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# Practical guidance for risk assessment of traffic noise effects on sleep

Mathias Basner <sup>a, b</sup>  , Uwe Müller <sup>a</sup>, Barbara Griefahn <sup>c</sup>[Show more](#) 

Outline



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## Abstract

Environmental noise disturbs sleep and may impair well-being, performance and health. The European Union Directive 2002/49/EC (END) requires member states to generate noise maps and action plans to mitigate traffic noise effects on the population. However, practical guidance for the generation of action plans, i.e. for assessing the effects of traffic noise on sleep, is missing. Based on the current literature, we provide guidance on hazard identification, exposure assessment, exposure–response relationships and risk estimation: there is currently no consensus on both exposure and outcome variables that describe traffic noise effects on sleep most adequately. END suggests the equivalent noise level  $L_{\text{night}}$  as the primary exposure variable, and our own simulations of single nights with up to 200 noise events based on a field study on the effects of aircraft noise on sleep support using expert consensus  $L_{\text{night}}$  ranges (<30, 30–40, 40–55, >55 dB) for risk assessment. However, the precision of risk assessment may be considerably improved by adding information on the number of noise events contributing to  $L_{\text{night}}$ . The calculation of  $L_{\text{night}}$  should be extended to the shoulder hours of the day if traffic is busy during these periods. More data are needed on the combined effects of different traffic modes.

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## Keywords

Noise; Sleep; Health; Traffic; Awakening

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