



Bathurst Quay
Neighbourhood Association

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Submission to MP Chi Nguyen

In response to Premier Ford's support of jet aircraft expansion at Toronto City Centre Airport – the BQNA has compiled the most recent information about Adverse Health Effects from Air and Noise Pollution.

This does not take into account the major safety concerns of jets flying next to buildings and schools in Toronto's largest population density – a population which is set to increase along our developing Waterfront.

Adverse Health Effects from Noise Pollution

Research into airport noise pollution focuses on the "non-auditory" effects of sound—specifically how unpredictable, high-decibel events trigger the body's stress response. Unlike the steady hum of a highway, aircraft noise is intermittent and jarring, which has been shown to cause systemic physiological strain. Here is a summary of the landmark studies regarding the health effects of airport noise.

Cardiovascular Health & Heart Structure

Recent breakthroughs have shifted the focus from simple blood pressure to the actual physical remodeling of the heart muscle.

UK Biobank / UCL Study (2025): One of the most recent and significant studies, analyzing nearly 27,000 participants, found that people living under noisy flight paths had 7% greater heart mass and 4% thicker heart walls. These structural changes (stiffening of the heart) can quadruple the risk of heart attack or stroke.

HYENA Study (Hypertension and Exposure to Noise near Airports): This massive EU-funded project across six countries found that a 10 dB increase in night-time aircraft noise was associated with a 14% increase in the risk of high blood pressure. It also proved that blood pressure spikes during sleep immediately following a "noise event" (plane flyover), even if the person does not wake up.

Medicare Multi-Airport Study (2013): Researchers looked at 6 million older Americans living near 89 US airports. They found that zip codes with 10 dB higher noise levels had a 3.5% higher cardiovascular hospital admission rate, specifically for heart failure and ischemic heart disease.

Cognitive Development in Children

Children are particularly vulnerable because their brains are in a state of rapid development, and noise interferes with the "auditory filtering" necessary for learning.

RANCH Study (2005): This study compared children near London Heathrow, Amsterdam Schiphol, and Madrid Barajas. It found a direct exposure-response relationship: for every 5 dB increase in aircraft noise, reading age was delayed by up to 2 months.

Munich Airport "Natural Experiment" (2002): When the old Munich airport closed and a new one opened, researchers tracked children in both locations. At the new airport, children's long-term memory and reading comprehension significantly declined, while children near the closed airport saw their cognitive scores improve almost immediately.

NORAH Child Study (2016): Conducted around Frankfurt Airport, this study confirmed a "reading retardation" of roughly one month for every 10 dB increase in aircraft noise among primary school students.

Mental Health & Sleep Disturbance

Airport noise is a potent "psychological stressor" that can lead to chronic mental health conditions.

NORAH Study (Mental Health Module): This German study found that residents exposed to high levels of aircraft noise had a significantly higher risk of unipolar depression. Specifically, a 10 dB increase in aviation noise was associated with an 8.9% increase in depressive episodes.

Swiss HERMES Study: Focused on 2.6 million adults, this research linked airport noise to increased risks of Type 2 diabetes and stroke, attributing the link to the chronic release of cortisol (the stress hormone) caused by nighttime noise.

Mortality Rates

Swiss National Cohort (2010): This study found that the risk of death from myocardial infarction (heart attack) increased with both the level and duration of aircraft noise exposure. Those exposed to noise levels above 60 dB for at least 15 years had a 30% higher risk of death from heart attack compared to those in quieter areas.

Area of Impact	Primary Findings
Cardiovascular	Thicker heart walls, arterial stiffness, and 10–20% worse heart function.
Metabolic	Hypertension, increased BMI, and higher risk of Type 2 Diabetes.
Cognitive	Delays in reading age, impaired long-term memory in school children.
Mental Health	Stronger correlation with depression compared to road or rail noise.
Sleep	Instant blood pressure spikes of 6–7 mmHg during "noise events."

Airport-generated Air Pollution Health Impacts to Local Communities

Research into the health impacts of living near airports has intensified recently, focusing largely on Ultrafine Particles (UFPs)—pollutants smaller than 100 nanometers that can bypass the body’s natural filters to enter the bloodstream. Below is a summary of key studies and findings regarding the adverse health effects of airport-related air pollution.

Various Cancers

Brain Cancer (Malignant Glioma)

A major study published in 2023/2024 provided some of the most direct evidence of a link between airport emissions and specific cancer types.

Los Angeles Multiethnic Cohort Study (2023/2024): Researchers analyzed over 75,000 residents in Los Angeles County over 16 years. They found that long-term exposure to airport-related UFPs (specifically from LAX) was associated with a 12% increased risk of malignant brain cancer.

Specific Risk for African Americans: The study noted that the risk was even higher for African American participants—the subgroup with the highest exposure—who showed a 32% increased risk for brain cancer.

Lung Cancer

While outdoor air pollution is a recognized Group 1 carcinogen, researchers have specifically looked at whether airport proximity adds an incremental risk.

