NORAH Lärmwirkungsstudie

The questions and methods of the study on health risks

The study on health risks wanted to find out whether traffic noise increased the likelihood of developing heart attack, stroke, weak heart, depression or breast cancer. To answer this question, the scientists around epidemiologist and specialist for occupational medicine Prof. Dr. med. Andreas Seidler from the University Dresden decided to use a case-control study. This study form compares people suffering from a specific disease ("cases") to those that do not ("control persons"). It examines whether specific factors – in case of NORAH traffic noise – occurs more frequently in the group of patients. To come to an indicative result, case-control studies sometimes need to include several thousand persons.

Health data from three statutory health insurances

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For the study on health risks, three large health insurances from the Rhine-Main area provided the scientists with the "pseudonymised" data of approx. one million insured persons. Using complex search queries, the NORAH team was able to filter out those persons who suffered from one of the

five diseases between 2005 and 2010. Persons were to be included as “cases” when doctors in the hospital or a practice diagnosed the disease for the first time. Since most of the examined diseases only occur more frequently in the second half of life, the scientists included only insured persons older than 40.

Individual noise calculations

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To answer the research questions, the NORAH team also needed to know how much road, aviation and railway noise each of the insured was exposed to at home. Therefore, the acoustician of the study calculated the noise load in approx. 900,000 addresses within the examination area – not only for the present, but retroactively until 1996. This way, the noise exposure of several years could be reconstructed for insured persons who lived in the area under examination at the time and the past addresses of which were known to the health insurance.

The NORAH acousticians based their aviation noise calculations on radar recordings of all flight movements in the Rhine-Main area – this data was provided by the German Air Traffic Services. States and municipalities provided the scientists with information on the road traffic occurrence in the examined area. The Deutsche Bahn and Germany’s Federal Railway Office (EBA) provided data on train movements in the Rhine-Main area. The acousticians also used a three-dimensional terrain model for their calculations to determine how the noise from cars and trains spread. This information could finally be used to calculate for all addresses in the area under examination, when how much noise was audible there.

More precise results from a deeper survey

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The health insurance data provided the NORAH team with lots of information on the diseases of the insured persons. Since particularly cardiovascular diseases are known to have several other risk factors – e.g. smoking or overweight – the scientists asked some insured persons to participate in a deeper survey. They thus received additional information on the lifestyle and living situation of several thousand persons. With this information, the NORAH team was able to examine using the persons suffering from cardiac insufficiency whether consideration of further risk factors changed the traffic noise results.

A reading aid for this issue of NORAH Wissen

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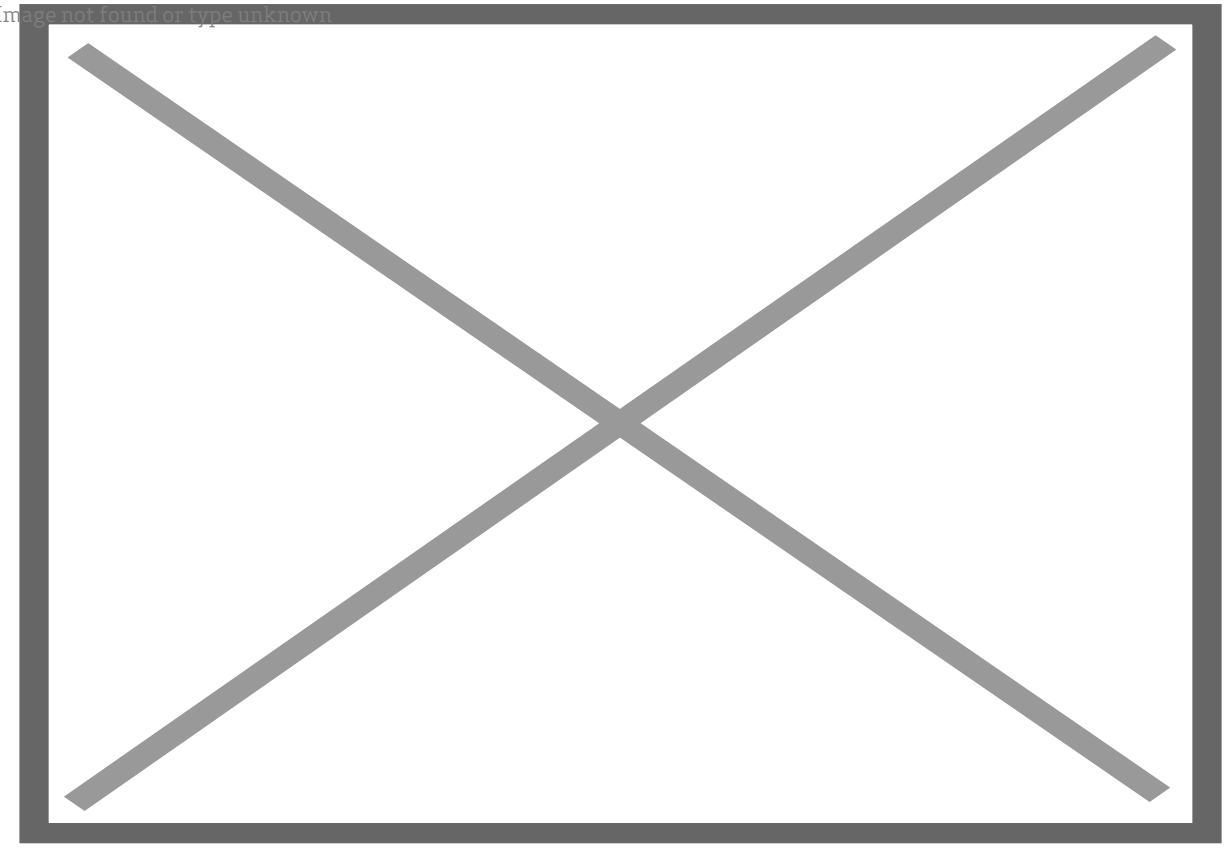

The study on health risks examines whether the risk of developing one of the five examined diseases increases when exposed to more traffic noise. The scientists present the results of their research in exposure-effect curves). Since you will find many of these curves on the following pages, we are providing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

4 | Confidence intervals

The confidence interval is a statistically calculated trust range above or below the risk estimator.

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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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