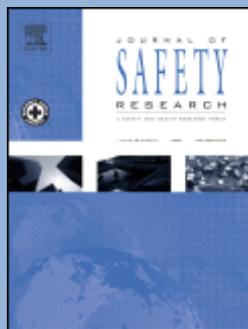


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Nicolas Clabaux, Jean-Yves Fournier, Jean-Emmanuel Michel. ***Powered two-wheeler drivers' risk of hitting a pedestrian in towns.***

Introduction: The risk of collision between pedestrians and powered two-wheelers is poorly understood today. The objective of this research is to determine the risk for powered two-wheeler drivers of hitting and injuring a pedestrian per kilometer driven in towns and to compare this risk with that run by four-wheeled vehicle drivers. Method: Using the bodily injury accidents recorded by the police on nine roads in the city of Marseille in 2011 and a campaign of observations of powered two-wheeler traffic, we estimated the risk per kilometer driven by powered two-wheeler drivers of hitting a pedestrian and compared it with the risk run by four-wheeled vehicle drivers. Results: The results show that the risk for powered two-wheeler drivers of hitting and injuring a pedestrian is significantly higher than the risk run by four-wheeled vehicle drivers. On the nine roads studied, it is on average 3.33 times higher (95% CI: 1.63; 6.78). Taking four more years into account made it possible to consolidate these results and to tighten the confidence interval. Conclusion: There does indeed seem to be problems in the interactions between pedestrians and powered two-wheeler users in urban traffic. These interaction problems lead to a higher risk of hitting and injuring a pedestrian for powered two-wheeler drivers than for four-wheeled vehicle drivers. The analysis of the police reports suggests that part of this increased risk comes from filtering maneuvers by powered two-wheelers. Practical applications: Possible countermeasures deal with the urban street layout. Measures consisting in reducing the width and the number of traffic lanes to a strict minimum and installing medians or pedestrian islands could be an effective way for the prevention of urban accidents between pedestrians and powered two-wheelers.

- **Keywords:** Powered two-wheelers; Motorcycle; Moped; Pedestrian; Crash risk

Eduardo Romano, Tara Kelley-Baker. ***Child passengers injured in motor vehicle crashes. Pages 1-8.***

Introduction: During 2010, 171,000 children aged 0–14 were injured in motor vehicle crashes. Despite the severity of the problem, research has been limited, and most of what we know about these children emanates from fatal crash databases. Method: Using information from the General Estimates System, this effort examines the occurrence of non-fatal crashes among children aged 0–14 over the last decade. Results: We found that about 1% of the non-injured children in the file had been driven by a driver who was positive for alcohol. This percentage climbed to about 2% among children who had

suffered injuries. Compared with the proportion of alcohol-positive drivers at the time of the crash, the proportion of drivers who sped or failed to obey a traffic signal was significantly higher. Practical applications: The finding that drinking and driving with children did not decrease over time questions the adequacy of the extant child endangerment laws.

- **Keywords:** Child endangerment; Non-fatal crashes; Alcohol; Speeding; Traffic signs

Anjana S., Anjaneyulu M.V.L.R. *Safety analysis of urban signalized intersections under mixed traffic.* Pages 9-14.

Introduction: This study examined the crash causative factors of signalized intersections under mixed traffic using advanced statistical models. Method: Hierarchical Poisson regression and logistic regression models were developed to predict the crash frequency and severity of signalized intersection approaches. The prediction models helped to develop general safety countermeasures for signalized intersections. Results: The study shows that exclusive left turn lanes and countdown timers are beneficial for improving the safety of signalized intersections. Safety is also influenced by the presence of a surveillance camera, green time, median width, traffic volume, and proportion of two wheelers in the traffic stream. The factors that influence the severity of crashes were also identified in this study. Practical application: As a practical application, the safe values of deviation of green time provided from design green time, with varying traffic volume, is presented in this study. This is a useful tool for setting the appropriate green time for a signalized intersection approach with variations in the traffic volume.

- **Keywords:** Signal control; Crash frequency prediction; Crash severity prediction; Hierarchical structure

Amanda N. Barczyk, Sarah V. Duzinski, Juliette M. Brown, Karla A. Lawson. *Perceptions of injury prevention and familial adjustment among mothers of teen parents.* Pages 15-21.

Introduction: Injury is a leading cause of death for infants and children. Teen mothering has been shown to put children at increased risk of injury. The mothers of teen parents often play a predominant role in the lives and caregiving of the children born to their children. Method: This article presents the findings of three focus groups conducted with 21 mothers of teen parents. Grounded theory methodology was used to explore family dynamics and how they relate to injury prevention beliefs and practices regarding infants and children. Results: Our findings revealed the difficulty mothers of teen parents and the teens themselves have in adjusting to the knowledge of the pregnancy. Unique barriers to injury prevention were also uncovered. Conclusions: Our findings provide evidence for the need of a multigenerational approach to programs aimed at improving the safety and well-being of children in this context.

