

## Journal of Safety Research – rok 2008, ročník 39

### Číslo 4



**Sibel Erkal, Susan Goodwin Gerberich, Andrew D. Ryan, Colleen M. Renier, Bruce H. Alexander. *Animal-related injuries : a population-based study of a five-state region in the upper midwest: Regional rural injury study II. Pages 351-363.***

**Abstract: Problem:** While agricultural injury has been identified among the major causes of occupational injury mortality and morbidity, data have been limited pertinent to the magnitude, consequences, and potential risk factors for animal-related injuries -- a major source of morbidity among agricultural operations. **Methods:** Demographics, exposure, and injury data were collected for 1999 and 2001 among agricultural households in a five-state region. Causal models facilitated survey design, data analyses, and interpretation of results; directed acyclic graphs guided multivariate modeling. **Results:** From 7,420 households (84% response of eligible), a total of 5,045 injury events were reported; 1,016 (20.1%) were animal-related. Multivariate analyses revealed increased risks for those < 20 years; residents of all states compared to Minnesota; all age groups compared to 0–4 years; > 0 hours worked; and prior agricultural injury history. For those 20+ years, increased risks were identified for: South Dakota residents; males; > 0 hours worked; and prior agricultural injury history. For those cases < 20 and 20+ years of age, 58% and 46%, respectively, resulted in lost work time on their agricultural operations (31% and 50%, one week or more). **Conclusions:** Animal-related injury has a major impact on the agricultural industry. Results serve as a basis for interventions and further research. **Impact on Industry:** The impact of animal-related injuries on the agricultural industry appears significant; among age groups < 20 and 20+, 85% and 82%, respectively, had some resulting restriction. For all events combined, 29% and 30%, respectively, involved restriction from one week to 3+ months; 12% and 15% involved restriction for one month or more. Among those < 20 and 20+ years of age, 58% and 46%, respectively, lost work time on their own agricultural operation as a result of injuries associated with their own operation; 22% and 15% lost one week or more. Moreover, of the non-agriculture-related injuries, 31% and 50% resulted in lost work time on their own operation; 15% and 28%, respectively, lost one week or more. Restrictions such as these can affect the productivity of the operation, resulting in financial impacts, especially on small operations that have few people to manage the required tasks.

- **Keywords:** Injury; Animal-related injury; Agricultural operation; Agricultural injuries; Epidemiology of injuries

**Alicia M. Alvero, Kristen Rost, John Austin. *The safety observer effect : the effects of conducting safety observations.* Pages 365-373.**

**Abstract: Introduction:** Some research suggests that conducting safety observations of another's safety performance may serve as an effective tool in increasing the safety performance of the observer. The primary purpose of the present study was to assess the effects of conducting safety observations on the postural safety performance of observers engaging in an assembly task for short time periods. The secondary objectives of the study were: (a) to measure productivity, and (b) to measure the accuracy of participant safety observations. **Method:** An ABC (A: baseline, B: information, C: observation) multiple-baseline design counterbalanced across postural behaviors (back, shoulder, and feet position) was implemented with six participants. **Results and Discussion:** Substantial improvements in postural safety occurred after participants conducted safety observations, and these improvements did not appear to negatively affect productivity. Results also suggest that there is no relation between the accuracy of an observer's safety observation and their subsequent safety performance. **Impact on Industry:** This research provides evidence that a safety observation process can function to increase safe postural behavior of observers. Thus, the implementation of such a process may contribute to the prevention of musculoskeletal disorders and related costs in the workplace.

- **Keywords:** Behavioral safety; Conducting observations; Observer performance; Postural behaviors; Accuracy of observations

**Ward Vanlaar, Herb Simpson, Dan Mayhew, Robyn Robertson. *Aggressive driving : a survey of attitudes, opinions and behaviors.* Pages 375-381.**

**Abstract: Introduction:** Aggressive driving encompasses a continuum of behaviors that range from extreme acts, such as shootings, to less severe manifestations, such as arguments and gestures. It is clear from the available data that aggressive driving is not uncommon and very risky. However, little is known about the opinions and practices of drivers. The purpose of this study was to help bridge these gaps. **Methods:** The data were gathered by means of a public opinion poll among a representative sample of 1,201 Canadian drivers. Univariate frequency distributions and 95% confidence intervals were calculated and logistic regression and generalized linear latent models were used to summarize the data. **Results:** It was found that the issue of aggressive driving is a significant one as a considerable percentage of drivers admits to it. The results coming from the logistic regression and the generalized linear latent model suggest that male and younger drivers are more likely to behave aggressively in traffic and that behaving more aggressively is associated with a history of traffic tickets. **Discussion:** When gauging people's attitudes, opinions, and behaviors, it becomes clear that aggressive driving is a considerable problem. There also seems to be a need for a better understanding of which specific behaviors respondents associate with the generic term "aggressive driving." **Impact on Industry:** Results from this study further emphasize the need of increasing the aggressive driving knowledge base.

