

# Future of Aviation Noise Management – Case for Change

## Health, wellbeing and quality of life

### Summary

There is increasingly robust evidence on the effects of aviation noise on health and quality of life as well as on cognition and learning in children. Aviation noise is not included as a statutory nuisance in UK noise policy and the economic and social benefits of aviation act against further limits on noise. There are guidelines and, in some cases, restrictions limiting night flights but there is still evidence of the health implications of sleep disturbance and of other health effects associated with aviation noise. Stronger evidence on broader health and economic effects could clarify the priorities for limiting the effects of aircraft noise on the communities who live near airports.

### Key issues

#### Health impact of aviation noise

##### Concerns

There is increasing evidence that exposure to long-term aviation noise above certain levels is associated with a range of physical and mental health effects in those individuals living near airports. There is moderate evidence of effects on sleep disturbance, obesity and stroke and emerging or weaker evidence of effects on other cardiovascular and metabolic outcomes. The average noise metrics used in legislation may not reflect the increases in aviation noise over time or their impact on health.

##### Improvement opportunities

Updated high-quality evidence reviews or longitudinal studies designed to measure the health and economic effects of long-term aviation noise could strengthen the existing evidence.

ICCAN will be making recommendations for research on the highest priorities for health.

#### Quality of life impact of aviation noise

##### Concerns

Increased levels of aviation noise are also associated with an impairment to the quality of life and wellbeing through increased annoyance (see the Case for Change for Annoyance).

##### Improvement opportunities

ICCAN is commissioning a new aviation noise attitudes survey (ANAS) to measure the effects of aviation noise on annoyance and wellbeing (see the Case for Change on Annoyance for further details).

#### Cognitive impact of aviation noise

##### Concerns

There is moderate quality evidence showing a harmful effect on cognition outcomes in children associated with aviation noise including impairment assessed through SATs, reading and oral comprehension and short-term and long-term memory.

### Improvement opportunities

Noise insulation schemes for properties in close proximity to airports such as triple glazing could mitigate effects indoors when windows are closed. Better information on the effects of noise when planning school sites could reduce future impacts.

### Increased health service use

#### Concerns

There is limited evidence of increased risks of stroke, coronary heart disease and cardiovascular disease for those living near London Heathrow airport, which has caused a rise in hospital admissions for these diseases.

### Improvement opportunities

Stronger evidence on health utilisation of primary and secondary care service associated with aviation noise could help quantify this.

# Supplementary information

## Health impact of aviation noise

### Concerns

Aviation noise is associated with increased risks for those living around airports for a range of conditions. There is moderate evidence (assessed through the formal rating, GRADE, of evidence quality, see [Appendix I](#)) of effects on sleep disturbance, obesity and stroke and emerging or weaker evidence of effects on other cardiovascular and metabolic outcomes. Other health outcomes that have been investigated, but with little or very weak evidence of any effect, include dementia and other neurodegenerative outcomes, breast cancer, and birth outcomes.

A meta-analysis of the field ([Babisch, 2014](#)) concluded that aircraft noise exposure was associated with increased risk for cardiovascular outcomes such as high blood pressure, heart attack and strokes. In brief, increased stress associated with noise exposure might cause physiological stress reactions in an individual, which in turn can lead to an increase in established cardiovascular disease risk factors such as blood pressure, blood glucose concentrations, and blood lipids. The stress that triggers this pathway can operate directly via sleep disturbance or indirectly via the mechanism of an emotional or cognitive perception.

If ATMs and ground operations increase in and around airports, they can increase the health impact by affecting more people and by increasing the risks for those already impacted, particularly in densely populated areas and locations around busier airports such as Heathrow.

However, the CAA states ([CAA, 2015](#)) that: 'Aircraft noise is not currently a statutory nuisance in the UK. It is not covered by the Environmental Protection Act 1990 or the Noise Act 1996. This means that local authorities do not have the legal power to take action on matters of aircraft noise, and nor does the CAA have the legal power to prevent aircraft flying over a particular location or at a particular time for environmental reasons.'

See [Appendix 1](#) for more details.