- **Keywords:** Childhood injury; Childhood injury prevention; Teen parents; Focus groups; Grounded theory

Birsen Donmez, Zishu Liu. *Associations of distraction involvement and age with driver injury severities.* Pages 23-28.

Introduction: This paper investigates the associations between the severity of injuries sustained by a driver who is involved in a two-vehicle crash, the existence and type of driver distraction as well as driver's age. Few studies investigated distraction as it relates to injury severity. Moreover, these studies did not consider driver age which is a significant factor related to driving behavior and the ability to respond in a crash situation. Methods: An ordered logit model was built to predict injury severity sustained

by drivers using data from the U.S. National Automotive Sampling System's General Estimates System (2003 to 2008). Various factors (e.g., weather, gender, and speeding) were statistically controlled for, but the main focus was on the interaction of driver age and distraction type. Results: The trends observed for young and mid-age drivers were similar. For these age groups, dialing or texting on the cell phone, passengers, and in-vehicle sources resulted in an increase in a likelihood of more severe injuries. Talking on the cell phone had a similar effect for younger drivers but was not significant for mid-age drivers. Inattention and distractions outside the vehicle decreased the odds of severe injuries. For older drivers, the highest odds of severe injuries were observed with dialing or texting on a cell phone, followed by in-vehicle sources and talking on the cell phone. All these sources were associated with an increased likelihood of injury severity. Similar to young and mid-age drivers, distractions outside the vehicle decreased the odds of severe injuries. Other distraction types did not have a significant effect for the older age group. Conclusions: The results support previous literature and extend our understanding of crash injury severity. Practical applications: The findings have implications for policy making and the design of distraction mitigation systems.

- **Keywords:** Driver distraction; Ordered logit model; Injury severity; Driver age; General Estimates System

Adriana Jimenez, Juan Pablo Bocarejo, Roberto Zarama, Joël Yerpez. *A case study analysis to examine motorcycle crashes in Bogota*. Pages 29-38.

Introduction: Contributory factors to motorcycle crashes vary among populations depending on several aspects such as the users' profiles, the composition and density of traffic, and the infrastructure features. A better understanding of local motorcycle crashes can be reached in those places where a comprehensive analysis is performed. This paper presents the results obtained from a case study analysis of 400 police records of accidents involving motorcycles in Bogota. Method: To achieve a deeper level of understanding of how these accidents occur, we propose a systemic approach that uses available crash data. The methodology is inspired by accident prototypical scenarios, a tool for analysis developed in France. Results: When grouping cases we identified three categories: solo motorcycle accidents, motorcyclist and pedestrian accidents, and accidents involving a motorcycle and another vehicle. Within these categories we undertook in-depth analyses of 32 groups of accidents obtaining valuable information to better comprehend motorcyclists' road crashes in a local context. Recurrent contributory factors in the groups of accidents include: inexperienced motorcyclists, wide urban roads that incite speeding and risky overtaking maneuvers, flowing urban roads that encourage high speed and increased interaction between vehicles, and lack of infrastructure maintenance. Practical Applications: The results obtained are a valuable asset to define measures that will be conveniently adapted to the group of accident on which we want to act. The methodology exposed in this paper is applicable to the study of road crashes that involve all types of actors, not only the motorcyclists, and in contexts different than those presented in Bogota.

- **Keywords:** Motorcyclist; Accident factor; Systems theory; Crash data; Road safety

Digvijay S. Pawar, Gopal R. Patil. *Pedestrian temporal and spatial gap acceptance at mid-block street crossing in developing world*. Pages 39-46.

Introduction: Most of the midblock pedestrian crossings on urban roads in India are uncontrolled; wherein the high degree of discretion in pedestrians' behavior while crossing the traffic stream, has made the situation complex to analyze. Vehicles do not yield to pedestrians, even though the traffic laws give priority to pedestrians over

motorized vehicles at unsignalized pedestrian crossings. Therefore, a pedestrian has to decide if an available gap is safe or not for crossing. Method: This paper aims to investigate pedestrian temporal and spatial gap acceptance for midblock street crossings. Field data were collected using video camera at two midblock pedestrian crossings. The data extraction in laboratory resulted in 1107 pedestrian gaps. Available gaps, pedestrians' decision, traffic volume, etc. were extracted from the videos. While crossing a road with multiple lanes, rolling gap acceptance behavior was observed. Using binary logit analysis, six utility models were developed, three each for temporal and spatial gaps. Results and conclusions: The 50th percentile temporal and spatial gaps ranged from 4.1 to 4.8 seconds and 67 to 79 milliseconds respectively, whereas the 85th percentile temporal and spatial gaps ranged from 5 to 5.8 seconds and 82 to 95 milliseconds respectively. These gap values were smaller than that reported in the studies in developed countries. The speed of conflicting vehicle was found to be significant in spatial gap but not in temporal gap acceptance. The gap acceptance decision was also found to be affected by the type of conflicting vehicles. Practical applications: The insights from this study can be used for the safety and performance evaluation of uncontrolled midblock street crossings in developing countries.

