NORAH
Lärmwirkungsstudie

Differences between the noise types

In the last years, the number of deaths from stroke has clearly dropped. Nevertheless, the sudden circulation impairment of the brain or bleeding in the brain is still among the most frequency causes of death in Germany. More than 18,000 persons died of stroke in 2013. The known risk factors includes, among others, overweight, smoking and hypertension. The NORAH study was able to prove that all three examined traffic noise types also influenced the stroke risk.

Road and railway noise: continuous risk increase at increasing continuous noise level

The NORAH team was able to find a statistically significant connection to stroke both for noise caused by trains and for car noise:

- When the 24-hours continuous noise level of road noise increases by ten decibel, the risk of stroke increases by 1.7 percent.
- For railway noise, the stroke risk increases by 1.8 percent per ten decibel.

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- There was no increase for stroke risk in aviation noise if the continuous noise level increased, but a reduction instead.

Aviation noise: Does the maximum noise play a role?

1. *The figure shows a tendency to linear risk decrease (violet line) of 2.4 % per 10 decibel (statistically borderline significant).*
2. *The figure shows a linear risk increase (violet line) of 1.7 % per 10 decibel (statistically significant).*
3. *The figure shows a linear risk increase (violet line) of 1.8 % per 10 decibel (statistically significant).*

Most calculations of the NORAH team were based on the continuous noise level. This physical value is the average from the number and noise level of the individual noise within a specific period – e.g. 24 hours. Additionally, the scientists also considered the maximum noise level: the maximum noise level that reaches an address when a car, train or airplane passes nearby. For aviation noise, the NORAH team found a statistically significantly increased stroke risk in persons with a continuous noise level below 40 decibel if the maximum noise level at night exceeded 50 decibel.

A reading aid for this issue of NORAH Wissen

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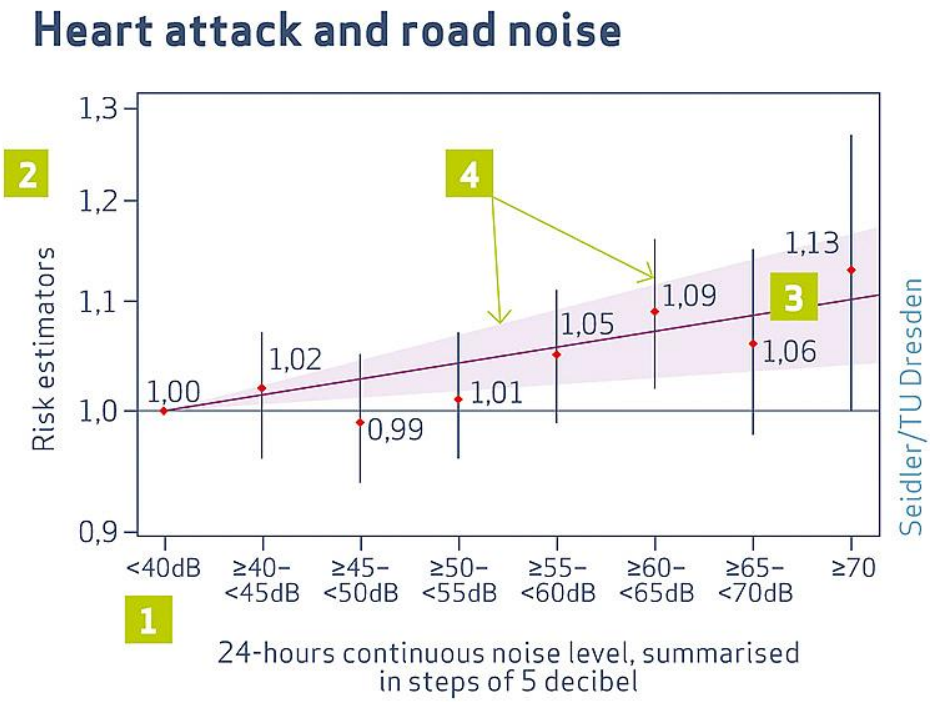

The study on health risks examines whether the risk of developing one of the five examined diseases increases when exposed to more traffic noise. The scientists present the results of their research in exposure-effect curves). Since you will find many of these curves on the following pages, we are providing a reading aid here:

1 | Continuous noise level

This axis shows the continuous noise level. The noise increases from the left to the right. For some calculations, the scientists also used "Noise level classes". If, e.g., the continuous noise level at the address of an insured person was at 63.7 decibel, his health data was included in the calculation for the noise level class "≥ 60 dB – < 65 dB".

2 | Risk estimators

Risk estimators indicate how high the "relative illness risk" is. 1 corresponds to the "basic risk" of a person not subject to traffic noise. If the value is higher, this suggests that noise at this degree may contribute to the disease. Additional calculations must show whether an increased or reduced relative risk is statistically significant and thus with a high probability not coincidental.

3 | Exposure-effect-curve

The exposure-effect-curve shows how the health risk changes with increasing noise. In this example, the risk increases by 2.8 percent per ten decibel. Additional calculations show whether this increase is statistically significant.

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4 | Confidence intervals

The confidence interval is a statistically calculated trust range above or below the risk estimator. The smaller the confidence interval, the more reliable and indicative the risk estimator. It is usual to apply 95-percent confidence interval. Simplified, this means that the "actual" risk is within this range with a probability of 95 %. The figures show the 95-percent confidence intervals of the individual risk estimators (black vertical lines) as well as the 95-percent confidence interval above and below the exposureeffect curve (pink area).

Do you have any questions?

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