- **Keywords:** Aggressive driving; Prevalence; Profile; Generalized linear latent modeling; Public opinion poll

**David M. Neyens, Birsen Donmez, Linda Ng Boyle. *The Iowa graduated driver licensing program : effectiveness in reducing crashes of teenage drivers.* Pages 383-390.**

**Abstract: Problem:** Graduated Driver Licensing (GDL) programs vary in the United States in terms of implementation and restrictions. The State of Iowa's GDL program is

assessed for its effectiveness in reducing crashes among teenage drivers. **Method:** Time series analysis was used to evaluate police documented crashes involving 16-, 17-, and 18-year-old drivers over a 10 year period, with an intervention identified at the point of GDL implementation. **Results:** After controlling for seasonal trends and auto-correlative effects, a significant reduction in the crash rate of and 16- and 17-year-old drivers was observed due to the GDL implementation. However, there were no significant reductions in crash rates for 18-year-old drivers. **Discussion:** The analyses suggest that the Iowa GDL program is effective in reducing the crash rates of 16- and 17-year-old drivers but the effects do not sustain for 18-year-old drivers. **Impact on Industry:** The results suggest that the program appears to be working, however further analysis is needed to determine what factors are preventing lasting effects for these teenage drivers.

- **Keywords:** Teenagers; intervention analysis; young drivers; crash rates; ARIMA model; time-series analysis

**Richard L. Neitzel, Noah S. Seixas, Michael J. Harris, Janice Camp. *Exposure to fall hazards and safety climate in the aircraft maintenance industry. Pages 391-402.***

**Abstract: Problem:** Falls represent a significant occupational hazard, particularly in industries with dynamic work environments. This paper describes rates of noncompliance with fall hazard prevention requirements, perceived safety climate and worker knowledge and beliefs, and the association between fall exposure and safety climate measures in commercial aircraft maintenance activities. **Methods:** Walkthrough observations were conducted on aircraft mechanics at two participating facilities (Sites A and B) to ascertain the degree of noncompliance. Mechanics at each site completed questionnaires concerning fall hazard knowledge, personal safety beliefs, and safety climate. Questionnaire results were summarized into safety climate and belief scores by workgroup and site. Noncompliance rates observed during walkthroughs were compared to the climate-belief scores, and were expected to be inversely associated. **Results:** Important differences were seen in fall safety performance between the sites. The study provided a characterization of aircraft maintenance fall hazards, and also demonstrated the effectiveness of an objective hazard assessment methodology. Noncompliance varied by height, equipment used, location of work on the aircraft, shift, and by safety system. **Discussion:** Although the expected relationship between safety climate and noncompliance was seen for site-average climate scores, workgroups with higher safety climate scores had greater observed noncompliance within Site A. Overall, use of engineered safety systems had a significant impact on working safely, while safety beliefs and climate also contributed, though inconsistently. **Impact on Industry:** The results of this study indicate that safety systems are very important in reducing noncompliance with fall protection requirements in aircraft maintenance facilities. Site-level fall safety compliance was found to be related to safety climate, although an unexpected relationship between compliance and safety climate was seen at the workgroup level within site. Finally, observed fall safety compliance was found to differ from self-reported compliance.

- **Keywords:** Fall hazards; safety climate; aircraft maintenance; fall protection; walkthrough compliance observation

**Keryn Pauley, David O'Hare, Mark Wiggins. *Risk tolerance and pilot involvement in hazardous events and flight into adverse weather. Pages 403-411.***

**Abstract: Introduction:** According to Lopes [Lopes, L.L. (1987). Between hope and fear: The psychology of risk. *Advances in Experimental Social Psychology*, 20, 255–295] tolerance of risk may be governed by sensitivity to either the opportunities for gain or threats of loss involved. **Methods:** In the initial study, qualified pilots were presented with

36 written flight scenarios that varied in the levels of opportunity and threat present. The pilots rated the likelihood that they would undertake each flight. Pilots were largely risk averse, as their ratings were all significantly influenced by threat. *Results:* The pilots whose ratings were significantly influenced by opportunity had been involved in more hazardous aviation incidents than the other pilots. In the final study, 32 qualified pilots completed both the risk tolerance measure and a simulated flight into adverse weather. The pilots who continued flying into adverse weather were less risk averse compared to the pilots who diverted. This further highlighted the link between risk tolerance and risk-taking, and suggested that some pilots may fly into adverse weather because of a greater tolerance of risk. *Impact on Industry:* The studies provide evidence that a measure of risk tolerance can predict potential accident involvement amongst general aviation pilots.