- **Keywords:** Pedestrians midblock crossings; Gap acceptance; Temporal gap; Spatial gap; Logit model

James Macinko, Diana Silver, Jin Yung Bae. *Age, period, and cohort effects in motor vehicle mortality in the United States, 1980–2010: The role of sex, alcohol involvement, and position in vehicle.* Pages 47-57.

Introduction: Although substantive declines in motor vehicle fatalities in 1980–2010 have been observed, declines by position in the vehicle and alcohol involvement have not been well elucidated. Method: Analyses of FARS data use the Intrinsic Estimator (IE) to produce estimates of all age, period, and cohort effects simultaneously by position in the car and by alcohol involvement. Results: Declines in MVC deaths by position in the car vary for men and women by age and cohort over time. Cohorts born before 1970 had higher risks than those born later. Analyses using proxy indicators of alcohol involvement found the highest risks for those aged 16–24. By period, these risks declined more rapidly than non-alcohol related traffic fatalities. Conclusion: Changes in risk patterns are consistent with evidence regarding the contributions of new technologies and public policy efforts to reduce fatalities, but gains have not been shared evenly by sex or position in the car. Practical applications: Greater attention is needed in reducing deaths among older drivers and pedestrians. Gender differences should be addressed in prevention efforts aimed at reducing MVCs due to alcohol involvement.

- **Keywords:** Motor vehicle crashes; Age–period–cohort analysis; Alcohol

Jeffrey S. Hickman, Feng Guo, Matthew C. Camden, Richard J. Hanowski, Alejandra Medina, J. Erin Mabry. *Efficacy of roll stability control and lane departure warning systems using carrier-collected data.* Pages 59-63.

Introduction: Large truck crashes have significantly declined over the last 10 years, likely due, in part, to the increased use of onboard safety systems (OSS). Unfortunately, historically there is a paucity of data on the real-world efficacy of these devices in large trucks. The purpose of this study was to evaluate the two OSSs, lane departure warning (LDW) and roll stability control (RSC), using data collected from motor carriers. Method: A retrospective cohort approach was used to assess the safety benefits of these OSSs installed on Class 7 and 8 trucks as they operated during normal revenue-producing deliveries. Data were collected from 14 carriers representing small, medium, and large carriers hauling a variety of commodities. The data consisted of a total of 88,112 crash records and 151,624 truck-years that traveled 13 billion miles over the observation period. Results: The non-LDW cohort

had an LDW-related crash rate that was 1.917 times higher than the LDW cohort ($p = 0.001$), and the non-RSC cohort had an RSC-related crash rate that was 1.555 times higher than the RSC cohort ($p < 0.001$). Conclusions: The results across analyses indicated a strong, positive safety benefit for LDW and RSC under real-world conditions. Practical applications: The results support the use of LDW and RSC in reducing the crash types associated with each OSS.

- **Keywords:** Roll stability control; Lane departure warning; Truck; Crash; Carrier data

Vilma Carande-Kulis, Judy A. Stevens, Curtis S. Florence, Bonita L. Beattie, Ileana Arias. *A cost–benefit analysis of three older adult fall prevention interventions*. Pages 65-70.

Introduction: One out of three persons aged 65 and older falls annually and 20% to 30% of falls result in injury. The purpose of this cost–benefit analysis was to identify community-based fall interventions that were feasible, effective, and provided a positive return on investment (ROI). Methods: A third-party payer perspective was used to determine the costs and benefits of three effective fall interventions. Intervention effectiveness was based on randomized controlled trial results. National data were used to estimate the average annual benefits from averting the direct medical costs of a fall. The net benefit and ROI were estimated for each of the interventions. Results: For the Otago Exercise Program delivered to persons aged 65 and older, the net benefit was \$121.85 per participant and the ROI was 36% for each dollar invested. For Otago delivered to persons aged 80 and older, the net benefit was \$429.18 and the ROI was 127%. Tai chi: Moving for Better Balance had a net benefit of \$529.86 and an ROI of 509% and Stepping On had a net benefit of \$134.37 and an ROI of 64%. Conclusions: All three fall interventions provided positive net benefits. The ROIs showed that the benefits not only covered the implementation costs but also exceeded the expected direct program delivery costs. These results can help health care funders and other community organizations select appropriate and effective fall interventions that also can provide positive returns on investment.

- **Keywords:** Cost; Falls; Elderly; Fall intervention