To:	City Development
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Subject:	Essential Evidence on a page: No. 27: Air pollution

Top line: Road transport is the chief source of the emissions responsible for respiratory related deaths in England. Reducing particulate emissions from motor vehicles could significantly reduce the number of such deaths.

A large body of evidence indicates that particulate air pollution has a detrimental effect on human health. Fine particles (those less than 2.5 μm in diameter, PM2.5) have a strong impact on public health, and both their acute and chronic effects have been described. Studies also show that improvements in air quality lead to reductions in mortality and morbidity. European policies on ambient air quality— namely, the adoption of standards for fine particulate matter (PM2.5), have generated a broad debate about choosing the air quality standards that can best protect public health. Despite effective abatement policies in the past, substantial investments have to be put into further emission reductions to decrease the remaining health risks. Regarding health impact, particulate matter (PM) air pollution is a major environmental factor affecting human health and there is no safe level of exposure—that is, a threshold has not been identified.[1]

Meeting World Health Organisation air-quality standards would substantially reduce mortality in European cities. It has been estimated the number of premature deaths from all causes that might be prevented by reducing PM2.5 levels in 26 European cities: reducing annual mean levels of PM2.5 to 10 mg/m3 could prevent seven times more premature deaths than a reduction to 25 mg/m3; the decrease would be fourfold with a reduction to 15 mg/m3, and only twofold with a reduction to 20 mg/m3.[2]

UK research has set out to measure geographical co-relationships between disease-specific standardised mortality ratios (SMR)[3] and different atmospheric emissions in 352 English local authorities.[4] It has sought to link specific exposures with specific causes of death and to identify responsible polluting sources, and to see whether long-term moderate exposures have the same lethal effects as short-term high-pollution (ie, smog) episodes. SMR for one group of diseases (including upper alimentary and respiratory cancers, ischaemic heart disease, peptic ulcer, pneumonia) were related to a range of combustion emissions and to multiple social deprivation, cigarette smoking, and binge drinking.

High mortality rates were observed in areas with elevated ambient pollution levels. Road transport was the chief source of the emissions responsible. There was a clear relationship between traffic effluents and an excess of deaths certified as caused by pneumonia.

[1] WHO Working Group. Health aspects of air pollution with particulate matter, ozone and nitrogen dioxide. Report from WHO Working Group Meeting Bonn, 13–15 January 2003. Copenhagen: WHO Regional Office for Europe, 2003.
[2] Ballester, F., Medina, S., Boldo, E., Goodman, P., Neuberger, M., Iñiguez, C., Künzli, N. and on behalf of the Apheis network, 2008 Reducing ambient levels of fine particulates could substantially improve health: a mortality impact assessment for 26 European cities, *Journal of Epidemiology and Community Health*, 62: 98-105.
[3] The SMR is a method of comparing mortality levels in different years, or for different sub-populations in the same year, while taking account of differences in population structure. The ratio is of (observed) to (expected) deaths, multiplied conventionally by 100.
[4] Knox, E. 2008 Atmospheric pollution and mortalities in English local authority areas, *Journal of Epidemiology and Community Health*, 62: 442-447.