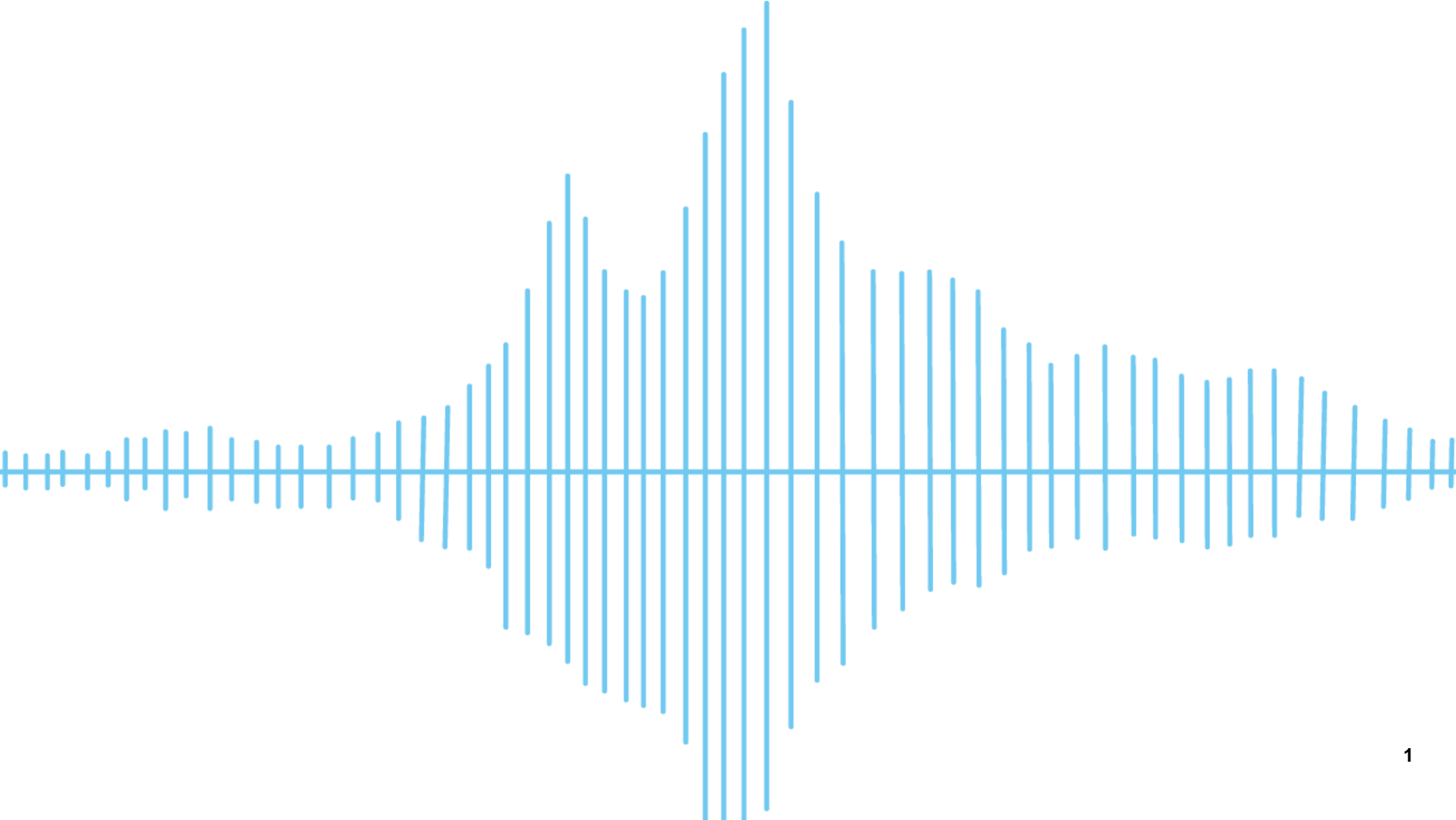


Aviation Noise and Public Health

Contents

This note accompanies a report produced for the Independent Commission on Civil Aviation Noise (ICCAN) by the National Centre for Social Research (NatCen), called '**Aviation Noise and Public Health: a rapid evidence assessment**' (NatCen, 2020).

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About ICCAN

Established in 2019, the Independent Commission on Civil Aviation Noise (ICCAN) is an independent non-departmental body, with the objective of being the impartial voice on civil aviation noise and its impact on communities. Our first two-year aim is to improve public confidence and trust in the management of aviation noise by building our expertise, credibility and profile across the UK. We have conducted a number of pieces of research and work, all of which can be found on ICCAN's website.

The need for robust evidence on the relationship between aviation noise and health

Disturbance from aviation noise is an inherently personal experience. Having engaged with many people and communities living with it, we know the effects can be substantial and may have a detrimental impact on people's quality of life, health and wellbeing. A robust evidence base on the relationship between aviation noise and health is crucial to fully understanding these impacts. To make any recommendations on the future of aviation noise management, including potential changes to the way it is regulated, an evidence-based understanding of the impacts of aviation noise is essential.

