From: Ronald Blay [redacted]
Sent: 19 January 2019 11:06
To: Manston Airport
Subject: Evidence on noise threat to health, and PDF files on particulate health threats.

Good day sir's I am writing on behalf of OAPs against a 24/7 freight hub on the door step of our Town of Ramsgate I enclose medical evidence that clearly sends the message of what a severe threat to the health of all residents not just OAPs but young and old alike a 24/7 freight hub will be should you pass this application. I have tried not to burden you with too many PDFs, but there are so many reports on sound and particulates from medical postings I really was spoilt for choice. Ronald Blay

Sent from Mail for Windows 10

AVIATION POLLUTION

In 2011, approximately 200 million passengers passed through mainland UK airports. This was a return to growth, following a recent period of decline in passenger numbers and air transport movements between 2007 and 2010. Government forecasts predict that this will rise to 255 million in 2020 and 313 million in 2030.

Airport operations are an important factor in our economy, for tourism, imports, exports and business. However, these benefits must be weighed against the impact air travel is having on the quality of life of increasing numbers of people and on the local and global environment. Noise and air pollution – both from aircraft and from airport ground operations – are a problem for those who live, work and study around airports.

The most immediate impact of aircraft is noise – whether it is the regular rumble of international jets or the buzz of microlights and light aircraft on sunny afternoons. The noise from airborne aircraft is related to air speed. Any fast-moving components, such as propellers and compressor blades, generate noise, as do the exhaust gases of jets. Aircraft are also responsible for an increasing proportion of air pollutant emissions, both at local and global level.

The Government has set up the Airports Commission, chaired by Sir Howard Davies, to look at long-term airport capacity issues in the UK. The Commission is examining the scale and timing of any requirement for additional capacity, focusing in particular on aviation hub issues, and identifying how any need for additional capacity should be met in the short, medium and long term.

The Commission is due to publish its interim report, assessing the most credible options for providing any new airport capacity, by the end of 2013. Criteria that the Commission is using to identify options include strategic, economic, surface access and environment. Environment criteria include air quality and noise. The Commission's final recommendations are expected by summer 2015.

AVIATION NOISE

The International Civil Aviation Organisation (ICAO) is responsible for drawing up aviation noise standards with the European Civil Aviation Conference, and UK standards are set in accordance with these.

Currently the Government only has direct responsibility for aircraft noise management at Heathrow, Gatwick and Stansted. Measures introduced to reduce noise include Noise Preferential Routes and restrictions on night flying. Maximum noise limits for departing aircraft are set and monitored and noise insulation schemes are in operation. Noise from aircraft on the ground is the responsibility of the airport operator. To comply with the EU Environmental Noise Directive, operators of airports with over 50,000 movements a year have been required to draw up Noise Action Plans (under criteria set for this 15 airports are designated in England, three in Scotland and one in N Ireland).

Noise limits have been introduced at the designated airports to cover the period 0700h – 2300h. Airport companies are responsible for monitoring compliance and breaches are subject to a financial penalty. Night flights are restricted between 2300h – 0600h and airports are given quotas of the number of night movements of noisier aircraft allowed to land during these periods.

Environmental Protection UK believes that any developments or alterations to the UK aviation infrastructure, air operations or flight scheduling, should not result in an increase to the night-time or day-time noise exposure of either the general population or of individual communities. Where an increase in exposure is unavoidable, a full package of mitigation measures should be offered to those affected, and the costs of such measure should be met by the aviation industry.

AIR QUALITY

Aircraft engines generally combust fuel efficiently, and jet exhausts have very low smoke emissions. However, pollutant emissions from aircraft at ground level are increasing with aircraft movements. In addition, a large amount of air pollution around airports is also generated by surface traffic.

The main pollutant of concern around airports is nitrogen dioxide (NO2). NO2 is formed by nitrogen oxide (NOx) emissions from surface traffic, aircraft and airport operations. PM2.5 is also of concern, since particulate emissions from jet exhausts are almost all in this fine fraction.

NOx in the lower atmosphere contributes to the production of ozone; ozone in the lower atmosphere is a pollutant, and contributes to global warming. Nitrogen oxides from high-altitude supersonic aircraft are thought to damage the stratospheric ozone layer, the protective layer that filters out harmful radiation from the sun.

The International Civil Aviation Organization (ICAO) sets international standards for smoke and certain gaseous pollutants for newly-produced large jet engines; it also restricts the venting of raw fuels. The latest standards came into effect in 2013 and apply to engine types certified after this date. Reductions in emissions from aircraft engines have generally been lower in recent years than in other sectors, where technologies such as selective catalytic reduction and exhaust gas recirculation have been employed. There are also increasing numbers of larger aircraft movements, which have disproportionately higher emissions than smaller aircraft.

