premiums, but others (particularly in NI) concerned at potential surveillance.

Conclusions GDL may have mixed results for reducing road injury in novice drivers, given much risky driving in rural (high risk) areas is 'outside the system', and may be increased by further legislation. However, participants were universally disapproving of one risk (drink driving) suggesting that attitudes to other risks may change as a result of GDL implementation. Evaluation of GDL will need to assess impact on population as well as licensed young driver injury rates to take into account possible reductions in access to cars and shifts towards more vulnerable modes.

529 AMBULANCE CRASH IN THAILAND

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Background The pre-hospital care providers in Thailand are always challenged by the task difficulty in working with limited resources and spaces, as well as the high risk of encountering traffic accidents. This study aims to elaborate situation and analyse the causes and factors of the ambulance crash in Thailand.

Methods This was a retrospective analysis of all fatal ambulance crash on Thailand public roadways in 2014, from the secondary data in three main sources, including the database of Information Technology for Emergency Medical System (ITEMS), the records of surveillance ambulance accident of EMS from January to December 2014, and the report of ambulance accident investigation collected from the local network in 2014, using the Haddon's matrix approach. The study was conducted from January to March 2015. The results are presented using descriptive statistics **Results** According to the ambulance accident surveillance data, 61 ambulance accidents occurred in 2014, resulting in 130 injured victims and 19 deaths. The number of accidents is more concentrated during June to August (25 times). The accident rate is 0.05 with the mortality rate of 0.02 per 1,000 operations. Factors related to accident and safeness of the ambulance could be concluded into human factors, vehicle and equipment factors, and road environment factors. Human factors include lack of ambulance driving training, unfastened seat belts, and high speed driving exceeding 90 km/hr. Unregistered ambulance and missing GPS installation contribute to the lack of vehicle standard. The disparity in each local road environment such as speed curve, crowded site, and missing directive signs lead to higher risk of accident.

Conclusions The proportion between the numbers of ambulances to the Thai population had been declining over the past years. However, accidents caused from the above three factors were still prevalent. Therefore, it is necessary for the related organisations to implement new policies and take actions towards preventing future ambulance accidents.

530 ROAD CRASHES IN METRO MANILA: OVERVIEW OF ROAD SAFETY

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Background Road crashes is one of the highest cause of morbidity and fatality in the Philippines.

The study tried to look into the trends of fatal and non-fatal injuries due to road crashes in Metro Manila Philippines, including all other relevant factors such as damage to property, number of registered cars, and time of accident.

Methods The study looked at all raw data and databases coming from all agencies that generate traffic and road safety monitoring and evaluation. These are the Metro Manila Development Authority, Land Transportation Office, Philippine National Police Road Board, Department of Transportation, and Communication. Several literature reviews were also done.

Results Fatal accidents due to road crashes was investigated from 2005 to 2014. In all the years, there was a minimum of 204 fatalities which was in 2012, and the year 2014 registered the highest at 418 deaths. This data is only for Metro Manila which is the capital of the Philippines. Non-fatal accidents was highest too in 2014 registering at 16,665 cases. Damage to property also peaked in 2014 at 73,175 cases. Most frequent accidents occurred between 10–11 am, and 2–3 pm. Over the past 10 years, the number of road crashes in the Philippines has been steadily increasing, except for a slight dip for the year 2012. The number of registered cars has also experienced a steady increase. This increase has led to the congestion of roads in Metro Manila, and more risk to road crashes. This is the first ever data on trending of road crashes in the Philippines for a period of 10 years.

Conclusions The data showed that there is an alarming rate of road crashes which calls for road safety programs and policies for driver and public safety in the Philippines.

531 PLACE OF OCCURRENCE OF TRAFFIC INJURY – CAN WE COMBINE PRE- AND HOSPITAL DATA TO GET LOCATION?

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Background It is cumbersome to ask patients for location of occurrence and irrelevant to the treatment upon arrival at hospitals. Since data on location of occurrence are found in ambulances and pre-hospital mobile emergency care units (MECU) information could easily be recorded. It is therefore of interest to explore the potential and possible biases of combining hospital- and pre-hospital data on traffic injury as an alternative to lengthy interviews once patients arrive at the hospital. The specific aim of this study was to assess complement and combined proportions of patients known from ambulances, MECU and trauma registries.

Methods Any patient record documented as "acute traffic injury" in the primary geographic catchment area of Kolding Hospital (level 2 trauma) and Odense University Hospital (level 1 trauma) in Denmark occurring in 2013 was included if identified in at least one of the three registries (hospital trauma, MECU, Ambulance Service). Records were merged on civil registration number and date of injury. Transfers between hospitals were excluded. No other service or hospitals provide service in the area.

Results Primary data consisted of 8895 records (patients) from the ambulance service, 669 from the medical emergency care unit and 564 from the trauma registries (excluding transfers). By

matching on civil registration number and date 97 patients were found in all three registries, 140 only in hospitals trauma, 8683 only in pre-hospital and 8147 only in ambulance data. For 69% of the trauma registry patients location of occurrence where known.

