

Science for Environment Policy

Health impacts of air pollution: the evidence reviewed

The damaging health impacts of some key air pollutants can occur at lower atmospheric concentrations than indicated by the most recent World Health Organization (WHO) Air Quality guidelines, set in 2005 and currently used in Europe. This is according to a new WHO report, which assesses scientific evidence to help inform European air pollution policies.

The report highlights key findings of the Review of Evidence on Health Aspects of Air pollution project¹, part-funded by the EU. It was written by 29 invited experts from a range of scientific fields who reviewed a wide range of scientific research to answer 22 key questions regarding the [health](#) effects of three major [pollutants](#): particulate matter (PM), ozone and nitrogen dioxide. The experts drafted answers to each question based on the consensus found in research papers, which were then assessed by an independent scientific advisory committee.

Among the report's highlights, research findings since 2005 have strengthened the evidence to show that PM_{2.5} can lead to adverse health effects, such as cardiovascular problems. The authors suggest that the current guidelines for PM_{2.5} should be re-examined in the light of recent results from long-term studies that have shown increased rates of mortality at concentrations well below the current guidelines of 10 micrograms per m³. In fact, the evidence suggests that there is no 'safe' threshold.

Research has also shown that PM₁₀ cannot be regarded as a proxy for the smaller PM_{2.5}, demonstrating that these larger particles are also dangerous in their own right. Again, evidence shows that there are health effects of long-term exposure to PM₁₀ even at concentrations below European limits.

When the WHO 2005 review was conducted, only short-term effects of exposure to ozone pollution could be observed. However, subsequent studies, highlighted in this review, now show longer-term effects on respiratory health problems and subsequent mortality.

Living near busy roads has been linked with detrimental health effects and this report explicitly addressed the question of whether these impacts were the result of air pollution, rather than other factors, such as noise or socioeconomic status. Evidence assessed by the report demonstrates that once these other factors have been accounted for, the damaging effects of air pollution remain clear. They are likely to be caused by a number of pollutants, including nitrogen dioxide, a major urban pollutant produced by car exhausts, and other harmful gases, such as carbon monoxide.

The report recommends revising guidelines for nitrogen dioxide, as both short- and long-term studies of communities exposed to the pollutant find an association between exposure and mortality. These studies are supported by laboratory experiments examining the toxicological effects of exposure, such as increased inflammation of the airways of subjects, or changes to lung cells, which provide evidence of a causal link between the two. Again, this evidence points to health effects that occur below the level recommended by the 2005 WHO guidelines, which the authors suggest provides a strong argument for their revision.



8 May 2013
Issue 327

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Source: WHO regional Office for Europe (2013). *Review of evidence on health aspects of air pollution – REVIHAAP Project*. 1-26. See:

www.euro.who.int/en/what-we-do/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap

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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. <http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/air-quality/activities/evidence-on-health-aspects-of-air-pollution-to-review-eu-policies-the-revihaap-project>