

Rat—a night before Eid, whilst some of them were also reported on normal week-days.

**Conclusions** Prevalence of MOW crashes across Punjab is alarming, as initially this dangerous venture was only confined to large cities. In addition to major cities, MOW crashes are mostly reported from Kasur, which is a suburban city. Though MOW crashes constitute only 1% of reported crashes, their outcomes are very severe, as all MOW fatalities/injured included youngsters have devastating psycho-social impacts on the society. A serious effort is required on part of all the stakeholders. School road safety education with parents partaking is also very important in this view.

## Brain Injuries, Drowning and Water Safety, Other

Post Tue 2.6

### 668 RECURRENT CONCUSSIONS IN UNITED STATES HIGH SCHOOL ATHLETES

<sup>1</sup>Dustin W Currie, <sup>1</sup>Lauren A Pierpoint, <sup>2</sup>Zachary Y Kerr, <sup>1</sup>R Dawn Comstock. <sup>1</sup>Program in Injury Prevention, Education and Research (PIPER), Department of Epidemiology, Colorado School of Public Health, Aurora, CO, USA; <sup>2</sup>Datalys Centre for Sports Injury Research and Prevention, Indianapolis, IN, USA

10.1136/injuryprev-2016-042156.668

**Background** An estimated 1.6–3.8 million sports-related concussions occur annually in the United States. Previous research has indicated risk of recurrent concussion is especially high within 10 days after initial concussion. Recurrent concussions have been associated with negative long-term outcomes. This study compares severity of initial and recurrent concussions.

**Methods** Recurrent concussions within athletes in sport seasons were identified in the High School RIO database using a combination of factors including either athlete IDs, or combinations of demographic and sports-related variables, depending on available data. We calculated days between concussions, and paired analyses were completed comparing initial and recurrent concussion within athletes on symptomatology, symptom resolution and return to play time.

**Results** Concussion pairs were identified in 176 athletes. Median time between initial and recurrent concussions was 21 days (IQR:10–43 days). The only significant symptom difference between initial and recurrent concussion was loss of consciousness, which occurred more frequently in recurrent concussions (6.8% vs. 1.3%,  $p = 0.04$ ). There was no significant difference in number of symptoms ( $p = 0.84$ ) or symptom resolution time ( $p = 0.74$ ). Recurrent concussions were much more likely to result in longer time loss from sport participation ( $p < 0.0001$ ), with 27.6% of recurrent concussions being season-ending.

**Conclusions** We did not find evidence of significant differences between initial and recurrent concussions on measures of injury severity, however clinicians and athletes are treating these concussions differently in return to play clinical decision-making. Our study found a longer average amount of time between initial and recurrent concussions than previously reported, possibly due to change in concussion management guidelines. More research needs to be done comparing initial and recurrent concussions with a clearer mechanism to link injuries within athletes.

### 669 PREVENTING CONCUSSION IN YOUTH ICE HOCKEY: IS RESEARCH EVIDENCE NECESSARY TO INFORM POLICY CHANGE

<sup>1,2</sup>CA Emery, <sup>1,2</sup>Krolkowski M, <sup>1</sup>A Black, <sup>1</sup>WH Meeuwisse, <sup>2</sup>A Nettel-Aguirre, <sup>3</sup>C Goulet, <sup>1,2</sup>BH Hagel. <sup>1</sup>Sport Injury Prevention Research Centre, Faculty of Kinesiology, University of Calgary, Canada; <sup>2</sup>Alberta Children's Hospital Research Institute, Departments of Paediatrics and Community Health Sciences, Cumming School of Medicine, University of Calgary, Canada; <sup>3</sup>Department of Physical Education, Faculty of Education, Laval University, Quebec City, Quebec

10.1136/injuryprev-2016-042156.669

**Background** Participation and concussion rates in youth ice hockey are high. The objective is to evaluate the effectiveness of evidence-informed policy change delaying the age of body checking in youth ice hockey compared to a rule enforcement policy change “zero tolerance for head contact” that was not evidence-informed, in reducing the risk of concussion in youth ice hockey players.

**Methods** This cohort study included competitive ice hockey players (ages 11–14) in leagues where body checking commenced at age 11 ( $n = 1408$ ) and leagues where body checking was delayed until age 13 ( $n = 1366$ ). In addition, player cohorts (ages 11–14) before ( $n = 1269$ ) and after ( $n = 830$ ) the “zero tolerance for head contact” rule enforcement were compared. Validated injury surveillance methodology was used. The primary outcome was game-related concussion.

