

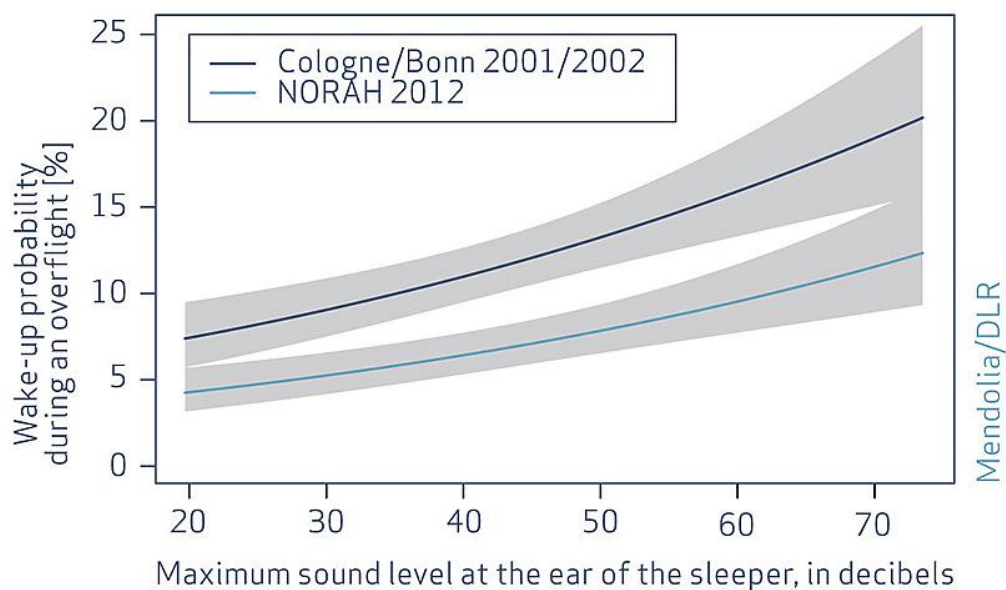
# Do residents around frankfurt airport sleep better than those in cologne?



Around ten years before the NORAH Study, the DLR investigated the sleep quality in the area around Cologne/Bonn Airport. The director of the NORAH Sleep Study, Dr. Uwe Müller, was also one of the researchers who investigated the quality of sleep in the Rhineland in 2001 and 2002. The results of the Cologne/Bonn study still have concrete significance, also for the residents around Frankfurt Airport: they provide the basis for the calculation of the Frankfurt Aviation Noise Indices. However, the noise situation in Cologne/Bonn at the start of the millennium was different in important respects to the situation in the Frankfurt region at the time of the NORAH Study: in 2001/2002 there were continuous flights through the night in Cologne/Bonn, in addition to this, the proportion of older freight aircraft was considerably higher. This type of aircraft generates more noise in other frequency ranges than the passenger aircraft which currently makes up most of the flights in and out of Frankfurt Airport. One of the tasks of the NORAH Sleep Study was to examine to what extent the Cologne/Bonn results could be transferred to the Frankfurt region. The researchers established differences in the sleep quality of the previous and present study participants.

## People in Cologne/Bonn wake up more frequently

### Aviation noise-associated wake-up probability at Frankfurt and Cologne/Bonn airports



*The NORAH participants were less likely to wake up during an overflight than the participants of a study carried out in the Cologne/Bonn region in 2001/2002.*

Due to the higher number of nocturnal flights, the residents around Cologne/Bonn airport woke up more frequently. The probability of being woken up by an overflight with a certain sound level was also higher at Cologne/Bonn Airport.

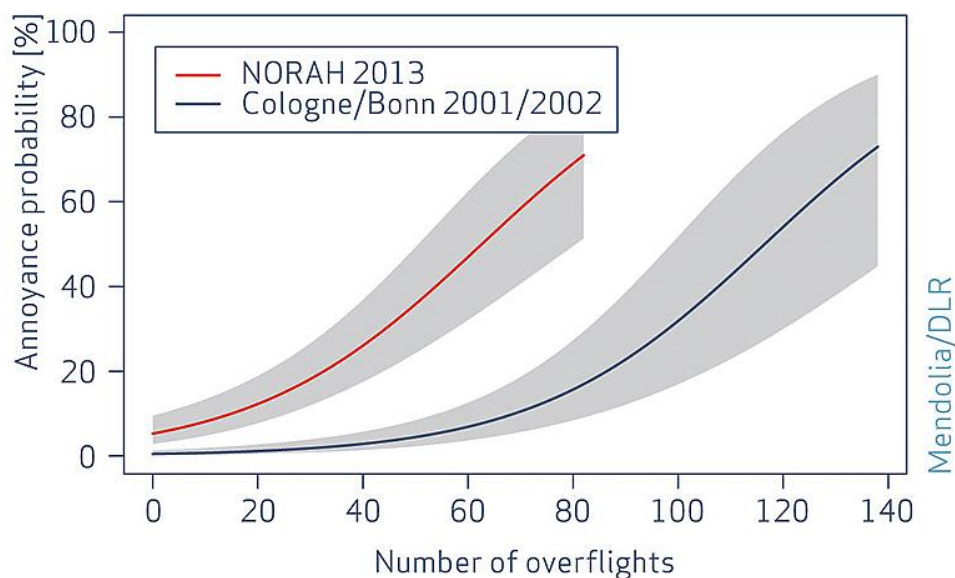
### Less time in deep sleep

The residents around Cologne/Bonn Airport got less rest when they were asleep than the Frankfurt study participants after the introduction of the curfew on scheduled flights between 11 pm and 5 am. According to the sleep measurements carried out in the Rhineland, the participants spent less time per night in the deep sleep phase which is so important for rest. There could be several reasons for this difference, which is why the results must be interpreted with care. The NORAH team regards it as possible that they had trouble reaching the deeper sleep phases due to frequent interruptions at the start of the night. The different frequencies of the aircraft types may also have played a role. The NORAH team also regards it as possible that the investigated groups of persons are different. A fourth possible explanation has to do with the fact that the evaluation of sleep

recordings is not carried out automatically, but requires a human eye. This is why the people evaluating the two studies may not have interpreted the sleep recordings in an entirely standardized manner.

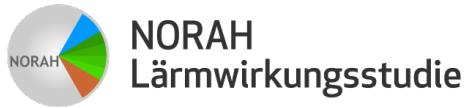
## Annoyance higher in Frankfurt than in Cologne/Bonn

### Aviation noise-associated wake-up probability at Frankfurt and Cologne/Bonn airports



*Compared with a study in the area of Cologne/Bonn Airport in 2001/2002, the participants of the sleep study in 2013 felt considerably more annoyed by the same number of nocturnal overflights.*

In addition to the sleep measurements, the scientists also asked the participants in both studies how severely they felt annoyed by the aviation noise of the previous night. Here they established that the study participants in the Frankfurt region felt considerably more annoyed by similar noise levels and a similar number of overflights than the respondents ten years before in the Rhineland. It is not possible to derive an explanation for this result from the data. It does, however, correlate with the results of the NORAH Quality of Life Study.



## Do you have any questions?

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