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No. 10 Proximity to emissions for children: School location

Top Line: New schools should be located at least 400m away from main traffic arteries.

Providing a healthy school environment is a priority for child health. There is evidence to support for the hypothesis that living close to heavily trafficked roadways is detrimental to cardiovascular health in children.[1] As a more extreme example of exposure, concentrations of air pollutants in and outside schools near motorways would seem to be linked. They are significantly associated through distance, traffic density and composition, and percentage of time downwind.[2] And studies have showed that traffic-related and other pollutants around primary school areas are associated with increased risks of allergic diseases among primary school students.[3]

Air pollution affects children exposed even pre-birth. Traffic-related air pollution in the early-life environment, as exemplified by residential ambient nitrogen dioxide (NO_2) exposure, both prenatal and during childhood, may increase the risk for chronic diseases in adulthood.[4] Extensive studies showed associations between ambient air pollution and adverse health outcomes, including premature mortality and cardiovascular and respiratory disease, both with short-term and chronic exposure. The biological mechanisms by which air pollutants may cause adverse health outcomes are not completely understood, but oxidative stress and inflammation are thought to be of importance.

Traffic-related air pollutants are elevated within approximately 100–500 metres of major roads. Based on research addressing traffic pollution and proximity of schools to main roads in London researchers suggest that new schools should be located at least 400 m away from main traffic arteries.[5] Measurements showed that levels of pollution in schools located in immediate proximity to high traffic roads are significantly higher than the background levels measured in schools in background locations, and that increase can be attributed to primary NO_2 from traffic.

A number of other strategies have been proposed to reduce children's exposure to traffic-related pollutants in the school environment. These include mandatory setbacks of schools from roadways; increased filtration/filtration maintenance; the use of sound walls, trees or other vegetation as barriers; and modified building design.

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[1] Armijos, R. et al, 2015. Residential Exposure to Urban Traffic Is Associated with Increased Carotid Intima-Media Thickness in Children, *Journal of Environmental Public Health*, doi: 10.1155/2015/713540

[2] Janssen, N., et al, 2001. Assessment of exposure to traffic related air pollution of children attending schools near motorways, *Atmospheric Environment*, 35(22): 3875-3884.

[3] Kim, H, et al, 2016 Near-Road Exposure and Impact of Air Pollution on Allergic Diseases in Elementary School Children: A Cross-Sectional Study, *Yonsei Medical Journal*, 5(73): 698-713

[4] Clemente, D. et al, 2019. Prenatal and Childhood Traffic-Related Air Pollution Exposure and Telomere Length in European Children: The HELIX Project, *Environmental Health Perspectives*, 127(8) DOI:10.1289/EHP4148

[5] Guerriero, C., et al, 2016. The economic benefits of reducing the levels of nitrogen dioxide (NO_2) near primary schools: The case of London, *Journal of Environmental Management*, 181: 615-622.