**Results** Based on multiple Poisson regression analyses (adjusted for cluster and other covariates and using exposure hours as an offset), the incidence rate ratio (IRR) associated with policy disallowing body checking for 11 and 12 year old players was 0.2 (95% CI: 0.08–0.51) for concussion. For 13 and 14 year old players, being in a league that allowed body checking since age 11 was not protective of concussion [IRR = 0.87 (95% CI: 0.51, 1.50)]. The IRR associated with the head contact rule enforcement change in 11–12 year old players was 1.85 (95% CI: 1.20–2.86) and in 13–14 year old players was 2.48 (95% CI: 1.17–5.24) for concussion. Concussion risk increased following the head contact rule enforcement change.

**Conclusions** Evidence-informed policy change delaying body checking to age 13 in youth ice hockey prevents concussions in 11–14 year old ice hockey players. Head contact rule enforcement policy change (not evidence-informed) did not reduce the risk of concussion. Referral bias related to a greater awareness of concussions in youth ice hockey may have accounted for the higher concussion rate following the 2011 policy change.

### 670 EXPLORATION OF ACCIDENT PROBABILITY OF DRIVERS WITH BRAIN PATHOLOGIES

<sup>1</sup>Dimosthenis Pavlou, <sup>1</sup>Athanasios Theofilatos, <sup>1</sup>Eleonora Papadimitriou, <sup>1</sup>George Yannis, <sup>2</sup>Sokratis G Papageorgiou. <sup>1</sup>National Technical University of Athens, Department of Transportation Planning and Engineering, Athens, Greece; <sup>2</sup>University of Athens, 2nd Department of Neurology, “Attikon” University General Hospital, Athens, Greece

10.1136/injuryprev-2016-042156.670

**Background** Despite the fact that road traffic casualties presented a decreasing trend during the last years, the number of fatalities in road accidents is still unacceptable and illustrates the need for greater efforts with respect to better driving performance and increased road safety. The objective of this paper is to investigate the accident probability of drivers with cognitive impairments (Alzheimer's Disease-AD, Parkinson's disease-PD and Mild

Cognitive Impairment-MCI) through a large driving simulator experiment.

**Methods** A full neurological and neuropsychological assessment was carried out and then a driving simulator experiment was applied. The driving tasks included driving in urban and rural road, at moderate and high traffic volumes, with and without distraction (conversation with passenger and conversation through mobile phone), while various unexpected incidents were scheduled to occur (sudden appearance of an animal on the roadway, or sudden appearance of a child chasing a ball or a car suddenly getting out of a parking position and getting in the road in urban area).

**Results** The sample scheme consisted of 140 participants of similar demographics: 31 healthy controls, 25 AD, 59 MCI, and 25 PD patients. The accident probability was analysed, by descriptive statistics at first and then appropriate mathematical models were developed. Results indicated that patients were more likely to crash the incident that unexpectedly happened. The accident risk of AD and MCI drivers was 30% higher than the control group. Finally, the negative impact of use of the mobile phone, regarding accident probability, was more significant on the patients.

**Conclusions** The patients had systematically higher accident probability than the cognitively intact individuals, in the majority of driving conditions. These results could have considerable practical importance as they provide useful information about the formulation of efficient countermeasures.

#### 671 EPIDEMIOLOGICAL SURVEILLANCE OF DROWNING: A NATIONAL SURVEY IN FRANCE, 1 JUNE TO 30 SEPTEMBER 2015

<sup>1</sup>Linda Lasbeur, <sup>1</sup>Emmanuelle Szego-Zguem, <sup>2</sup>Marie-Thérèse Guillam, <sup>1</sup>Bertrand Thélot. <sup>1</sup>Santé Publique France, Saint-Maurice, France; <sup>2</sup>SEPIA-Santé, Baud, France

10.1136/injuryprev-2016-042156.671

**Background** In France, national surveys on drowning have been contributing to the epidemiological surveillance of injuries for 15 years. The purposes of these surveys were to describe the characteristics and the risk factors of unintentional drowning, and to contribute to their prevention.

**Methods** A prospective survey was set up in France from the 1 June to 30 September 2015. Each drowning followed by hospitalisation or death was recorded. The data were collected by fire rescue and emergency services.

