

Airport Noise Report



A weekly update on litigation, regulations, and technological developments

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Noise Guidelines

WHO/EUROPE EXPECTED IN MAY OR JUNE TO ISSUE UPDATED ENV. NOISE GUIDELINES

The European office of the World Health Organization (WHO) is expected in May or June to issue Environmental Noise Guidelines for the European Region that will update Community Noise Guidelines adopted by WHO/Europe in 1999.

The new guidelines will focus on the WHO European Region and will be used by the European Union to orient its environmental noise policies.

But because of the strict evidence review criteria adopted to ensure that only the best quality study data are included in the update, the new WHO environmental noise guidelines are expected to be influential far beyond Europe.

The guidelines will be based on systematic evidence reviews on the health effects of environmental noise and will incorporate significant research carried out in recent years through 2014.

Two significant European studies completed after 2014 – the Swiss SiRENE study on acute, short- and long-term effects of transportation noise exposure on annoyance, sleep disturbances and cardiometabolic risks and the German NORAH

(Continued on p. 6)

Annoyance

DOSE/RESPONSE CURVES ON ANNOYANCE HAVE SHIFTED OVER TIME, STUDY SHOWS

A review of surveys of aircraft noise annoyance conducted between 2001 and 2014 in communities around 15 airports in Europe and Asia reached two major conclusions:

- Dose/response curves showing the percentage of people highly annoyed by aircraft noise have shifted over time, leading to a higher percentage of annoyed people at a given noise level compared to older surveys; and
- This increase in the percentage of people highly annoyed by aircraft noise is greater at so-called “high-rate change” airports – those facing a sharp change in noise exposure due to activities, such as opening of new runways, operational changes, etc. – than at low-rate change airports.

However, the ‘change effect’ does not fully explain the shift in noise dose/response curves over time, Dick Schreckenberg, one of the authors of the paper, “WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Annoyance,” told ANR.

Rainer Guski of the Department of Psychology at Germany’s Ruhr University

(Continued on p. 7)

In This Issue...

Noise Guidelines ... In May or June, the European Office of the World Health Organization (WHO) is expected to issue updated environmental noise guidelines on the impact of noise from aircraft, road, rail, and other sources on annoyance, sleep disturbance, cardio-metabolic disease, and other health impacts.

Because the WHO-Europe guidelines will be based only on study data that meets the most rigorous evidence review criteria, they are expected to be influential far beyond Europe - p. 5

Annoyance ... More recent surveys of aircraft noise annoyance show a higher percentage of annoyed people at a given noise level compared to older annoyance surveys, a WHO/Europe study team concludes in a new paper.

Whether the results of FAA’s community aircraft noise annoyance survey, which are due out around June, show the same trend remains to be seen - p. 5

Guidelines, from p. 5

(Noise-Related Annoyance, Cognition and Health) study on the impact of traffic, rail, and aircraft noise on the health and quality of life – are not included in the evidence review that will undergird the WHO/Europe environmental noise guidelines.

Teams of experts working on the WHO guidelines are in the process of assessing the impact of noise from aircraft, rail, road, wind turbines, and personal electronic devices on annoyance, sleep disturbance, cognitive impairment of children, mental health/quality of life, tinnitus/hearing impairment, cardio-metabolic diseases, and adverse birth outcomes.

The evidence reviews will include analysis of dose/response relationships whenever possible but at least for annoyance, sleep disturbances/awakenings, and cardio-vascular effects.

The WHO environmental noise guidelines also will consider environmental noise impact in specific settings – such as residences, hospitals, educational settings, and public venues – and will review the evidence on health benefits from noise mitigation and interventions to decrease noise levels.

Top Scientists Developing Guidelines

“The process for developing the guidelines is complex, involving the work of top scientists from around the world under the coordination of WHO,” the organization, which is a specialized agency of the United Nations, explained.

The evidence reviews being undertaken in the update of WHO environmental noise guidelines have to follow a strict research protocol originated in the field of clinical medical science but that WHO has adopted for the field of environment and health for the first time, Dirk Schreckenberg, of the Centre for Applied Psychology, Social and Environmental Research of the German firm ZEUS, told ANR.

“That is, the reviews are not just narrative; the inclusion and exclusion of original studies have to be justified, each included study has to be evaluated with regard to its quality and the overall evidence has to be evaluated using a specific method, the GRADE [Grading of Recommendations, Assessment, Development and Evaluations] system, which seems to be adopted by WHO for all guidelines,” Schreckenberg said.

GRADE is a systematic approach to making judgements about the quality of evidence and the strength of study recommendations.