Environmental Protection UK believes that no developments or alterations to the UK aviation infrastructure, air operations or flight scheduling should result in a breach of the EU limit values or UK air quality objectives, or worsen current breaches. Emissions considered must include direct emissions from aircraft, air-side service vehicles and plant, and the surface access required for airports.

Aviation is also a significant source of carbon dioxide emissions, and presents a major threat to Government targets in terms of emissions growth. This is for three reasons, firstly aviation is predicted to grow significantly, secondly emissions at altitude however are thought to have a greater effect on climate change than those at ground level, and finally there is no practical alternative to kerosene fuelled jet engines currently on the horizon. As other sectors reduce emissions aviation is therefore likely to become responsible for a far larger proportion of global climate change emissions.

ADDRESSING AVIATION POLLUTION

Environmental Protection UK is concerned at the potential impact of the apparent 'predict and provide' approach that is being taken to air travel in the UK and we would like to see the environmental impacts caused by any expansion reduced or avoided. We will be following the recommendations of the Airports Commission with interest.

We would like to see aviation policies developed in a way which is consistent with the approach used for other transport sectors, and aviation should be fully bedded into an integrated transport policy, rather than being treated as a separate issue.

The Government should also seek to reduce the environmental and social harm arising from aviation through a balanced programme of progressive introduction of improved technology, better operational practice and demand management. Where new infrastructure is required, or where existing capacity is expanded, the mitigation of further environmental and social harm should be seen as a key priority.

Action to reduce the environmental and social harm caused by aviation will require international cooperation. The Government should adopt a leading and active role in international debate, particularly within the European Union, and should encourage the development of radical and innovative solutions.

Environmental Protection UK has been lobbying the Government on aviation pollution, and responded to the consultation on the Draft Aviation Policy Framework, with the response below:

- EPUK response to the Draft Aviation Policy Framework – October 2012 (PDF)

SURFACE ACCESS

Planning development to meet the projected increased demand in passenger air traffic is also a cause for concern. While emissions from road vehicles are expected to decrease, this will be offset by growth in surface access movements around airport. Increasing capacity in more rural areas will lead to the erosion of tranquillity, loss of habitats for wildlife and increased surface traffic.

The environmental impact of aviation must include the impact of surface access to airports, and given that passengers, employees and goods often travel considerable distances to reach certain airports, this must be considered across the widest possible geographical context.

Where any airport infrastructure development occurs, either as new build or extension to existing infrastructure, surface access infrastructure must be planned, funded and delivered as an integral and wholly necessary part of the project. It should therefore be a condition of any new airport infrastructure development that the necessary surface access infrastructure be in place in its entirety before the airport facility comes into use.

COST AND TAXATION

Under international law, aviation fuel for international flights is exempt from taxation, which means air travel is relatively cheap. This also reduces the incentive for airlines to invest in more efficient aircraft. Aircraft operators are included within the European Union Emissions Trading Scheme. They could be further incentivised via fuel tax (which could be levied for domestic flights). This could:

- ensure airlines pay for the pollution they cause, like other transport operators
- encourage the development of more fuel-efficient aircraft
- help reduce the demand for air travel as other options become more competitive
- be consistent with UK pledges to reduce greenhouse gas emissions from airport operations

Policy should progressively seek an equitable cost/taxation basis across all modes of transport. In particular, all possible attempts should be made to ensure that the costs of aviation fully include the environmental and social costs, in accordance with the “polluter pays” principle.

The Government should also acknowledge the fact that the tax free status of aviation fuel effectively acts as a subsidy for the aviation industry, and should therefore fully factor this into its economic analysis of the costs and impacts of the industry.

Tel: [redacted]

