

Science for Environment Policy

Air pollution linked to increased incidents of stroke

Exposure to gaseous and particulate matter pollution have been found to increase the immediate risk of stroke, a review of medical studies has shown. The increased risk is most pronounced the same day as the exposure, and for fine particles the increased risk persists over several days. The authors hope information from this study will help policymakers to develop suitable controls to limit the risks posed by these harmful air pollutants.

Stroke is the second most common cause of death worldwide, and is also a leading cause of disability. It can be brought on by a variety of factors, including smoking, high blood pressure, and obesity. Although previous studies have made links between long-term exposure to air pollution and stroke, this study provides new insight into the impacts of the short-term effects of [air pollution](#).

The researchers conducted a comprehensive analysis of 94 studies from a total of 28 different countries that identified air pollution levels up to seven days before fatal or hospitalising incidents of stroke. Pollutants examined included carbon monoxide, sulphur dioxide and nitrogen dioxide, and particulate matter (fine particles less than 2.5 micrometres in diameter (PM_{2.5}), and particles less than 10 micrometres across (PM₁₀)). All of these pollutants are commonly found in combustion-related emissions such as from vehicles and large power plants.

Carbon monoxide, sulphur dioxide and nitrogen dioxide were found to increase the risk of stroke significantly on the day of maximum exposure to air pollution, with risk decreasing on following days, demonstrating a clear short-term association. However, exposure to PM_{2.5} was deemed to be the most dangerous, creating a heightened risk of stroke up until at least two days after exposure. These particles are small enough to diffuse from the lungs into the bloodstream, where they can trigger cardiovascular problems and other issues.

Studies were sourced from all over the world, but those that originated in low to middle income countries showed the highest levels of air pollution with the strongest links between pollution and incidents of stroke. However, the researchers noted that there were fewer studies from these countries compared to high income countries, perhaps due to reduced funding. This is cause for concern, as it is currently low to middle income countries which suffer most from the adverse health effects of air pollution.

The authors acknowledged that it was difficult to achieve full consistency in the measurements of exposure to air pollution, because of the variety of different data types in the studies. They therefore added the criterion that all the studies they selected made sufficiently frequent measurements of air quality, and took precautions in their statistical analysis to ensure their results were accurate and bias-free.

The EU [Air Quality Directive 2008/50/EC](#) seeks to minimise all atmospheric pollution, but it pays specific attention to the control of the pollutants with health damaging effect. Out of all air pollutants, particulate matter poses the greatest threat to human health by increased mortality and also aggravating conditions such as asthma, cancer and stroke. This study can help policymakers to develop the right controls for these harmful substances, the authors say.



18 June 2015
Issue 417

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Source: Shah, A.S.V., Lee, K.K., McAllister, D.A., Hunter, A., Nair, H., Whiteley, W., Langrish, J.P., Newby, D.E. & Mills, N.L. (2015). Short term exposure to air pollution and stroke: systematic review and meta-analysis. *British Medical Journal* 2015; 350: h1295. DOI 10.1136/bmj.h1295

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To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.