

Health effects of ambient diesel exhaust: 'real-world' studies in London

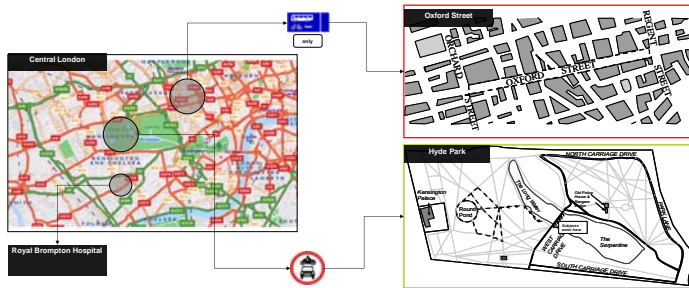
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Background to study 1* (N Engl J Med 2007;357:2348-58.)

Epidemiological evidence suggests a link between respiratory morbidity and urban fine particles, many of which are produced by diesel-powered vehicles. Supporting evidence is largely confined to 'chamber' and toxicological studies; extrapolation of their findings to the 'real world' is uncertain. We studied the health effects of diesel exhaust in asthmatic patients exposed within a 'natural exposure chamber'.

* funding assistance from HEI

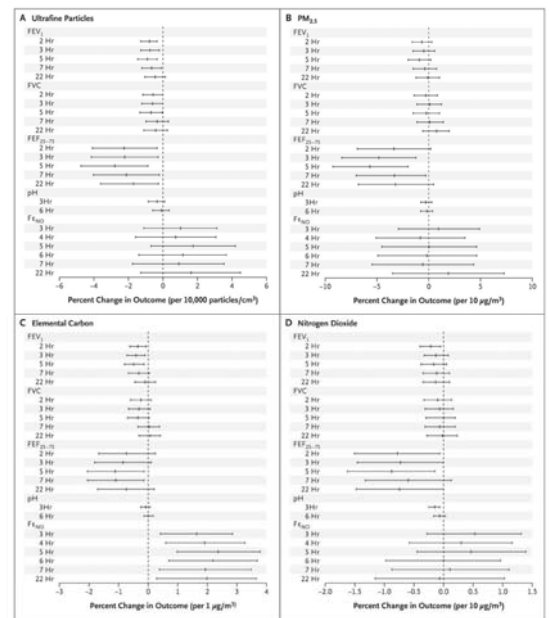
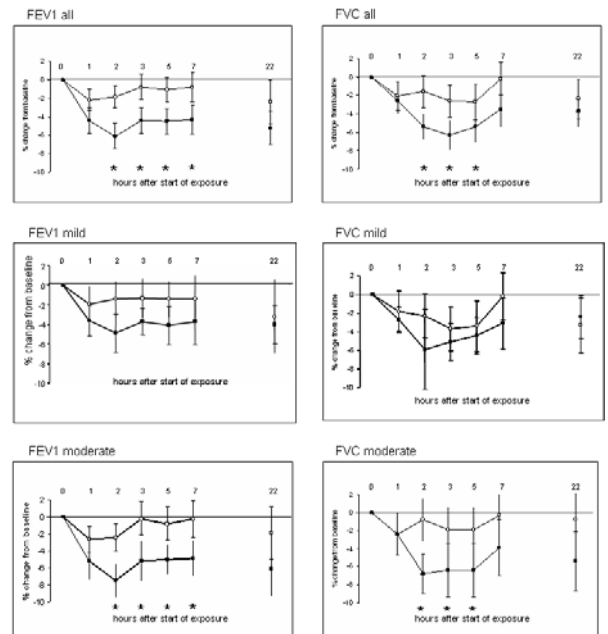
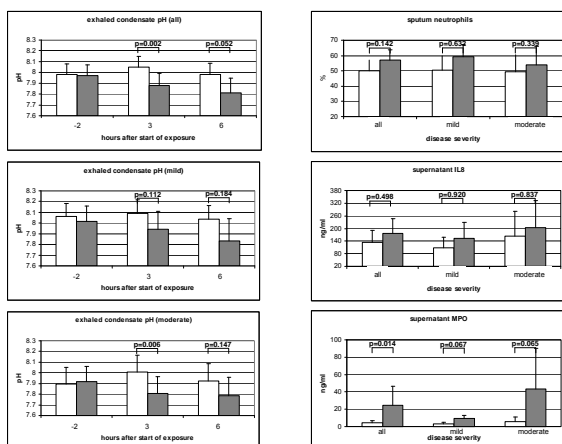
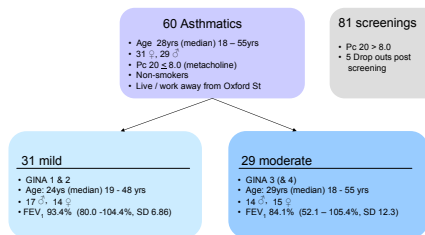


Pollutant	Hyde Park	Oxford Street
Ultrafines (pt/cc)	19459	66627
PM _{2.5} (µg/m ³)	16.9	32.7
El. carbon (µg/m ³)	1.7	8.1
NO ₂ (µg/m ³)	36.1	143.0
CO (mg/m ³)	0.97	1.26
Temperature (F)	48.5	50.8
RH (%)	71.4	65.4

Methods

On separate occasions non-smoking adult asthmatics were exposed, for 2 hours, in Oxford Street, London (where only pedestrians, diesel powered buses and taxicabs are permitted) or Hyde Park, a large, nearby open park mostly free of vehicles. We measured PM_{2.5}, elemental carbon, CO, NO₂ and ultrafine particles during each session. Lung function, oxidative stress and inflammatory markers, and symptoms were monitored during exposures and for 24 hours afterwards.

Study population



Conclusion

Short exposures to ambient 'urban' diesel exhaust induce bronchial inflammation and a reduction in lung function in people with asthma. The changes are related to specific combustion pollutants in the environment, specifically UFP, EC and to a lesser extent NO₂ and PM_{2.5}.

Further questions:

1. in patients with asthma does 'pre-treatment' with a high dose of ICS ameliorate the inflammatory response? (application under review by Asthma UK)
2. are there similar inflammatory effects in normal subjects and in those with COPD or IHD (applications to NIHR and BHF)