TECHNICAL PAPER

Epidemiology of Farm Equipment Crashes in Nine Midwest States

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Purpose/Objective:
Crashes involving farm equipment are a persistent risk in the Midwestern U.S. Prevention efforts require an understanding of the patterns of these crashes in order to inform the development of effective interventions to reduce crash risks. The goal of this research is to describe the epidemiology of farm equipment crashes and subsequent injuries, examining crash-, vehicle- and person-level factors associated with crashes occurring in the nine Midwest states from 2005-2010.

Methods/Efforts:
Department of Transportation data from nine Midwestern states including: Iowa, Illinois, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin, were used in our analysis. The data was hierarchical and consisted of three levels: crash, vehicle/driver, and person. Our study population was comprised of motor vehicle crashes involving a farm vehicle/equipment and the other non-farm vehicle/s from 2005-2010 (n=7,115 crashes and 12,562 vehicles/drivers). Univariate analyses were performed on the crash level data (e.g., year/month/day of week/time of crash, number of fatalities, number of injuries, light conditions, manner of collision, overall crash severity, state, and weather). At the vehicle/driver level, we compared age, gender, injury severity, occupant protection, and vehicle action by farm vehicle/equipment vs. non-farm vehicle using Chi-square tests for significance.

Results/Findings:
Farm equipment crashes were most prominent (42%) in the harvest season. At least one fatality occurred in 2.2% of all crashes, and 32% of crashes involved at least one injury. Rear-end collisions were the most common type of collision (23%). Crashes involving farm equipment were more common in those aged <16 and 45-64 (p<0.0001), and in males (p<0.0001). Injuries to farm vehicle occupants tended to be less severe than injuries to non-farm vehicle occupants (p<0.0001). Yet, nearly two-thirds of farm vehicle drivers did not use occupant protection whereas 85.6% of non-farm vehicle drivers wore a seat belt (p<0.0001). Left and right-hand turns, and backing were more common types of actions by farm vehicle drivers that led to a crash whereas heading straight and overtaking/passing maneuvers occurred more frequently in non-farm vehicle drivers (p<0.0001).

Application to Field Research:
Increasing urbanization of rural farming communities has brought farms and population centers in closer geographic proximity, leading to increased interaction on the roadways between farm equipment and passenger vehicles. Current research is critical for informing the development of policies and educational strategies to reduce risk of farm equipment crashes and subsequent injuries.

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