

# New study details correlation between tornado deaths and social inequality

Eric London  
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A new study published by the *Regional Science and Urban Economics* journal reveals the degree to which social inequality and poverty determine the likelihood of being killed by a tornado.

The study, titled “Double danger in the double wide: Dimensions of poverty, housing quality and tornado impacts,” is written by Michigan State University academics Jungmin Lim, Scott Loveridge, Robert Shupp and Mark Skidmore.

It was published in April, as tornado season begins in the United States. Last weekend, tornadoes and floods left at least 15 dead, including many children, across impoverished parts of East Texas, Missouri, Arkansas, and Tennessee.

The number of people crushed to death or swept up and killed by tornadoes is staggering. Between 1980 and 2014, 2,718 people were killed and 39,635 injured by tornadoes in the world’s wealthiest country. In a three-day period in April 2011, 351 tornadoes killed 316 people.

The study’s authors explain, “While it is clear that some places are simply more prone to tornadoes due to climatic reasons, this does not fully explain the difference in fatalities across the region.”

The report notes that “poor people tend to cluster in high tornado risk areas” across the Midwest and South. For the most part, the wealthiest Americans live in major coastal cities where tornadoes do not occur. Those who remain in “tornado alley” do so in part because the risk of tornado is factored into the lower cost of living. A 2016 study revealed that half of Americans cannot afford the cost of a \$400 emergency expense like travel, hotel and meal expenses during a storm evacuation.

But this “does not fully explain the differences in fatalities across the regions,” the study says, because

“the areas with relatively high tornado fatalities do not necessarily match up with the areas with the highest tornado intensities.” The study’s conclusion is that areas with higher poverty and inequality are more vulnerable to deaths during tornadoes due to a large number of people living in mobile homes and a lack of infrastructure and government programs.

Poor and working class residents of tornado-prone areas are less likely to evacuate in the face of tornado warnings, “mostly due to constraints placed by a lack of transportation and affordable refuge options,” the study’s authors write, citing an earlier study. In addition, even if families had money saved to evacuate, many workers simply cannot afford to take time off work, even to escape a tornado.

Even after controlling for the likelihood that residents of areas with a history of tornadoes are more likely to be prepared, the report notes that for each one percent increase in the poverty rate, the number of tornado fatalities increases by two percent.

Further, the report notes: “people living in mobile homes are more vulnerable to natural events such as tornadoes because mobile homes typically have no foundation or basement and can be more easily destroyed” and “the rate of death from tornadoes in mobile homes is about 20 times higher than in site-built homes.”

Controlling for other factors, a one percentage point increase in the proportion of mobile home owners to total housing units leads to a five percent increase in tornado fatalities. Roughly one-half of all tornado deaths from 1996 to 2000 were in mobile homes. Particularly concerning is the fact that “more households are choosing this type of housing arrangement over time and thus vulnerability may be increasing.”

Lower levels of local government spending on public safety and welfare had a “significant” impact on tornado fatalities, increasing the likelihood of death. Counties with less educated residents and more female-headed households were also more likely to experience fatalities when tornadoes strike. Only in Minnesota and a small number of individual counties in other states are mobile home park owners required to provide storm shelters for residents.

Perhaps most notable is the correlation between social inequality and tornado-induced deaths. The study found that a 1 percent increase in the share of income controlled by a county’s wealthiest 10 percent increased the average deaths from tornadoes by 14.8 people over a five-year period.

“Holding other factors constant including per capita income and the poverty rate, a higher top ten percentile income level means a larger lower-middle income group, which indicates wider income disparity in the community. Our estimates suggest that greater income inequality tends to exacerbate the impacts of disasters.”

This key fact underscores the disastrous impact of social inequality on elements of social life that may not initially appear to be directly impacted by social relations. Those areas most affected by tornadoes are the rural and semi-rural towns spread out across the American South and Midwest where infrastructure is collapsing, social services are limited and poverty is widespread.

Though storms do not select their victims, capitalism does. The few wealthy people who live in these regions own mansions with large basements and storm shelters. There is little question whom the police and National Guard will rescue first in the event of a natural disaster, while public shelters are largely unavailable. Over 60 percent of Oklahoma’s public schools have no storm shelter, for example.

But the majority of people in these parts of “tornado alley” either work low-wage jobs at grocery stores, fast food restaurants and other service sectors, or they join the military or National Guard. Ten to 30 percent of people live in mobile homes because they cannot afford to buy homes. Healthcare costs and opioid abuse are on the rise, while life expectancy for middle-aged white men is declining. Local, state and federal government propose new budget cuts that axe emergency relief programs.

One professional estimate shows that the cost of installing a 700-person storm shelter at a public school would be \$1 million. Constructing the 25,000 large shelters capable of housing the entire 17 million population of “tornado alley” would cost \$25 billion. This equals just 1.25 percent of the wealth of the 400 richest Americans, valued at about \$2 trillion.



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