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Stacy A. Balk, Johnell O. Brooks, Nathan Klein, Jason Grygier. *Pedestrians' estimates of their own visibility: A simple and effective computer-based technique.* **Pages 101-106.**

Introduction: Research has shown that both pedestrians and drivers drastically overestimate pedestrians' nighttime visibility (NHSTSA, 2008a, 2008b; Owens & Sivak, 1996) and fail to appreciate the safety benefits of proven conspicuity aids. One solution is educational intervention (Tyrrell, Patton, & Brooks, 2004); however, the on-road assessment of its effectiveness is expensive and time consuming. Metod: Experiment One introduces a computer-based alternative to the field-based approach, successfully replicating the previous study's trends among 94 students who either receive or do not receive an educational lecture. Experiment Two utilizes the simulation's portability to determine if professional roadway workers have a more accurate understanding of pedestrian conspicuity than students. Results: Results among 88 workers show they do not significantly appreciate the advantages of effective retroflective material configurations or vehicle headlamp settings, for example, any better than non-lectured students in Experiment One. Impact: The study's results demonstrate the need for education among all pedestrians and the benefits of efficient testing methods.

Highlights: ► Education is a simple way to help pedestrians understand their own conspicuity. ► Computer-based testing can successfully assess education interventions. ► Road-workers are not more informed of road risks than other pedestrians. ► Most road users fail to appreciate the safety benefits of conspicuity aids without education.

- **Keywords:** Pedestrian safety; Conspicuity; Education; On-road training; Roadway worker; Nighttime safety

Yunlong Zhang, Yuanchang Xie, Linhua Li. *Crash frequency analysis of different types of urban roadway segments using generalized additive model.* **Pages 107-114.**

Introduction: This paper utilizes generalized additive model to explore the potential non-linear relationship between crash frequency and exposure on different types of urban roadway segments. Methods: Generalized additive models are used to analyze crash frequency data and compared with the commonly used crash rate method and generalized linear models using a five-year crash data set from Houston, Texas. Results: The study shows that the relationship between crash frequency and exposure varies by segment type and the linearity may only approximately exist in certain segment types. In

addition, the generalized additive modeling results suggest that such relationship curves may not be monotonic. Finally, this study demonstrates that generalized additive models in general provide better flexibility and modeling performance than generalized linear models. Impact on Industry: The generalized additive model provides a very promising alternative for crash frequency modeling and other safety studies.

Highlights: ► We model crash frequency as function of traffic flow on different roadway segment types. ► Approximately linear relationship may only exist for certain segment types. ► For some segment types, the relationship is nonlinear and not monotonic. ► GAM is capable of identifying nonlinear and non-monotonic relationships.

• **Keywords:** Crash analysis; Crash rate; Generalized linear model; Generalized additive model; Roadway type

Lela Rankin Williams, David R. Davies, Kris Thiele, Judith R. Davidson, Alistair W. MacLean. *Young drivers' perceptions of culpability of sleep-deprived versus drinking drivers.* **Pages 115-122.**

Introduction: Sleep-deprived driving can be as dangerous as alcohol-impaired driving, however, little is known about attitudes toward sleep-deprived drivers. This study examined the extent to which young drivers regard sleep-deprived compared to drinking drivers as culpable for a crash, and how their perceptions of driving while in these conditions differ. *Method:* University student participants (N = 295; M = 20.4 years, SD = 1.3; 81% women) were randomly assigned to read one of five fatal motor-vehicle crash scenarios, which differed by aspects of the driver's condition. Culpability ratings for the drinking driver were higher than those for the sleep-deprived driver. *Results:* Qualitative findings revealed that driving while sleep-deprived was viewed as understandable, and driving after drinking was viewed as definitely wrong. The dangers of sleep-deprived driving remain under-recognized.

Highlights: ► We examine sleep-deprived to drinking drivers as culpable for a crash, and perceptions of driving while in these conditions. ► Participants were randomly assigned to read one of five fatal motor vehicle crash scenarios. ► Culpability ratings for the drinking driver were higher than those for the sleep-deprived driver. ► Qualitative findings revealed that driving while sleep-deprived was viewed as understandable and driving after drinking was viewed as definitely wrong. ► The dangers of sleep-deprived driving remain under-recognised.

