

## Updates from the Field

### June 2023: Lawnmower safety (children)

Fletcher, A. N., Schwend, R. M., Solano, M., Wester, C., & Jarka, D. E. (2018). Pediatric Lawn-Mower Injuries Presenting at a Level-I Trauma Center, 1995 to 2015: A Danger to Our Youngest Children. *The Journal of bone and joint surgery. American volume*, *100*(20), 1719–1727.

<https://doi.org/10.2106/JBJS.18.00096>

**Background:** Unintentional injuries are the leading cause of morbidity and mortality among children 0 to 18 years of age in the U.S. An estimated 9,400 to 17,000 pediatric lawn-mower injuries occur each year. The aims of this study were to better define the epidemiology of lawn-mower injuries and to identify predictors of severe lawn-mower injuries to optimize public education and injury prevention.

**Methods:** All patients 0 to 18 years of age who presented to Children's Mercy Hospital (CMH), Kansas City, Missouri, during the period of 1995 to 2015 after sustaining a lawn-mower injury were identified using International Classification of Diseases, 9th Revision (ICD-9) codes. Demographic information and data regarding primary outcome measures (death, amputation, need for prosthesis, Injury Severity Score [ISS]) and secondary outcome measures were collected. Bivariate and multivariate analyses were used to identify risk factors for severe lawn-mower injuries.

**Results:** One hundred and fifty-seven patients were identified, with a bimodal age distribution peaking at 4 and 15 years of age. Seventy-five percent of the subjects were male. Sixty-six percent of the patients were admitted to the hospital, with a mean length of stay of 6 days. An average of 3 operations were performed. Nineteen percent of the patients lived in a nonmetro/rural location. Lower-extremity injuries were most prevalent, affecting 84% of the patients. Forty percent of the patients experienced at least 1 traumatic amputation. Thirteen percent of the patients required a prosthesis after the injury. The average ISS was 8. Significant predictors of a higher ISS included an age of 0 to 9 years, a riding lawn mower, a grandparent operator, and a nonmetro/rural location. Younger children were more likely to be injured from a riding lawn mower, be the passenger of the mower or a bystander, be injured with a grandparent operator, and live in a nonmetro/rural location. Younger children also had a higher ISS and amputation rate, longer LOS, and more surgical procedures.

**Conclusions:** Education to protect younger patients should target parent, grandparent, and older sibling operators. Education for the older, teenage group should include safe mowing techniques. Efforts should also target nonmetro/rural populations and grandparents, specifically highlighting the severe dangers of riding lawn mowers when young children are passengers or bystanders.

**Level of evidence:** Prognostic Level IV. See Instructions for Authors for a complete description of levels of evidence.

Ren, K. S., Chounthirath, T., Yang, J., Friedenber, L., & Smith, G. A. (2017). Children treated for lawn mower-related injuries in US emergency departments, 1990-2014. *The American journal of emergency medicine*, *35*(6), 893–898. <https://doi.org/10.1016/j.ajem.2017.03.022>

**Objective:** Investigate the epidemiology of lawn mower-related injuries to children in the US.

**Methods:** A retrospective analysis was conducted of children younger than 18 years of age treated in US emergency departments for a lawn mower-related injury from 1990 through 2014 using data from the National Electronic Injury Surveillance System.

**Results:** An estimated 212,258 children <18 years of age received emergency treatment for lawn mower-related injuries from 1990 through 2014, equaling an average annual rate of 11.9 injuries per 100,000 US children. The annual injury rate decreased by 59.9% during the 25-year study period. The leading diagnosis was a laceration (38.5%) and the most common body region injured was the hand/finger (30.7%). Struck by (21.2%), cut by (19.9%), and contact with a hot surface (14.1%) were the leading mechanisms of injury. Patients <5 years old were more likely (RR 7.01; 95% CI: 5.69-8.64) to be injured from contact with a hot surface than older patients. A projectile was associated with 49.8% of all injuries among patients injured as bystanders. Patients injured as passengers or bystanders were more likely (RR 3.77; 95% CI: 2.74-5.19) to be admitted to the hospital than lawnmower operators.

**Conclusions:** Lawn mower-related injuries continue to be a cause of serious morbidity among children. Although the annual injury rate decreased significantly over the study period, the number of injuries is still substantial, indicating the need for additional prevention efforts. In addition to educational approaches, opportunities exist for improvements in mower design and lawn mower safety standards.

Khansa, I., Pearson, G. D., Bjorklund, K., Fogolin, A., & Kirschner, R. E. (2021). Pediatric Lawnmower Injuries: a 25-year Review. *JPRAS open*, 29, 135–143.  
<https://doi.org/10.1016/j.jptra.2021.05.001>

**Background:** Despite regulations currently in place, the incidence of lawnmower injuries in children has not decreased for several decades in the United States. In fact, studies in several countries show that the incidence of riding lawnmower injuries are actually on the rise worldwide. Those injuries tend to be devastating and limb-threatening. The purpose of this study was to evaluate a pediatric trauma center's experience with those injuries over the past 25 years.

**Methods:** All patients who presented to a level I pediatric trauma center with injuries from lawnmowers between 1994 and 2019 were reviewed. Date of birth, gender, date of injury, mechanism of injury, type of lawnmower, and type of injury (including whether an open fracture, soft tissue defect, and/or amputation were present) were recorded.

**Results:** A total of 142 pediatric patients were treated over the study period. The average age was 7.5 years. The three most common mechanisms of injury were being hit by a riding lawnmower moving forward, falling off a riding lawnmower, and being hit by a riding lawnmower moving backward. Of all patients, 68.3% sustained an open fracture and 38% required an amputation. Riding lawnmowers resulted in more operative procedures, longer hospital stays, and more soft tissue defects that require reconstruction than push mowers. Younger patients were at a higher risk to sustain proximal amputations (wrist/ankle or proximal) than older patients.

**Conclusion:** Lawnmower injuries are devastating and largely avoidable. There are currently recommendations and regulations in the United States, which if followed, would prevent the

vast majority of pediatric lawnmower injuries. Unfortunately, the incidence of these injuries has not decreased despite the current regulations. Broader public education is essential to decrease the incidence of serious lawnmower injuries in children. **Level of Evidence: IV.**