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Health Impacts of Aviation Noise: Overview, Issues & Potential Advocacy Strategy

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"Clearly, aviation noise has been and remains a controversial issue affecting communities that are located near airports. Likewise, trying to limit and mitigate the noise exposure of those communities has been and remains a challenging task."

- House Transportation and Infrastructure Aviation Subcommittee Chairman Congressman Thomas Petri (R-WI)

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We will discuss the findings of aviation health impact studies in the U.S. and abroad: what practical things come out of those studies, i.e., beyond research for research's sake.

Furthermore, what do these studies mean for MSP-adjacent communities and what steps or recommendations are needed for this region to be engaged and at the forefront of the next health impact studies – locally and nationally?

1. Overview of Health Impact Studies Conducted Abroad
2. Overview of U.S / PARTNER-led Health Studies
    - Literature Review (Project 19)
    - Annoyance/ Sleep Disturbance
    - Low Frequency Noise
    - Project 44 – Health Effects on the Elderly
3. Minneapolis Metropolitan Area Study
4. FAA & PARTNER Research – Current Bill
5. The Intersection of Advocacy and Research: Positioning NOC for Future Success

Selection of Health Impact Studies Conducted Abroad

World Health Organization (WHO) Study (March 2011) on Health Effects of Noise From Roads, Railways & Airports

- WHO is the directing and coordinating authority for health within the United Nations system - responsible for providing leadership on global health matters and shaping the health research agenda.

<u>The WHO Study Found:</u>

Noise causes a wide range of health effects, including:

- sleep disturbance;
- cardiovascular effects;
- damage to work and school performance;
- hearing impairment including tinnitus (the perception of sound the ears or head where no external source is present).

"This new review of evidence is WHO's contribution to the policy process in the European Union. We hope that it can influence the update of the European Union directive to include stricter limit values for noise pollution, and that it can be extended to other parts of the Region," comments Rok Ho Kim, Scientist, Noise and Health at WHO/Europe, who coordinated the WHO project to draw up the report."

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Selection of Health Impact Studies Conducted Abroad

Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health: Exposure-Effect Relationships and Combined Effects (RANCH)

- The RANCH project is the largest cross-sectional study of noise and children's health, examining 9-10 year old children living around three major airports: Schiphol, Amsterdam in the Netherlands, Barajas, Madrid in Spain and London Heathrow in the United Kingdom.

The RANCH study (2005) found:

- High levels of chronic aircraft noise exposure impair children's reading comprehension and recognition memory.
- The results confirm previous findings that children experience annoyance and extend knowledge on exposure-effects for aircraft and road traffic noise exposure. This implies an impaired quality of life for children.
- There is no evidence for exposure-effect relationships between noise exposure and children's self-reported health or overall mental health and inconclusive evidence for blood pressure and sleep disturbance.
- Opportunities for psychological restoration may potentially protect against adverse reactions to noise and improve children's well-being.

Selection of Health Impact Studies Conducted Abroad

Hypertension and Exposure to Noise Near Airports: the HYENA study (2008)

- Conducted by consortium of higher education researchers in Europe

HYENA Study

- The study demonstrated an increased prevalence of **hypertension and heart disease** has been found in people exposed to higher levels of road and aircraft noise.
- This study supports a possible role of **sleep disturbance** in the observed outcomes of increased hypertension with increased nighttime aircraft noise exposure.

"Thus, results of both studies supporting plausible biological pathways for hypertension genesis resulting from noise and environmental studies observing its apparent occurrence have appeared—thus, a well-supported case seems to exist for the occurrence of an effect of noise on hypertension development, possibly mediated by sleep disruption."

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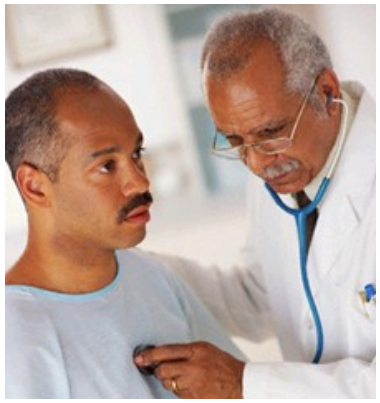
Selection of Health Impact Studies Conducted Abroad



IN THE NEWS: "Study: Airport Noise Increases Risk of Strokes"

By **TRISTANA MOORE / TIME MAGAZINE / BERLIN**
Tuesday, Dec. 15, 2009

- Men who are exposed to jet noise have a 69% higher risk of being hospitalized for cardiovascular disease.

