

G160 ASSOCIATION BETWEEN EXTERNAL AND INTERNAL DOSE OF DIESEL SOOT (BLACK CARBON) IN HEALTHY SCHOOLCHILDREN: A PILOT STUDY

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Aims Exposure to diesel soot (black carbon, BC) is linked to adverse health in children. A cross-sectional study reported that BC in airway macrophages (AM BC), a marker of inhaled dose of diesel soot, is associated with decreased lung function in healthy children [1]. These data are compatible with the reduction in growth of lung function associated with long-term exposure to elemental carbon reported in an 8 year epidemiological study of schoolchildren [2]. To date, the determinants of AM BC are unknown. This is an important evidence gap since it is unclear whether policy-makers should target background BC, or peaks of freshly generated BC from roads. Using a newly developed portable monitor for BC, we sought to determine whether peaks in BC exposure are associated with airway macrophage black carbon (AM BC) in healthy schoolchildren.

Methods Sputum inductions were carried out at schools as previously described [1]. Following processing, mean AM BC (μm^2) for 50 randomly selected AM was calculated using Image J software.

Personal exposure to BC was measured by a portable aethalometer (MicroAeth AE51, Magee Scientific). This monitor continuously

samples BC in the air and data is downloaded after 24 h using the microAethCOM PC-based software (Fig 1). The number of peaks of BC above 10000 ng/300 sec was determined for each child by inspection of the 24 h plot.

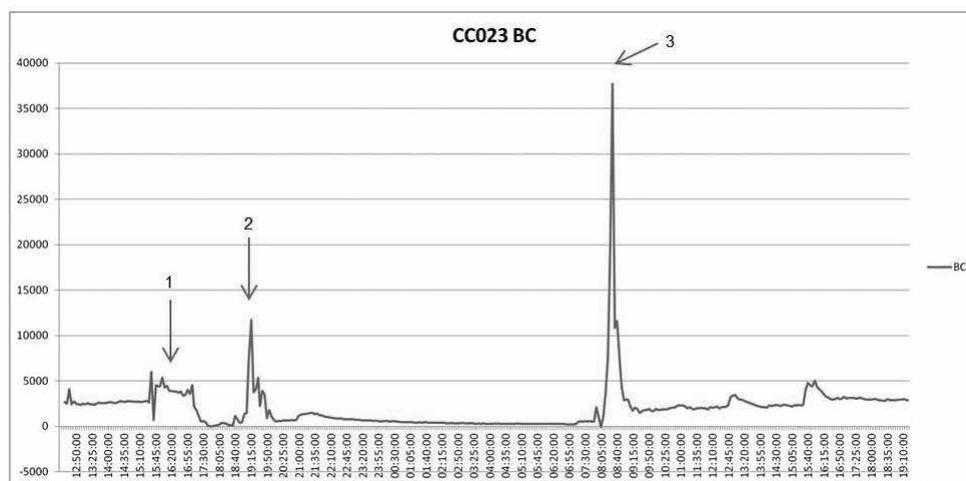
Results Twenty three children underwent sputum inductions. In the 15 children (65%) who produced sufficient AM for analysis, the median AM BC was 0.26278 μm^2 (interquartile range (IQR) of 0.16164 to 0.42842 μm^2). Personal 24 hour BC data was obtained in 13/15 children. The median BC exposure was 783758 ng (IQR: 336583.5 to 1321364.5 ng). Exposure peaks were caused by the school journey and cooking.

No significant correlation was found between the number of peaks of carbon exposure above 10000 ng/300 sec and average AM BC (μm^2) (Fig 2). However the positive association ($r = 0.40$, Pearson coefficient) suggests that this pilot study may be underpowered.

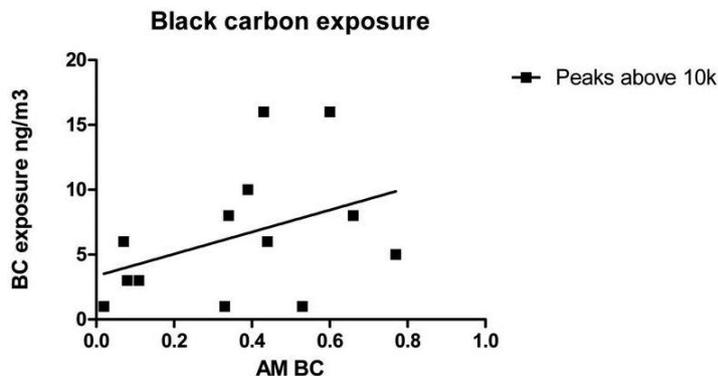
Conclusion Linking external and inhaled dose of BC is feasible in schoolchildren, and may provide important insights into the determinants of inhaled dose of BC.

REFERENCES

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Abstract G160 Figure 1 Example 24 hour aethalometer trace. Peaks are associated with daily commute (1 and 3) and cooking (2).



Abstract G160 Figure 2 Scatter graph showing AM BC vs. number of BC exposure peaks above 10000 ng/300 sec. The correlation coefficient for the number of peaks above 10000 ng/300 sec against AM BC ($r = 0.4028$, $n = 13$, $p = 0.1724$) shows a non-significant positive correlation.