

# Study takes first look at toxic air pollution in urban parking garages, finds SUVs bigger polluters

August 23 2007

---

The pollution produced by light trucks, SUVs and minivans is only half a percent higher than that produced by conventional cars, based on a recent study. But researchers say that this tiny difference becomes enormous when considering the number of light trucks moving along the nation's highways.

“That small difference becomes tremendously magnified when you consider the billions of miles traveled by automobiles every day in this country,” said Timothy Buckley, the study's senior author and an associate professor of environmental health sciences at Ohio State University.

“There are easily tens of millions of light trucks on the roads every day.”

While the findings are linked to vehicle driving, the conclusions derive from a study of air quality inside an inner-city parking garage, one of the many “micro-environments” found within cities.

It's the first study to take a comprehensive look at the concentration of certain automobile-related toxic air pollutants inside a parking garage, said Sung Kim, the study's lead author and a postdoctoral fellow with the Johns Hopkins Bloomberg School of Public Health.

The researchers found that the emission of key pollutants from light

trucks – a category that includes SUVs and minivans – was 0.5 to 0.6 percent greater than the pollutant levels released by cars.

Buckley says that although he and his colleagues expected to see a bigger impact from light trucks, the seemingly tiny difference between a car and an SUV shouldn't be discounted.

The results appear online at the Articles in Press website for the journal *Environmental Research*. Buckley and Kim conducted the study with Francesca Dominici, also with the Bloomberg School of Public Health at Johns Hopkins.

The researchers conducted their study in one eight-story parking garage in downtown Baltimore, Md. The garage has parking for 1,400 autos and is used by employees and visitors coming to a local hospital and university.

Vehicles were put into one of two categories – light trucks, which included SUVs and minivans, and cars, which included station wagons. A video camera set up at the garage entrance recorded the autos as they entered the facility.

The air within the garage was monitored eight hours a day, from 7 a.m. until 3 p.m., for 24 consecutive days. The monitors were used to analyze three kinds of pollutants that are emitted from nearly all gasoline-powered vehicles: carbon monoxide (CO), particle-bound polycyclic aromatic hydrocarbons (pPAH) and several volatile organic compounds (VOCs).

“These pollutants include known and suspected carcinogens,” Buckley said. “Pedestrian exposure to high levels of these air toxics within parking garages is of concern because of the proximity and intensity of the vehicle activity within the semi-closed environment.”

The researchers monitored air pollution and traffic in the garage during the summer of 2002. After the 24-day monitoring period, they watched the videotape, counting and classifying each vehicle as either a car or a light truck. They separated the vehicle counts into 30-minute blocks of time. Each 30-minute segment of videotape was matched with the same 30 minute segment of pollution data.

Light trucks accounted for about one out of every three vehicles using the garage. For some of the pollutants, the study's authors were able to attribute an increase in air pollution of 0.5 to 0.6 percent per vehicle for light trucks, relative to cars.

As expected, far fewer vehicles used the garage on the weekend (about six per half-hour) than the weekday (an average of 71 vehicles per half-hour.) This 12-fold reduction in traffic volume from weekday to weekend was matched by a 2- to 7-fold reduction in air pollution.

“The less than one-to-one reduction in pollution is likely due to surrounding traffic influences,” Buckley said. “We didn't specifically measure air pollution coming from traffic outside the garage.”

Buckley and his colleagues say that measured pollutant concentrations inside the parking garage are not very different from levels outside the garage. The researchers compared the concentrations of VOCs in the parking garage to VOC pollution data collected by an outdoor monitoring station in downtown Baltimore by a different group of researchers.

“Our goal was to give some perspective to the concentrations recorded in the garage, and we wanted some basis of comparison,” Buckley said.

“We were pleasantly surprised to see that the garage concentrations were in fact lower than what was measured at a nearby outdoor site.”

However, Buckley cautions against reading too much into this comparison, since the time frame and measurement methods differed between the two studies.

“Ours is the first study that has described the concentration of vehicle-related hazardous air pollutants in a parking garage,” he said. “We wanted to know what those concentrations were, and how they varied within and between days to better understand the health risk.

“Our conclusion is that they're comparable to, or even less than, concentrations seen in other urban settings.”

Buckley plans to continue this research to better understand traffic-related “hotspots” and these areas contribute to air pollution. Future studies may include the type of fuel that a vehicle uses (i.e. gasoline vs. diesel) as well as the age, make and model of a vehicle, which all may factor into the amount of pollution it creates.

Source: Ohio State University

Citation: Study takes first look at toxic air pollution in urban parking garages, finds SUVs bigger polluters (2007, August 23) retrieved 25 April 2024 from <https://medicalxpress.com/news/2007-08-toxic-air-pollution-urban-garages.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--