• **Keywords:** drowsy driving; sleepiness; fatigue; crash; attitudes

Joseph Clare, Len Garis, Darryl Plecas, Charles Jennings. *Reduced frequency and severity of residential fires following delivery of fire prevention education by on-duty fire fighters: Cluster randomized controlled study.* **Pages 123-128.**

Introduction: In 2008, Surrey Fire Services, British Columbia, commenced a firefighter-delivered, door-to-door fire-prevention education and smoke alarm examination/installation initiative with the intention of reducing the frequency and severity of residential structure fires in the City of Surrey. Metod: High-risk zones within the city were identified and 18,473 home visits were undertaken across seven temporal delivery cohorts (13.8% of non-apartment dwellings in the city). The frequency and severity of fires pre- and post- the home visit intervention was examined in comparison to randomized high-risk cluster controls. Results: Overall, the frequency of fires was

found to have reduced in the city overall, however, the reduction in the intervention cohorts was significantly larger than for controls. Furthermore, when fires did occur within the intervention cohorts, smoke detectors were activated more frequently and the fires were confined to the object of origin more often post-home visits. No equivalent pattern was observed for the cluster control. Impact on Industry: On-duty fire fighters can reduce the frequency and severity of residential fires through targeted, door-to-door distribution of fire prevention education in high-risk areas.

Highlights: ► On-duty fire fighter delivered door-to-door fire-prevention education campaign. ► Targeted high-risk fire areas across the City of Surrey, British Columbia. ► Reduced annual fire rate in targeted areas relative to high-risk cluster controls. ► Reduced severity of fires that did occur in targeted areas. ► No reductions in fire severity for high-risk cluster controls.

- **Keywords:** Fire prevention; home visits; public education; smoke detectors; cluster controls

Adnan Turgut, Tevfik Turgut. *A study on rescuer drowning and multiple drowning incidents*. Pages 129-132

Introduction: Drowning is a leading cause of injury related death in many countries, including Turkey, where this study originates. The aim of the study is to define and examine "rescuer" drowning and Multiple Drowning Incidents (MDIs), and suggest preventative measures against MDIs. Metod: The event of a person drowning can be complicated if an untrained person attempts to rescue the Primary Drowning Victim (PDV). This can result in the death of the "rescuer" as well as the PDV, which then becomes an MDI. This study categorizes these MDI incidents by examining online news media accounts in Turkey from 2005 through 2008. Results: In this 4-year period, 88 "rescuer" drowning incidents occurred in which 114 "rescuers" and 60 PDVs died from drowning in MDIs; 114 drowned "rescuers" rescued 47 PDVs before they died from drowning. Most of the "rescuers" were male and 42.1% of them were under the age of 18. Most of the drowning incidents (68.5%) occurred in fresh water (lakes/dams/water holes and rivers/creeks/streams). Conclusion: In this study, risk factors for drowning deaths include gender and entering in unguarded open water. An increased awareness of such risks as well as promotion of both swimming and rescue skills in water could help reduce MDIs. Parents who live close to fresh water sources with boys under the age of 18 years should be more aware of drowning risk because of their higher rates of deaths from drowning. Impact on Industry: The results of this study give the chance to policy makers and all other related people or organizations to see the whole picture of deaths by drowning and the results can be used to build up preventative strategies as swimming teaching and life guard education.

Highlights: ► In four years 114 "rescuers" and 60 PDVs died from drowning in 88 MDIs. ► 82% of "rescuers" were males and 42.1% were children. ► "Rescuers" saved lives of 47 PDVs and then died from drowning. ► PDVs were mostly males (65%) and aged between 3 and 52 years. ► MDIs occurred mostly during swimming and picnicking activities.

- **Keywords:** "rescuer" drowning; multiple drowning incident; aquatic lifeguards; non-contact rescue techniques; Turkey

Jonathan Howland, Salma Bibi, James English, Sophia Dyer, Elizabeth W. Peterson. *Older Adult Falls at a Metropolitan Airport: 2009–2010.* Pages 133-136.

Introduction: We investigated falls at a metropolitan airport to determine fall incidence, identify potential causes of these falls, and suggest opportunities for mitigation. Methods: We used deidentified incident reports of all falls requiring EMS response that occurred at the airport during 2009 and 2010. Results: On average, one fall occurred every 2.3 days. Ninety-six percent (96%) of falls occurred in terminals. Of all falls, 44% occurred on escalators, making escalators the most common location. Seventy-two percent (72%) of fallers were females; 43% were ≥ 65 years; 92% of all falls resulted in a documented injury; 37% of falls resulted in transport to hospital emergency departments. Escalator fall risks include carrying bags (due to changes in baggage fees), using cells phones, not using handrails, and compromised strength and balance. Conclusions and Impact: Diverting at-risk passengers to elevators could significantly reduce the overall falls. Interventions targeting escalator falls have the greatest promise for reducing falls at this airport.

Highlights: ► Falls requiring emergency services response are common at airports. ► Almost half of these falls occur on escalators. ► Over a third of these escalator falls require transport to hospital. ► The majority of those falling on airport escalators are older adults. ► Encouraging passengers carrying bags to use elevators could reduce airport falls.

