NORAH
Lärmwirkungsstudie

Overview of the sleep study



We sleep on average just over seven hours every night. Just how important this rest phase is, is clear to anybody who has ever had too little sleep at night. It is not always easy for people living in the proximity of airports to settle down at night and find sleep. The NORAH Sleep Study examined how nocturnal flights affect people's sleeping habits. The study paid special attention to the effects of two new measures, which changed the noise background in the Rhine-Main Region in October 2011. Since then there has been a curfew at Frankfurt Airport on scheduled take-offs and landings between 11 pm and 5 am. At the same time, the new North-West runway began operations. A comparison of the sleep measurements from 2011 and 2012 shows how the changes affected residents with otherwise healthy sleep patterns.

Measuring sleep quality in the proximity of the airport

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In order to answer their research questions, the scientists carried out sleep measurements directly in the bedrooms of residents around Frankfurt Airport in the summers from 2011 to 2013. Over 200 persons took part in the measurements, many of them over two or all three years. The study participants spent three to four successive nights with several electrodes attached to their bodies. While they were sleeping, the electrodes recorded the brain activity, the heartbeat and other

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physical signals. A sound level meter also registered all nocturnal noises reaching the ears of the sleeping individuals. This allowed the NORAH team to calculate how overflights affect people's sleep. All of the participants provided other information in questionnaires – including how they subjectively perceived their sleep and how positive or negative their attitude is towards air traffic.

Quieter nights improve the sleep quality

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The curfew on scheduled flights between 11 pm and 5 am since October 2011 has had a positive effect: as fewer overflights could be heard in the bedrooms in 2012, the people generally woke up less frequently. Persons who went to bed between 10 and 10.30 pm, and got up between 6 and 6.30 am woke up on average less frequently than those who went to bed and got up one hour later. The latter were more frequently woken on average in the early morning hours by aviation noise.

Increased tiredness in the morning

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Although the measurements show that the study participants in 2012 woke up less frequently on average than in 2011, this positive development is not reflected in the perception of the people themselves: they felt somewhat more tired and sleepy in the mornings than in the previous year in each year of the investigation at the same noise exposures, but in all years in the middle range of the tiredness scale. The scientists are unable to derive any explanation for this effect from the data. It must, therefore, be due to factors not examined by the study.

People with a critical attitude towards air traffic tend to sleep less well

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Some of the questions asked by the NORAH team addressed the attitude of the participants towards air traffic. On the basis of the responses and the sleep measurements it was shown that people who have a more negative attitude towards air traffic slept less well. They needed longer to fall asleep, lay awake for longer at night, and spent less time in deep sleep. Whether the poorer quality of sleep is the result or the cause of the negative attitude towards air traffic cannot be established on the basis of the data.

Results from Cologne/Bonn not reliably transferrable to Frankfurt

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As far back as 2001 and 2002 the German Aerospace Centre (DLR) had measured the sleep quality of residents around airports, not in the Rhine-Main Region, however, but in the area of Cologne/Bonn Airport where a lot of freight planes are taking off and landing more or less continuously during the night. Noise abatement calculations and indices at several airports are based on the results of this investigation. Within the framework of the sleep study, the NORAH team has now found out that the

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results from then cannot be readily transferred to the current situation at Frankfurt Airport. The people in Cologne/Bonn slept less well in 2001 and 2002 than the participants in the Rhine-Main Region in 2012 after the introduction of the curfew on scheduled flights between 11 pm and 5 am. At the same time, the NORAH participants felt more annoyed by nocturnal aviation noise.

Do you have any questions?

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