Schreckenberg is one of three German researchers that prepared the evidence review for the impact of environmental noise on annoyance (see story on p. 5).

“Given that there is enough qualified evidence, a meta-analysis is carried out to identify a generalized dose-response relationship,” he said of the WHO effort.

Separate from the team of scientists reviewing the study data, Schreckenberg said, is a second team of scientists that develops suggestions for noise guidelines, i.e. exposure thresholds for each noise source. The guidelines will be developed on the base of the evidence provided by the reviews.

“Whether one or more thresholds (e.g. for each kind of noise effect) are defined for each noise source is unknown to me,” he told ANR.

Five Evidence Reviews Completed

Already four evidence reviews addressing the impact of environmental noise on annoyance, adverse birth outcomes, permanent hearing loss and tinnitus, and the impact of noise interventions on health have been published in a special issue “WHO Noise and Health Evidence Reviews” of the open-access journal “International Journal of Environmental Research and Public Health” (http://www.mdpi.com/journal/ijerph/special_issues/WHO_reviews).

A fifth evidence review on the impact of environmental noise on the cardiovascular and metabolic systems is published as a report and available from http://www.rivm.nl/en/Documents_and_publications/Scientific/Reports/2017/november/Cardiovascular_and_metabolic_effects_of_environmental_noise_Systematic_evidence_review_in_the_framework_of_the_development_of_the_WHO_environmental_noise_guidelines_for_the_European_Region.

Cardiovascular Effects

The noise experts who reviewed studies on the impact of transportation noise on the cardiovascular and metabolic systems offered this conclusion:

“The current review shows that, despite the fact that a large number of studies have investigated the impact of noise on the cardiovascular system, applying the GRADE [data evaluation system], the quality of the evidence is often rated as relatively low. This does not mean that exposure to noise has no effect on the cardiovascular system, but encourages further research to improve the quality of the evidence. After all, there is a strong biological plausibility that noise affects human health.

“Furthermore, in a large number of the studies that were evaluated in the current review, we observed statistically significant effects of noise on the cardiovascular system. The most robust were the effects of road traffic noise on IHD [Ischaemic Heart Disease]. On the basis of the results of cohort and case-control studies, we found high quality evidence that exposure to road traffic noise associated with increased incidence of IHD.

“This review also addressed the possible impact of noise on the metabolic system. In comparison with the studies on the impact of noise on the cardiovascular system, the number of available studies was rather limited. The results of these studies were not always consistent. In addition, the quality of the evidence was rather low. It is therefore, at this moment, too early to draw definite conclusions with regard to the impact of noise on the metabolic system.”

Increased Risk of Heart Disease

The experts evaluated 22 studies that investigated the im-

fact of noise from air, road, and rail traffic on the risk of IHD. The majority (11) were of cross-sectional design.

“The studies that investigated the impact of air traffic found indications of an increased risk of IHD,” those reviewing the studies found.

“Aircraft noise was associated with the prevalence of IHD, the incidence of IHD, and mortality due to IHD. Only the association between aircraft noise and the incidence of IHD was statistically significant,” they reported.

They estimated a Relative Risk [RR] of 1.09 per 10 dB after aggregating the results of two studies comprised of 9,619,082 participants, including 158,977 incident cases of IHD.

That means that those impacted by aircraft noise have a 1.09 times greater risk of incidence of IHD for every 10 dB increase in aircraft noise compared to those not affected by aircraft noise.

“Since most studies on the impact of aircraft noise were of ecological and cross-sectional design, the quality of the evidence from these studies, was mostly rated as “very low.” However, the results of the current review are consistent with the results of new longitudinal studies that were not yet included, which reported positive associations between aircraft noise and mortality due to IHD,” the reviewers said.

The NORAH study found a statistically significant increased risk of dying of heart failure if exposed to aircraft noise levels above 60 dB. That 1.6 percent increased risk per 10 dB increase in continuous noise level was revealed by examining the medical records of heart attack patients who had died from heart failure (27 ANR 160).

“Overall, we consider the quality of the evidence supporting an association between air traffic noise and IHD as “low,” indicating that further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate,” the WHO team said.

In terms of hypertension, the reviewers found “indications that noise from air, road, and rail traffic increases the risk of hypertension.”

However, only in relation to road traffic noise did they find a statistically significant increase in the risk of hypertension (an RR of 1.05 per 10 dB LDEN increase). But they said this estimate is “very uncertain” due to the “very low” quality of the study evidence supporting it.

Annoyance, from p. 5

and Rudolf Schuemer, an independent German researcher, also authored the paper, which is referred to as the “Guski et al” paper.

