

Outdoor air pollution and near fatal/fatal asthma attacks in children. A systematic review.

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Abstract

Background: Globally, observational studies have demonstrated an association between high levels of air pollution and asthma attacks in children. It remains unclear whether and to what extent exposure may be associated with increased near fatal and fatal attacks. **Objective:** To systematically review the evidence for an association between ambient outdoor air pollution and fatal and/or near fatal asthma (NFA). **Methods:** Following Cochrane methodology, we searched MEDLINE, EMBASE, Web of Science, Scopus and Open Grey electronic databases for studies reporting the association of fatal/NFA and air pollution (Particulate Matter (PM), sulphur dioxide, nitrogen dioxide, black carbon and ozone) in children. NFA was defined as requiring intensive care (ICU) management. **Results:** Two reviewers independently screened 1,358 papers. 276 studies identified asthma attacks related to air pollution, 272 did not meet inclusion criteria after full text review. Four observational studies described fatal/NFA, of which 3 addressed NFA. PM_{2.5} and ozone (22ppb) were associated with NFA in one study (RR 1.26 CI (1.10-1.44)). PM₁₀ was associated with ICU admission in the context of thunderstorm asthma. Elemental carbon was associated equally with NFA that did not require an ICU admission (p=0.67). Studies of fatal asthma including children did not demarcate age within analysis. **Conclusions:** Ozone and PM_{2.5} have been associated with NFA in children but synthesis is limited by the paucity of studies and methodological heterogeneity. Poor reporting of severities of asthma attack does not enable assessment of whether outdoor air pollution is associated with an increased number of NFA and fatal attacks in children.

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