

### S3 - The Health Effects of Traffic-related Air Pollution in Hong Kong School Children

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**Introduction and Project Objectives:** Traffic exhaust is a principal source of ambient air pollution in urban areas. There are increasing concerns in recent years about the adverse health effects of traffic-related air pollution, especially in schoolchildren. However, there is little information on this topic in Hong Kong. We therefore conducted a cross-sectional study to investigate the impact of all traffic exhaust on air pollution in the school environment and its health effects on the students.

**Methods:** This was a cross-sectional study design. We selected the primary schools based on their nearby roads and traffic densities. We conducted air quality assessments at the school environment and on-roads surrounding the schools. We also recruited 2,319 primary students (aged between 7 and 14 years old) and each of them received a health survey including spirometry testing and anthropometric measurements. Their parents/guardians were also required to complete a self-administered questionnaire that collected information about respiratory symptoms/diseases. The major health outcomes in the present study were lung function parameters, rhinitis and respiratory diseases. The lung function parameters included the forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), peak expiratory flow (PEF), and maximum mid-expiratory flow (MMEF). Mix linear regression and logistic regression analyses were used to assess the relationships between health outcomes and the school environment air pollution as well as the traffic counts.

**Results:** The correlations between on-road air pollutions/traffic counts and the air pollution at school environment were weak with correlation coefficients ranged from 0.14 to 0.53. Generally higher levels of air pollution/traffic count were associated with lower lung function parameters. Among the four lung function parameters, MMEF was the most sensitive. Lower level of MMEF was associated with higher PM2.5 ( $\beta$  for an interquartile-range [IQR]: 61.8, 95% confidence interval [CI]: 32.3-92.7), Black Carbon (BC) ( $\beta$  for an IQR: 53.7, 95% CI: 11.5-106.1), and total traffic count ( $\beta$  for an IQR: 26.3, 95% CI: 11.8-60.1). Total traffic count was also associated with rhinitis (OR for an IQR: 1.48; 95% CI: 1.03-2.16). There were no significant associations observed for diesel vehicles and health outcomes in this study.

**Conclusions:** Higher level of air pollution at school environment was associated with poorer respiratory health in primary school children. Our study also suggests that total traffic surrounding school was associated with poorer respiratory health (i.e. lower MMEF and higher prevalence of rhinitis) in the students.

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