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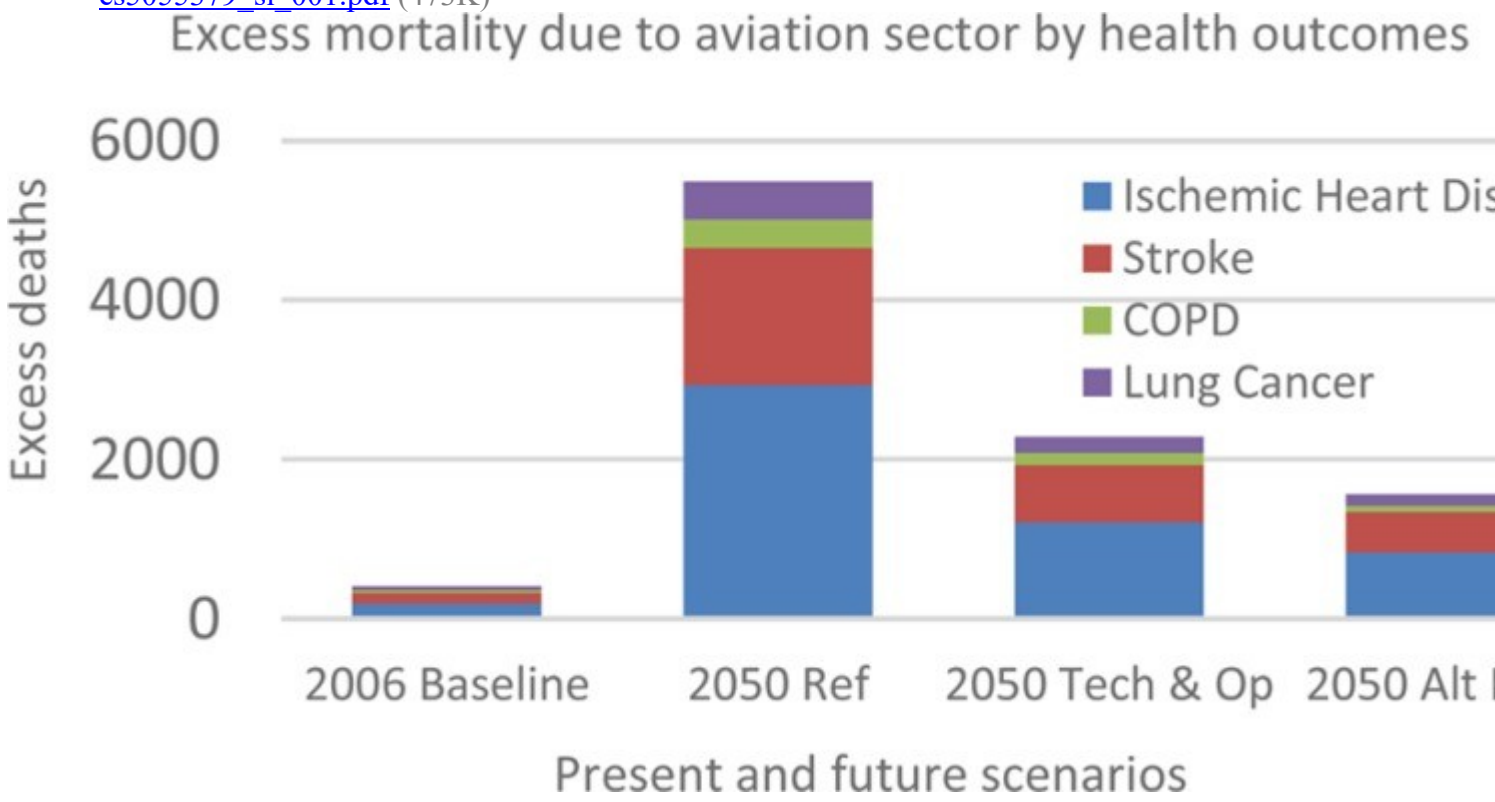
Global Health Impacts of Future Aviation Emissions Under Alternative Control Scenarios

Haruka Morita,*† Suijia Yang,† Nadine Unger,‡ and Patrick L. Kinney†
Author information Article notes Copyright and License information Disclaimer

Associated Data

Supplementary Materials
es5055379_si_001.pdf
es5055379_si_001.pdf (473K)



There is strong evidence of an association between fine particulate matter less than 2.5 μm ($PM_{2.5}$) in aerodynamic diameter and adverse health outcomes. This study analyzes the global excess mortality attributable to the aviation sector in the present (2006) and in the future (three 2050 scenarios) using the integrated exposure response model that was also used in the 2010 Global Burden of Disease assessment. The $PM_{2.5}$ concentrations for the present and future scenarios were calculated using aviation emission inventories developed by the Volpe National Transportation Systems Center and a global chemistry-climate model. We found that while excess mortality due to the aviation sector emissions is greater in 2050 compared to 2006, improved fuel policies (technology and operations improvements yielding smaller increases in fuel burn compared to 2006, and conversion to fully sustainable fuels) in 2050 could lead to 72% fewer deaths for adults 25 years and older than a 2050 scenario with no fuel improvements. Among the four health outcomes examined, ischemic heart disease was the greatest cause of death. Our results suggest that implementation of improved fuel policies can have substantial human health benefits.

