



To: Transport Planners

From: Adrian Davis

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Subject: School Travel Toolkit: No. 4 Traffic-related air pollution and asthma in children

Top line: Research has found a possible link between traffic-related air pollution outside people's homes and the onset of asthma in children during the first eight years of life. Higher levels of nitrogen dioxide, PM_{2.5} and soot (generated by greater traffic volumes) were more likely to be recorded at the homes of those children who developed asthma and asthma symptoms.

Exposure to air pollution can exacerbate existing asthma but its role in the development of childhood asthma is less clear. The level of asthma symptoms appears to change rapidly during childhood, so it is important to study them over a period of time. A Dutch eight-year study was unique in its length and collection of annual data on the health of children.¹ Over 3800 children were studied for the full eight years, from birth. Parents completed annual questionnaires on their child's respiratory health, eczema. Sensitivity to allergens was measured at age 8 years. This information was then related to estimated air pollution levels, in terms of nitrogen dioxide, PM_{2.5} and soot, at the birth address of each participant.

The total cases of asthma-related symptoms within the population decreased with age. The number of new cases of asthma was highest in the first year of life (6 per cent) and was lower thereafter (between 1 and 2 per cent). The levels of all three traffic pollutants appeared to be linked to the number of new cases of asthma and total cases of asthma in children from birth until the age of 8 years. This indicated that in those areas with greater traffic pollution there is likely to be a greater number of total cases of asthma and new cases of asthma. The association between air pollution levels and the children's sensitivity to allergens was less clear. No link was found between air pollution levels and eczema.

The researchers highlighted some limitations of the study. For example, asthma was identified by parental reports of a doctor's diagnosis rather than a direct medical diagnosis. Also, the children's actual exposure may be different from the exposure at their home due to exposure to pollution at other locations, such as schools and day-care centres, where they regularly spend time. Although the study provided insight into the relationship between pollution and asthma over time, there is still very little known about the relevance of the timing of exposure and whether early life exposure has a greater impact than exposure later in life.

The research found that effects of pollution on health were stronger in those who had remained at their birth address compared to those who had moved, which may indicate that the pollution continues to influence health later on in life. Another important issue is to identify which pollutants are responsible for which effects. In this study the levels of pollutants were so strongly related that it was not possible to separate out their individual effects. This study helps to enhance understanding from previous cross-sectional studies which have reported associations between motor traffic volume, pollution, and childhood asthma.

¹ Gehring, U., Wijga, A.H., Brauer, M. *et al.* 2010 Traffic-related Air Pollution and the Development of Asthma and Allergies during the First 8 Years of Life. *American Journal of Respiratory and Critical Care Medicine*, 181: 596-603.