

To: Transport & Health Policy Makers, & Practitioners
From: Prof Adrian Davis, TRI, Edinburgh Napier University
Date: 20th April 2023
Subject: Essential Evidence 4 Scotland No.67 Traffic Noise and health harms

Top line: Speed reduction is primarily employed to improve road safety, which is why there are few studies on the impact of speed reduction on road noise within the transport system. However, reducing speed limits to improve harm from noise is supported by scientific research.

Noise is often called the Cinderella of environmental health harms. Where other harms like air pollution, soil contamination and climate change get a lot of public and/or political attention, noise is often overlooked. Many politicians and policy makers are not aware of the extent to which noise damages health. It is often believed that noise only causes annoyance that ends when it stops. However, the harms of noise go far beyond annoyance and includes that it is a barrier to sleep. Adequate, restful sleep (about 7–9 hours for adults) and mental well-being are as essential to good health as adequate nutrition and physical activity. Research evidence suggests that the health effects of noise are second only to those of air pollution.¹

Long lasting noise leads to stress and anxiety (significant health problems in themselves), but also contribute to physical effects including high blood pressure which can lead to cardiovascular problems such as heart attacks and strokes that can cause death and disability.^{2 3} This is, in part, due to the fact that older adults, along with young people, are more vulnerable to the health effects of noise. The principal source of noise in urban areas is road traffic noise. Research has indicated that long term exposure to road traffic noise may be negatively associated with executive function (the mental processes and skills used to perform tasks, concentrate on new information and negotiate decisions) among older adults i.e. over 50.⁴

Even at moderate levels of road noise exposure, elderly adults i.e. aged 75 plus are at increased risks of death from all causes and cardiovascular illness and death, particularly of stroke. There is also evidence of the impact of noise on the health of youths. More noise annoyance was associated with less social cohesion, and in turn with worse mental health; noise annoyance was also associated with lower neighbourhood restorative quality, which links to social cohesion and physical activity, again leading to poorer mental health for young people.

The World Health Organization published updated Environmental Noise Guidelines in 2018.⁵ Included are recommended limit values for environmental noise exposure based on systematic reviews for a range of health outcomes, including cognitive impairment. However, these are very broad and can't account for individual sensitivities or changes that come with age. Some people are likely to still experience health effects of noise well below these values. More important than recommended limits is, arguably, to reduce noise levels as much as possible.

¹ ünzel, T., Kröller-Schön, S., Oelze, M., et al 2020 "Adverse Cardiovascular Effects of Traffic Noise with a Focus on Night-time Noise and the New WHO Noise Guidelines". *Annual Review of Public Health*, 41: 309–328. doi:10.1146/annurev-publhealth-081519-062400. PMID 31922930.

² Selander J, Nilsson ME, Bluhm G, Rosenlund M, Lindqvist, Nise G, Pershagen G. 2009 Long-term exposure to traffic noise and myocardial infarction. *Epidemiology*, 20:272-279.

³ Wolfert, H. 2009 Eurocities meeting Florence, 19th March. 4

⁴ Mac Domhnaill, Douglas, O., Lyons, S. et al, 2021 Road traffic noise and cognitive function in older adults: a cross-sectional investigation of The Irish Longitudinal Study on Ageing, *BMC Public Health*, 21: 1814.

⁵ WHO, 2018 Environmental Noise Guidelines for the European Region. noise-guidelines-eng.pdf (who.int)