

The Relationship between Airplane Emissions & Pre-Mature Births

Kris Johnson, PhD

Public Health Seattle and King County

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Risks Resulting from Preterm Births

- Preterm babies are at increased risk of cognitive issues, visual/hearing impairments, and health concerns
- Increased risk for Sudden Infant Death Syndrome (SIDS)
- Babies born a few weeks early (late preterm, 34-36 weeks) often face long-term difficulties such as:
 - Behavioral and social-emotional problems
 - Learning difficulties
 - Attention Deficit-Hyperactivity Disorder (ADHD)
- Children born preterm are more likely as adults to have chronic diseases such as heart disease, hypertension and diabetes
- Mothers who deliver preterm have an increased risk of having subsequent preterm deliveries as well as hypertension, cardiovascular disease, and renal disease



Risks Resulting from Preterm Births

- Children born preterm are more likely to require early intervention and special education services
- Positive mother-child interactions reduced infant stress levels



How Aircraft-related Pollutants Might Affect Preterm Birth Risk

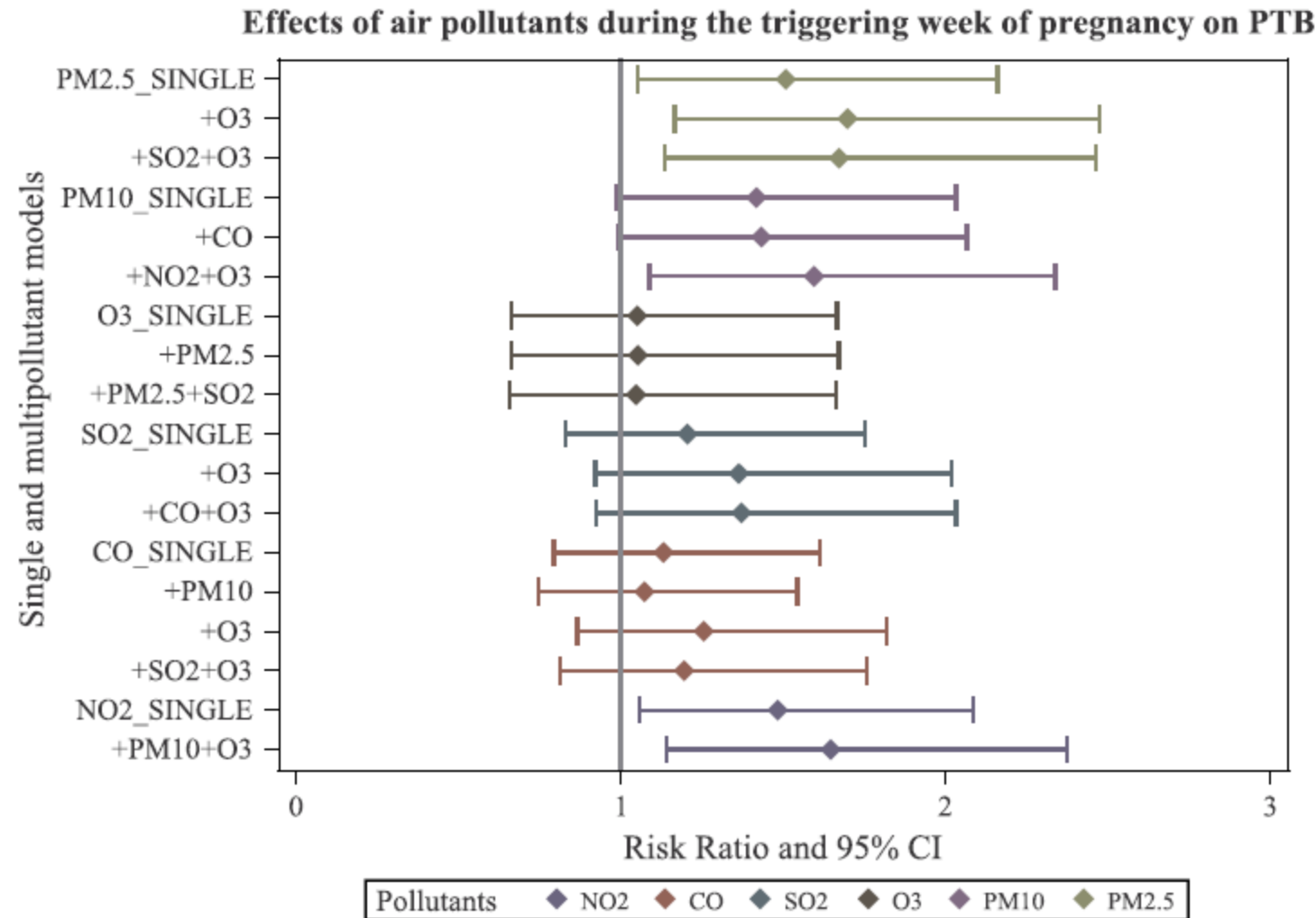
- Some evidence suggests that Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) and Ozone can result in preterm births
- Fine Particulate Matter ($\text{PM}_{2.5}$) exposure likely increases risk and new evidence suggests UFP increases risk
- Noise pollution can impact likelihood of preterm births through central stress response system



