First study of its kind identifies differences in pediatric mortality after MVCs

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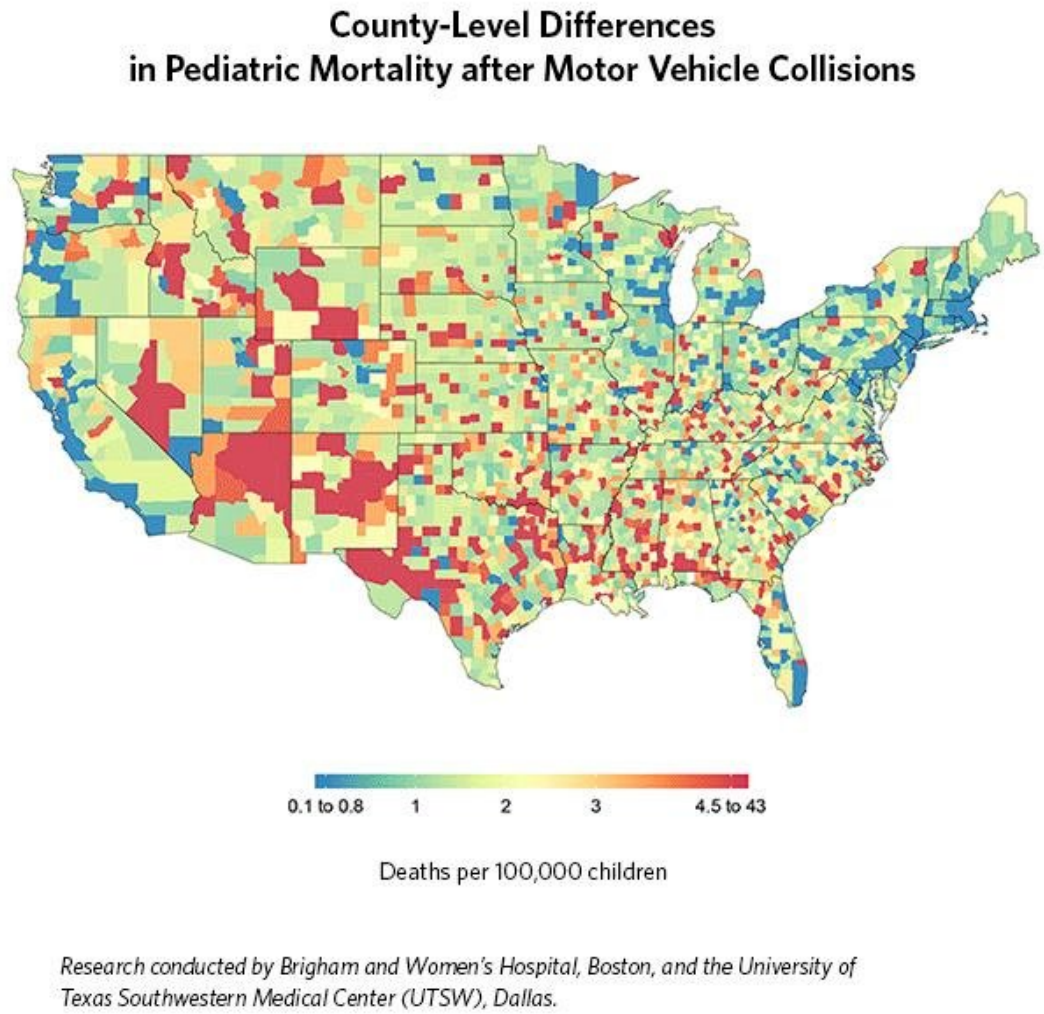

The first study to map the incidence of motor vehicle collisions resulting in deaths of children at the local level has identified wide variations in mortality across the country and even between neighboring counties. Credit: American

A child seriously injured in a motor vehicle collision (MVC) may not have the same chance of survival as one injured in a different state, or even a neighboring county, where there is a closer proximity to available trauma centers and quicker emergency response times, according to new research findings. The first study to map the incidence of motor vehicle collisions resulting in deaths of children at the local level has identified wide variations in mortality across the country and even between neighboring counties, according to researchers from Brigham and Women's Hospital, Boston, and the University of Texas Southwestern Medical Center (UTSW), Dallas, who are analyzing the factors that contribute to these differences. The investigators identified proximity and availability of trauma centers and emergency response times as key factors in their analysis. They presented their findings at the American College of Surgeons Clinical Congress 2018.