**Results** During the 4 months, 1,217 unintentional drownings were reported (on 2015/11/23), including 435 (36%) which resulted in death. Children under 6 represented 18% of the victims (219, including 29 deaths); adults over 45 accounted for 45% of the victims (550, including 260 deaths). The distribution by drowning place was the following: 233 in private swimming pools (68 deaths), 61 in public swimming pools (6 deaths), 156 in streams (115 deaths), 130 in lakes (65 deaths), 600 in sea water (166 deaths), and 37 in other places (15 deaths). In private swimming pools, children under 6 mainly drowned due to the lack of parental surveillance. In streams and lakes, drowning was more frequent among adults after a fall, or when engaging in solitary activities, or after having consumed alcohol. In sea water, many victims were tourists over 45 with a health problem.

**Conclusions** The number of drowning remained stable during the summer months since 2003, except for children under 6 in private swimming-pools, whose deaths declined from 30 in 2003 to 13 in 2015. These results illustrate the need to strengthen

prevention messages: careful surveillance of young children; learning how to swim as early as possible, since swimming is the most reported activity; not overestimating one's physical condition; swimming in supervised areas; inquiring about the state of the sea and the meteorological conditions. During the survey period, the media relayed prevention messages on TV and newspapers.

#### 672 ACCEPTABILITY OF CHILD DROWNING PREVENTION INTERVENTIONS IN RURAL BANGLADESH

<sup>1</sup>Shirin Wadhwanji, <sup>2</sup>Kamran Ul Baset, <sup>3</sup>Shumona Sharmin Salam, <sup>4</sup>NM Rabiul Awal Chowdhury, <sup>3</sup>Jasmin Khan, <sup>1</sup>Olakunle Alonge, <sup>1</sup>Adnan A Hyder. <sup>1</sup>Johns Hopkins International Injury Research Unit, Department of International Health, Johns Hopkins Bloomberg School of Public Health, USA; <sup>2</sup>Centre for Injury Prevention and Research, Bangladesh; <sup>3</sup>International Centre for Diarrhoeal Disease Research, Bangladesh; <sup>4</sup>Comilla University, Department of Anthropology, Bangladesh

10.1136/injuryprev-2016-042156.672

**Background** Drowning accounts for 43% of childhood mortality among 1–4 years old in Bangladesh. The Saving of Lives from Drowning (SoLiD) project is being implemented in seven rural sub-districts of Bangladesh to assess the effectiveness of two child drowning prevention interventions – playpen and crèche. Nearly 78,000 children are receiving either playpen (plastic or wooden) or are enrolled in crèche or are receiving both. To our knowledge no study has explored the acceptability of crèche intervention for childhood drowning prevention. A previous study from Bangladesh has studied acceptability of metal playpen for childhood drowning prevention. The overall goal of this study is to explore and gain an in-depth understanding of the acceptability and perceptions of different stakeholders about crèche and playpen interventions.

**Methods** Qualitative research methods including 16 focus group discussions (FGDs) and 16 in-depth interviews (IDIs) will be conducted with parents of children who are receiving interventions, community-level workers who are involved in delivering these interventions and community leaders. Interview/FGD guide are developed for this. Grounded theory approach would be used for data collection and data analysis. Respondents will be recruited purposively. FGDs and IDIs will be audio-recorded, transcribed, translated, coded and thematically analysed.

**Results** Findings would explore stakeholder's perception and opinion about crèche and playpen; acceptability and utilisation; perceived advantages and disadvantages; challenges in using these interventions; and their relevance for child drowning prevention. Findings would also focus on stakeholder's recommendations for improving these interventions, and explore issues related to sustainability.

**Conclusions** This study is expected to provide inputs on the implementation and scale-up of playpen and crèche interventions for child drowning prevention in Bangladesh and other low- and middle-income countries.

#### 673 BANGLADESH ANCHAL AND SWIMSAFE (BASS) CHILD DROWNING PREVENTION RESEARCH- A GRAND CHALLENGE

<sup>1</sup>Stephen Beerman, <sup>2</sup>Mike Linnan, <sup>3</sup>Aminur Rahman, <sup>3</sup>Fazlur Rahman, <sup>4</sup>Justin Scarr. <sup>1</sup>University of British Columbia, Canada; <sup>2</sup>The Alliance for Safe Children; <sup>3</sup>Centre for Injury Prevention and Research, Bangladesh; <sup>4</sup>Royal Life Saving Society Australia

10.1136/injuryprev-2016-042156.673