LUNG FUNCTION

Children Living Near Highways Suffer Pronounced Deficits in Lung Function
In this prospective study of 3677 children from 12 southern California communities who lived within 500 meters of a freeway had substantial deficits in 8-year growth of forced expiratory volume in 1 second (FEV1) and maximum mid-expiratory flow rate (MMEF), compared with children who lived at least 1500 meters from a freeway. Joint models showed that both local exposure to freeways and regional air pollution had detrimental, and independent, effects on lung-function growth.

W. Gauderman, H. Vora, R. McConnell, K. Berhane, F. Gilliland, D. Thomas, F. Lurmann, E. Avol, N. Kunzli, M. Jerrett. "Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study." *The Lancet*, 369 (9561): 571-577.

Lung Function Reduced Among Children Living Near Truck Traffic
A European study determined that exposure to traffic-related air pollution, "'in particular diesel exhaust particles," may lead to reduced lung function in children living near major motorways.

Brunekreef, B; N.A. Janssen; J. DeHartog; H. Harssema; M. Knape; P. Van Vliet. (1997). "Air pollution from truck traffic and lung function in children living near motorways." *Epidemiology*. 8(3):298-303.

FETAL DEVELOPMENT

Pregnant Women Who Live Near High Traffic Areas More Likely to Have Premature and Low Birth Weight Babies
Researchers observed an approximately 10-20 percent increase in the risk of premature birth and low birth weight for infants born to women living near high traffic areas in Los Angeles County. In particular, the researchers found that for each one part-per-million increase in annual average carbon monoxide concentrations where the women lived, there was a 19 percent and 11 percent increase in risk for low-birth weight and premature births, respectively.

Wilhelm,Michelle and Beate Ritz. (2002). "Residential Proximity to Traffic and Adverse Birth Outcomes in Los Angeles County, California, 1994-1996." *Environmental Health Perspectives.*

Pregnant Women Who Live Near Highways More Likely to Give Birth Prematurely
A 2007 study conducted by Quebec's Institute of Public Health and soon to be published in the *Journal of Epidemiology and Community Health* suggests Montreal women who live within 200 metres of a highway have a higher risk of delivering a small baby or giving birth prematurely.

Dr. Melissa Genereux, the study's lead author, and her research team studied 100,000 births between 1997 and 2001 in Montreal. The mothers of 6,000 of those infants lived within 200 metres of a major expressway. The main finding was these mothers were 15 to 20 per cent more

likely to deliver prematurely or have a low birth weight baby compared to mothers living further away from the highway, and that these babies tend to have more infections.

HEART DISEASE

A 2003 Brigham Young University study led by professor and epidemiologist Arden Pope suggests that the tiny particulate pollution from cars, power plants and factories leads to the development of heart disease. While there is clear evidence that exposure impacts the lungs, "long-term, chronic exposure to air pollution seems to manifest more in cardiovascular disease than it does in respiratory disease." While the link between air pollution and increased deaths has been shown previously in research by Pope and others, this more recent study demonstrates the biological mechanism by which long-term exposure to tiny-particle pollution can actually lead to ischemic heart disease, which causes heart attacks, as well as irregular heart rhythms, heart failure and cardiac arrest.[5]

OTHER RELEVANT STUDIES

People Who Live Near Freeways Exposed to 25 Times More Soot Particulate Pollution

Studies conducted in the vicinity of Interstates 405 and 710 in Southern California found that the number of ultra-fine soot particles in the air was approximately 25 times more concentrated near the highways and that pollution levels gradually decrease back to normal (background) levels around 300 meters, or nearly 330 yards, downwind from the highway. The researchers note that motor vehicles are the most significant source of ultra-fine particles, which have been linked to increases in mortality and morbidity. Recent research concludes that ultra-fine soot particles are more toxic than larger particles with the same chemical composition. Moreover, the researchers found considerably higher concentrations of carbon monoxide pollution near the highways.