Ambient Air Pollution and Risk of Preterm Birth

Researchers in Finland conducted a population cohort study that controlled for pollutant exposures at home and relevant maternal characteristics like smoking.

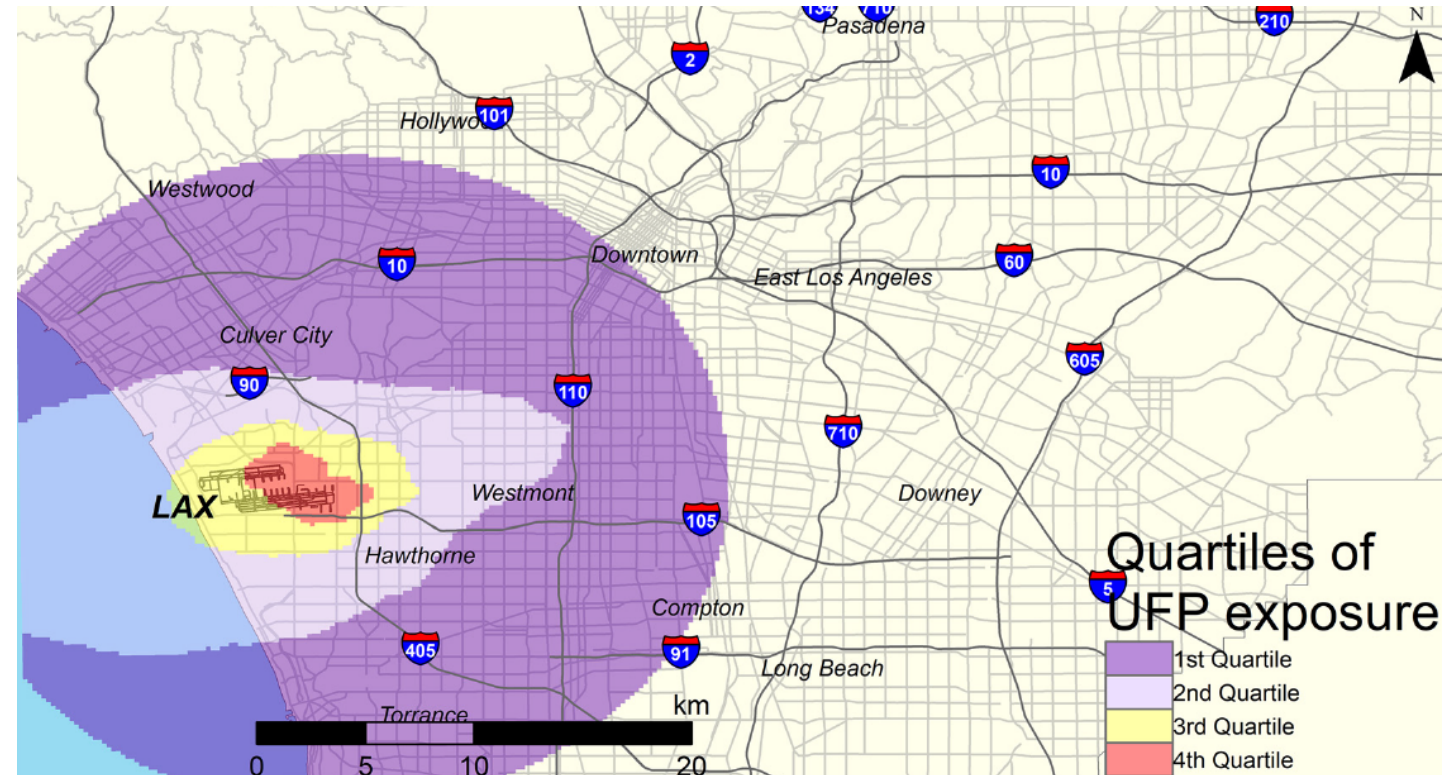
- Exposure to ambient NO, CO, SO₂, PM₁₀, and PM_{2.5} during the third trimester increased risk of preterm birth
- Exposure during week before pregnancy to PM_{2.5} and PM₁₀ and NO₂ increased risk of preterm birth (short-term exposure associated with a 60–67% increase in the risk of preterm birth)
- Risk higher during cold season