Jeffrey Leinert, Russell Griffin, Justin Blackburn, Gerald McGwin Jr. *The epidemiology of lawn trimmer injuries in the United States: 2000-2009.* **Pages 137-139.**

Introduction: Yard maintenance equipment is potentially dangerous, and some of the more frequency used equipment (e.g., lawn mowers) has been extensively studied. However, the extent of lawn trimmers as a source of injury has not previously been explored. Methods: Data from the Consumer Product Safety Commission's National Electronic Injury Surveillance System were used to estimate the number of patients treated in U.S. emergency departments for lawn trimmer-related injuries. Injury rates were calculated according to age, sex, and race, and characteristics of the injury event were determined. Results: An estimated 81,907 injuries involving a lawn trimmer occurred from 2000–2009. The incidence generally increased over time. Men, people aged 40–49, and Caucasians were the groups most likely to be injured. The most commonly injured body part was the head, specifically the eye, accounting for 42.5% of the injuries. Contusions and abrasions were the most common type of injury to the head, but lacerations were the most common injury to the extremities, and strains/sprains were the most common injury to the trunk. Discussion: Although previous research on lawn trimmers has focused exclusively on injuries to the eyes, the results of the current study show that such injuries are one component of the problem. Because most of the injuries were due to foreign objects, it is important that the use of adequate safety gear be emphasized when operating lawn trimmers. Impact on Industry: Results suggest that lawn trimmer design changes and better safety education for trimmer use can reduce the rate of injury and reverse the current trend.

Highlights: ► Incidence of lawn trimmer injuries increased from 2000–2009 ► Men, persons aged 40–49, and Caucasians were more likely to be injured ► Nearly half of lawn trimmer-related injuries were to the eye

Rebecca B. Naumann, Ann M. Dellinger, Melissa L. Anderson, Amy E. Bonomi, Frederick P. Rivara. *Healthcare utilization and costs among older adult female drivers and former drivers.* **Pages 141-144.**

Purpose: This study compared the healthcare utilization and costs for specific types of medical services among older adult women who currently drive and those who no longer drive. Methods: This study included 347 women aged 65 or older who were either former (had stopped driving) or current drivers, randomly sampled from a large U.S. health plan to participate in a telephone survey, and who had automated health records with healthcare utilization and cost data. Bivariate analyses and generalized linear modeling were used to examine associations between driving status and healthcare utilization and costs. Results: Adjusting for age, income, and marital status, former drivers were more likely than current drivers to use mental health care services (RR = 3.37; 95% CI: 1.03, 10.98). Former drivers also tended to use more inpatient (RR = 1.85; 95% CI: 0.88, 3.87) and emergency services (RR = 1.89; 95% CI: 0.96, 3.70), but results did not reach statistical significance. Total annual healthcare costs in 2005 were almost twice as high for former drivers compared with current drivers ($13,046 vs. $7,054; mean difference = $5,992; 95% CI: -$360, $12,344), although this relationship was not statistically significant (CR = 1.61; 95% CI: 0.88, 2.96). Impact on Industry: Former drivers were more than three times as likely as current drivers to use mental health services, and tended to use more emergency and inpatient services. Further research on factors that potentially mediate the relationship between driving status and health service use is warranted.

• **Keywords:** Older adults; Mobility; Motor vehicle; Costs; Healthcare

Allan F. Williams, Julie Tison. *Motor vehicle fatal crash profiles of 13-15-year-olds.* **Pages 145-149.**

Objektive: The goal was to provide a description of fatal crashes involving 13-15-year-old drivers and passengers. Methods: Information was obtained from the Fatality Analysis Reporting System for 2005-2009. Results: The 1,994 passenger deaths during the 2005-2009 period far exceeded the number of driver deaths (299) or the number of drivers in fatal crashes (744). Passenger deaths occurring with teenage drivers, particularly 16-17-year-olds, increased with passenger age. Most 13-15-year-old drivers in crashes were driving either with no license or permit (63%), or with a permit but without required adult presence (10 percent). Fatal crashes involving illegal driving were most likely to involve high-risk actions such as speeding and nonuse of belts. Supervised learners were few in number (about 12 per year) and had the lowest rates of high-risk actions. Conclusions: The main issues for 13-15-year-olds' motor vehicle deaths are passenger deaths and driving without a license or adult supervision. Impact on Industry: Parents, pediatricians, and others need to recognize the increase in motor vehicle occupant deaths that occurs in the early teen years.

Highlights: ► Driver and particularly passenger deaths increase at ages 13–15 ► Many 13-15-year-old passengers do not use seat belts ► Most 13-15-year-old drivers are driving illegally ► Illegal 13-15-year-old driving is associated with high-risk actions ► Supervised learners have the lowest rate of high-risk actions

• **Keywords:** Teenagers; Motor vehicle crashes; Fatal crashes; Graduated driver licensing; Driver's license