MVCs are the leading cause of unintentional death among children between the ages of 1 and 19. More than 3,000 children died as a result of an MVC in 2016, according to the National Highway Traffic Safety Administration (NHTSA).[1]

A 2016 study of pediatric deaths from MVCs by the same two research centers was the first of its kind to evaluate differences in mortality from state to state. Data from this study identified child safety regulations that could reduce high regional annual mortality rates following car accidents.[2]Study researchers explain they drilled down their analysis to the local level to better inform policymakers. "Variations in child mortality at the state level can lead to legislation regarding the use of child restraints and red light camera policies. By digging down to the local county level we may be able to help policymakers make informed

and actionable decisions about clinical services that we think impact mortality, such as the location of pediatric or adult trauma centers," said Ali Mokdad, MD, MS, lead author of the study and a surgical resident at UTSW.

Researchers looked at data on pediatric deaths from MVCs through the Fatality Analysis Reporting System (FARS). FARS is a national data base created by NHTSA to provide an overall measure of traffic safety, identify behavioral factors that may lead to fatalities following traffic accidents, suggest ways to reduce fatalities from traffic accidents, and help assess the effectiveness of motor vehicle safety standards and highway safety programs.

FARS data are extensive. Information is gathered about the date and time of every MVC that resulted in a fatality within 30 days and categorized by location. The county and city as well as mile point latitude and longitude are provided. Data also include weather conditions, the nature of the collision, the sequence of events leading to the accident, and the specific site of the accident: on a roadway or shoulder, along the median, or at the roadside.

For this study, researchers gathered information on pediatric deaths from MVCs on public roads between 2010 and 2015, the latest data available from FARS. Deaths of children younger than 15 years were categorized by the county in which they occurred.

This analysis found that 4,958 children died as a result of a traffic accident in that time period. The average age of the children was 7 years.The average annual mortality rate for the country was 1.6 deaths per 100,000 children. The estimated mortality rates by county ranged from a low of 0.3 deaths per 100,000 children to a high of 11.5 deaths per 100,000 children.

High mortality rates—exceeding 4.5 deaths per 100,000 children—occurred in Arizona, New Mexico, and Texas. Low mortality rates—below 0.8 deaths per 100,000 children—occurred in California and in states along the Great Lakes and in the Northeast.Mortality rates varied widely from county to county. For example, one county in Arizona with a population of nearly 150,000 has an estimated annual MVC death rate in excess of 4.5 per 100,000 children. The county lying directly west with nearly the same number of residents has an annual MVC death rate between 0 and 1.

The researchers are now examining factors that may improve survival for children in counties that have high mortality rates following MVCs. "Our preliminary findings show that having a pediatric trauma or an adult trauma center reduces the county mortality rate. Obviously, not every county can have a trauma center; so we're looking at proximity by driving distance or by air to determine if air transport should be available if a trauma center is particularly far away," Dr. Mokdad said.

The researchers are also exploring why some counties have high MVC death rates even though they have trauma centers and why some rural areas with quick emergency response times still have a higher mortality rate. "Is it because injured children are being transported to the closest facilities, not the ones that can handle pediatric trauma?" Dr. Mokdad asked. "Clearly, there is more work to be done to help us reach a clearer conclusion about delivering the best trauma care we can for seriously injured children."

More information: 1. National Highway Traffic Safety Administration, NCSA Data Resource Website. Fatality Analysis Reporting System Encyclopedia (FARS). Washington, DC, March 15, 2018.

2. Wolf LL: Pediatric Deaths from Motor Vehicle Crashes. State-Level

Variation and Predictors of Mortality. AAP 2016 National Conference and Exhibition, San Francisco, Oct. 23, 2016.

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