

(17%) and driving seat vibration (10.1%). The options available in vehicles for drivers comfort looked insufficient in most of the heavy vehicles (availability of Air Conditioning (4.8%), Automatic gear transmission (0.8%) and availability of head rest in driving seat (43.4%) were not adequate. The emerging hazard of “inattention blindness” in driving due to use of cell phones while driving (18.2%) was also noted among Sri Lankan heavy vehicle drivers in significant level.

**Conclusions** The study shows that road safety research needs to go beyond common RTI risk factors and analyse risks involved with the health status of drivers. And it suggests that strengthening of quality control of heavy vehicles, health education and regular monitoring of health status of heavy vehicle drivers is vital to improve the status of countries injury prevention efforts.

### 143 INVESTIGATING CHARACTERISTICS OF WORK ZONE AND NON-WORK ZONE CRASHES ON NATIONAL HIGHWAY-8, INDIA

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**Background** The continuously increasing number of road construction and maintenance projects in India, especially on highways, creates huge risk for road users. This prompted us to examine the difference between characteristics of fatal crashes in Work Zones (WZs) and Non-Work Zones (NWZs).

**Methods** The study included analysis of fatal crash data for the period November 2009 to December 2013. Crash parameters such as the date, time, collision type, type of victim, i.e., pedestrian/cyclist/car user, etc., victim's age, vehicle type, number of persons injured/killed etc., were extracted from fatal crash records. WZ crashes were extracted from the main crash database. The design chainage, length, start date and end date of each WZ was obtained from the concessionaire.

**Results** The crash rate is higher in WZs (1.68 crashes/km/year) as compared to Non-WZs (1.32 crashes/km/year). 77% and 71% of WZ and NWZ fatalities respectively involved vulnerable road users (pedestrians, bicyclists and motorised two wheeler riders) as victims. A higher proportion of working age group people (26–60 years) are involved in both WZs (46%) and NWZs (48%). Fatal crashes in both WZs and NWZs are more likely to be involved with another vehicle (nearly 95%). “Hit pedestrian” crashes were the dominant type in both WZs (41%) and NWZs (39%). Trucks are involved (as a striking vehicle) in a higher proportion of fatalities in both WZ (52%) and NWZ (54%) locations.

**Conclusions** The proportion of fatalities and fatal crashes are very similar in both WZs and NWZs but the rate of fatal crashes is comparatively higher in WZs. The predominance of hit pedestrian crashes, especially, in WZs, strongly indicates that one of the causal factors is over speeding. The implementation of a countermeasure like rumble strips that forces drivers to drive at approximately the same speeds throughout the WZs will improve safety at WZs significantly.

### 144 ROAD TRAFFIC INJURY MORTALITY, MORBIDITY AND DISABILITY: EVIDENCE FROM BANGLADESH HEALTH AND INJURY SURVEY (BHIS)

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**Introduction** Road traffic injuries (RTIs) are a leading cause of morbidity, disability and mortality in low income countries. In 2004 nearly 1.3 million people of all ages were killed in road traffic crashes and over 50 million were injured or disabled. There are indications that road traffic injury fatalities and morbidities are increasing in Bangladesh.

**Objective** Investigate the magnitude of and risk factors for road traffic injury in Bangladesh.

**Methodology** A cross sectional study was conducted to explore the magnitude of mortalities and disabilities due to RTIs. Face-to-face interviews were used. Multi stage cluster sampling was used to select the sample.

**Results** Data were collected from 171,366 rural and urban households, covering a population of 819,429. The overall incidence of RTIs fatality was 12.9 per 100,000 population. The mortality rate gradually rose from children under 5 and peaked in the older age group, 55 years and above, (21.4 per 100,000). The overall rate of non-fatal RTI was calculated as 134.5 per 100,000. The highest incidence (165.7 per 100,000) was in the 20–39 years age group. A significantly higher rate of RTI mortality and morbidity was observed among males. The incidence of RTI was found to be three times higher in rural than urban areas. Most RTIs were non motorised vehicle and pedestrian injuries. The highest rate of RTI disability was found among males, aged 30–54 years.

**Conclusion** Road traffic injury is an important public health issue in Bangladesh. Immediate attention should be made to strengthen preventive intervention measures.

## Occupational safety

### Parallel Mon 2.4

### 145 AGRICULTURAL SAFETY & HEALTH MANAGEMENT PLANNING

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**Background** Agricultural producers lack an easily understandable reference to help them develop a comprehensive safety and health plan for their operation. While many examples of safety management plans exist for general industry, they do not relate well to the hazards and risk of agriculture.

**Objective** To develop an agricultural safety and health management plan reference manual applicable to a wide range of agricultural operations.