Top of Form

Civil Aviation Authority

Connecting with the CAA

Aviation activity has many benefits to society such as allowing people to freely travel for business and pleasure. However, like other forms of transport, aircraft do cause environmental pollution.

This can be categorised as follows:

noise that can cause annoyance and in some cases health problems for local residents

pollutants that contribute to climate change pollutants that affect local air quality

other local impacts to the environment from running and maintaining aircraft that can impact local wildlife, habitats and water quality.

The level of environmental effects

Broadly speaking the more aviation activity that occurs, the greater the quantity of the pollutant – so the larger the airline, the higher the environmental impact. However, looking only at absolute levels doesn't tell the whole story. Per passenger pollution levels can also be considered, as can improvements in efficiency and performance. An airline that only used older, less environmentally friendly aircraft might create more noise and air pollution per flight than a larger airline.

Airlines publish information about their environmental impact in terms of:

Greenhouse gas emissions

Noise

Unfortunately, some techniques and procedures designed to reduce one environmental effect can lead to an increase in another environmental effect, for example by avoiding flying over more densely populated areas to reduce noise impacts can increase the journey distance which will increase the amount of emissions it generates.

The government has issued guidance to the CAA setting out a policy where noise should be prioritised over climate change at lower levels of altitude and vice-versa at higher altitudes. Read the government guidance.

The factors that can vary the impact on the environment

Like with other forms of transports such as road and rail; many factors affect the environmental impact of taking a flight. Generally speaking the more fuel-efficient an aircraft is the better for the environment. However, many factors affect fuel efficiency, such as:

Type of aircraft and engine

The length of flight, route flown and air traffic control restrictions

The configuration of the aeroplane, the number of passengers and amount of cargo carried

The weather

Determining which flight is best for the environment

This is a difficult question to answer as there are many factors involved. However, there are some general principles you can use when choosing a flight such as selecting airlines with modern (i.e. more efficient) aircraft.

What rules must airlines follow?

Rules and environmental standards vary from airport to airport. Airlines will have to meet the required standards to operate at that airport. If they don't, they may have to pay higher environmental landing charges, or the airport might restrict the number of flights they are allowed to make.

Some airlines are legally obliged to report their emissions. These are:

those that fly on routes between European airports have to report their emissions under the Emissions Trading System

those that are listed companies have to report their emissions under the Companies Act 2006 (Strategic and Directors' Reports) Regulations 2013.

How can airlines reduce their environmental impact?

There are lots of ways that airlines can reduce the environmental impact of their operations.

These can include:

Noise

investing in quieter aircraft

using their quietest aircraft at airports where there are more people affected by noise

sticking to operational procedures that reduce the noise impact.

Climate Change

purchasing more fuel-efficient aircraft when replacing old aircraft

ensuring that load factors are maximised so that emissions per passenger or tonne of freight carried are lowered

developing the use of next generation biofuels

finding ways to reduce unnecessary aircraft weight.

Air Quality

on arrival - switch off main engines and limit use of aircraft auxiliary power units where possible.

use fixed electrical ground power and preconditioned air if available at airports or ground power units.

conversely, on departure delay switching on main engines until ready for push-back.

The industry body Sustainable Aviation highlights what airlines are doing to implement these measures in practice.

Noise & Health
A Bimonthly Inter-disciplinary International Journal

Noise Health. 2017 Mar-Apr; 19(87): 41–50.

doi: 10.4103/nah.NAH_104_16

Abstract

Noise is defined as “unwanted sound.” Aircraft noise is one, if not the most detrimental environmental effect of aviation. It can cause community annoyance, disrupt sleep, adversely affect academic performance of children, and could increase the risk for cardiovascular disease of people living in the vicinity of airports. In some airports, noise constrains air traffic growth. This consensus paper was prepared by the Impacts of Science Group of the Committee for Aviation Environmental Protection of the International Civil Aviation Organization and summarizes the state of the science of noise effects research in the areas of noise measurement and prediction, community annoyance, children’s learning, sleep disturbance, and health. It also briefly discusses civilian supersonic aircraft as a future source of aviation noise..

Noise mitigation

Annoyance due to aircraft noise has been recognized by authorities and policy makers as a harmful effect that should be prevented and reduced. Priority is given to noise reduction at the source (e.g., engine noise, aerodynamic noise) and reducing noise by adjusting take-off and landing procedures, but these measures are not always sufficient or feasible. Sound insulation of dwellings is often applied, but may not reduce annoyance levels when it is associated with poor indoor air quality.[16] In addition, the observed influence on annoyance of several non-acoustical factors such as fear, perceived control, and trust in authorities suggests that communication strategies addressing these issues could strongly contribute to the reduction of annoyance, alongside or even in the absence of a noise reduction.