- **Keywords:** Risk tolerance; Decision-making; Aviation; Opportunity; Threat

**J.C.F. de Winter, P.A. Wieringa. *Gender differences in driver's license theory test scores in the Netherlands. Pages 413-416.***

**Abstract: Introduction:** Gender differences were investigated in a sample of persons (N = 34,755) who completed the driver's license theory test in the Netherlands. **Results:** Contrary to recent findings from Sweden, no gender differences were found. **Impact of Industry:** The present study signifies the importance of standardization in driver testing.

- **Keywords:** Gender difference; Driver training; Driver testing; Theory test

**Vojtech Eksler, Sylvain Lassarre. *Evolution of road risk disparities at small-scale level : example of Belgium. Pages 417-427.***

**Abstract: Problem:** Road accident outcomes are traditionally analyzed at state or road network level due to a lack of aggregated data and suitable analytical methods. The aim of this paper is to demonstrate usefulness of a simple spatiotemporal modeling of road accident outcomes at small-scale geographical level. **Method:** Small-area spatiotemporal Bayesian models commonly used in epidemiological studies reveal the existence of spatial correlation in accident data and provide a mechanism to quantify its effect. The models were run for Belgium data for the period 2000-2005. Two different scale levels and two different exposure variables were considered under Bayesian hierarchical models of annual accident and fatal injury counts. The use of the conditional autoregressive (CAR) formulation of area specific relative risk and trend terms leads to more distinctive patterns of risk and its evolution. The Pearson correlation tests for relative risk rates and temporal trends allows researchers to determine the development of risk disparities in time. **Results:** Analysis of spatial effects allowed the identification of clusters with similar risk outcomes pointing toward spatial structure in road accident outcomes and their background mechanisms. From the analysis of temporal trends, different developments in road accident and fatality rates in the three federated regions of Belgium came into light. Increasing spatial disparities in terms of fatal injury risk and decreasing spatial disparities in terms of accident risk with time were further identified. **Impact on industry:** The application of a space-time model to accident and fatal injury counts at a small-scale level in Belgium allowed identification of several areas with outstandingly high accident (injury) records. This could allow more efficient redistribution of resources and more efficient road safety management in Belgium.

- **Keywords:** Road risk; Risk exposure; Bayes hierarchical model; Spatial correlation; Convolution model

**James Mayrose. *The effects of a mandatory motorcycle helmet law on helmet use and injury patterns among motorcyclist fatalities. Pages 429-432.***

**Abstract: Background:** The National Highway Traffic Safety Administration (NHTSA) has found that motorcycle helmets are 37% effective in preventing death and 65% effective in preventing brain injuries in a crash. Unfortunately, in 1995 Congress lifted federal sanctions against states without helmet laws and since then there have been a number of primary motorcycle helmet laws repealed or weakened. More lives could be saved and serious injuries avoided if there was increased helmet use throughout the United States. **Methods:** This study analyzed helmet use and injury patterns among motorcycle riders in the United States involved in fatal crashes from 1995 through 2003 and compared the results between states with and without a primary helmet law. Age, sex, injury severity and helmet use are some of the variables obtained from the Fatality Analysis Reporting System (FARS). **Results:** In the 20 states and the District of Columbia, which currently have a primary helmet law, 84.0% of fatally injured riders were wearing a helmet. In the 27 states with a secondary helmet law, 36.2% of fatalities used a helmet, and in the remaining three states with no law at all, helmet use dropped to 17.6%. In the two states (Arkansas and Texas) that changed from a primary helmet law to a secondary helmet law in 1997, helmet use decreased from 78.2% in 1996 to 31.7% in 2000. **Conclusion:** If all states were to enact a primary motorcycle helmet law, helmet use would dramatically increase while decreasing the number of motorcyclist head injuries and fatalities. **Impact on Industry:** The results of this study will hopefully persuade law makers to enact primary helmet laws in all states throughout the nation. Helmet manufacturers can use this data to design more comfortable helmets while also improving upon the protective qualities of these safety devices.

