

*Better Health. Better Environment. Sustainable Choices.*

Fact sheet 6

# Reducing Noise to Promote Health

## Tuning down urban soundscapes to promote health and well-being

### Summary

Normal sounds become noise when they are unwanted or harmful. Environmental noise is associated with an increased risk of negative physiological and psychological health outcomes. Although noise is a by-product of many human activities, noise from transport – road, rail and aircraft – has the highest negative health impact. Given the projections of rapid urban growth over the next years, noise pollution, and its associated adverse effects on the physical, mental and social well-being of people, can be expected to increase. Therefore, to protect human health – a core element of sustainable development – it becomes important to position noise mitigation at the centre of urban development and transport policies.



### Introduction

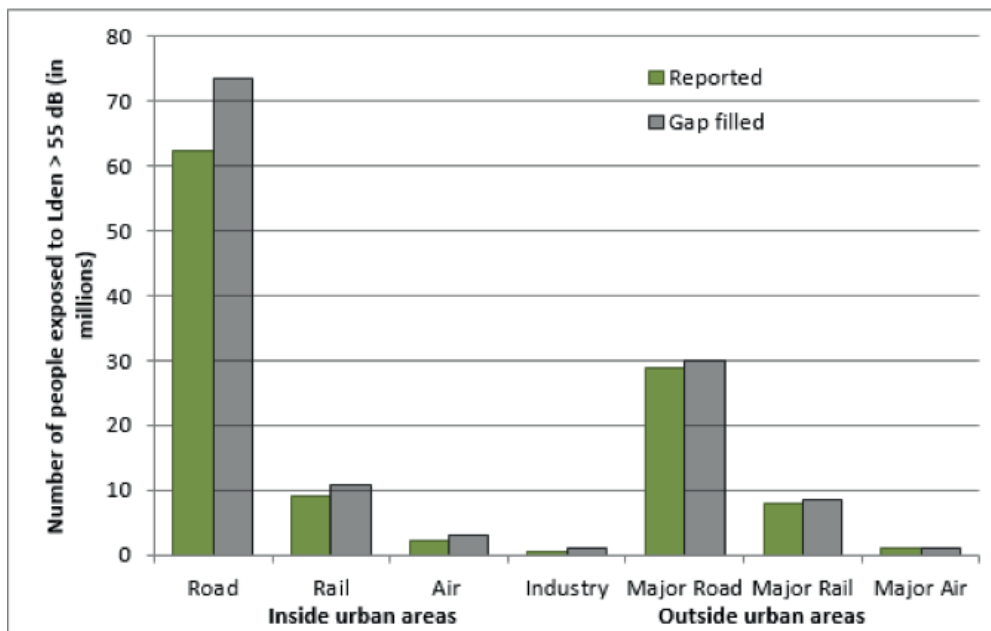
Environmental noise pollution features among the top environmental hazards to physical and mental health, and well-being, in Europe. The current state of knowledge on noise sources, and related population exposure in Europe, is largely based on data submitted every five years to the European Environment Agency (EEA) by its member countries under the requirements of the Environmental Noise Directive (END). However, there is hardly any reporting from other Member States of the WHO European Region.

An effective assessment of noise exposure patterns is hindered by the fact that exposure estimates reported by countries vary in quality and quantity. For example, in 2013, only 44% of the expected amount of data was delivered in the latest reporting round under END. Establishment of the levels of noise related to health outcomes is crucial to guide policy actions.



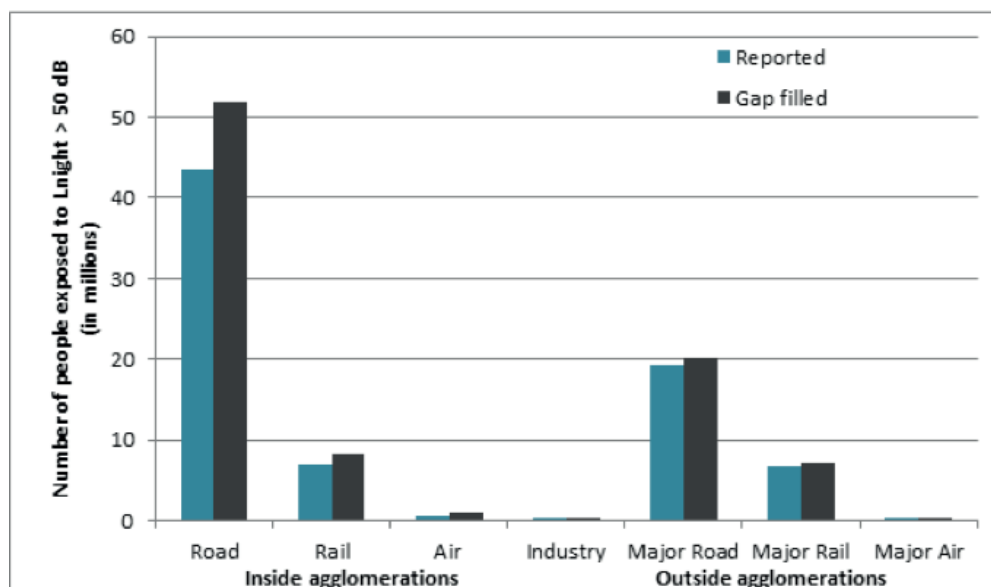
In 2009, the WHO Regional Office for Europe published its Night Noise guidelines (NNG). Considering the scientific evidence on the thresholds of night noise exposure, indicated by  $L_{night, outside}$  as defined in END, a  $L_{night, outside}$  of 40 dB was set as the target of NNG to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. An  $L_{night, outside}$  value of 55 dB was recommended as an interim target for the countries where the NNG cannot be achieved in the short-term, and where policy-makers adopt a step-wise approach.