Children’s Learning

Chronic aircraft noise exposure and children’s learning

Recent reviews of how noise, and in particular aircraft noise, affect children’s learning have concluded that aircraft noise exposure at school or at home is associated with children having poorer reading and memory skills.[17] There is also an increasing evidence base which suggests that children exposed to chronic aircraft noise at school have poorer performance on standardized achievement tests, compared with children who are not exposed to aircraft noise. In the limited space available here, it is only possible to discuss some of the central epidemiological field studies forming the empirical basis of these conclusions. The most recent large scale cross-sectional study, the RANCH study (Road traffic and Aircraft Noise and children’s Cognition & Health), 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, after taking social position and road traffic noise, into account.[18] Reading comprehension began to fall below average at around 55 dB L Aeq,16hours at school, but as the association was linear, there is no specific threshold above which noise effects begin, and any reduction in aircraft noise exposure should lead to an improvement in reading comprehension. A 5 dB increase in aircraft noise exposure was associated with a 2 month delay in reading age in the UK, and a 1-month delay in the Netherlands.[19] These associations were not explained by air pollution.[20] Children’s aircraft noise exposure at school and that at home are often highly correlated. In the RANCH study, night-time aircraft noise at the child’s home was also associated with impaired reading comprehension and recognition memory, but night-noise did not have an additional effect to that of daytime noise exposure on reading comprehension or recognition memory.[21]

Interventions to reduce aircraft noise exposure at school

Studies have shown that interventions to reduce aircraft noise exposure at school do improve children's learning outcomes. The longitudinal, prospective Munich Airport study[22] found that prior to the relocation of the airport in Munich, high noise exposure was associated with poorer long-term memory and reading comprehension in children aged 10 years. Two years after the airport was closed, these cognitive impairments were no longer present, suggesting that the effects of aircraft noise on cognitive performance may be reversible if the noise stops. In the cohort of children living near the newly opened Munich airport, impairments in memory and reading developed over the 2-year period. This study suggests that it takes a couple of years for impairments to develop. A cross-sectional study of 6000 schools exposed between the years 2000–2009 at the top 46 United States airports (exposed to day–night-average sound level of 55 dB or higher) found significant associations between aircraft noise and standardized tests of mathematics and reading, after taking demographic and school factors into account.[23] In a sub-sample of 119 schools, it was found that the effect of aircraft noise on children's learning disappeared once the school had sound insulation installed. These studies suggest that insulation of schools yields improvements in children's learning.

Mechanisms linking chronic aircraft noise exposure and learning

Aircraft noise may directly affect the development of cognitive skills such as reading and memory, but a range of pathways and mechanisms for the effects have also been proposed. Effects might be accounted for by communication difficulties, teacher and pupil frustration, reduced morale, impaired attention, increased arousal − which influences task performance, and sleep disturbance from home exposure which might cause performance effects the next day.[24,25] Noise causes annoyance, particularly if an individual feels their activities are being disturbed or if it causes difficulties with communication. In some individuals, annoyance responses may result in physiological and psychological stress responses, which might explain poorer learning outcomes.

Guidelines for children's noise exposure at school

The World Health Organization (WHO) Community Noise Guidelines[26] suggest that the background sound pressure level (SPL) in school classrooms should not exceed 35 dB L Aeq during teaching sessions to protect from speech intelligibility and disturbance of information extraction. The WHO guidelines also suggest that school's outdoor playgrounds should not exceed 55 dB L Aeq during the recess period, to protect from annoyance. The American National Standards Institute (ANSI) Standard for School Acoustics (ANSI S12.50-2002/2010), suggests that internal background noise for unoccupied classrooms should be 35 dB L Aeq. The ANSI standard is supported by the Acoustical Society of America and INCE-USA. While the WHO and the ANSI guidelines both specify a maximum sound level of 35 dB for classrooms, it should be noted that for ANSI guidelines, this is for unoccupied classrooms, whereas for the WHO guidelines, this is for occupied classrooms. It should also be noted that WHO included cognitive impairment of children as one end-point in their publication on Burden of Disease from Environmental Noise − Quantification of healthy life years lost in Europe,[27] relying mainly on the results from the Munich study and the RANCH study.

Sleep and its importance for health

Sleep is a biological imperative, and a very active process that serves several vital functions. Undisturbed sleep of sufficient length is essential for daytime alertness and performance, quality of life, and health.[27,28] The epidemiologic evidence that chronically disturbed or curtailed sleep is associated with negative health outcomes (such as obesity, diabetes, and high blood pressure) is overwhelming. For these reasons, noise-induced sleep disturbance is considered the most deleterious non-auditory effect of environmental noise exposure.

