

Health impacts of aircraft noise

NACF Project Summary

25 September 2024

Introduction and overview

Who are we?

Frontier Economics is one of Europe's largest economic consultancy firms.

Frontier provides independent and objective advice to clients across a range of sectors and issues.

We have a strong track record in public policy and healthcare analysis. We work with government departments, agencies, local government and across the NHS.



What were we asked to do?

We were commissioned to develop a thought piece / scoping study for the Independent Chair of the NACF, which assesses the case for considering a wider set of harms from aviation noise.

This was amid concern that the government's Transport Analysis Guidance (TAG)* is too narrow, leading to the exclusion of some relevant harms to local residents' health.



*TAG sets out the current approach to measuring and valuing harms created by aviation noise, based on high-quality published evidence

Scope



General scope

This short project was carried out over 2 months in early 2024, during which we were required to:

- Assess whether there were relevant harms which needed to be added to the TAG guidance
- Reassess the relevant harms already included in TAG guidance, to evaluate whether these are appropriately represented in current modelling

This was to be undertaken through a quick, broad review of the literature around the health effects of aviation noise, meaning a wide range of papers were briefly assessed.



The following were considered out-of-scope for this project:

- Applying the TAG guidance to undertake any assessment of analysis of actual impacts
- Non-health impacts of noise, including annoyance*
- Impacts of aviation not due to noise
- Measurement of aviation noise or measurement of populations affected by noise
- Assessment of any other aspects of the TAG guidance or its application (e.g. to inform policy and regulatory decisions)

*we note that to the extent annoyance leads to mental or physical health impacts, these are within scope

Methodology: Harms assessed

In this research, we assessed the following harms:

Harms within existing TAG modelling

- Sleep disturbance
- Dementia
- Hypertension
- Ischaemic/Coronary Heart Disease (IHD)
- Acute Myocardial Infarction (AMI)
- Strokes

Harms outside existing TAG modelling

- Depression
- Cognitive impairment of children
- Cancer
- Birth outcomes
- Atrial Fibrillation
- Diabetes

Our research primarily focused on published English-language evidence from the last 10 years, but we have reviewed other evidence where relevant. These include:

- [The 2018 WHO Environmental Noise Guidelines paper](#)
- [CAA updates on recent work and findings \(2019-2023\)](#)
- A handful of recent academic papers



Methodology: Evaluation of evidence

We first came to a judgement on the quality of evidence for each harm

For this we assessed:

- The **consistency of findings** across recent papers
- The **quality of the individual papers**, considering the methodology and reliability of measurement for relevant metrics



We then evaluated whether there is sufficient evidence to change the current TAG modelling

For this, the evidence would need to be of **moderate quality**, and **indicate either**:

- There is a **significant difference** in noise effects from new evidence, compared to **current TAG modelling**
- New evidence suggests there are **strong noise effects** which are **not included in the TAG modelling**



Results: Harms for which updates to the TAG modelling could be made

Sleep disturbance



There exists sufficient evidence to suggest:

- Aircraft noise effects on sleep disturbance (%HSD) may be underestimated in current modelling
- Baseline night noise in the modelling could be lowered from 45 dB to 40 dB

There is consensus in the literature that:

- A 10 dB increase increases the incidence of high sleep disturbance by more than 8 percentage points
- More than 10% of individuals are sleep disturbed at 45 dB

Cognitive impairment of children



There exists sufficient evidence to suggest:

- Aircraft noise effects on children's cognitive ability could be considered in future TAG modelling

There is consensus in the literature that aircraft noise can:

- Delay development of reading and oral comprehension
- Increase behavioural problems