Zhu, Yifang; William C. Hinds; Kim Seongheon; Si Shen; Constantinos Sioutas. (2002) "Concentration and size distribution of ultrafine particles near a major highway." *Journal of the Air and Waste Management Association.* September.

(2002). "Study of ultrafine particles near a major highway with heavy-duty diesel traffic." *Atmospheric Environment*. 36: 4323-4335.

Air Pollution from Busy Roads Linked to Shorter Life Spans for Nearby Residents

Dutch researchers looked at the effects of long-term exposure to traffic-related air pollutants on 5,000 adults. They found that people who lived near a main road were almost twice as likely to die from heart or lung disease and 1.4 times as likely to die from any premature cause compared with those who lived in less-trafficked areas. The authors say traffic emissions contain many pollutants that might be responsible for the health risks, such as ultra-fine particles, diesel soot, and nitrogen oxides, which have been linked to cardiovascular and respiratory problems.

---

[5] Lois M. Collins, "Pollution in the air can cause heart ills," *Deseret Morning News*, 16 Dec 03.

Hoek,Brunekreef, Goldbohn,Fischer, van den Brandt.(2002)."Association Between Mortality and Indicators of Traffic-related Air Pollution in the Netherlands: A Cohort Study." *Lancet.* 360 (9341):1203-9.

Five Times More Deaths Due to Air Pollution than Traffic Accidents
This study analyzed the affect of traffic-related air pollution and traffic accidents on life expectancy in the area of Baden-Wurttemberg, Germany. It estimated that almost five times more deaths in this region resulted from motor vehicle pollution than from traffic accidents.

Szagun and Seidel. (2000). "Mortality due to road traffic in Baden-Aurttemberg." *Gesundheitswesen.* 62(4): 225-33.

Motor Vehicle Air Toxins Cause High Pollution Levels Inside Homcs
An air pollution study was done as a part of the West Oakland Diesel Truck Emissions Reduction Initiative. Researchers measured diesel particulates near mobile and idling trucks at the West Oakland Port. An aethalometer was used to measure indoor toxins and a high level of diesel particulates was found. The people who lived in these homes were exposed indoors to five times the level of diesel particulates that people were exposed to outdoors in other areas of Oakland.

W. Buchan, M.D.and M. Chan Jackson. (2003). *Clearing the Air, Reducing Diesel Pollution in West Oakland, a Report to Pacific Institute*, 654 13th Street, Preservation Park, Oakland, California 94612, by TIAX LLC, 1601 S. De Anza Blvd., Suite 100, Cupertino, California 95014, November.

Cardiovascular, Respiratory Disease and Cancer
A 2004 study on the impact of expanding the Katy Freeway in Houston, Texas conducted by Dr. Matt Fraser, an Assistant Professor of Civil and Environmental Engineering at Rice University, found that the 42% increase in traffic predicted for the expansion will increase pollution to all who live, work, play, and attend schools in the vicinity of the Freeway. His computer analysis examined fine particulate levels caused by traffic along six miles of the Katy Freeway, between IH-610 and Beltway 8, for current usage of 280,000 vehicles per day and expected future use of 397,600 vehicles per day when the construction project is completed. Particulate levels were highest near the intersection of the Freeway and the 610 West Loop where those in schools, day care centers and retirement homes would be most at risk. Lowering the freeway below grade will reduce particulate levels by 10%. "The kids playing outdoor sports along I-10 are most likely already suffering from the effects of some of the worst pollution in the nation," said Dr. Jack Jensen, the sports doctor for many of the schools in the I-10 corridor.