Aircraft noise effects on sleep

The auditory system has a watchman function and constantly scans the environment for potential threats. Humans perceive, evaluate, and react to environmental sounds while asleep.[29] At the same SPL, meaningful or potentially

harmful noise events are more likely to cause arousals from sleep than less meaningful events. As aircraft noise is intermittent noise, its effects on sleep are primarily determined by the number and acoustical properties (e.g., maximum SPL, spectral composition) of single noise events. However, whether or not noise will disturb sleep also depends on situational (e.g., sleep depth)[30] and individual (e.g., noise sensitivity) moderators.[29] Sensitivity to nocturnal noise exposure varies considerably between individuals. The elderly, children, shift-workers, and those who are ill are considered at risk for noise-induced sleep disturbance.[28] Repeated noise-induced arousals impair sleep quality through changes in sleep structure including delayed sleep onset and early awakenings, less deep (slow wave) and rapid eye movement (REM) sleep, and more time spent awake and in superficial sleep stages.[30,31] Both deep and REM sleep have been shown to be important for sleep recuperation in general and memory consolidation specifically. Non-acoustic factors (e.g., high temperature, nightmares) can also disturb sleep and complicate the unequivocal attribution of arousals to noise.[32] Field studies in the vicinity of airports have shown that most arousals cannot be attributed to aircraft noise, and noise-induced sleep-disturbance is in general less severe than that observed in clinical sleep disorders such as obstructive sleep apnea.[33] Short-term effects of noise-induced sleep disturbance include impaired mood, subjectively and objectively increased daytime sleepiness, and impaired cognitive performance.[34,35] It is hypothesized that noise-induced sleep disturbance contributes to the increased risk of cardiovascular disease (CVD) if individuals are exposed to relevant noise levels over months and years. Recent epidemiologic studies indicate that nocturnal noise exposure may be more relevant for long-term health consequences than daytime noise exposure, probably because people are also at home more consistently during the night.[36]

Conclusions

Undisturbed sleep is a prerequisite for high daytime performance, well-being and health. Aircraft noise can disturb sleep and impair sleep recuperation. Further research is needed to (a) derive reliable exposure–response relationships between aircraft noise exposure and sleep disturbance, (b) explore the link between noise-induced sleep disturbance and long-term health consequences, (c) investigate vulnerable populations, and (d) demonstrate the effectiveness of noise mitigation strategies. This research will inform political decision-making and help mitigate the effects of aircraft noise on sleep.

Go to:

Health Impacts

There are several ways in which noise could affect health,[40] including a physiological response via the autonomic nervous system leading to rises in blood pressure and heart rate, stress potentially mediated by annoyance, and disturbed sleep. However, the number of health studies available to date is limited.

Aircraft noise and cardiovascular disease hospitalizations and mortality

Two large studies have found associations between aircraft noise and heart disease and stroke; one of these examined hospitalization rates in 6 million adults aged 65 years and over living near 89 US airports,[41] the second examined hospitalization and mortality in a population of 3.6 million potentially affected by noise from London Heathrow airport.[42] These studies used a small area (ecological) not individual-level design, so may not have fully accounted for confounding factors. Two individual-level studies have found associations between heart disease and stroke in subgroups who had lived in the same place for >15–20 years; one a cross-sectional study of approximately 5000 individuals living near seven European airports,[43] the second a census-based study of 4.6 million individuals in the Swiss National cohort.[44] A further two individual-level studies, of heart disease mortality in adults in Vancouver,[45] and stroke mortality in 64,000 adults living in Denmark,[46] did not find associations possibly due to the fact that the study areas had low levels of noise.

Aircraft noise and hypertension

Two meta-analyses[47,48] relating to seven epidemiological studies in total have found associations between chronic aircraft noise exposure and hypertension in adults (meta-analyses combine evidence from several studies and are considered to provide the highest ranked research and to provide stronger evidence than single studies). Results from the meta-analyses are consistent with findings from meta-analyses of studies investigating road noise that have also shown associations with hypertension.[49] Aircraft noise has been associated but not consistently so with raised blood pressure in children in a number of studies, of which the largest involved 62 schools around London Heathrow and Schiphol airport.[50] The findings from epidemiological studies are supported by experimental and field studies that have demonstrated short-term effects of aircraft noise on blood pressure in adults. A field study of 140 individuals living near four European airports found increases in blood pressure measurements during the night sleeping period related to aircraft movements.[51] Short-term experimental studies in healthy adults[52] and those with existing CVD[53] have found dose–response associations between aircraft noise at night and next-morning blood pressure and blood vessel functioning.