Schreckenber is a researcher at the Centre for Applied Psychology, Social and Environmental Research of the German firm ZEUS.

The Guski et al paper will be used to update environmental noise guidelines expected to be issued by the World Health Organization’s European office in May or June (see related

story in this issue).

It can be downloaded at (http://www.mdpi.com/journal/ijerph/special_issues/WHO_reviews).

Mary Ellen Eagan, President of the consulting firm HMMH, discussed the findings of the paper, at a Jan. 10 session of the annual meeting of the Transportation Research Board.

The paper was commissioned by WHO-Europe as part of a systematic evidence review of the effects noise from aircraft, road, rail, combined sources, and wind turbines on long-term residential annoyance, Eagan noted.

The aircraft noise annoyance surveys included in the study encompassed a total of 18,947 respondents around both large and small airports.

The paper concluded that, for every 10 dB increase in observed (measured) noise, the odds of being highly annoyed by aircraft noise increased by 3.405% and increased by 2.738% for road noise.

For every 10 dB increase in modeled noise, the odds of being highly annoyed increased by 6.633% for combined noise sources and by 3.033% for road noise.

A 5dB increase in wind turbine sound was associated with an increase of 6.375% in the odds of being highly annoyed.

The Guski paper includes a graph that compares dose-response curves for the percentage of people highly annoyed by aircraft noise that were drawn in 2001 and 2009 with a new curve derived from the data in 12 of the aircraft noise annoyance surveys that the paper authors reviewed for WHO.

The 2001 curve predicts that roughly 26% of people will be highly annoyed with aircraft noise at a level of 65 Lden; the 2009 curve predicts that roughly 52% of people (twice as many) will be highly annoyed at that noise level, and the WHO curve predicts that roughly 46% of people will be highly annoyed at 65 Lden.

FAA Aircraft Annoyance Survey

By June, FAA is expected to release the results of its own survey on aircraft noise annoyance conducted in communities around 20 U.S. airports.

The agency did not respond to a question from ANR regarding whether a new U.S. dose-response curve for aircraft noise annoyance would accompany the survey results.

But an FAA spokesman said the following:

“The survey results and a draft report are in the process of being reviewed by the FAA in coordination with the Department of Transportation and other federal agencies. Once final, the report will be made available to the public.

“While we do not have a specific release date, we hope to make the survey results publicly available sometime in the first half of 2018.

“The FAA will use the survey results to help understand how community perception of aircraft noise has changed and to inform the development of measures related to aircraft noise. The FAA will evaluate the survey results, along with

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other noise information and ongoing research, as well as feedback from stakeholders, in making any decisions to update existing noise policy.”

The dose/response curve FAA uses to determine compatible land use development around airports is 25 years old and based on annoyance data older than that. It was included in a 1992 report by the Federal Inter-agency on Noise (FICON).

At 65 DNL, the FICON curve predicts that 12.3% of the population will be highly annoyed by aircraft noise. That level of annoyance is significantly below what the dose/response curve in the Guski paper, which is based on relatively recent annoyance survey data, predicts. The WHO-data curve predicts roughly 46% of the population will be highly annoyed at 65 Lden.

Note that the DNL (Day-Night Noise Level) noise metric used in the FICON curve differs from the Lden (Day-Evening-Night Noise Level) metric used in the WHO curve in the Guski et al paper.

“FAA is not obliged to follow WHO recommendations (and actually, I think, the WHO guidelines are not much more than that),” Schreckenber told ANR. “And, with regard to aircraft noise annoyance, it probably also depends on the new FAA curve, whether it fits somehow to the WHO curve for aircraft noise annoyance or not. We will learn more as soon as the results of the FAA study are published.”

In Brief...

Vince Mestre Retires

The aviation consulting firm Landrum & Brown announced in December that Vince Mestre, P.E., associate vice president and head of the Irvine, CA, office of L&B, has retired after over four decades of dedicated service to the aviation industry.

Christian Valdes is now head of L&B’s Irvine office. He formerly served as managing consultant.

As an industry leader in noise control and acoustical engineering, Mestre co-founded Mestre Greve Associates, a professional engineering firm that specialized in noise control, air resources engineering, and airport studies, in 1981. L&B acquired the firm in 2009.

In his retirement, Mestre plans to continue to participate in noise research and remain as chairman of the Society of Automotive Engineers International’s A-21 Committee on aircraft noise and emissions.

“Vince’s contributions to the industry and his commitment to developing the next generation of airport noise professionals are qualities that we should all strive to achieve. The board is thankful for his leadership and we wish him all the best,” said L&B CEO Mark Perryman.

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