Results: Harms within the TAG modelling for which more research would be needed

Dementia

No new evidence on dementia has been assessed

Hypertension

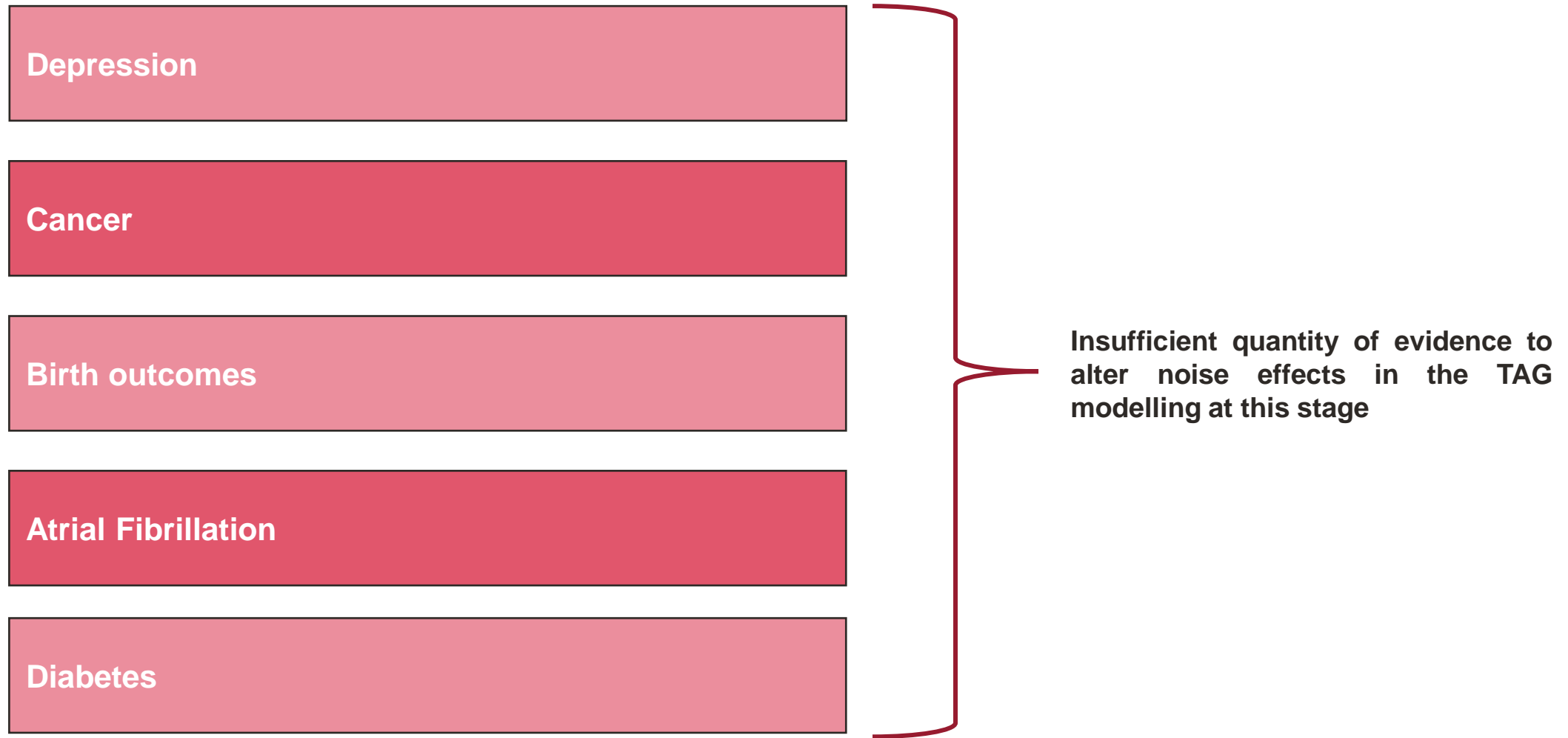
Ischaemic/Coronary heart disease (IHD)

Acute myocardial infarction (AMI)

Strokes

Insufficient consistent evidence to alter noise effects in the TAG modelling at this stage

Results: Harms outside the TAG modelling for which more research would be needed



Recap



Summary

- We were tasked with assessing whether the TAG guidance on the **health effects of aircraft noise** needed updating
- We undertook a **short but broad review** of literature relating to the effects of aircraft noise on health
- We found that **sleep disturbance** was the only health condition currently included in the TAG modelling which could be updated, to reflect **increased noise effects**
- We found that, of health conditions outside the current TAG modelling, **cognitive effects on children** was the only one that could be **included in future TAG modelling**



Purpose of our final report

- Our final report goes into detail on how the **current TAG modelling** accounts for each health effect and what **new research** indicates about each health effect
- Our final report then evaluates, for each health effect, whether TAG modelling should be **updated**
- **This report should not be used in isolation, but instead should feed into a wider review on TAG guidance**



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