Aircraft noise and cardiovascular risk factors

Few studies have been conducted looking at cardiovascular risk factors, e.g., biomarkers, adiposity, and diabetes. Two experimental studies of aircraft noise recordings played at different volumes during sleep did not find associations with inflammatory markers (Interleukin6, C-Reactive Protein) in the blood the following morning, while findings were inconsistent with adrenaline and cortisol.[52,53] A study of approximately 5000 individuals in Stockholm followed up for 10 years found a L den 5 dB(A) increase in aircraft noise was associated with a greater increase in waist circumference of 1.5 cm (95% confidence interval: 1.13–1.89 cm)[54] but no associations were seen with body mass index.[55] The authors suggested that increased stress hormones might contribute to central obesity, measured by waist circumference and waist-hip ratio.

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Aircraft noise effects on psychological health

The evidence for aircraft noise exposure being linked to poorer well-being, lower quality of life, and psychological ill health is not as strong or consistent as for other health outcomes, such as hypertension. A study of 2300 residents near Frankfurt airport found that annoyance but not aircraft noise levels per se (L Aeq,16hours, L night, L den) was associated with self-reported lower quality of life.[58] The HYpertension and Exposure to Noise near Airports (HYENA) study, found that a 10 dB increase in day-time (L Aeq,16hours) or night-time (L night) aircraft noise was associated with a 28% increase in anxiety medication use, but not with sleep medication or anti-depressant medication use.[59] A sub-study of the HYENA study found that salivary cortisol (a stress hormone that is higher in people with depression) was 34% higher for women exposed to aircraft noise above 60 dB L Aeq,24hours, compared to women exposed to less than 50 dB L Aeq,24hours,[60] but no associations were found for men. Studies in schools around London Heathrow airport found no effect of aircraft noise at school on children's psychological health or cortisol levels.[61,62,63] However, the West London Schools Study of 451 children aged 8–11 years found higher rates of hyperactivity symptoms for children attending schools exposed to aircraft noise exposure >63 dB L Aeq,16hours compared to children in schools exposed to levels below 57 dB L Aeq,16hours.[62] A similar effect was observed in the RANCH study.[63] These increases in hyperactivity symptoms, whilst statistically significant, were very small and most likely not of clinical relevance.

Noise is considered one, if not the most detrimental environmental effect of aviation. There is abundant evidence that aircraft noise exposure in the vicinity of airports is related to annoyance, and some evidence that the annoyance response has increased in recent years. There is sufficient evidence for a marked negative effect of aircraft noise exposure on children's cognitive skills, with some evidence that insulation of schools could mitigate this. There is also sufficient evidence that aircraft noise disturbs sleep and can impair sleep recuperation, but further research is needed to establish reliable noise exposure–response relationships and best mitigation strategies. Studies are suggestive of impacts of aircraft noise on health, but inconclusive with respect to quantification of exposure–response relationships, with a limited number of studies conducted to date. Mitigation of these various noise effects

is necessary to protect the population living in the vicinity of airports and to address potential constraints to air traffic movements.

Aircraft noise characteristics

In contrast to, e.g., continuous road traffic noise from a busy road, aircraft noise is intermitted noise, i.e., consecutive aircraft noise events are usually separated by a noise-free period. During take-off, noise is predominantly generated by aircraft engines, while aerodynamic noise generated at flaps, gears, etc. may be more prominent than engine noise during landing.

Noise mitigation

The best noise mitigation measure is noise reduction at the source. Engineers were able to substantially reduce aircraft noise over the past decades (e.g., through high-bypass engines). Over the same period, air traffic volume increased substantially. Thus, people are exposed to a higher number of less noisy aircraft today. As it takes many years for new quieter aircraft designs to penetrate the market, different solutions are needed to reduce the number of people affected by relevant levels of aircraft noise. Potential measures include restricting how land is used near airports, changing how and where aircraft operate, limiting aircraft operations based on noise levels, limiting the hours that aircraft are allowed to operate, and providing sound insulation of homes and schools.

Noise monitoring

Many airports monitor noise levels on a regular basis. The equipment includes aircraft noise monitors, devices containing sound level meters, computer memory, and possibly communication equipment. The noise monitors are placed at strategic locations in the airport vicinity, often to assess the noise impact on selected neighborhoods or specific noise-sensitive locations such as hospitals or schools. By regular noise monitoring, an airport can ensure that the great majority of aircraft operations are within established noise limits.

