

# The association between road traffic noise annoyance and health-related quality of life (HRQOL)

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## Summary

**Background:** Quality of life is a relevant factor for mental and physical health. Noise annoyance has been associated with a decreased HRQOL and further negative health effects.

**Methods:** In 2008, we enrolled 1375 adults aged between 30 and 60 years and residing in the urban and suburban area of Basel, Switzerland. Road traffic noise exposure was determined using the SonBASE model in suburban areas and the traffic cadastre for the city of Basel. Self-rated annoyance, general health status and mental health status were assessed by written questionnaire using a four points Likert scale, the von Zerssen score of somatic symptoms and the SF-36 mental health module. Data were analysed using multivariable mixed-effects regression models adjusted for age, sex, self-reported physical activity, smoking behaviour, education, marital status and the noise model used. Upon identification of interaction with sleep disturbance score, we built a structural equation model considering the relationships between road traffic noise exposure, annoyance to road traffic noise, sleep disturbance score and the von Zerssen score of somatic symptoms.

**Results:** Average road traffic noise exposure expressed as  $L_{dn}$  was 46 dB(A) with 5.5% of the study population exposed to noise levels > 70 dB(A). Annoyance to road traffic noise was highly associated with road traffic noise exposure. The association between the von Zerssen score and 10 dB(A) road traffic noise increase was borderline significant after adjustment (0.47, 95% CI: -0.01, 0.95). The von Zerssen score of somatic complaints and the SF-36 mental health module were strongly associated with annoyance to road traffic, industry and neighbourhood noise. The structural equation model revealed an indirect association linking physical noise exposure to health-related quality of life (HRQOL) and sleep disturbances via annoyance.

**Conclusion:** Physical road traffic noise exposure is associated with HRQOL. Structural equation modelling reveals a strong mediating effect of noise annoyance.

PACS no. xx.xx.Nn, xx.xx.Nn

This research paper has already been published in the open access journal “International Journal of Environmental Research and Public Health” in a special issue on sound and health related quality of life. DOI: 10.3390/ijerph111212652

The article is available under the following link: <http://www.mdpi.com/1660-4601/11/12/12652>