Los Angeles Lung Cancer Study (2024): A follow-up study within the same Multiethnic Cohort examined the link between airport UFPs and lung cancer. It found that historical UFP exposure was modestly associated with an increased risk of lung cancer (HR = 1.03), particularly for certain histological types like squamous cell carcinoma.

Dutch Population Study (2022): Research in the Netherlands found that UFP exposure (which included contributions from Schiphol Airport) was positively associated with lung cancer mortality. For every 10,000 particles/cm³ increase in UFP exposure, there was an approximately 3.8% increase in lung cancer deaths.

Toxic Air Pollutants (VOCs)

Airports are significant sources of "Air Toxics"—gaseous chemicals emitted during jet fuel combustion and ground operations. Rhode Island T.F. Green Airport Study: The EPA conducted monitoring in neighborhoods near the airport and found that concentrations of five VOCs, including benzene and 1,3-butadiene, were higher than "cancer benchmarks" (the level at which the risk of cancer exceeds one in a million).

Toronto Pearson Risk Assessment: A health risk assessment found that "Incremental Lifetime Cancer Risks" (ILCR) from airport-alone emissions for substances like formaldehyde and benzene reached levels of concern in residential areas immediately adjacent to the airport.

Occupational & Biological Evidence

Jet Engine Emissions Review (2021): A review of health effects concluded that jet engine exhaust has physicochemical properties nearly identical to diesel exhaust, which is a known human carcinogen. Because jet exhaust contains high levels of Polycyclic Aromatic Hydrocarbons (PAHs), it is biologically plausible that it causes the same DNA damage and oxidative stress that lead to cancer.

Cardiovascular & Metabolic Health

Studies have found strong links between aviation emissions and chronic diseases, often using "natural experiments" like runway congestion to isolate airport-specific effects.

California Airport Study (Schlenker & Walker, 2011/2016): Using data from the 12 largest California airports, researchers found that daily increases in airport congestion (ground delay) led to a significant rise in hospital admissions. A one-standard-deviation increase in pollution led to roughly \$1 million in additional hospitalization costs for respiratory and heart-related issues for those within 10km of an airport.

European Multi-Airport Study (Transport & Environment/CE Delft, 2024): This large-scale report estimated that UFP emissions from 32 major European airports could be associated with 280,000 cases of high blood pressure, 330,000 cases of diabetes, and 18,000 cases of dementia.

Schiphol Airport Study (RIVM, 2022): A comprehensive study around Amsterdam Schiphol found "possible associations" between long-term UFP exposure and increased use of medication for heart disease and high blood pressure.

Respiratory Health & Inflammation

Because airport pollutants are highly concentrated downwind, they have immediate effects on lung function, particularly for sensitive groups.

Los Angeles International (LAX) Study (Habre et al., 2018): This study monitored adults with asthma and found that even short-term exposure (walking downwind of LAX) led to immediate airway inflammation and reduced lung function. Crucially, it noted that aircraft-related UFPs caused systemic inflammation in the blood, not just the lungs.

Seattle/Sea-Tac Research: Studies in the Seattle area identified that airport-related UFPs have a unique "chemical signature" compared to traffic pollution and can penetrate deeper into residential homes, specifically impacting the respiratory health of children and the elderly.

Birth Outcomes & Developmental Risks

Emerging research suggests that the toxic components of jet fuel combustion may cross the placental barrier.

Pre-term Births & Pregnancy: A systematic review (2021) and the RIVM (2022) study identified increased rates of pre-term births and "small for gestational age" infants in communities living directly in flight paths.

Lead Exposure (EPA, 2023): While primarily affecting smaller regional airports using piston-engine planes, the EPA issued a final determination that lead emissions from aviation gasoline (AvGas) contribute to air pollution that endangers public health, specifically impacting the neurological development of children living nearby.

Mortality & Life Expectancy

Global Aviation Mortality Study (2015/2024): Recent modeling suggests that global aviation emissions contribute to approximately 16,000 to 21,200 premature deaths annually. About one-third of these deaths are attributed to PM2.5 exposure for people living within 20km of an airport.

This does not take into consideration health impacts from UltraFine particles – recently measured at Toronto City Centre Airport by the University of Toronto. Peaks of UFPs exceeded World Health Guidelines multiple times over in the Bathurst Quay community.

Pollutant	Potential Cancer Links	Source
Benzene	Leukemia, blood cancers	Fuel evaporation & exhaust
Formaldehyde	Nasopharyngeal cancer, Leukemia	Incomplete combustion
PAHs	Lung, bladder, and skin cancers	Soot from jet engines
Ultrafine Particles	Brain and lung cancer	Fuel combustion at high thrust

Health Area	Identified Effects
Respiratory	Asthma exacerbation, wheezing, coughing, lung inflammation.
Cardiovascular	Hypertension (high blood pressure), arrhythmia, heart disease.
Metabolic	Increased risk of Type 2 Diabetes.
Neurological	Links to dementia and Alzheimer's; cognitive impacts from lead.
Perinatal	Pre-term birth, lower birth weight, congenital abnormalities.