**Results** The manual *Safety and Health Management Planning for General Farm and Ranch Operations*. The major sections of this

manual include: Establishing Safety policies and Procedures; Identifying and assessing Hazards and Risks; Preventing and Controlling Hazards and Risks; Educating and Training Employees; and Evaluating Training Program and Resources. The manual provides several examples and forms that help users adapt and implement a safety and health management plan that matches their operation. The safety and health management plan also helps farm and ranch owners be aware of safety and health regulations that their operation may be under.

**Conclusions** The *Safety and Health Management Planning for General Farm and Ranch Operations* has been well accepted by the agricultural community. The manual is in its second printing and has been used as part of an Agricultural Safety and Health Certificate course for safety professionals and insurers loss control specialist offered by the International Society of Agricultural Safety and health. It is also serving as a basis to develop companion manuals for specific types of farming operations such as biomass producers and dairy producers.

#### 146 INJURY SURVEILLANCE IN A DECENTRALISED U.S. SYSTEM: INNOVATIVE APPROACH TO FIND NEW HAZARDS, 2015

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**Background** Identifying emergent themes in safety begins with data that illustrate changes in rates of injury and illness. Often-times, these data are borne from surveillance systems. Dairy farming is a useful case study, as it is among the most hazardous domestic jobs and increasingly technology-driven. Thus, surveillance of injury and illness on dairy farms is a chore ripe with challenge as well as necessity. Located in the second largest dairy producing state and with electronic health records covering over 90% of the healthcare service population, the study provides a valuable example in surveillance.

**Description of the problem** The agricultural and healthcare industries in the U.S. are as decentralised and fragmented as the data sources that track them. Prior and current agricultural injury surveillance systems suffer from a dearth of data and difficulty determining farm exposures from existing resources. Response rates on injury surveys tend to be low, thus combining data from different sources and with different operationalizations is necessary but provides an additional problem to effective surveillance.

**Results** A surveillance program is built by first leveraging the grounded knowledge of agriculturalists. Relationship-building is imperative in accessing the best data available and appropriately linking disparate data sets. Dairy license information, farm vehicle registrations, and federal farm subsidy recipients are used to enumerate a sample of dairy farmers. This information is then linked to electronic health records, health payer claims, and mail surveys in order to cull injury and illness events, as well as current safety practices. Rates of injury and illness are examined at regular intervals.

**Conclusions** The current project may serve as a model for creatively overcoming the unique challenges of passive, ongoing

surveillance in a decentralised system, with broader implication for public health safety surveillance programs in other world regions.

#### 147 EFFECTIVENESS OF OPERATOR PROTECTION DEVICES TO MITIGATE INJURIES ASSOCIATED WITH QUAD-BIKE (ATV) ROLLOVERS

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**Background** There is growing concern regarding the number of serious injuries and fatalities related to quad bikes (All-Terrain Vehicle or ATV) in many countries of the world related to the farming sector. There have been over 150 quad bike fatalities in Australia since 2000, many of which involve the rider losing control at a low speed with the vehicle subsequently rolling on top of the rider and crushing or asphyxiating them. Operator Protection Devices (OPDs) developed in Australia and New Zealand are designed to reduce the potential of such incidents. Manufacturers, however, claim that OPDs have the potential to increase the incidence of injuries and deaths during a rollover event. Currently, there are around 3000 OPDs fitted to quad bikes in Australia and are now being sold in the USA.

**Methods** 300 farmers and other users who have a Quadbar OPD fitted to their quad bike will be surveyed about the performance of the quadbar in a rollover event. Participants will be asked about their quad bike usage patterns and history of rollover events before and after the fitment of a Quadbar. Participants will be interviewed face to face and via telephone.

**Results** Information on rider demographics, usage for work (mustering, carrying loads, transporting, etc.) and other purposes (recreational), terrain over which the quad bikes are ridden, direct information relating to incidents involving quad bikes with and without an OPD, injuries resulting from an OPD, and other safety relevant information, will be collected.

**Conclusions** The study will provide real world recorded evidence determining whether indeed the injury risk when using an OPD on a quad bike (ATV) increases or instead reduces crush related injury and asphyxia fatality potential and related to purpose of task.

#### 148 ROAD ACCIDENTS AS AN OCCUPATIONAL SAFETY PROBLEM

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**Background** Finland currently uses two parallel preventive accident investigation systems. Fatal accidents occurring at work are investigated as **occupational accidents**. Fatal accidents occurring in traffic are investigated as **road accidents**.

In professional driving, fatal road accidents are road and occupational accidents at the same time, but the accident investigation method used is the same as in road accidents. However, the