

# Car Make, Age and Fuel Economy All Affect How Much Vehicles Pollute, Study Finds

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When it comes to how much automobiles pollute, some makes are cleaner than others, according to new research.

A study using data on nearly 4 million cars that underwent government-mandated emissions test in three states found that cars manufactured by German auto maker BMW were the least likely to fail these state pollution tests. Cars manufactured by Hyundai, Mitsubishi, Chrysler and GM were most likely to fail.

While other studies have analyzed data from state emissions tests, this is the first time that researchers examined how different car makes compared, said Jean-Michel Guldmann, co-author of the study and professor of city and regional planning at Ohio State University.

“There are several factors that determine how much cars and trucks pollute, and vehicle make is one of the more significant,” Guldmann said.

In the case of trucks, Honda, Nissan and Toyota models were least likely to fail pollution tests, while Mitsubishi, Mazda and Chrysler were most likely to fail.

The study also found that the vehicles that polluted the most tended to be those that were older models, had higher mileage, poorer fuel economy, and were less-well-maintained.

And car owners worried about passing emissions tests should have their vehicles tested in spring and summer, when vehicles emitted less pollutants on average, the study showed.

“These effects were uniform, but the magnitudes were different depending on the make of the car,” Guldmann said. “Some makes are cleaner than others.”

The study was based on the doctoral dissertation of Mustapha Beydoun, who studied with Guldmann at Ohio State. Beydoun is now an assistant professor at Texas Southern University. Their results appear in the January 2006 issue of the journal *Transportation Research Part D*.

The researchers examined data from emissions tests in Massachusetts, Maryland and Illinois in 2001. Under the Clean Air Act, certain urban areas violating federal air quality standards are required by the U.S. Environmental Protection Agency to implement pollution emissions testing on vehicles. Currently 33 states and the District of Columbia have some type of vehicle emissions testing.

Guldmann said the samples from the three states they used are much

larger and more comprehensive than those used in earlier studies, which were generally confined to one or two metropolitan areas. Earlier studies were also confined to Western states. This is also the first study to examine the role of fuel economy and vehicle maintenance in emissions.

The Massachusetts database provided the most comprehensive and consistent data on specific vehicle emissions, and was the focus of some of the analyses, Guldmann said.

Results showed that newer model cars tended to be much cleaner than older ones. For example, a 1985 vehicle averages almost 38 times more carbon monoxide emissions per mile than a 2001 model. But again, the make of the car has a large influence. Toyota vehicles tended to have the least difference between older and newer cars, because their older cars tended to be already lower polluting, Guldmann said.

But other foreign models – Honda, Nissan and Hyundai – had a much greater age effect, with their older models showing relatively high levels of pollution emissions.

“The effects of age and other factors on pollution levels are stronger for some vehicle makes than others,” Guldmann said. “It's not always foreign cars that are better. It really depends on what pollutant or variable you are measuring.”

The fact that cars polluted less in spring and summer is probably linked to both differences in atmospheric conditions, and changes in fuel mixtures produced by refineries during different seasons, Guldmann said.

The finding that cars with better gas mileage also polluted less is important, Guldmann said. It suggests that current regulations, which measure emissions in grams per mile driven, should be changed to grams

per gallon of gasoline used.

“This would ensure that higher fuel economy standards are automatically translated into emissions reductions,” he said.

Other factors studied by the researchers, such as vehicle weight, number of cylinders, and engine displacement, had mixed results with no clear effect on emissions of pollutants, according to Guldmann.

Source: Ohio State University

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