Link between Lead Exposure and Criminal Activity[6]
A broad range of scientific research has emerged to demonstrate that crime rates in New York City during mayor Giuliani's tenure dropped as a result of local and federal efforts decades

[6] Shankar Vedantam, "Link between Lead Exposure, Criminal Activity." *Washington Post* Sunday, July 8, 2007; A02
http://www.washingtonpost.com/wp-dyn/content/article/2007/07/07/AR2007070701073.html

earlier to reduce lead poisoning. The theory put forth by economist, Rick Nevin, is that lead poisoning accounts for much of the variation in violent crime in the United States. It offers a unifying new neurochemical theory for fluctuations in the crime rate, and it is based on studies linking children's exposure to lead with violent behavior later in their lives. What makes Nevin's work persuasive is that he has shown an identical, decades-long association between lead poisoning and crime rates in nine countries: Sixty-five to ninety percent or more of the substantial variation in violent crime in all these countries was explained by lead.

Through much of the 20th century, lead in U.S. paint and gasoline fumes poisoned toddlers as they put contaminated hands in their mouths. The consequences on crime, Nevin found, occurred when poisoning victims became adolescents. Nevin does not say that lead is the only factor behind crime, but he says it is the biggest factor.

Other evidence has accumulated in recent years that lead is a neurotoxin that causes impulsivity and aggression, but these studies have also drawn little attention. In 2001, sociologist Paul B. Stretesky and criminologist Michael Lynch showed that U.S. counties with high lead levels had four times the murder rate of counties with low lead levels, after controlling for multiple environmental and socioeconomic factors.

In 2002, Herbert Needleman, a psychiatrist at the University of Pittsburgh, compared lead levels of 194 adolescents arrested in Pittsburgh with lead levels of 146 high school adolescents: The arrested youths had lead levels that were four times higher. "Impulsivity means you ignore the consequences of what you do," said Needleman, one of the country's foremost experts on lead poisoning, explaining why Nevin's theory is plausible. Lead decreases the ability to tell yourself, "If I do this, I will go to jail."

Nevin's work has been published mainly in the peer-reviewed journal *Environmental Research.* Within the field of neurotoxicology, Nevin's findings are unsurprising, said Ellen Silbergeld, professor of environmental health sciences at Johns Hopkins University and the editor of Environmental Research. "There is a strong literature on lead and sociopathic behavior among adolescents and young adults with a previous history of lead exposure," she said.

Nevin's finding may even account for phenomena he did not set out to address. His theory addresses why rates of violent crime among black adolescents from inner-city neighborhoods have declined faster than the overall crime rate -- lead amelioration programs had the biggest impact on the urban poor. Children in inner-city neighborhoods were the ones most likely to be poisoned by lead, because they were more likely to live in substandard housing that had lead paint and because public housing projects were often situated near highways.

Chicago's Robert Taylor Homes, for example, were built over the Dan Ryan Expressway, with 150,000 cars going by each day. Eighteen years after the project opened in 1962, one study found that its residents were 22 times more likely to be murderers than people living elsewhere in Chicago.

PUBLIC POLICY ACTIONS

No Schools to be Built within Close Proximity to Major Highways
The State of California passed a law which states that no school, day care facility, recreational or sports facility, or nursing home can be closer than 500 feet from a major highway or busy road.

In the State of Massachusetts, House Bill 840, Healthy Breathing Act of 2007 would limit construction of certain facilities in areas of elevated particulate matter pollution, including open public spaces and sports fields. House Bill 2227: An Act to Reporting on Health Effects of Particulate Matter would require the Department of Public Health to conduct a comprehensive study on the health effects of air pollution from transportation sources, including respiratory and cardiovascular disease and cancer.

Design of Built Environment
In 2006, National Public Health Week in the United States focused on the modern built environment as a factor harming the health of children.

U.S. Senator Barack Obama of Illinois and Congresswoman Hilda Solis of California introduced a bill in Congress to address the built environment's health effects, such as diabetes, obesity and asthma, on the nation's children. Among other measures, the legislation would provide additional support for research on the relationship between the built environment and health, as recommended by two Institute of Medicine reports.

