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Abstracts

Safe Mobility on Land, Sea and in the Air

23rd World Congress International Traffic Medicine Association

May 19th – May 22nd 2013

Hamburg / Germany

It is our great pleasure to introduce the 23rd World Congress "Safe Mobility on Land, Sea and in the Air" of the International Traffic Medicine Association (ITMA), which is held in Hamburg, Germany, from May 19th to May 22nd 2013.

ITMA aims to increase and spread scientific knowledge about reducing traffic crashes, injuries and fatalities. The world congresses are therefore covering all areas of Traffic Medicine and its associated disciplines.

The world becomes smaller and international cooperation, exchange of knowledge, common projects and personal contacts are vital in academic life and research. We are confident, that the World Congress will further strengthen the ties between the wide range of professionals involved in medical, behavioural and technical aspects of Traffic Safety.

It is the first time an ITMA World Congress is held in Germany.
Welcome!

Paul Brieler Klaus Püschel

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L. EVANS

Policy implications from comparing traffic fatality trends thru 2011 in 27 countries

Objective: To distinguish between effective and ineffective traffic safety policies by comparing traffic fatality trends in different countries. *Methods:* Data from 1966 thru 2011 from the *International Road Traffic and Accident Database (IRTAD)* is analyzed. A number of different measures are used. Much of the focus is on a non-traditional measure, namely, how a nation's annual traffic fatalities decline after reaching a maximum value. Twenty-seven countries were selected based on human population. *Results:* Final results will be available for presentation at the May 2013 Congress. The 2011 IRTAD data is not yet available (as of 3 Dec. 2012), but is expected to be available in good time for completing analyses for presentation at the Congress. Analyzing the latest data will likely strengthen results derived from the 2010 data. These results showed large differences between countries. On average, countries reduced deaths by 65 % from their all time high, with seven countries (Austria, Denmark, Finland, France, Germany Netherlands and Switzerland), enjoying reductions of more than 75 %. A striking outlier was the US, with a decline of only 38 %. Every one of the other 26 countries had national fatalities that dropped faster or further than US fatalities. *Conclusions:* US safety policy has been a catastrophe for US road users, leading to the deaths of tens of thousands of additional Americans every year. US policy does not so much ignore science, but rather goes systematically opposite to what science has discovered. Most US focus remains is on vehicle factors, while science shows road-user factors to be of vastly more importance. The most successful countries have policies that, while still far from optimum, are nonetheless still guided and illuminated by science.

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Fit for service at sea

Like other industries shipping has many particularities that are worth mentioning and need to be taken into account for decisions on fitness. Compared to other occupations onshore a very important issue that has to be considered is the special situation regarding access to and availability of medical care. In this context it is not difficult to understand that the fitness of a seafarer has to be examined and medically assessed regularly. The regular medical assessment of people who work aboard sea-going vessels has proved to be reliable and thus enhances the safety of the individual and the ship safety. Regarding the above mentioned background this lecture aims to give a summary about the system of the medical assessment of seafarers for fitness for sea service, especially the requirements which are necessary to get the obligatory medical certificate, referring to the current regulations in Germany. In addition the relevant international conventions and guidelines, which will lead to changes of the current German regulations and the legal prerequisites, need to be considered.

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Physician warnings for unfit drivers and the risk of a road crash

Background: Medical warnings to patients potentially unfit to drive are a controversial element of road safety controlled by physicians. We tested whether such warnings lead to a decrease in the risk of a serious road crash for the patient. *Methods:* We identified adult patients receiving a medical condition warning from April 1, 2006 through December 31, 2009 in Ontario, Canada. We then analyzed prior and subsequent emergency department

visits for road crashes over five total years including a three year baseline interval, a one year induction interval, and a one year subsequent interval for each patient. *Results:* A total of 100,075 patients received a medical condition warning from a total of 6,098 physicians, most commonly for a psychiatric diagnosis. These patients accounted for a total of 1430 road crashes as drivers during the 3 year baseline interval (37 per month) and 273 road crashes as drivers during the 1 year subsequent interval (21 per month). This equated to about a 45 % relative reduction in annual crash risk per 1,000 patients following the warning (4.76 vs 2.73, p <0.001). The relative risk reduction following a physician's warning persisted for crashes with different characteristics, did not extend to the patient's risk as a passenger or as a pedestrian, was accompanied by an increase in depression, and led to a reduction in return visits to the responsible physician. *Conclusions:* Medical warnings to patients potentially unfit to drive can contribute to a decrease in subsequent serious road crashes, yet may exacerbate mood disorders and compromise the doctor-patient relationship.