### Current approach and limitations

WHO guidelines recommend reducing noise levels produced by aircraft below 45 dB  $L_{den}$ , as aircraft noise above this level is associated with adverse health effects ([WHO, 2018](#)). For night noise exposure, they strongly recommend reducing noise levels produced by aircraft during night time below 40 dB  $L_{night}$ , as night-time aircraft noise above this level is associated with adverse effects on sleep. Under ICAO principles these health impacts on affected communities must be balanced against the wider economic and social benefits of aviation. The Environmental Noise (England) Regulations (2006) stipulates that affected agglomerations are those who receive air traffic noise equal to, or greater than,  $L_{den}$  55 dB or  $L_{night}$  50 dB.

Currently designated airports (Heathrow, Gatwick and Stansted) have night flight restrictions defined by noise measures under the Civil Aviation Act 1982, in recognition of the effects on sleep disturbance ([Heathrow Airport Limited, n.d.](#)). For example, under the current structure in place since 2017, Heathrow has night time restrictions during the hours 11.30pm-6:00am which allows 5,800 night-time take-offs and landings a year (3,250 in the summer season and 2,550 in the winter season) ([Heathrow Airport Limited, n.d.](#)).

There are insulation schemes in place for those who live in certain areas around specific airports, for example, triple glazing, in an attempt to decrease the amount of noise people hear within their homes with windows closed (see the separate Case for Change on Insulation). More robust evidence on the health impact at increasing noise levels (dose-response curves) could improve eligibility for these and other compensation schemes.

Currently the evidence on the health impacts of aviation noise has not been deemed strong enough to implement further limits in policy when balanced against the economic benefits of aviation. Evidence on the effects of aviation noise on some health outcomes is of limited quality and is often integrated with other environmental noise (such as road traffic). Assessing the effects of aviation noise above other background noise and separately from other environmental factors such as air pollution can be challenging. For some outcomes there are more significant risk factors (such as the effects of diet and exercise on cardiovascular disease) making the contribution of aviation noise towards health issues difficult to determine. The distinction between risk factors which are environmental in nature and those which are personally modifiable should be remembered, however.

### Opportunities for improvement and challenges

Ten airports are subject to night noise controls under the Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003. This could be extended to other airports and compliance made clear to those affected. As the aviation industry recovers from the effects of Covid-19 and as UK leaves the EU there is an opportunity to re-consider night flight restrictions.

ICCAN is responding to a consultation on night flight restrictions being undertaken by the UK government to be completed in May 2021 ([UK Government, 2021a](#)).

## Quality of life impact of aviation noise

### Concerns

Aviation noise is associated with negative impacts on quality of life including increased levels of annoyance for residents living around airports (see the Case for Change for Annoyance). It additionally disturbs and interferes with concentration, communication and relaxation. Levels of annoyance can change in response to noise exposure changes, for example, in newly overflowed areas or due to increased noise exposure, or to a change in the pattern of noise exposure.

### Current approach and limitations

There are voluntary insulation schemes in place for those who live in certain areas around specific airports (see the Case for Change for Insulation) but there is no standard approach in terms of funding and eligibility criteria. Additionally, there are schemes that fine aircraft operators for non-NPR compliance or noise threshold exceedance. The funds raised may be invested in local projects such as sports teams and local community groups who bid for a share of the money.

[Transport Analysis Guidance](#) (TAG) is a transport appraisal guidance and toolkit and is a requirement for all interventions that require government approval. It focuses on cost benefit ratio of interventions ([DfT, 2014](#)). The TAG Noise Workbook assesses the expected impacts of transport policy proposals and projects ([DfT, 2017](#)). Using a baseline scenario, TAG calculates a monetary cost and/or benefit when that baseline scenario experiences a change. For each one decibel change in average noise level, a monetary value is assigned for the change in the following health impacts: amenity (annoyance), sleep disturbance and health impacts including acute myocardial infarction, dementia and stroke. The evidence on which these values are based can be reviewed and updated.

As with the health impacts detailed above, currently the evidence on the quality of life impacts of aviation noise has not been deemed strong enough to implement further limits in policy when balanced against the social and economic benefits of aviation.

### Opportunities for improvement and challenges

ICCAN is commissioning a new aviation noise attitudes survey (ANAS) to measure the effects of aviation noise on annoyance and wellbeing (see the Case for Change on Annoyance for

further details). This will measure changes in self-reported wellbeing, annoyance, sleep-disturbance and impact on day-to-day activities together with sociodemographic factors over a range of locations and over time.

