

# Science for Environment Policy

## Further sulphur dioxide reductions would lead to greater health benefits

**EU air pollution legislation** to reduce sulphur dioxide (SO<sub>2</sub>) has effectively reduced rates of premature deaths, new research suggests. Moreover, additional reductions would lead to even further public health benefits, the researchers say.

**In the 1990s**, the European Commission drafted a number of policies aimed at reducing levels of [air pollutants](#), including SO<sub>2</sub>: a [chemical](#) that has been linked to health problems, such as cardiovascular and respiratory [illnesses](#). These policies have been successful in achieving more than 80% reduction in SO<sub>2</sub> emissions since 1990.

Previous studies have suggested that there is a 'linear' relationship between concentrations of SO<sub>2</sub> and the number of deaths associated with this type of air pollution. This means that concentrations of SO<sub>2</sub> and numbers of deaths rise and fall together, suggesting there may be no threshold below which there are no health impacts.

However, since [sulphur legislation](#) was introduced over several phases in the mid-nineties, SO<sub>2</sub> concentrations have fallen to levels well below those which such research and conclusions were based on. As such, it is important to confirm whether the linear relationship between mortality and SO<sub>2</sub> remains true at low levels of SO<sub>2</sub>.

This study, conducted under the EU [Aphekom](#) project<sup>1</sup>, assessed the number of deaths associated with changes in SO<sub>2</sub> concentrations prior to the legislation and during each of its phases. It focused on 20 European cities and used data on the daily average SO<sub>2</sub> concentrations, measured at automatic monitoring stations, and daily numbers of deaths from disease (including cardiovascular and respiratory problems) but excluding 'external' causes, e.g. traffic accidents.

The results showed an overall positive association between daily concentrations of SO<sub>2</sub> and mortality in these 20 cities. Fourteen cities, chosen because they had the same implementation dates for the measures, showed average decreases in estimated annual deaths of 639, 1 093 and 1 616 following each stage of sulphur reductions. Cardiovascular deaths were reduced the most.

The results showed that an increase of 1 microgram of SO<sub>2</sub> per cubic metre had the same impact on mortality in the late 2000s (post-legislation) as in early 1990 (pre-legislation). This confirms the previously identified relationship between levels of SO<sub>2</sub> and rates of mortality, and suggests that even low concentrations of SO<sub>2</sub> are associated with health impacts.

These results imply that SO<sub>2</sub> concentrations have a consistent and direct relationship with mortality at both high and low concentrations. This suggests that legislation limiting SO<sub>2</sub> emissions further will result in even greater public health benefits.



5 June 2014  
Issue 375

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**Source:** Tertre, A., Henschel, S., Atkinson, R. W. *et al.* (2014). Impact of legislative changes to reduce the sulphur content in fuels in Europe on daily mortality in 20 European cities: an analysis of data from the Aphekom project. *Air Quality, Atmosphere & Health*. 7(1): 83–91. DOI:10.1007/s11869-013-0215-x.

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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.

1. The Aphekom project was supported by the European Commission's Programme on Community Action in the Field of Public Health. See: [www.aphekom.org](http://www.aphekom.org)