

## Strengthening US air pollution standards

Air pollution poses significant threats to both the environment and to human health. The World Health Organisation reports that in 2012 around 7 million premature deaths were due to air pollution exposure, making it the world's largest single environmental health risk. Our researchers developed a large-scale computer simulation model that provides a flexible platform for developing a wide variety of models for predicted exposures. This has impacted on public policy and has resulted in the US Environmental Protection Agency making changes to legislation and regulations governing acceptable air quality.



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Air pollution poses significant threats both to human health and to the natural environment. The World Health Organisation reports that in 2012 around 7 million premature deaths were due to air pollution exposure, making it the world's largest single environmental health risk. Understanding the impact of air pollution on human health and creating scientifically-informed air quality legislation requires accurate information on both ambient concentrations of air pollution and how these translate into exposures experienced by individuals.

## The challenge

The US Clean Air Act of 1970 requires the Environmental Protection Agency (EPA) to set national ambient air quality standards for ozone and five other products considered harmful to public health and the natural environment. It is mandated that these standards are reviewed periodically. Detailed information is required on the potential exposures experienced by individuals in order to provide scientific support for changes in air quality standards; this is very challenging to collect in sufficient quantities.



## The solution

With colleagues from the University of British Columbia, our researchers developed a theoretical framework for estimating personal exposures to pollutants, and statistical models to simulate these personal exposures. The research resulted in the development of the Personal Computer National Exposure Model (pCNEM) which provides a flexible platform for comparing a wide variety of models for predicted exposures.

## The benefits

The Personal Computer National Exposure Model has had a direct impact on public policy through its application, results and their contribution to the analyses of the EPA's Clean Air Scientific Advisory Committee for Ozone. These analyses led to the Committee making recommendations for new standards that prompted the US EPA to make new proposals 2008.

Continuing our focus in this area, in 2015, the University of Bath's Gavin Shaddick was appointed to coordinate the World Health Organisation's Data Integration Task Group run under the auspices of the Global Platform for Air Quality.

*"On March 12, 2008, EPA significantly strengthened its national ambient air quality standards (NAAQS) for ground-level ozone, the primary component of smog. These changes will improve both public health protection and the protection of sensitive trees and plants."*

Fact Sheet: Final Revisions to the National Ambient Air Quality Standards for Ozone,  
[http://www.epa.gov/glo/pdfs/2008\\_03\\_factsheet.pdf](http://www.epa.gov/glo/pdfs/2008_03_factsheet.pdf)

Air Quality Criteria for Ozone and Related Photochemical Oxidants (2006 Final).  
U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-05/004aF-cF, 2006.