Noise prediction

One of the additional tools used by airports and regulatory authorities are sound level contour maps, often just called noise maps. Using a combination of sound level measurements and appropriate sound mapping software, an airport can establish expected noise levels and determine, for example, locations where noise mitigation is needed. Looking down upon a map of the airport, the highest sound levels occur immediately next to the runways and along the primary aircraft takeoff and descent ground tracks. Moving away from these highest levels, decreased noise is found. Such noise maps can be very useful for assessing current and future noise exposure within several kilometers of airports.

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Media Blog

10. 12. 17

Health Issues Caused By Living Near an Airport

There is mounting evidence that living near an airport may cause health issues. There are various health risks which can have long term effects and can prove to be fatal for the life of people living near the airport. Listed below are four major contaminants residence should monitor while living near an airport.

1. Noise

Airports are major contributors to noise pollution because an aircraft and its components produce a lot of noise during the various stages of a flight. The sources of noise include power units, propellers and jet exhaust. It has been found that in residential areas, aircraft induced noise levels go upto 60 decibels in the day and 45 decibels at night. Constant exposure to such high levels of noise can lead to several health problems like hypertension, hearing impairment, heart problems, sleep disturbance and irritation. In extreme cases, the immune system can get compromised and children can be born with birth defects.

2. Odors

Air pollution is another major problem associated with airports. The toxic emissions released by aircrafts contain volatile organic compounds or VOC's and nitrogen oxides which pose a serious threat to human health. These pollutants are very smelly and constant exposure to them can cause severe headache as well as respiratory problems. Aviation emissions are transmitted in the form of sprays which even our lungs cannot filter out.

3.Ozone

The emissions that come out of the aircrafts contain a large variety of chemical elements including ozone. Ozone is a very powerful oxidant which affects the tissues of the respiratory tract. It leads to throat irritation, tightness in the chest and cough. The inflammation in the lung increases the chances of asthma attacks. Ozone exposure can make it very difficult for people to breathe deeply. It can also induce emphysema and chronic bronchitis. In extreme cases it leads to chronic obstructive pulmonary disease.

4. Soot

Emission from aircraft also contains impure carbon particles called soot. These are released as a result of incomplete combustion of hydrocarbons. This carcinogenic substance is present in the form of a powder which easily mixes with the air. When human beings breathe such polluted air constantly, it can lead to problems like chronic lung disease, asthma, lung cancer and influenza.

5. Ultra-fine particulates

The air around an airport contains ultrafine particulates. They are extremely small in size which is why they affect a larger surface area of the lung tissue. Ultrafine particulate matter lead to serious respiratory diseases which are connected to cardiovascular problems. The ultra-fine particles pass quickly into the circulatory system and cause cellular damage as well. Problems like cancer, asphyxiation, drowsiness, mutations, pulmonary irritation, wheezing, mental depression and distorted perceptions are all results of exposure to such ultra-fine particulate matter.

Measures to deal with these harmful effects

- ## Go for indoor air quality testing

Combating the harmful effects of living near the airport is very important. The first thing that you need to do is to go for an indoor air quality testing and air sampling so that you get to know the level of air pollution that you are exposed to. Testing can give you an exact idea regarding the amount of dust, mould and chemicals in the air inside your house. Once you know the quality of air that you are breathing, you can take actions to improve the air quality and remove the potential indoor air

pollution sources. More than 10,000 chemicals can be tested and identified. If you live near the airport, you should immediately go for such air quality testing in order to avoid the health damage due to polluted air.

- ## Buy a noise meter

Measuring noise levels is very important to understand the level of noise that you are exposed to on a daily basis. Monitoring the noise level and removing the sources of noise pollution help in preventing health risks pulmonary and lung diseases. You can buy a noise metre to measure and control knowing that you are exposed to. Locating problem areas in your house can give you an idea as to where you need to put in sound filters to keep out the noise.

- ## Install High quality air purifier

There are many air purifiers available in the market nowadays to deal with air pollution inside the house. You should always go for high quality air purifiers which are able to remove the maximum particulate matter from the air so that you can protect your health. These air purifiers act as vacuum cleaners and clean the air of dust, pollen and particulate matter. They can prevent allergies and other health issues.

- ## Check the presence of internal filters in HVAC system

You should always check whether your HVAC system has air filters or not. If not, you should get them installed immediately. This can help in reducing the amount of particulate matter that you are exposed to. The HVAC system is a major source of air pollution if the filter is not present because it disperses the particulate matter.

If you follow these tips, they can help you to reduce the health risks of living near the airport.