A report of the Centers for Disease Control and Prevention (CDC) notes that "While pediatricians are accustomed to thinking about health hazards from toxic exposures, much less attention has been given to the potential for adverse effects from 'built environments' such as poor quality housing and haphazard land use, transportation, and community planning." The CDC argues that "Today's cities sprawl into forest and farmland with ever widening roadways but no sidewalks or bicycle routes. With their vast asphalt parking areas and treeless streets, these cities coddle the automobile while denying children the opportunity to experience the wonder and joy of the natural world. What child can be allowed independent exploration in cities experienced as dangerous and lacking parks and sidewalks?"

With the projected doubling of the U.S. population over the next century, the CDC report says, "protection of water sources, both underground and surface water - lakes and rivers - is no longer solely an aesthetic issue but a critical health protection need as well."

Forests sustain the planet because they provide shade and cooling and contribute oxygen to the atmosphere. When forestland is destroyed, rapid runoff of rainwater introduces silt, road wastes, and toxic materials to source water. Poorly maintained private septic systems cause groundwater contamination that can last generations, the CDC report warns.

As examples of how to build a healthier environment, the American Public Health Association recognized communities as national models for solutions that protect kids' health and foster smart economic growth:

Riverside County, California, known for the worst sprawl in the nation, is now at the forefront of livable communities nationwide, the APHA said. A pedestrian master plan, comprehensive maps of walking trails and collaboration with local developers will ensure a healthier future for Riverside's kids.

Highlands' Garden Village in Denver, Colorado was once an abandoned amusement park. The 27-acre site now hosts environmentally friendly, mixed-income housing. Nearby office and retail spaces eliminate the need to drive to work or shopping and neighborhoods are connected by a network of pedestrian-friendly walkways and parks.

Delaware County, Ohio is the fastest growing county in the state. Unchecked growth had begun to impact residents' health when the community launched a rigorous assessment to identify areas for improvement. As a result, more parks are being built and community programs were created to encourage families and children to be more active.

