

Fahad Aziz, MD, FASN

Beyond the Crash Count: Turning Local Data Into Safer Roads

Fahad Aziz, MD

A motor vehicle crash unfolds in seconds. An ordinary trip can suddenly result in a life-changing injury, a family tragedy, and a challenge for emergency responders and health systems. The consequences may be especially profound in rural communities, where higher-speed roads, longer emergency response times, and greater distances to trauma care can influence survival. In 2023, rural areas accounted for 41% of US traffic fatalities despite representing approximately 20% of the population, and the fatality rate per vehicle mile traveled was 1.5 times higher on rural versus urban roads.[1] Longer emergency medical services response times also have been associated with greater motor vehicle crash mortality.[2]

Preventing these injuries requires recognizing a fundamental principle: not all crashes are alike, and not all locations along the same road carry the same risk.

In this issue of the *Wisconsin Medical Journal*, Rhodes-Lyons and colleagues demonstrate how local data can reveal these differences and guide practical solutions.[3] They examined motor vehicle collisions along a rural 4-lane segment of US Highway 10 in Wood County, Wisconsin, from January 1, 2019, through March 1, 2024. Using dispatch records, statistical analysis, and geospatial mapping, they asked which collision types were most likely to result in injury or death—and where those crashes occurred.

Frequency Is Not the Same as Severity

Among 239 collisions, 51 (21.3%) resulted in injury or death. Deer-related collisions accounted for 38.0% of all crashes, reflecting a familiar Wisconsin hazard. Statewide, more than 17,000 deer-related crashes occurred in 2024, causing 708 injuries and 9 deaths.[4] Yet on the corridor studied, only 4.3% of deer-related crashes resulted in injury or death, compared with 31.7% of nondeer collisions.[3]

Angle collisions showed the opposite pattern. Although less frequent, they were disproportionately associated with harm. After multivariable adjustment, angle collisions carried more than twice the odds of injury or death compared with other mechanisms (odds ratio, 2.52; 95% CI, 1.04-6.09). Daylight, dry road surfaces, and clear weather were not independently associated with injury outcomes.[3]

Wrong-way driving provided another concerning signal: 4 of 5 wrong-way collisions resulted in injury or death. The sample is too small for a precise risk estimate, but the pattern warrants attention. Together, these findings underscore a central lesson of injury prevention: the most common event is not necessarily the most harmful. Prevention priorities must reflect severity as well as frequency.

From Crash Counts to Precision Prevention

The study's geospatial analysis makes the findings particularly actionable. Nondeer and angle collisions clustered near major intersections, especially County Roads 80, A, and 186, whereas deer-related crashes were more broadly distributed along the corridor's rural eastern portion.[3] Different patterns therefore require different responses.

> This is translational research at its most practical—turning local evidence into meaningful change.

General safety messages—wear a seat belt, avoid impaired or distracted driving, obey speed limits, and remain alert—remain essential. But they cannot fully address risks created by a particular intersection, crossover, turning movement, or roadway design. Local data make precision prevention possible: identifying which crashes cause the greatest harm, where they occur, which roadway features may contribute, and which countermeasures are most likely to help.

From Research to Action

This is translational research at its most prac-

Author affiliations: Dr Aziz is *WMJ* editor in chief; associate professor, Department of Medicine, and chief, Divsion of Nephrology, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin.

tical—turning local evidence into meaningful change. Translation can mean moving findings from a spreadsheet to a safer intersection, from a map to a redesigned roadway, or from an observation to a community intervention. Achieving that change requires collaboration across disciplines, including researchers, clinicians, engineers, law enforcement, emergency medical services, public health, and transportation planning. When these perspectives come together, local research can move beyond describing a problem to becoming a catalyst for change.

Interpreting the Findings With Caution

The findings should be interpreted within the study's limitations. The analysis involved a single highway corridor and relied on sheriff's office dispatch records. Events could not be linked to hospital or trauma registry data, limiting assessment of injury severity, treatment, disability, and long-term outcomes. Alcohol and drug involvement was inconsistently documented, and the modest sample constrained the multivariable analysis.

