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The economic impact of noise pollution on human health

A recent report has assessed the latest research on the adverse affects of noise on health, focusing on approaches to estimating the economic cost of noise. This information could help policy makers tasked with designing cost-effective noise reduction and management policies.

Increased traffic noise and the wider spread of a 24 hour society have contributed to rising complaints about disturbance and annoyance caused by noise. In addition, there is growing evidence of a link between noise pollution and ill health. However, in the UK, as an example, there is no agreed method for assessing and valuing the impact of noise on human health. There is therefore a need for statistically reliable information which robustly links noise exposure to a specific health problem to enable policy makers to assess the economic impact of higher environmental noise levels on health when developing noise management plans.

This study investigated the current state of evidence for potential health effects caused by exposure to noise. The health impacts considered were annoyance, mental health effects, cardiovascular (heart and blood vessels) effects, sleep disturbances, delayed language and reading skills in children and hearing impairment. With the exception of mental health, the study found that there was sufficient evidence to link noise exposure with adverse health effects.

Based on these earlier assessments, the researchers analysed, in depth, the impact of noise on cardiovascular disease, hypertension (high blood pressure) and sleep disturbance. These health areas were chosen because previous work suggests they have the best prospect for developing statistically valid relationships between noise exposure and health effects. These robust 'dose-response relationships' can be used by policy makers to derive an economic cost for the adverse health effects associated with environmental noise. A dose-response relationship is the relationship between the amount (dose) of noise and the specific health response (e.g. hypertension) in a population.

Previous evidence suggests there is an increased occurrence of acute myocardial infarctions (heart attacks) and other cardiovascular problems in people living in areas with higher environmental noise levels. The researchers suggest the dose-response relationship established in this research could provide the basis for the economic assessment of the incidence of heart attacks in relation to environmental noise. However, there are uncertainties associated with this relationship: for example, it is uncertain if noise abatement strategies that do not also reduce air pollution would reduce the health impact of environmental noise.

The researchers found good statistical evidence for an association between noise and transient, or short-lived, sleep disturbance. However, in terms of developing environmental noise policies, there was no universal dose-response relationship which could be used to place a monetary value on the health impacts from sleep disturbance. Furthermore, the previous studies did not provide sufficient evidence of a measurable link between adverse health effects *over the long term* and transient sleep disturbance caused by noise.

Policy makers wanting to assess self-reported sleep disturbances are advised by the researchers to use the dose-response relationships published in the 2004 EU Position Paper, 'Dose-effect relationships for night-time noise'[1]. But the researchers caution against using these relationships to estimate any *long term* adverse health effects.

For hypertension, although the researchers found strong evidence to link noise with hypertension, current research was not considered to be sufficiently advanced to be able to provide a single dose-response relationship that could be used to assess the economic impact of environmental noise on the incidence of hypertension.

1. See: http://ec.europa.eu/environment/noise/pdf/positionpaper.pdf

Source: Berry, B.F., Flindell, I.H. (2009). Estimating Dose-Response Relationships Between Noise Exposure And Human Health Impacts In The UK. *BEL:* 2009 - 001. The full report can be accessed at: http://www.defra.gov.uk/environment/quality/noise/igcb/publications/healthreport.htm
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