## **Cognitive impact of aviation noise**

### **Concerns**

There is moderate quality evidence (based on the evidence grading scale GRADE) showing a harmful effect on cognition outcomes in children due to aviation noise including impairment assessed through SATs (national assessments for 10-11 year olds), reading and oral comprehension and short-term and long-term (episodic) memory (see Appendix I: Health evidence summary). There is also evidence from the relocation of Munich airport that effects may be reversible with the removal of noise ([Hygge, et al., 2002](#)).

The RANCH study, of 2844 children aged 9–10 years from 89 schools around London Heathrow, Amsterdam Schiphol, and Madrid Barajas airports found exposure–response associations between aircraft noise and poorer reading comprehension and poorer recognition memory and as the association was linear, there is no specific threshold above which noise effects begin ([Stansfeld, et al., 2005](#); [Clark, et al., 2005](#)). A 5 dB increase in aircraft noise exposure was associated with a two-month delay in reading age in the UK.

The NORAH study (Noise Related Annoyance, Cognition and Health) considered the cognitive development of school children and found an increase in the noise level by 10 dB associated with a reduction in reading performance which corresponds to a one-month delay in reading development in Germany ([Klatte, et al., 2016](#)).

A US study of 6,000 schools exposed between 2000-2009 found significant associations between aircraft noise and standardised tests of mathematics and reading, after taking demographic and school factors into account ([Sharp, et al., 2014](#)). In a sub-sample of 119 schools, they found that the effect of aircraft noise on children’s learning disappeared once the school had noise insulation installed.

### **Current approach and limitations**

There are noise insulation schemes in place in certain areas around specific airports e.g. extra glazing and loft and ceiling insulation in an attempt to decrease the amount of noise people hear within homes, schools and other community buildings, (see the Case for Change Mitigation and Compensation for further details). The health-benefits associated with many of these need to be empirically tested.

As part of information relating to noise options compiled by the Airports Commission ([UK Government, 2015](#)), Gatwick Airport Limited stated that it hoped no new noise sensitive buildings would be given planning consent in the areas with the highest noise contours around Gatwick though there could be additional schools exposed to higher noise levels ([Clark, 2015](#)).

### **Opportunities for improvement and challenges**

Better insulation with ventilation in affected schools and better noise information available for school site planning.

## **Example: Noise-proof playground buildings**

### **Who, What and How?**

Noise-proof domes were installed in primary school playgrounds near Heathrow helped to mitigate noise impact at play times, where landing aircraft were regularly interrupting outside play. Planes pass low over the area emitting a noise level loud enough to drown out voices. Sound tests inside the domes showed a considerable reduction in the level and duration of

noise according to the makers of the structures. Heathrow Airport contributed to these shelters ([Heathrow Airport Limited, 2016](#)).

[How could the best practice be applied to UK aviation?](#)

These could be extended to other schools around Heathrow and to other airport regions.

## **Increased health service use**

### [Concerns](#)

A study around London Heathrow airport examined risks for hospital admission for stroke, coronary heart disease and cardiovascular disease for around 3.6 million people living near London Heathrow Airport ([Hansell, et al., 2013](#)). Both daytime ( $L_{Aeq}$  16 hour) and night-time ( $L_{night}$ ) aircraft noise exposure was related to an increased risk of cardiovascular hospital admission. The study concluded that aircraft noise was associated with increased risks of stroke, coronary heart disease, and cardiovascular disease for hospital admissions in areas near to Heathrow airport.

### [Current approach and limitations](#)

There is currently limited evidence and no routine monitoring or surveillance of the health service burden from aviation noise.

### [Opportunities for improvement and challenges](#)

Further academic studies or monitoring of utilisation of health services associated with aviation noise would improve the evidence on the health service costs associated with aviation noise. ICCAN is conducting a health prioritisation exercise to elicit priorities for future research from a range of stakeholders.

# Appendices

## Appendix I: Health evidence summary

These are a summary of an assessment of the quality of evidence on the health effects of aviation noise extracted from the National Centre for Social Research (NatCen) Rapid evidence assessment, commissioned by ICCAN ([Grollman, et al., 2020](#)). This included the evidence on aviation noise and health from recent WHO and Defra reviews, as well as any studies published subsequently. For each health outcome, the technical quality of the evidence base was assessed through a formal rating system (GRADE). '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'. 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. Note that 'low quality' here indicates a lack of evidence, not a lack of effect. '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 summarised in Table 1.

