Heavy airplane traffic potentially a major contributor to pollution in Los Angeles

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Credit: Wikipedia.

Congested freeways crawling with cars and trucks are notorious for causing smog in Los Angeles, but a new study finds that heavy airplane traffic can contribute even more pollution, and the effect continues for up to 10 miles away from the airport. The report, published in the ACS journal *Environmental Science & Technology*, has serious implications for the health of residents near Los Angeles International Airport (LAX) and other airports around the world.

Scott Fruin, D.Env. P.E., Neelakshi Hudda and colleagues note that past research has measured pollution from air traffic before, but most of these studies only sampled air within a couple of miles, at most, from airports. Not surprisingly, these analyses have found higher levels of pollutants, such as nitrogen oxides and small (ultrafine) particles less than 0.1 micron (about one-thousandth of the width of a human hair), that scientists attributed to airplane emissions.

This added pollution is potentially a major public health issue. Ultrafine particles, which form from condensation of hot exhaust vapors, are of particular concern because they deposit deeply into the lungs and can enter the bloodstream. The oxidative stress and resulting inflammation appear to play a role in the development of atherosclerosis (blocked arteries) and can make other health conditions worse, especially for people with existing cardiac or lung conditions including asthma.

Fruin's team at the Keck School of Medicine and the University of Southern California suspected that residents near LAX, the sixth busiest airport in the world, were getting exposed to excessive doses of pollution from airplanes even farther from the runways than previous research had considered. During its busiest times, 40 to 60 jets take off and land every hour.

Over a period of 29 days, the scientists drove the area within 10 miles downwind of the airport to measure levels of air pollutants. The area included densely packed residential neighborhoods flanked by three major freeways.

They found that over a 23-square-mile area, particle number (PN) concentrations were double the background levels (that is, the PN concentrations without the LAX contribution). Over 9 square miles, levels were five times higher than background. And within nearly 2 miles east of the airport, PN levels were nearly 10 times higher. Based on other researchers' calculations of PN levels from one of the local freeways, Fruin estimated that this is equivalent to 174 to 491 miles of freeway traffic. For reference, the entire area of Los Angeles County has a total of about 930 miles of freeways.

Based on their calculations, scientists concluded that within the area they found to have elevated pollution from the airport, automobiles contributed less than 5 percent of the PN levels. "Therefore, the LAX should be considered one of the most

important sources of PN in Los Angeles," the scientists state in the journal article.

More information: Paper: pubs.acs.org/doi/full/10.1021/es5001566

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