Conclusions For the present geographical region in Denmark pooling data from these registries seems a promising way for identifying place of occurrence. However, immediate merge were only valid with manual cumbersome review. Further analysis must look into whether the recorded locations are valid indications of actual places and gives sufficient input to the planning of preventive measures in municipalities.

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NEW EMERGING PERSPECTIVES ON ROAD SAFETY MANAGEMENT: WHAT LIGHT CAN COMPLEXITY SCIENCE THROW?

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Background The words “complexity” and “complex system” are increasingly used in road safety and transport system literature. They refer to the acknowledgement of the complexity of the multi-causal nature of road safety issues, and their solutions. The terms have also been used in describing the complexity of changing individual behaviours or policies, anticipating and assessing the consequences of interventions. Hence, it seems rational turning to complexity science for insights.

Description of the problem Complexity science is about complex adaptive systems (CAS). It defines a complex adaptive system as a collection of autonomous, interactive and adaptive agents that act freely in diverse ways, and are unpredictable and, non-linear but interconnected. It is considered an ever changing system, typically with fuzzy boundaries which is built of multi-layer nested systems.

Changes Utilising the lenses of complexity, a road traffic system is perceived as a dynamic complex adaptive system formed of many diverse interdependent agents including individuals, culture, environment, policies, vehicles and roads which constantly change. In addition, any change in one aspect or component of this system can significantly change other parts and so the whole system. This new understandings provides new explanations for current road safety issues leading us to new understanding of potential adaptable solutions.

Conclusions This paper will explain this new understanding. By doing this, it suggests that utilising concepts of complexity science is a promising line of inquiry to explore successful approaches to context and time dependent road safety interventions. It also argues that it is not possible to remove the complexity, but we need to harness it in order to be able to develop more safe transport systems across all countries and communities.

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FRACTURE PATTERNS IN YOUNG CHILDREN AFTER MOTOR VEHICLE CRASHES

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Background In Africa, road traffic injuries rank second to interpersonal violence and the road traffic fatality rate is higher than for any WHO region. The aim of this study is to explore

potential differences in number and patterns of fractures between childhood survivors and non-survivors after a motor vehicle crash in view of developing targeted and more effective prevention strategies.

Methods Total body radiographs were obtained of all children under 13 years presenting to our trauma unit after a motor vehicle crash during a 30 month period between January 2010 and July 2012. In addition, total body radiographs were obtained from the mortuary of all children under the age of 13 who demised after a motor vehicle crash. The number and types of fractures as well as any other skeletal malformations were compared and evaluated. Approval was obtained from our University Ethics Committee.

Results A total of 1045 children were assessed; 1007 presenting to the trauma unit, and 38 directly to the mortuary. Twenty patients presenting to the trauma unit did not survive. The total amount of non survivors was 58 but 6 were excluded since radiographs were not available. From the 987 survivors 79 were excluded because the radiographs were unavailable. The average age of children was 6.2 years (SD 3.1; Range 0–12). Fractures were far more common in non-survivors than survivors (78.8% vs 46.7%). Fractures of the Skull ($p < 0.0001$), Cervical Spine ($p < 0.0001$), Thoracic Vertebrae ($p < 0.0001$), Trunk including Shoulder ($p < 0.0001$), Lower Arm ($p < 0.002$), Upper Arm ($p < 0.3$) were statistically significantly more frequent in non-survivors than in survivors. Fractures of Facial bones, Elbow, Wrist, Hand, Pelvis, Femur, Knee, Foot and Ankle were different but not statistically significant in survivors and non-survivors.

Conclusions This is the first study documenting and comparing fracture patterns with outcome (survivors and non-survivors) in young children after motor vehicle crash. Since motor vehicle crashes are the most common cause of unnatural childhood death it is important to study fracture patterns in order to understand the injury mechanism and develop preventative strategies. This study indicates that skull, cervical spine and torso fractures are more intricately associated with severe morbidity and mortality in children than fractures of other body regions. The upper torso, head and neck are the body regions most vulnerable in young children and requiring most protection.

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RESULTS OF THE “DECADE OF ROAD SAFETY ACTION” IN COLOMBIA. 2010–2015

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Background In the 1990's, the United Nations set the standards for confronting the increasing issue of traffic injuries and fatalities (TIF). In Colombia, the 2013–2021 National Road Safety Plan was created to implement guidelines and facilitate inter-sector coordination of the strategic pillars proposed in the program Decade of Road Safety Action-DRSA. This study shows the results of the first five years of the DRSA program in Colombia.

Methods This descriptive, longitudinal study analyses the behaviour of TIF in Colombia from 2010 to 2015. The injury and fatality records were obtained from the Colombian National Institute of Legal Medicine and from the Colombian National Statistics Department. The number of vehicles was obtained from the Unified National Transit Registry. Adjusted fatality rates were estimated. A lineal regression model was made to correlate the