

health and safety program were evaluated, and farm-level tools were developed to improve safety and security management on farms.

**Results** As a result of the study new implication describing the farm manager's various tasks and the farm safety and security risk management approach is presented. The results point out the need for systematic risk management approach in farm safety management. The findings indicate that safety risks were connected to other management risks on farms. Injury risk were significantly connected to animal (vs. crop) production, larger farm size (field and herd size), dependence on one person, physical work strain, perceived fire risk, and infrastructural problems on farms. Regular monitoring of safety and security risks was protective against injury incidents. A contextual tool for preliminary farm risk identification, a Farm Risk Map, was constructed and tested.

**Conclusions** Mitigation of farm safety and security risks requires specific management tools and occupational skills applied to agriculture. Risk management tools to assist farmers are not currently in a sufficient level compared to safety and security risks faced by farmers. The Farm Risk Map helped the case farmers to visualise and identify major risk sources affecting the farm operations. It can be used to define the risk context on farms. Additional tools to assist managing and controlling major farm risk areas were presented. Improved knowledge management skills and holistic risk management tools are needed on farm risk management in the future.

## Traffic Safety

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### 759 ROAD LIGHTING AND SAFETY: A PILOT STUDY OF ARTHABASKA REGION

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**Background** We investigate the specification of roadway lighting for safety to understand the elements needed in statistical analysis of road collisions during night time. Several goals were targeted. First, which type of response is best, or whether both responses should be used. Second, which indicator of lighting should we favour? Third, which other factors should be included in the analysis and fourth, how effective is lighting in reducing night-time collision.

**Methods** The case study comprised illuminance and luminance measurements collected for the Arthabaska region in Quebec, along with available operational and geometric variables expected to explain roadway collisions. A zero-inflated negative-binomial model was used to analyse the impact of predictors on collision frequency and severity using classical maximum likelihood validated by a Full Bayesian regression

**Results** It was found that collision severity is best, resulting in more factors being significant in the expected sense of contribution. Luminance was the best indicator for road lighting. A correlation matrix aided in the identification of linearly dependencies between factors and the response or other factors. The last goal was investigated by comparing daytime with night-time collision analysis. The night time analysis included luminance and glare. The results were very close between day and night, with luminance proving to be an effective countermeasure for night

collisions. A three-times difference on the coefficient for traffic volume was found. The use of a dummy variable related to standard levels of illumination is presented and will be key in future research for the estimation of effective levels of lighting.

**Conclusions** A connexion between roadway lighting and crash history can be used to support the warrant of lighting and identification of levels by using the statistical methods herein proposed adapted to test effectiveness of lighting levels and explanatory power of variables surviving co-linearity and significance tests.

### 760 PREDICTING AND ANALYSING THE TREND OF DEATH CAUSED BY TRAFFIC ACCIDENTS IN IRAN IN 2014 AND 2015

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**Background** Predicting the death trend caused by traffic accidents and its analysis is a useful tool for planning and policy-making by the authorities in the field of road traffic, conducting interventions appropriate with death trend, and taking the actions required for controlling future conditions.

**Methods** In a cross-sectional research, all the information related to the traffic accidents leading to death available in the database of Iran Legal Medicine Organisation from 2004 to the end of 2013 was used to determine the change points (multi-variable time series analysis). Role of regulations and rules in the variations of death caused by traffic load was studied using Box Jenkins multi-variable time series models and critical path analysis (CPA) over time. Using autoregressive integrated moving average (ARIMA) model, rate of death caused by traffic accidents was predicted for 2014 and 2015 and, finally, the actual rate of death caused by traffic accidents was compared with the predicted value to determine the efficiency of the model.

**Results** Results showed that rate of death in 2014 was almost equal to the actual rate of death recorded for this year, while rate of death in 2015 decreased compared with the previous year (2014) during all months. It was also predicted that, in January and February 2015, rate of death would reach its minimum value in that year, i.e. 4.1%.

**Conclusions** According to the prediction and analysis of the trend of death caused by traffic accidents, it was observed that applying and continuing the intervention conducted in the previous years for road safety improvement, motor vehicle safety improvement, particularly training and culture-fostering interventions, as well as approval and execution of deterrent regulations for changing the organisational behaviours can significantly decrease the loss caused by traffic accidents.

### 761 FIRST STEPS IN ENDORSING TRAFFIC SAFETY AMONG EMPLOYEES IN FINLAND

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**Background** Time spent on commuting is the most dangerous time of the workday. Over two million Finnish people commute on daily basis and 80% of the commuting accidents occur as pedestrians or by bicycle. Contacting working-aged people has