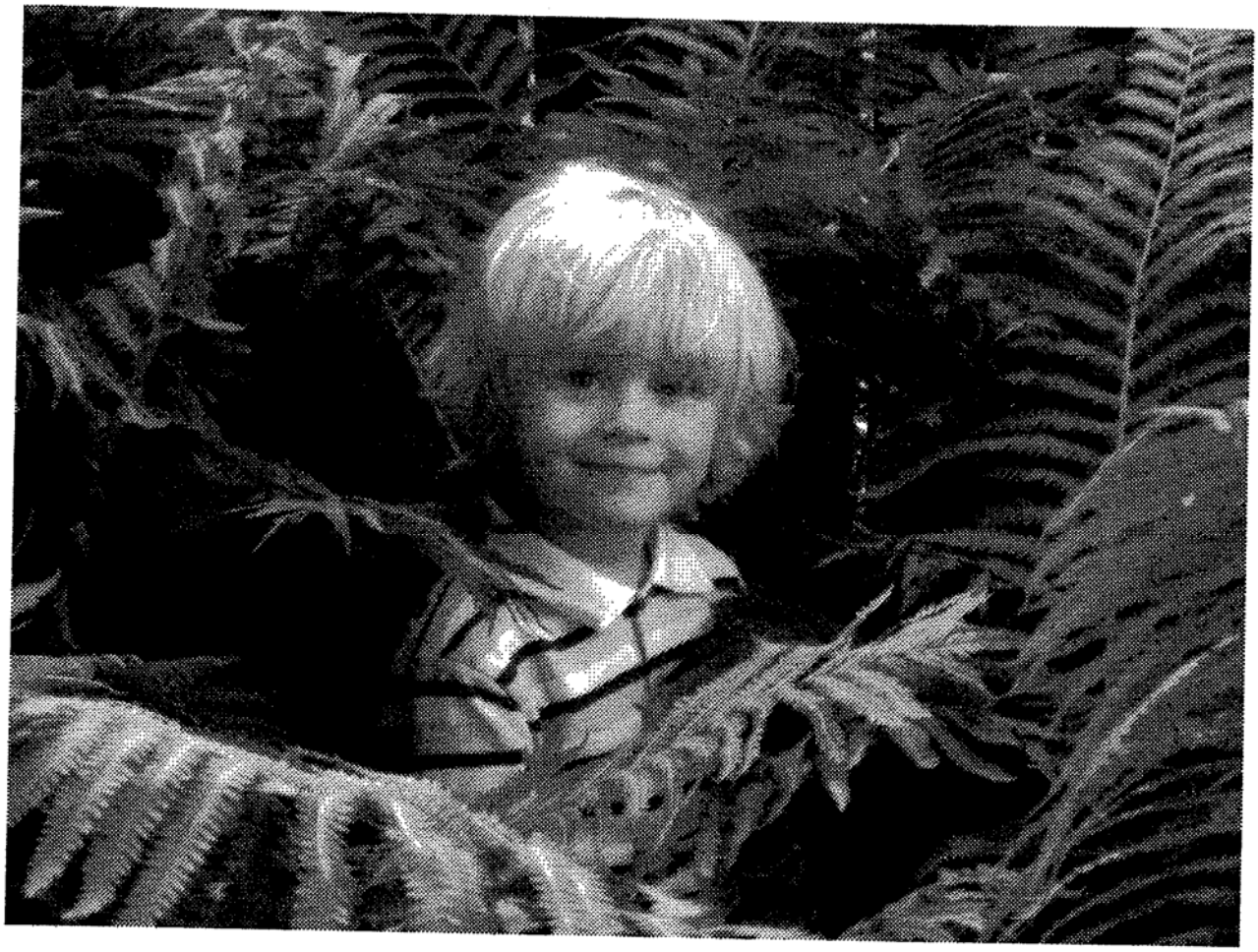
Kettle Island Crossing:
The Impact on Quality of Life

Submitted to the Interprovincial Crossings - Project Team, **info@ncrcrossings.ca**

October 10, 2008

The air is full of a farewell—
deserted by the silver lake
lies the wild world, overturned.
Cities rise where the mountains fell,
the furnace where the phoenix burned

-Kathleen Raine, from "On Leaving Ullswater," Collected Poems, 1956



"As the eagle was killed by the arrow winged with his own feather, so the hand of the world is wounded by its own skill."

-Helen Keller (1880-1968)

I. WHAT'S WRONG WITH A KETTLE ISLAND CROSSING? THE CASE IN BRIEF

It would not remove truck traffic from King Edward and would add a second truck route in the downtown.

A four lane truck and commuter highway would be built along the most heavily populated corridor of all the options studied. People who live and work in this corridor would be subjected to significant noise, vibration and dangerous levels of diesel exhaust.

This truck route would pass right beside the Montfort Hospital and Long Term Care Facility, and several smaller health care facilities, exposing the patients and staff to the same hazards as noted above.

National Institutions such as the Aviation Museum and the National Archives are also located along this corridor and subject to the same hazards.

There would be a risk of contaminating Gatineau's water supply from a spill of hazardous materials because this corridor is located upstream of Gatineau's water intake.

This corridor would route hazardous materials and 18 wheeled trucks through our communities.

It would increase car and truck traffic in established residential communities and add traffic to already congested roads in Ottawa's downtown increasing the danger to cyclists and pedestrians.

It could not be linked to a future regional ring road.

It would turn the Aviation Parkway into a four lane truck route and the Rockcliffe Parkway into a commuter route with the loss of useable recreational paths and parkland.

It would negatively impact the environmentally significant Kettle Island which is owned by the Nature Conservancy of Canada.

It would jeopardize the future of Rockcliffe Airport (Canada's oldest operating airport) and the operations of the RCMP Musical Ride, its pastures, stables and museum.