- Women living under flight paths fare even worse, logging a 93% higher rate of hospitalization with cardiovascular problems, compared with their counterparts in quiet residential areas.

- The study found that women who are exposed to jet noise (of about 60 decibels) during the day are 172% more likely to suffer a stroke.

"Living under a flight path can seriously damage your health. German researchers have discovered that people who are exposed to jet noise have a substantially increased risk of stroke, high blood pressure and heart disease. The findings are bound to provide further ammunition to anti-airport campaigners and make uncomfortable reading for world leaders at this week's climate summit in Copenhagen."

PARTNER History

- The Omnibus Budget Reconciliation Act of 1990 (PL 110-508) gave the Administrator of the FAA the power to establish Centers of Excellence to conduct aviation research on a continuous basis. The areas of research are:

  - Noise and emissions impacts on the environment and people
  - Noise and emissions abatement flight procedures and technology
  - Compatible land use management
  - Airport operational controls
  - Noise and emissions measurements and health impacts
  - Aviation atmospheric effects
  - Interrelationships between noise and emissions

Selection of Health Impact Studies Conducted in the U.S

PARTNER PROJECT 19: (Completed July 2010)

Project 19 research involved a review of the health effects of noise literature, particularly that portion related to aircraft noise, and to examine in detail the basis for the findings reported in these recent meta-analysis studies.

<u>In its discussion for future research:</u>

- "Future research needs to address further the relevance of differences in noise types and characteristics, explore more the question of the important exposure settings, and conclusively differentiate between the waking and sleeping effects of noise exposure. Further studies might also benefit from questionnaire items taking into account potential confounding by sleep disordered breathing as well as other nighttime noise exposure within the home."

- "While some research findings concerning hypertension and heart disease seem to support a possible role of noise disturbance through sleep, other potential outcomes of sleep disrupted by aircraft such as obesity and diabetes have not been specifically investigated."

"A great deal of research remains to be done in the field of health effects of noise. For instance, serious questions remain as to the most relevant exposure types and environments and the best metrics with which to evaluate these risks."

Selection of Health Impact Studies Conducted in the U.S

"The concern with annoyance and the concern with health effects arising out of stress reactions in humans is in the fact the dominant historical position in noise-health research."

—Project 19 Findings

Ongoing PARTNER Projects:

Project 24: Noise Exposure Response: Annoyance

- Goal of Project 24: Develop a deeper understanding of how noise affects annoyance in communities in proximity to airports & construct models that can be coupled with sound prediction models to predict annoyance that would result from future airport developments or changes in air traffic patterns.

Project 25: Noise Exposure Response: Sleep Disturbance

- Goal of Project 25: Understand how much aircraft noise impacts sleep in communities around airports, and how impacts due to aircraft noise compare with those due to other things (other noise sources, weight, age, stress, etc.) that are known to affect sleep.

Selection of Health Impact Studies Conducted in the U.S

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—Project 19 Findings

National Academy of Sciences

Transportation Research Board : Airport Cooperative Research Project:

Research Methods for Understanding Aircraft Noise Annoyance and Sleep Disturbance (#02-35)

- TRB is one of six major divisions of the National Research Council— a private, nonprofit institution that is the principal operating agency of the National Academies in providing services to the government, the public, and the scientific and engineering communities.
- Research is underway, and the ACRP-approved panel has reviewed and approved the amplified work plan.
- The objectives of this research are to (1) develop and validate a research protocol for a large-scale study of aircraft noise exposure-annoyance response relationships across the U.S. and (2) propose alternative research methods for field studies to assess the relationship between aircraft noise and sleep disturbance for U.S. airports.

Selection of Health Impact Studies Conducted in the U.S

Low-Frequency Noise Impacts

The PARTNER Low Frequency Noise Study (Project 1 – Completed April 2007) evaluated the perceptual impact of low frequency aircraft noise.

- It encompassed many factors, including the source level and its spectrum; atmospheric propagation; the impact on homes in the form of noise, vibration and rattle; subjective perception and annoyance; and the ability of metric calculations to predict the physical and perceived impact.

