Summary of Research re Noise and its Effects on Human Health

Prepared for the

Toronto Aircraft Noise Group (T.A.N.G.)

A few of the more relevant papers on the subject together with a brief summary:

1) **City of Toronto - Health Effects of Noise,**
   Dr. Sheela V. Basrur, Medical Officer of Health , March 2000

   Key Point(s): One way of measuring excessive noise is the point at which 10 percent of the population is seriously affected or highly annoyed by the noise (Job, 1996).

   Conclusions: Noise is an important health issue that affects more than hearing. The scientific research demonstrates that health effects occur at noise levels below those that impair hearing. Some of these health effects include increased risk for cardiovascular disease, negative effects on sleep, communication, performance and behaviour, reading and memory acquisition, and mental health.

2) **Aircraft Noise, Air Pollution, and Mortality From Myocardial Infarction,**
   Anke Huss, Adrian Spoerri, Matthias Egger, and Martin Roosli, for the Swiss National Cohort Study Group, Epidemiology, November, 2010

   Conclusions: Our study adds to a growing body of evidence supporting a link between high levels of exposure to aircraft noise over extended periods of time and mortality from myocardial infarction.

3) **Aircraft Noise, Health, and Residential Sorting - Evidence from 2 Quasi Experiments,**
   Stefan Boes, Stephan Nüesch, Steve Stillman, July 2012

   Conclusions: We find that aircraft noise significantly increases sleeping problems, weakness/weariness, and headaches. Based on noise-related reductions of rents around Zurich airport, we estimate the yearly costs of aircraft noise to be around USD 400 per person living in the canton of Zurich.

4) **The Effect of Nocturnal Aircraft Noise on Health: a Review of Recent Evidence,**
Charlotte Clark & Stephen A Stansfeld, Barts & the London School of Medicine, Queen Mary,University of London, Report prepared forthe London Borough ofHounslow, September 2011

Conclusions: this review indicates that nocturnal aircraft noise exposure is potentially associated with considerable public health impact and impact on quality of life for residents living near major airports.

5) **The Effects of Aviation Noise on People,**
Rob Adams of Landrum and Brown, Institute of Transportation Studies University of California, Berkeley, Power Point Presentation

Summary:
Is there a link between noise (specifically aircraft noise) and human health? YES.

- Irritability/annoyance
- Hypertension/blood pressure
- Speech interference/reduced learning

Is there enough evidence to quantify cause/effect relationships between the two? NO.

- More study is needed to isolate the impact aircraft noise has on human health
- Many of the studies are inconclusive or contradictory

- Are there guidelines that an airport can follow? YES.
  - For the FAA and airports, the minimum guidelines are set forth in the FAR Part 150 Land Use Compatibility Guidelines
  - EPA/WHO guidelines do not take into account economic impact or feasibility of enforcing them

6) **A Review of the Literature Related to Potential Health Effects of Aircraft Noise**
Hales Swift, Ray W. Herrick Laboratories, Purdue University, prepared for Partnership for AiR Transportation Noise and Emissions Reduction, an FAA/NASA/Transport Canada sponsored Center of Excellence, July 2010

Conclusions: Potentially serious health outcomes have been identified in studies involving transportation noise exposure in a population. These include heart disease and hypertension and the observed effects seem to be related especially to nighttime noise exposure although similar daytime exposure effects have also been identified.

The Babisch meta-analysis reports an odds ratio for occurrence of myocardial infarction of 1.13 per 10 dB increase of Lday and the HYENA results found an increase odds ratio for hypertension in those exposed to nighttime aircraft noise of 1.14 per 10 dB increment of noise. The possible role of sleep disruption in the development of these health outcomes has been investigated in this report along with the potential role of stress reactions. Hypertension and heart disease have been identified as potential outcomes in studies examining the effects of sleep disruption on health outcomes. Thus, a potential pathway exists for noise exposure to lead to these ailments through the long-term disruption or shortening of sleep. However, the exact size of the effect on sleep due to aircraft noise is not perfectly clear and may be small in magnitude, although significant results have been obtained for objectively measured sleepiness resulting from aircraft noise in the laboratory. Additionally, two other outcomes—obesity and diabetes—also seem to correlate with reduced or disrupted sleep and thus should also be examined as potential noise outcomes.

7) Hypertension and Exposure to Noise Near Airports: the HYENA Study
Lars Jarup, Wolfgang Babisch, Danny Houthuijs, Göran Pershagen, Klea Katsouyanni, Ennio Cadum, Marie-Louise Dudley, Pauline Savigny, Ingeburg Seiffert,Wim Swart,Oscar Breugelmans,Gösta Bluhm,Jenny Selander,Alexandros Haralabidis,Konstantina Dimakopoulou, Panayota Sourtzi, Manolis Velonakis and Federica Vigna-Taglianti,

Results

We found significant exposure–response relationships between night-time aircraft as well as average daily road traffic noise exposure and risk of hypertension after adjustment for major confounders. For night-time aircraft noise, a 10-dB increase in exposure was associated with an odds ratio (OR) of 1.14 [95% confidence interval (CI), 1.01–1.29]. The exposure–response relationships were similar for road traffic noise and stronger for men with an OR of 1.54 (95% CI, 0.99–2.40) in the highest exposure category (> 65 dB; *p*trend = 0.008).

Conclusions

Our results indicate excess risks of hypertension related to long-term noise exposure, primarily for night-time aircraft noise and daily average road traffic noise.