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Previously, evidence on the relationship between aviation noise and health has been compiled and assessed predominantly as part of larger reviews on the health effects of environmental noise. The studies reviewed cover a range of noise types, health outcomes and research methods used. The World Health Organisation (WHO) published a series of systematic reviews on environmental noise and health that underpin its 2018 guidelines on environmental noise (WHO, 2018) and the Department for Environmental, Food and Rural Affairs (Defra) commissioned two reviews, one by National Institute for Public Health and the Environment (RIVM, 2019) and the other by Arup (Arup, 2020). These gathered evidence on noise and health, including aviation noise. Since these reviews have been completed, more studies have been published, adding to the aviation noise and health evidence base.



ICCAN's approach

To better understand the quality of the evidence relating to aviation noise specifically and identify gaps in the evidence base, ICCAN commissioned the National Centre for Social Research (NatCen) to

conduct a rapid evidence assessment (REA), which systematically reviews the existing evidence in this fast-developing subject area. This included the evidence on aviation noise and health from the WHO and Defra reviews, as well as any studies subsequently published. NatCen's review summarises the health effects of aviation noise together with a rigorous assessment of the quality of the evidence relating to a wide range of health outcomes, measurement metrics and research methodologies.

For each health outcome, the technical quality of the evidence base was assessed through a formal rating system (GRADE) by the WHO and Defra reviews, as well as by NatCen for ICCAN. 'Quality' is a technical measure of the uncertainty of the study evidence as a predictor for the effect being studied. NatCen concluded that the quality of the evidence for most health outcomes is 'very low' or 'low', while only some are 'moderate'. 'Moderate' or 'high quality' ratings are based on a demanding evidence threshold, which requires a body of evidence with several high-quality studies involving longitudinal designs (study repeated over time) and large sample sizes. These are costly and resource intensive methods.

An initial study might prove to be useful, informative or of significant value, but GRADE will have classified it as being of 'very low' quality until it has been supported by additional studies over time. The evidence grading does not lessen the potential value of conclusions which may demonstrate how aviation noise impacts on health; rather it is a reflection of the complexity of research required to give a high level of certainty.

NatCen used the findings of its assessment to identify gaps in the evidence and suggest possible future studies to develop the evidence base. Both the approach taken by NatCen, and its final report, were reviewed by two members of ICCAN's expert panel. This review is ICCAN's first step in exploring potential future areas of health research and how it might take this forward in its work programme.

Key findings

1. For most health outcomes, the evidence on the effects of aviation noise is of 'low' or 'very low' quality (GRADE rating). This indicates that further research on these outcomes is very likely to have an important impact on the certainty of the health effects. This includes birth and reproductive outcomes, diabetes, hypertension, some aspects of sleep, and wellbeing. There was also little or no evidence for some areas of health, including dementia and other neurodegenerative outcomes, auto-immune disorders and other cancers. Therefore, in these areas there are no specifically defined gaps in the evidence base that indicate a clear focus for future research.

2. There were limited health areas where there is 'moderate' quality evidence (GRADE rating). For example, reading comprehension and stroke incidence. 'Moderate' evidence was the highest identified grading from all the health outcomes.

3. However, selected health outcomes could be prioritised for further research in short to medium term. For example, on the basis of the NatCen work and existing evidence, our noise and health expert advisors identified sleep, diabetes, wellbeing, depression and anxiety as potential high-priority areas for future research, with possible research methods including self-reported studies and physiological measurements.

4. NatCen suggested a range of study designs which could be used to build the evidence base on health and aviation noise together with an assessment of their strengths, weaknesses and resource implications. Shorter-term approaches include re-analysis of existing data, such as linking noise data to current health cohort studies or using meta-analyses to systematically assess the results of previous research to derive conclusions about the strength of the evidence across studies. Longer term, more resource intensive approaches involve designing new studies such as a specialist cohort studies.

5. Further work is needed to develop a strategy for delivering research in the short- and long-term. This will include identifying health areas for future research, how this should be undertaken and careful consideration when selecting what noise metrics should be used.



ICCAN's next steps

Our review has shown that there is no single clearly defined evidence gap in the health research; rather that many areas are ripe for further research. Different health effects may need different research approaches. We will build on this review to develop a strategy for how best to both expand and improve the existing evidence base. As the aviation industry recovers following the COVID-19 pandemic, it will be even more crucial to measure the health impacts of the return of aviation noise, at whatever pace it happens. This strategy will enable ICCAN to concurrently plan studies addressing the identified health outcomes while investigating broader policy prioritisation. We will continue to engage with noise and health experts and other stakeholders (including academics, industry experts, government and communities) to refine our strategy and develop robust research designs. We intend to have identified and initiated our first set of priorities for research in time for the publication of our second corporate strategy and work programme, in April 2021.



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