollutants and lung function and symptoms. Multi-pollutant models were examined. Mean NO₂ levels were 18.7ppb 1-hr average (range 0–69ppb) and 7.9ppb 24-hr average (0–30.8ppb).

Results: Two hundred and seventy children participated in the panel study (girls: 46%; mean age: 10 (SD=1.2) years. About 94% of the children kept a diary for at least four weeks. The most consistent results were seen with NO₂. In single pollutant models there were consistent relationships between NO₂ and night symptoms (cough, wheeze and shortness of breath) and effects were greater for NO₂ 24-hr than for NO₂ 1-hr. There were also more consistent relationships between NO₂ and day time symptoms and effects were greater for NO₂ 24-hr than for NO₂ 1-hr. Children were also more likely to use more reliever medications for asthma on days with higher NO₂ concentrations. In two pollutant models with ozone, the effects of NO₂ on lung function were increased, effects on symptoms decreased slightly and effects on daytime medication use were no longer significant.

Conclusions: In this panel of Australian school children, effects of air pollution on lung health were most consistently observed with NO₂.