**Table 1: Outcomes for which there is moderate quality evidence from WHO, Defra and ICCAN reviews**

Outcome	Direction of effect
Stroke mortality	No effect
Stroke incidence	Harmful effect
Self-reported sleep disturbance in adults	Harmful effect
Physiologically measured awakenings in adults	Harmful effect
Change in waist circumference	Harmful effect
Reading comprehension	Harmful effect
Impairment assessed through SATs	Harmful effect
Short-term and long-term (episodic) memory	Harmful effect

A complete summary of strength and direction of health effects for all outcomes covered in the NatCen review are shown in the tables below. Note that for each health condition, incidence refers to new cases within a given period, prevalence refers to the number of cases at a given time or within a given period and mortality refers to deaths from that condition.

**Table 2: Summary of the quality of evidence for sleep outcomes**

**Impact:** Residents affected by aviation noise suffer sleep disturbance leading to a range of health issues.

Outcome	Quality of evidence – Direction of effect
Physiologically measured awakenings in adults	Moderate quality – Harmful effect

Outcome	Quality of evidence – Direction of effect
Self-reported sleep quality	Very low quality – Harmful effect
Self-reported sleep coping behaviors	Very low quality – Harmful effect
Self-reported awakenings	Low quality – Harmful effect
Self-reported sleep disorder	Very low quality – No effect
Self-reported sleep disturbance in adults (source not specified)	Very low quality – Harmful effect
Self-reported sleep disturbance in adults (source specified)	Moderate quality – Harmful effect

**Table 3: Summary of the quality of evidence for cardiovascular and metabolic outcomes**  
**Impact:** Covers several severe conditions and risk factors, including obesity, which are national health priority areas.

Outcome	Quality of evidence – Direction of effect
Arterial stiffness	Low quality – Harmful effect
Blood pressure	Very low quality – No effect
Blood pressure in children	Very low quality – No effect
Cortisol levels	Very low quality – Harmful effect
Diabetes incidence	Low quality – Harmful effect
Diabetes prevalence	Very low quality – No effect
Heart rate	Very low quality – Harmful effect
Hypertension incidence (high blood pressure)	Low quality – Harmful effect
Hypertension prevalence	Low quality – No effect
Incidence of central obesity	GRADE not conducted – Harmful effect
Ischemic heart disease incidence	Low quality – Harmful effect
Ischaemic heart disease mortality	Low quality – No effect
Ischaemic heart disease prevalence	Very low quality – No effect
Asymptomatic heart damage	Very low quality – Harmful effect
Obesity (change in BMI)	Low quality – No effect
Obesity (change in waist circumference)	Moderate quality – Harmful effect
Obesity (incidence of overweight)	GRADE not conducted – Harmful effect
Obesity (weight gain)	GRADE not conducted – Harmful effect
Self-reported diagnosis of arrhythmia	Very low quality – No effect
Self-reported diagnosis of diabetes	Very low quality – No effect
Self-reported diagnosis of heart disease	Very low quality – No effect
Self-reported diagnosis of hypertension	Very low quality – No effect
Stroke incidence	Moderate quality – Harmful effect
Stroke mortality	Moderate quality – No effect
Stroke prevalence	Very low quality – No effect

**Table 4: Summary of the quality of evidence for quality of life, mental health and wellbeing outcomes**

**Impact:** Mental health issues are one of the government priority health areas.

Outcome	Quality of evidence – Direction of effect
Wellbeing of children	Very low quality – No effect
Depression prevalence	Low quality – No effect
Depression prevalence mediated by annoyance	Low quality – Harmful effect

Outcome	Quality of evidence – Direction of effect
Emotional and conduct disorders in children	Low quality – No effect
Hyperactivity	Low quality – Harmful effect
Interview measures of depression and anxiety	Low quality – Harmful effect
Medication intake to treat anxiety and depression	Very low quality – Harmful effect
Self-reported QOL or health	Very low quality – No effect
Wellbeing	Very low quality – Harmful effect
Self-reported diagnosis of chronic headaches/migraine	Very low quality – No effect
Children's medication intake	Very low quality – No effect
Children's physical diseases	Very low quality – No effect