Aircraft Emissions and Preterm Birth Risk

U.S. Researchers examined effects of UFP exposure for a birth cohort that resided within 10 miles of the Los Angeles airport, controlling for maternal characteristics, exposure to traffic related pollution, and airport-related noise

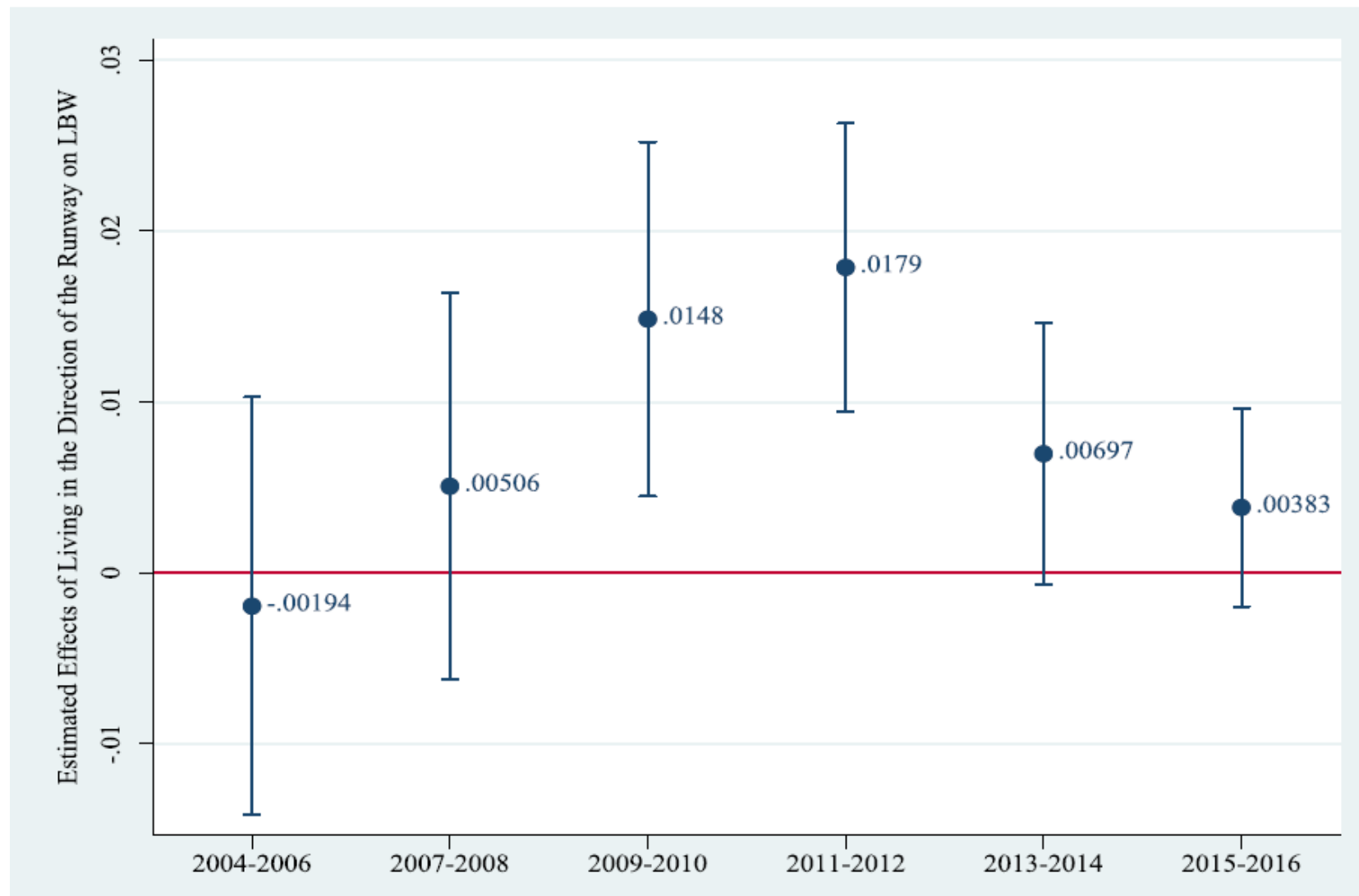
- Exposure to aircraft-related ultra fine particle matter (UFP) was associated with preterm birth (odds ratio of 1.14)
- Odds of preterm birth increased with greater exposure levels
- Preterm births also associated with road traffic NO₂



Airport Noise Pollution and Low Birthweight Risk

Recent study of birth cohort living near Newark airport controlled for air pollution, relevant mother characteristics, distance from airport

Exposure to noise pollution (above 55 Db) increased risk of pre-term birth by 1.6% for mothers living in the direction of the runway



Prevalence of birth risk factors in King County

Birth risk factors							
by Zone, 2014-2018 average							
Indicator	Zone A: <1 mile from airport		Zone B: 1 to <5 miles from airport		Zone C: 5 to 10 miles from airport		Balance of County
	Percent of live births	Count	Percent of live births	Count	Percent of live births	Count	Percent of live births
Early and adequate prenatal care ¹	63.9%	300	68.8%	2,367	71.1%	5,042	75.0%
Premature births (singleton) ²	9.8%	48	9.4%	334	8.2%	593	6.6%
Low birthweight (singleton) ³	5.8%	28	6.1%	217	5.5%	400	4.7%

¹ "Early and adequate prenatal care" based on Kotelchuck Index ($\geq 80\%$ of expected prenatal care visits).

² A low birth weight is a weight at birth of less than 2500g.

³ A premature birth is a birth at less than 37 weeks gestation.

Higher than Balance of County

Lower than Balance of County

Not different from Balance of County

Cost of raising a child in the U.S.

Cost of raising a child born in 2015 was \$233,610, assuming the child was born to a middle-income, married couple

- When factored for inflation, cost is more than \$284,000 (2019)
- A 2019 survey of 1,000 parents with children 1-3 years of age showed parents spent an average of \$13,186 per year raising their child, median spending was \$6,000
- Expenses vary by income, geography and other characteristics





Questions or
thoughts?