Speed Humps Study Contains Numerous Flaws

by Randal O'Toole and Kathleen Calongne

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A recent paper[1] purporting to show that speed humps make residential streets safer for children actually shows nothing of the kind. In fact, the study's data can even be interpreted to mean that humps make streets more dangerous.

Speed humps are annoying and potentially dangerous to drivers and can cause deadly delays to emergency service vehicles. But an Oakland, California study claims to show that speed humps make streets 50 to 60 percent safer for children.

The study used a database showing when and where 1,600 speed humps were installed on Oakland streets between 1995 and 2000. Ideally, the researchers would have compared accident rates on those streets before the speed humps were installed with rates after -- but they did not. Or they could have compared accident rates on those streets with rates on streets that did not have speed humps -- but they did not, at least not directly.

Instead, the study used emergency room data to identify 100 accidents in which a child under 15 years was hit by a car in those years. Forty-nine of those accidents were on the same street and block on which the child resided and of those, six had speed humps.

As a "control," for each accident the study examined two "randomly selected" non-automobile related emergency room visits that took place on the same day as the auto accident involving a child living on a residential street of the same age and gender as the one in the auto accident. The only point of this complicated and error-prone procedure was to estimate what share of children lived on streets with speed humps, the supposed answer being about 24 percent.

If 24 percent of Oakland children live on streets with speed humps but only 14 percent of child-auto accidents took place on streets with speed humps, the authors conclude that this proves that streets with speed humps are safer.

In addition to the above 49 accidents, the authors found another 51 accidents in which children who were hit by cars lived on streets with speed humps. But these accidents did not take place on the streets the children lived on -- the streets with the speed humps -- but on other streets up to a quarter mile of the children's homes.

Curiously, the researchers found that having a speed hump in front of your home reduces your child's chances of being hit by a car a quarter mile away from your home by the same percentage as they reduce the chances of being hit in front of your home. The study does not say how a speed hump in front of your home protects your children when they are a quarter mile away. This strange finding should have signaled to the authors that something was wrong with their methods.

In fact, there are numerous problems with their methodology. First, about 85,000 children under the age of 15 live in Oakland, yet the authors base this study on just 49 accidents (100 counting the accidents on streets other than the streets on which the children live). The size of that sample is far too small to be reliable.

Second, the study uses a "control" group to find out the share of children that live on streets with speed humps. The study claims that the control group was "randomly selected," yet first the authors had to identify each child's age, sex, and residential location (because only children who lived on residential streets were considered).

With such a small sample, their selection could easily have biased the result.

There are far more reliable methods of estimating what share of children live on streets with speed humps. One way would be to simply count the residential streets in Oakland and determine what share of those streets had humps, adjusting for the population density in each neighborhood. Another way of doing the study is to measure accidents on streets before and after installation of speed humps. A Portland study that used this method found that speed humps reduced accidents by only 5 percent, which the researchers said was too small to be statistically significant.

The problems with small samples can be seen in the statistical data reported in the Oakland paper. The paper says that children living on streets with speed humps are 40 percent as likely to be hit by cars on their street as children on streets without speed humps. But a table in the paper says that the "confidence interval" for this number ranges from 15 percent to 106 percent.

In statistical terms, this means the authors are 95-percent certain that streets with speed humps could be anywhere from 85 percent safer to 6 percent more dangerous than streets without speed humps. This broad confidence interval means there is no certainty at all, demonstrating that the sample size was too small.

To top it off, the paper relied on data showing when speed humps were installed on Oakland streets after 1995. Yet, in correspondence, the authors admit that an unknown number of Oakland streets -- at least 125 -- had speed humps installed before 1995. Since these were not in their database, any accidents on those streets would have been counted as accidents on streets without speed humps. This error could easily account for the differences, statistically insignificant though they may be, estimated by the paper. Nor, in fact, did the authors verify that there actually were speed humps on all the streets in their database.

Naturally, the authors made no attempt to look at the other side of the question, which is whether any problems were caused by speed humps delaying emergency service vehicles. How many houses burned more than they might have because of delays to fire crews? How many people, including children, may have died because of delays to paramedics? How many burglars got away because of delays to police?

In a city with 85,000 children, the authors could find only a few dozen pedestrian accidents over a six-year period involving children on their street of residence. Considering that other studies[2] have shown that problems caused by delays to emergency service vehicles completely dwarf the benefits of speed humps, advocates of speed humps and other traffic delaying devices will need better research using more data addressing the full range of the impacts of these devices before anyone can conclude that speed humps are a good idea.

References

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This article was co-authored by Randal O'Toole of the Thoreau Institute and Kathleen Calongne of the Independence Institute Center for the American Dream. Please feel free to forward or reprint the article with appropriate citation.