**Table 5: Summary of the quality of evidence for cognition outcomes**

**Impact:** Exposure to aviation noise affects student learning and short-term and long-term memory issues.

Outcome	Quality of evidence – Direction of effect
Assessments of student distraction	Very low quality – Harmful effect
Attention	Low quality – No effect
Executive function deficit (working memory capacity)	Very low quality – No effect
Impairment assessed through SATs	Moderate quality – Harmful effect
Reading and oral comprehension	Moderate quality – Harmful effect
Short-term and long-term (episodic) memory	Moderate quality – Harmful effect

**Table 6: Summary of the quality of evidence for birth outcomes**

**Impact:** This is currently an under-researched area in aviation noise-health but the importance of studying birth-related outcomes is increased by the long-term morbidity that they can cause.

Outcome	Quality of evidence – Direction of effect
Congenital malformations	Very low quality – Harmful effects*
Low birth weight	Very low quality – Harmful effects*
Preterm birth	Very low quality – Harmful effects*

\* No overall effect stated in GRADE assessment but harmful effects reported in narrative review

**Table 7 Summary of the quality of evidence for other health outcomes**

**Impact:** There is currently only evidence of the impact of aviation noise on a single cancer type and very few studies on the impacts on general health.

Outcome	Quality of evidence – Direction of effect
Incidence of breast cancer	Low quality – Harmful effect
General physical health of children mediated by annoyance	Low quality – Harmful effect

## **Appendix II: Legislation**

### **The Environmental Noise (England) Regulations (2006)**

This regulation came into force in 2006, it transposes the Environmental Noise Directive into domestic law for England. This regulation is applicable to environmental noise, mainly from transport. It requires regular noise mapping and action planning for road, rail and aviation noise and noise in large urban areas (agglomerations).

### **Civil Aviation Act 1982**

This act sets out the primary duties and functions such as air transport licenses and exercisable power for the CAA. It also includes the regulation of civil aviation, air transport operations and air navigation services.

### **Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003**

This regulation was implemented into UK law in 2003 with regard to the introduction of noise-related operating restrictions at UK airports. They apply to city airports and to other civil airports within the United Kingdom which have more than 50,000 take-offs or landings of civil subsonic jet aeroplanes per calendar year. The competent authority is required to publish an environmental objective for the airport when addressing noise issues at the airport. They must adopt a balanced approach which may also include economic incentives

### **Environmental Protection Act 1990**

This act makes provision for the management of pollution from industrial and other processes. It imposes a duty of care on any person who imports, produces, carries, keeps, treats or disposes of controlled waste or, as a broker, has control of such waste.

### **Noise Act 1996**

If your local council has resolved to apply the provisions of the Act, they are required to take reasonable steps to investigate complaints of noise from dwelling and licensed premises.

## Appendix III: Other

### Guidance by regulators in similar sectors (or facing similar issues)

There are house insulation schemes for both road (through highway authority) and rail noise (through relevant railway authority).

There are no legal limits for railway noise. People are advised to contact their local council if they think rail noise is affecting their health ([UK Government, 2021b](#)). Local authorities do not have powers to act on matters of aircraft noise since it is not currently a statutory nuisance in the UK. Neither the Environmental Protection Act (1990) nor the Noise Act 1996 cover aircraft noise ([CAA, 2015](#)).

When planning a new road, the local highway authority assess how the noise at your property will change when the road opens ([UK Government, 2016](#)). If noise from a new road exceeds certain levels at homes, they might be able to get noise insulation. The eligibility levels for noise insulation are not clear from existing government documents, however, at the time of creating this document, Highway England stated that the noise insulation scheme for roads had ceased and a new scheme is due to be introduced ([UK Government, 2020](#)).

### Aviation noise and public health: rapid evidence assessment

This recent review summarised the quality of evidence on the health effects of aviation noise using GRADE (Grading of Recommendations, Assessment, Development and Evaluations). Note that a low or very low quality study reporting no effects indicates an absence of evidence, not an absence of an effect ([Iccan, 2020](#)).