MSP Low Frequency Noise Study (1998)

- The primary effect of current and anticipated low-frequency aircraft noise on the residents of neighborhoods near MSP is rattle-related annoyance.

- "Low-frequency aircraft noise (apart from that of low-altitude, high-speed military aircraft) poses no known risk of adverse public health consequences, nor a risk of structural damage."

- The Federal Interagency Committee on Airport Noise (FICAN) concurred with the study's assessment of the health impacts of LFN in their 2002 response.

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Selection of Health Impact Studies & MSP

Rebecca Donatelle: "The Impact of Commercial Aircraft Noise on Human Health: A Neighborhood Study in Metropolitan Minnesota." Published in the Journal of Environmental Health in November 2000, Vol. 63 Issue 4, p9

In brief: Four neighborhoods exposed to commercial-aircraft noise (in Minneapolis, Eagan, St. Paul and Bloomington) were ranked according to the severity of the exposure by frequency of loud exposures and decibels. Over 2,000 subjects responded to a randomly administered survey that measured general health; mental health; sense of vitality; and noise annoyance, noise sensitivity, and perceived stress levels.

- All health measures were significantly worse in the neighborhoods exposed to commercial-aircraft noise.

- Respondents with the worst health status tended to be among those experiencing commercial-aircraft noise of the greatest severity. Stress and noise annoyance levels were significantly higher in the exposed neighborhoods, and these measures were also significantly worse for those neighborhoods exposed to the highest levels of commercial-aircraft noise.

Selection of Health Impact Studies & MSP

The study concluded:

- Aircraft noise is physically and psychologically distinct from all other forms of uninvited sound.
- Lack of control over this stressor may contribute to diminished coping ability, as well as to a sense of vulnerability.
- The authors suggest that in the planning of airport locations and expansions, careful consideration be given to the potential adverse human health effects caused by aircraft noise.

"That's all well and good – but – how does the health-impact of aviation noise move forward in the current economic and political climate?"

Future Health Impact Studies To Be Conducted in the U.S

PARTNER PROJECT 44: Aviation-Related Noise Effects on the Elderly

In Project 44, PARTNER will employ national data on Medicare enrollees and noise contours surrounding 95 airports to evaluate the linkage between aviation-related noise and hospital admissions for cardiovascular disease.

This will be the first national-scale investigation of health impacts of airport noise in the US.

- Conclusions regarding airports where health impacts appear more significant and where future investigations may be warranted.
- This is all possible with community emphasis & support in FAA reauthorization on aviation-noise research and technological developments.

Legislative Summary: FAA Authorization

Bills: S 223, HR 658,
Latest extensions: HR 2887 (became Public Law 112-30)

Status: A comprehensive reauthorization of the Federal Aviation Administration passed in each chamber in 2011, but the legislation remains stalled. The most recent short-term extension for the FAA is set to expire at the end of January 2012.

When Passed, this law will:

- Reauthorize the PARTNER Center of Excellence in applied research and training in the use of advanced materials in transport aircraft. (Section 608)
- Provide for Environmental-Related Research Programs and Funding
- Noise Set-Aside Funding
- AIP Grant Assurances
- Address Aircraft and Airport Air Emissions and Noise

The Intersection of Advocacy and Research: Positioning NOC for Future Success

Moving Forward:

Potential NOC objectives in relation to the impacts of aviation noise on human health:

- Be on the forefront of Research
- Impact Policy Change
- Direct Funding for local mitigation

Advocacy for Research AND Policy Change:

- **Potential Research**
  - Advocate why Minnesota is unique
  - Minnesota's Healthy Cities
  - Access to Resources—U of M, Mayo
  - Leadership in N.O.I.S.E/PARTNER
  - Residential Flight Path
  - Unique Socioeconomic airport-adjacent footprint

Minnesota can be a model – we want to lead the charge!

N.O.I.S.E.

Policy Change:

- Coalitions like NOC are vital
- National coalition building—what other airports are impacted?
  - NOISE
  - National League of Cities
  - Aviation Policy Group (Tempe/College Park)
- Raising awareness of severity of the issue on public health

Support for concrete outcomes following research:

- Engaging with Policy Makers in Congress to connect with FAA
- Demonstrate to FAA (PARTNER) Leadership and Motivation

The Minneapolis / St. Paul metropolitan region can be a leader in creating a national debate in order to comprehensively address the negative health impacts of aviation noise