

# Science for Environment Policy

## Parallel parking improves air quality on urban pavements

**Pedestrians are exposed** to different levels of pollution on the pavements depending on how parked cars at the roadside are arranged, according to the first in a series of new studies in this area. The researchers modelled different parking regimes and found that less pollution reached the pavement when cars were parked sideways on, rather than at an angle to the street. Their results may help urban planners design more pedestrian-friendly streets.

**Walking is a good** form of exercise that does not affect air quality or contribute to greenhouse gas emissions. However, people who choose to walk are still exposed to the pollution emitted by drivers. Urban planning can reduce the level of pollution that pedestrians are exposed to through congestion charging and intelligent transport systems. However, some pollution can also be prevented from reaching pedestrians simply by introducing barriers between the pavement and the road.

Trees and low walls have both been found to have an impact on the passive dispersion of pollutants. Therefore, parked cars were considered as an existing element of street canyons, which could also be used to passively control air pollutants at street level.

The researchers investigated how different on-street parking layouts would affect pollution dispersion. They used computer modelling to simulate a street canyon in which cars were either parked parallel to the pavement, at a 45 degree angle or at a 90 degree angle. Their model was based on a street canyon of varying widths and heights. Carbon dioxide was chosen as a representative pollutant, to understand how emissions from moving cars might be affected by parked cars.

The best results were obtained in the street canyon with parallel parking bays, which reduced pedestrian exposure to pollutants by 31% and 49%, depending on the wind direction. Models of air flow within the street canyon revealed that parked cars created a primary 'vortex' or 'eddy' effect in the road and additional secondary vortices over the pavements, which circulated air in the canyon.

The proportion of parking spaces occupied also affected pollutant levels on the pavement. When fewer parking spaces in the parallel parking model were occupied, the barrier was broken and individual cars helped to direct pollutants towards the pavement.

The researchers say their study informs those working in urban planning and public policymakers about the optimum on-street parking layout for improving air quality on footpaths.



6 September  
2012. Issue 296

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**Source:** Gallagher, J., Gill, L.W. & McNabola, A. (2011). Optimizing the use of on-street car parking system as a passive control of air pollution exposure in street canyons by large eddy simulation. *Atmospheric Environment*. 45(9):1684-1694. Doi: 10.1016/j.atmosenv.2010.12.059.

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**Theme(s):** Air pollution, Urban environment

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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.