- **Keywords:** Motorcycle; Helmet; Law; Fatality

**James Mayrose, Aruna Priya. *The safest seat : effect of seating position on occupant mortality.* Pages 433-436.**

**Abstract: Introduction:** This study investigated the survival rates of occupants of passenger cars involved in a fatal crash between 2000 and 2003. **Methods:** The information from every fatal crash in the United States between 2000 and 2003 was analyzed. Variables such as seat position, point of impact, rollover, restraint use, vehicle type, vehicle weight, occupant age, and injury severity were extracted from the Fatality Analysis Reporting System (FARS). Univariate and a full logistic multivariate model analyses were performed. **Results:** The data show that the rear middle seat is safer than any other occupant position when involved in a fatal crash. Overall, the rear (2<sup>nd</sup> row) seating positions have a 29.1% (Univariate Analysis,  $p < .0001$ , OR 1.29, 95% CI 1.22 - 1.37) increased odds of survival over the first row seating positions and the rear middle seat has a 25% (Univariate Analysis,  $p < .0001$ , OR 1.25, 95% CI 1.17 - 1.34) increased odds of survival over the other rear seat positions. After correcting for potential confounders, occupants of the rear middle seat have a 13% (Logistic Regression,  $p < .001$ , 95% CI 1.02 - 1.26) increased chance of survival when involved in a crash with a fatality than occupants in other rear seats. **Conclusion:** This study has shown that the safest position for any occupant involved in a motor-vehicle crash is the rear middle seat. **Impact on Industry:** The results of this research may impact how automobile manufacturers look at future rear middle seat designs. If the rear seat was to be designed exactly like its outboard counterparts (headrest, armrests, lap and shoulder belt, etc.) people may choose to sit on it more often rather than waiting to use it out of necessity due to multiple rear seat occupants.

- **Keywords:** Seating Position; Fatality; Crash; Safety

**Katherine E. Heck, Ramona M. Carlos. *Passenger distractions among adolescent drivers.* Pages 437-443.**

**Abstract: Problem:** Adolescents who drive with peers are known to have a higher risk of crashes. While passengers may distract drivers, little is known about the

circumstances of these distractions among teen drivers. **Method:** This study used survey data on driving among 2,144 California high school seniors to examine distractions caused by passengers. **Results:** Overall, 38.4% of youths who drove reported having been distracted by a passenger. Distractions were more commonly reported among girls and students attending moderate- to high-income schools. Talking or yelling was the most commonly reported type of distraction. About 7.5% of distractions reported were deliberate, such as hitting or tickling the driver or attempting to use the vehicle's controls. Driving after alcohol use and having had a crash as a driver were both significant predictors of reporting passenger-related distraction. **Conclusion:** Adolescents often experience distractions related to passengers, and in some cases these distractions are intentional. **Impact on industry:** These results provide information about teenage drivers who are distracted by passenger behaviors. In some cases, passengers attempted to use vehicle controls; however, it seems unlikely that this behavior is common enough to warrant redesign of controls to make them less accessible to passengers.

- **Keywords:** Adolescent; Motor vehicles; Distraction; Social behavior

**Robin L. Toblin, Leonard J. Paulozzi, Julie Gilchrist, Patricia J. Russell.**  
***Unintentional strangulation deaths from the "Choking Game" among youths aged 6-19 years – United States, 1995–2007. Pages 445-448.***

**Abstract:** The "choking game" is defined as self-strangulation or strangulation by another person with the hands or a noose to achieve a brief euphoric state caused by cerebral hypoxia. Participants in this activity typically are youths (Andrew & Fallon, 2007). Serious neurologic injury or death can result from engaging in this activity. Recent news media reports have described numerous deaths among youths attributed to the choking game. Because no traditional public health dataset collects data on this practice, CDC used news media reports to estimate the incidence of deaths from the choking game. This report describes the results of that analysis, which identified 82 probable choking-game deaths among youths aged 6-19 years during 1995-2007. Seventy-one (86.6%) of the decedents were male, and the mean age was 13.3 years. Parents, educators, and health-care providers should become familiar with warning signs that youths are playing the choking game (Urkin & Merrick, 2006). *Impact of industry:* By learning about the risk factors for and warning signs of the choking game, parents, educators, and health-care providers may be able to identify youth at risk for playing the game and prevent future deaths.

- **Keywords:** Choking game; Risky behavior; Adolescence; Suffocation; Hanging; Unintentional injury