The day-evening-night level indicator ( $L_{den}$ ) is an average sound pressure level over all days, evenings and nights in a year; and  $L_{night}$  is an outdoor sound pressure level associated with a particular type of noise source during night-time (at least 8 hours), calculated over a period of a year.



**Figure 1**

Number of people exposed to noise in Europe > 55 dB  $L_{den}$  (Day, Evening and Night) in EEA member countries (2012): reported and estimated data



**Figure 2**

Number of people exposed to noise in Europe > 50 dB  $L_{night}$  in EEA member countries (2012): reported and estimated data

Source: Fig. 1 & 2: Noise in Europe 2017: updated assessment ETC/ACM Technical Paper 2016/13. [http://acm.eionet.europa.eu/reports/ETCACM\\_TP\\_2016\\_13\\_NoiseInEurope2017](http://acm.eionet.europa.eu/reports/ETCACM_TP_2016_13_NoiseInEurope2017)



Due to incomplete reporting by Member States, missing data have been filled using a gap-filling methodology (more information can be found in the ETC/ATM 2017 technical paper). Figure 1 shows that more than 100 million people in Europe are being exposed to road traffic noise above 55 dB  $L_{den}$  (see Fig. 1), and 52 million are exposed to night-time road traffic noise levels above 50 dB (see Fig. 2).

There is a scarcity of data on population numbers exposed below these levels, as reporting for these lower levels is not required under END. This is a clear gap, as health and well-being are also affected at lower noise levels.

Moreover, scientific studies now show an even stronger association between noise exposure particularly from road, rail, and aircraft – and negative auditory and non-auditory health outcomes. As a result, approximately 1.6 million healthy years of life are estimated to be lost to illness, disability or early death known as Disability Adjusted Life Years, or DALYs – in Western Europe each year because of environmental noise exposure.

## Key messages

- ▶ Over the years, the number of studies on the health effects of noise exposure has increased substantially. Moreover, while earlier studies focused mainly on road traffic and aircraft noise, scientific literature now includes noise from railway and/or wind turbines. Several recent studies have reported results on new health outcomes in relation to noise, such as cardiovascular and metabolic effects. In light of new scientific developments and regional policy needs, the WHO Regional Office for Europe is finalising the work on the Environmental Noise Guidelines for the European Region, to be published soon.
- ▶ The European Union (EU) in particular has been harmonizing efforts to develop noise policy for more than two decades. These efforts are supported by the Seventh Environment Action Programme (7th EAP) which clearly states, in its objective, that noise pollution in the EU should significantly decrease by 2020, moving closer to WHO-recommended levels.
- ▶ Data reported to the EEA suggest an increasing trend in exposure to environmental noise in Europe; however, there are no or limited data available for many countries of the eastern part of the WHO European Region.

## Key facts

- ▶ Environmental noise pollution ranks among the top environmental health hazards in Europe.
- ▶ The mapping of noise exposure data, according to END stipulations, shows that common sources of noise are transport – specifically road traffic, railways and aircraft – and less common sources are wind turbines. Notably, noise exposure from road traffic ranks highest followed by noise from rail and aircraft. However, noise from leisure sources, particularly personal listening devices, are beginning to feature as a growing problem among the younger population.
- ▶ Surveys conducted in the European Union show that noise from neighbours and streets, which is not reported through END, is also perceived as a source of complaints and/or annoyance. An estimated 18% of citizens of the EU-28 reported being exposed to neighbourhood noise, with Germany (26%), Malta (25%) and the Netherlands (25%) being most affected.
- ▶ Auditory health outcomes associated with excessive noise exposure include hearing impairment and tinnitus, while non-auditory effects can manifest as annoyance, poor sleep, cardiovascular events, cognitive impairment, metabolic effects, poor mental health and well-being, and adverse birth outcomes.
- ▶ The estimated healthy years of life lost to illness, disability or early death – known as Disability-Adjusted Life Years, or DALYs – for western Europe is: 903 000 DALYs from sleep disturbance; 654 000 DALYs from noise-induced annoyance; 45 000 DALYs from cognitive impairment in children aged 7–19 years; and 22 000 DALYs from noise-induced tinnitus.



## “Best buys”

- ▶ An important requirement for improving health outcomes and reducing noise exposure is to implement noise policies that are based on recent scientific evidence and noise exposure data. Equally important in the development of these policies is collaboration with, and the engagement of, the private and public sectors at national and local levels, including health, environment, transport and urban planning, to name a few.
- ▶ Member States of the WHO European Region are encouraged to measure and report data to aid noise mapping.
- ▶ As populations can be exposed simultaneously to multiple sources of noise at once, an overall reduction of exposure from all sources should be promoted and quiet areas should be protected. A coordinated approach to policy development in sectors related to urban planning, transport, climate and energy should be adopted.
- ▶ Five broad categories of environmental noise intervention can be effective at reducing noise emission, exposure and/or health outcomes from noise. These include noise source interventions, noise path interventions, changes in infrastructure, changes in the physical dimensions of dwellings and neighbourhoods, and behavioural interventions. While assessment of the effectiveness of specific interventions is challenging due to a significant time lag between the intervention and measurable change, such interventions nevertheless have health benefits and should be actively promoted.
- ▶ Citizens, architects, environmentalists and public health professionals are key to guiding decision-making when planning new urban and/or rural developments. Members of the public in particular have varying perceptions of noise and should be informed and engaged in the decision-making process, especially if they are to be affected by a change in noise exposure.

## Key references

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## Sixth Ministerial Conference on Environment and Health

13–15 June 2017, Ostrava, Czech Republic