INJURY PREVENTION AND ARTIFICIAL INTELLIGENCE (AI)

Between 2020 and 2024, the University of Iowa Injury Prevention Research Center (IPRC) partnered with the Iowa Initiative for Artificial Intelligence (IIAI) at the College of Engineering to support seven pilot projects using AI to study injuries and violence.

These data-driven projects have used AI to investigate important research questions to address suicide, substance use disorders, violence, older adult falls, teen driving, and agricultural injuries.

The IIAI fosters inter-disciplinary and cross-college research and discovery in AI among faculty, graduate students, and postdoctoral fellows. Seven IPRC-affiliated researchers, including early career investigators, have received pilot grants to work with AI experts in the IIAI ($15,000 for the injury researcher and $30,000 for the AI expert).

Some highlights:

Suicide

PI: Jonathan Platt, Assistant Professor, Department of Epidemiology
Project: **Structural differences and intersectional suicide deaths in the U.S.** (2022)

Aim: To understand the various social factors that affect suicide rates, identify high-risk groups, and explain how social differences play a role. The study analyzed county-level suicide rates and compared them with social and economic factors from 2005 to 2020.

This project led to an abstract published in the *Journal of the American Academy of Child and Adolescent Psychiatry* and a R49 grant (CDC Injury Control Research Centers program) to examine racial differences in suicide and overdose among rural populations.

Firearms violence

PI: Cori Peek-Asa, Former Director, UI Injury Prevention Research Center
Project: **Firearms and circumstances of violent deaths** (2021)

Aim: To identify differences in circumstances between firearm and non-firearm violent deaths using National Violent Death Reporting System (NVDRS) data.

Some results: Strong predictors of suicide with firearms were sex (male), toxicology information availability, injury-related location types (detention facility, bridge, railroad tracks, street, hotel), history of attempted suicide and suicide note, mental health problem and mental heath diagnosis, physical health problem, and never married.

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Older adult falls

PI: Colette Galet, Associate Research Scientist, Department of Surgery

Project: **Identification of a signature predictive of fall injury and 30-day readmission for a fall in an elderly patient cohort** (2020)

Aim: To identify a "signature" (combination of clinical variables) that could predict which elderly patients are at risk for a fall and factors associated with 30-day hospital readmission after a fall injury. The study analyzed data (2010- 2014) from the National Readmission Database.

Some results: Being a woman aged 65-74 years and presenting a 5-item modified Frailty Index score >3 predicted admission for fall-related injuries in over 80% of this population. This study was published in *Geriatrics and Gerontology International*.

Citation: Le N, Sonka M, Skeete DA, Romanowski KS, Galet C. Predicting admission for fall-related injuries in older adults using artificial intelligence: A proof-of-concept study. Geriatr Gerontol Int. 2025 Feb;25(2):232-242. doi: 10.1111/ggi.15066. Epub 2025 Jan 12. PMID: 39800578; PMCID: PMC11788240.

"[The AI team] really brought in the expertise because while I can do classical statistics, I am absolutely not able to do any machine learning work. So, their expertise was key to this project." – Colette Galet

Teen driving safety

PI: Elizabeth O-Neal, Assistant Professor, Department of Community and Behavioral Health
Project: **Advanced eye tracking of moving objects in driving simulation** (2022)

Researchers collected videos and eye-tracking data of teen drivers engaged in a simulated drive. Each simulated drive contained nearly 20 hazard events (e.g., braking vehicles, animals near the roadway) interspersed with driving periods with no hazards.

Current software that tracks where eyes look does not accurately detect moving or stationary objects as the driven car moves. While human coding of such data is possible, it is laborious and costly.

Aim: To develop a machine learning algorithm to identify objects or areas of interest (AOIs) that change over time in the driving simulation and derive measures of eye gaze using the location of AOIs identified and previously captured gaze locations.

This study will provide an automated and economical way for researchers and practitioners to know what newly licensed teens are paying attention to when potential hazards on the roadway emerge and how that may change because of training. The AI object detection algorithm will be used in a study that seeks to improve teen drivers' anticipation of hazards through a parent-focused intervention.

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