

# IMPACT ON CHILDHOOD RESPIRATORY HEALTH BY RESIDENTIAL EXPOSURE TO HIGHWAY TRAFFIC EXHAUST IN AN ALPINE VALLEY IN SWITZERLAND

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**Background and Aims:** Little is known about residential exposure to air pollution from trans-alpine highway traffic and its impact on respiratory health. Our previous questionnaire study showed significant associations between respiratory symptoms and highway exposure in adults and children. The current pediatric asthma panel study is focusing on the short-term relationship between residential air pollution exposures and respiratory health outcomes.

**Methods:** From November 2007 to June 2009 13 children (ages 7–13) with asthma participated in monthly health monitoring including measurements of exhaled NO (eNO) and oxidative stress markers in exhaled breath condensate (eBC) as well as outdoor and indoor air pollution monitoring. Asthma symptoms, medication use, allergies, exposure to tobacco smoke, and a time-activity diary of the child for the day before the health monitoring were recorded. Measurements of NO<sub>2</sub> at 13 locations in the community and PM<sub>10</sub> at two fixed and four mobile locations were used to model the home outdoor exposures. Linear mixed regression models are used to assess the association between levels of eNO and eBC markers and modeled traffic air pollution exposures. In addition different source contributions (e.g. diesel trucks, gasoline cars, biomass burning, etc.) to PM<sub>10</sub> are quantified by source apportionment methods enabling assessment of their association with respiratory health.

**Results:** Associations between eNO and pollutants were analyzed for same day and different lag-day measurements. Preliminary results showed an increase of eNO levels per interquartile range of pollutant of 4% (CI: -1.7, 9.9) for elemental carbon, 2.4% (CI: -3.1, 8.3) for NO<sub>2</sub> and 1.7% (CI: -2.8, 6.4) for PM<sub>10</sub> at lag1 day. Analysis between the respiratory health markers and source apportioned PM<sub>10</sub> results is currently underway.

**Conclusions:** Our first results demonstrate that air pollution from the trans-Alpine highway traffic is likely a significant risk factor for adverse respiratory effects in school children.