## Appendix IV: References

Babisch, W., 2014. Updated exposure-response relationship between road traffic noise and coronary heart diseases: A meta-analysis. *Noise Health*, 16(68), pp. 1-9.

CAA, 2015. *Noise: An overview of aviation noise*. [Online]  
Available at: <https://www.caa.co.uk/Consumers/Environment/Noise/Noise/>

Clark, C., 2015. *Aircraft noise effects on health*, s.l.: Queen Mary University of London.

Clark, C. et al., 2005. Exposure-Effect Relations between Aircraft and Road Traffic Noise Exposure at School and Reading Comprehension: The RANCH Project. *American Journal of Epidemiology*, 163(1), pp. 27-37.

DfT, 2014. *TRANSPORT ANALYSIS GUIDANCE - An Overview of Transport Appraisal*. [Online]  
Available at:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938759/tag-overview.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938759/tag-overview.pdf)  
[Accessed 12 03 2021].

DfT, 2017. *Guide to WebTAG Noise Appraisal for non-experts*. [Online]  
Available at:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/669423/webtag-for-non-experts.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669423/webtag-for-non-experts.pdf)  
[Accessed 12 03 2021].

Grollman, C., Martin, I. & Mhonda, J., 2020. *Aviation Noise and Public Health*, s.l.: NatCen.

Hansell, A. L. et al., 2013. Aircraft noise and cardiovascular disease near Heathrow airport in London: small area study. *BMJ*, Volume 347, p. f5432.

Heathrow Airport Limited, 2016. *Heathrow press releases*. [Online]  
Available at: <https://mediacentre.heathrow.com/pressrelease/details/81/Corporate-operational-24/6008>  
[Accessed 24 02 2021].

Heathrow Airport Limited, n.d. *Night flights*. [Online]  
Available at: <https://www.heathrow.com/company/local-community/noise/operations/night-flights>  
[Accessed 24 02 2021].

Hygge, S., Evans, G. W. & Bullinger, M., 2002. A prospective study of some effects of aircraft noise on cognitive performance in schoolchildren. *Psychological science*, Volume 13, pp. 469-474.

ICCAN, 2020. *Aviation noise and public health*. [Online]  
Available at: <https://iccan.gov.uk/aviation-noise-public-health/>  
[Accessed 24 02 2021].

Klatte, M. et al., 2016. Effects of Aircraft Noise on Reading and Quality of Life in Primary School Children in Germany: Results From the NORAH Study. *Environment and Behavior*, 49(4), pp. 390-424.

Sharp, B., Donald, M., Charlotte, C. & Joy, H., 2014. *Assessing Aircraft Noise Conditions Affecting Student Learning, Volume 1: Final Report*, Washington, DC: The National Academies Press.

Stansfeld, S. A. et al., 2005. Aircraft and road traffic noise and children's cognition and health: a cross-national study. *The Lancet*, 365(9475), pp. 1942-1949.

UK Government, 2015. *Airports Commission final report: noise*. [Online]  
Available at: <https://www.gov.uk/government/publications/airports-commission-final-report-noise>  
[Accessed 08 03 2021].

UK Government, 2016. *Your property and Highways England road proposals*. [Online]  
Available at: <https://www.gov.uk/government/publications/your-property-and-highways-england-road-proposals>  
[Accessed 12 03 2021].

UK Government, 2020. *Highways England noise insulation scheme*. [Online]  
Available at: <https://www.gov.uk/guidance/how-to-apply-to-highways-england-for-noise-insulation#history>  
[Accessed 24 02 2021].

UK Government, 2021a. *Closed Consultation - Night flight restrictions*. [Online]  
Available at: <https://www.gov.uk/government/consultations/night-flight-restrictions-at-heathrow-gatwick-and-stansted-airports-between-2022-and-2024-plus-future-night-flight-policy/night-flight-restrictions>  
[Accessed 08 03 2021].

UK Government, 2021b. *Noise from roads, trains or planes*. [Online]  
Available at: <https://www.gov.uk/noise-pollution-road-train-plane/railway-noise#:~:text=There%20are%20no%20legal%20limits,sound%20insulation%20for%20your%20home>  
[Accessed 23 02 2021].

WHO, 2018. *Environmental Noise Guidelines for the European Region*, Copenhagen: © World Health Organization 2018.