The wrong-way driving findings should therefore be considered a safety signal rather than a stable estimate of risk. Likewise, the association between angle collisions and injury does not prove that roadway design caused those outcomes; speed, traffic volume, driver behavior, sight distance, and other unmeasured factors may have contributed. These limitations temper certainty but do not diminish the value of the approach. Meaningful change often begins by identifying a pattern, studying it systematically, and bringing the findings to those positioned to act.

If roadway changes are implemented, ongoing monitoring and before-and-after analyses will be essential to determine whether they reduce serious collisions and whether benefits are sustained.

Why Local Research Matters

National datasets and multicenter studies define broad patterns and shape policy, but they cannot answer every question facing an individual community. Wisconsin communities differ in geography, infrastructure, health care access, emergency response capacity, and resources. Some local problems may never become the subject of a national study, but that does not make them less important.

Local research can identify risks that may be missed when we look only at statewide data. It can also help communities move more quickly from understanding a problem to taking action. Rhodes-Lyons and colleagues studied 239 crashes along one section of a Wisconsin highway, but the lessons from their work reach far beyond Highway 10.

The true value of research is not simply its publication, but in what happens because of it. Sometimes research changes how we care for patients in a clinic or hospital. Sometimes, as this study shows, it can help make a rural Wisconsin road safer for everyone who travels it.

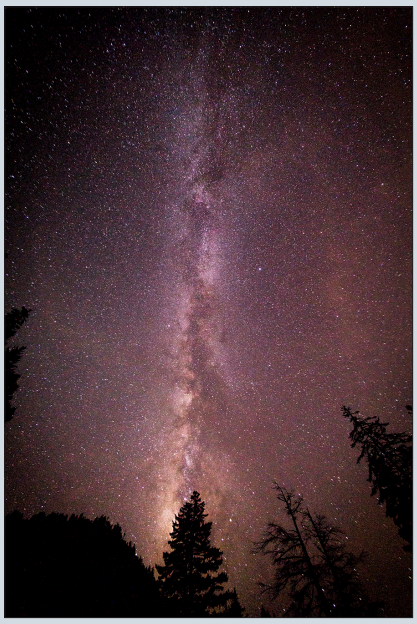
REFERENCES

1. National Highway Traffic Safety Administration. Rural/Urban Traffic Fatalities: 2023 Data. US Department of Transportation; 2025. DOT HS 813 728. Accessed September 7, 2026. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813728.

2. Byrne JP, Mann NC, Dai M, Mason SA, Karanicolas P, Rizoli S, et al. Association between emergency medical service response time and motor vehicle crash mortality in the United States. *JAMA Surg.* 2019;154(4):286–293. doi:10.1001/jamasurg.2018.5097

3. Rhodes-Lyons H, Symons R, Brandl G, Klarr E, Martinek L. Wrong-way driving and injury risk on a rural four-lane corridor: a descriptive and spatial analysis of US Highway 10, 2019–2024. *WMJ*. 2026;125(4):445-450.

4. Wisconsin Department of Transportation. Deer crashes rise during late spring, drivers take caution 2025. May 7, 2025. Accessed September 7, 2026. https://wisconsindot.gov/Pages/about-wisdot/newsroom/news-rel/050725deercrashes.aspx.



"Milky Way, Vertical"

About the Artist

Richard Abraham, MD, is a pediatric anesthesiologist. "My work begins before I ever reach for a medication. It begins with a frightened child, a worried parent, and a few minutes to help them feel safe. Medicine has also deepened my appreciation for light's ability to reveal and heal. For more than a decade, I have photographed that light on location. I wanted to bring these views to people who might never have the opportunity to make the journey themselves."

WMJ

Call for Artwork

The *WMJ* invites original artwork that illustrates the art and science of medicine to feature on our covers.

Learn more at

www.wmjonline.org

advancing the art & science of medicine in the midwest

WMJ

WMJ (ISSN 2379-3961) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

© 2026 Board of Regents of the University of Wisconsin System and The Medical College of Wisconsin, Inc.

Visit www.wmjonline.org to learn more.