An evaluation of the effects of a congestion tax trial in Stockholm, designed to reduce traffic levels, reveals that there was a decrease of 8.5 per cent in nitrogen oxide (NOx) emissions and of 13 per cent in coarse particle (PM$_{10}$) emissions in the congestion zone. Improvements of this level could avoid 27 premature deaths due to road traffic emissions a year for Stockholm.

EU legislation on air quality sets limits for Member States for air pollutants including NOx and the PM$_{10}$. Meeting the limit values of PM$_{10}$ is proving challenging for EU Member States and the deadlines for complying with the PM$_{10}$ standards have been postponed until 2011. Measures such as congestion taxes could help meet these targets.

Few studies have examined the impact of congestion charges on emissions, air pollutants and health. This research investigated all three for the Stockholm Trial road pricing system. This trial took place between January and July 2006 and charged vehicles entering and exiting a congestion area. The amount of the charge varied, but was highest during rush hour, with the maximum charge at 60 Swedish Kronor (about €6) per day.

Based on measured and modelled changes in road traffic, the researchers estimated that the tax reduced total road use by 15 per cent within the charge area. Using air dispersion modelling, the study estimated the changes in air quality in terms of the concentrations of air pollutants measured in micrograms per m$^3$.

The calculations indicate that a permanent congestion tax system would reduce the annual average NOx concentrations for the streets with the densest traffic by up to 12 per cent and for PM$_{10}$ by 7 per cent. PM$_{10}$ concentrations are substantially more variable as they depend on the wetness of the road surface. Despite this improvement in air quality, the limit values for both NOx and PM$_{10}$ were not achieved on streets with the heaviest traffic.

Total population exposure to NOx emissions in the area of Greater Stockholm was estimated to drop by 0.23 micrograms per m$^3$ during the trial. The researchers estimate that this reduction would avoid 27 premature deaths each year. To compare these figures with traffic accident data, the total number of people killed in traffic accidents in the Stockholm region has averaged at 54 per year for the period 1998-2008. Another interpretation of the data is over a ten year period, 206 years of life are gained for every 100,000 people benefitting from reduced exposure to traffic pollution. The effects on mortality are likely to be caused by vehicle exhaust particles, not NOx, but NOx measurements act as a useful indicator of exposure to traffic pollution.

The study demonstrates that even modest improvements in air quality can lead to health benefits, and the researchers argue that it is important to make quantitative estimates of health impacts in order to justify actions to reduce air pollution.

1. See [http://ec.europa.eu/environment/air/quality/legislation/existing_leg.htm](http://ec.europa.eu/environment/air/quality/legislation/existing_leg.htm)
2. See [www.ntf.se/olyckor/statistik.asp?region=Stockholms+l%E4n&manad1=01&manad2=12&regionretur=1](http://www.ntf.se/olyckor/statistik.asp?region=Stockholms+l%E4n&manad1=01&manad2=12&regionretur=1)


Contact: christer.johansson@ltm.su.se

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