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Mental disorder and car driving – Standards of evaluation in German speaking countries

For safe driving on public roads a comölex interplay of mental functions and capabilities is required, which can be temporarily or permanently affected by a number of mental disorders. Disturbance of realistic perception, processing and evaluation of information, coordination of movements or control of behavior may lead to the exclusion of fitness to drive. Other important criteria are course of the disorder and coping strategies as well as the effects and side effects of psychopharmacological treatment. In the presentation the standards of assessment in German speaking countries will be demonstrated.

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Fitness to drive

The driving license regulations in Germany determine that those who cannot drive safely in the traffic due to physical or mental deficiencies may participate in the traffic only if care is taken to avoid a danger to other traffic participants. Two categories of drivers are distinguished, private car or motorcycle drivers and professional drivers of trucks and persons carrying vehicles like bus, taxi, ambulance car. The traffic accident rate due to driver's illness is not recorded in Germany and thus not known. Medical causes of road accidents include epilepsy, syncope, diabetes on insulin, heart problems, and strokes. The relationship between an attending physician and a patient was legislated in Germany in February 2013 ("Patientenschutzgesetz"). Even before this law came into force it was the duty of the physician to comprehensively inform the patient about his disease. This includes the duty to inform a patient about the lack of ability to drive. This information is to be documented in writing. Due to the confidentiality of the physician patient relationship, reporting to the authorities is not requested. Only at immediate threat by a not insightful driver (e. g. a bus driver with acute myocardial infarction who will not refrain from driving a school class for holidays), the police is to inform. The assessment of the ability to drive is regulated by the driving license regulation with attachments. These are official regulations that may be deviated from only with good reason. Not legally binding are the assessment guidelines of the Federal Road Research Institute (Bundesanstalt für Straßenwesen). In many parts these guidelines are outdated. Also not legally binding are the statements of professional societies (such as German Diabetes Society, German Society of Cardiology etc.). The recommendations are usually well-justified and can be implemented. When is the fitness to drive lacking? According to the assessment guidelines of the Federal Road Research Institute (Bundesanstalt für Straßenwesen) the fitness to drive is lacking, if "the risk of sudden failure of physical and mental performance of the driver is expected to occur in the foreseeable future". The time frame for „foreseeable future", however, is not defined. By establishing the risk of harm formula the Canadian Cardiovascular Society has defined a risk threshold for dri-

ving with cardiovascular diseases. The risk to seriously harm other traffic participants is proportional to the time at the wheel, the kind of vehicle, the probability of sudden cardiac incapacity and the probability that an accident results in serious injury. If a risk of 1 % per year for a sudden cardiac incapacity (sudden death, syncope, stroke) is accepted for a professional driver, an accident rate of 1:20.000 drivers have to be expected. A private driver who is about 30 min per day at the wheel will cause a serious accident with a probability of 1:20.000 when this driver faces a sudden cardiac incapacity of 22 % per year. The assessment of the ability to drive has to be performed on an individual basis. For patients with cardiovascular diseases the use of the risk of harm formula is very helpful. Whether this formula can also be applied to other diseases has to be established. The information of a patient about theoretical medical problems while driving is able to significantly reduce the accident rate.

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Assessment and rehabilitation of fitness to drive: An integrated medical and psychological approach

The integrated approach to fitness to drive is based on the International Classification of Functioning (ICF) framework of the World Health Organization (WHO). In this framework participation (social roles) and activities (everyday skills) are constrained by anatomical, physiological and psychological functions (the body level), but it will be argued that context factors (for example car adaptations and "adapted" driving skills and habits) can strongly modulate the effect of these functions and their impairments (by disposition or disease). Besides anatomy and basic sensory and motor functions, the body level comprises enduring psychological dispositions (personality, intelligence, cognitive function). Diseases and legal drugs (medication) affect the body level, but may be quite specific in the functions they impair. Fitness to drive is traditionally defined on the body level and does not take into account the context factors. Also comorbidity, that is the combined effect of more than one impairments and/or weak predispositions and/or medications has often been neglected, for example when a visual acuity level requirement is defined independent of cognitive function. Examples will be given of the importance of comorbidity in fitness to drive and it will be argued that comorbidity should not be excluded in research but rather be studied. It is proposed that fitness to drive is assessed individually in a specialized center, also taking into account context factors. If rehabilitation methods could be made available that reduce the negative effects of the impairments these can be prescribed and applied followed by reanalysis of fitness to drive. Based on psychometric considerations, only persons screened to be in high risk groups, should be assessed, at least if the assessment has legal consequences. In the integrated approach, fitness to drive is ultimately defined on the activity and participation level (practical fitness to drive) but it always starts with a thorough mapping of the body level constraints. Functions on the body level are viewed as risk indicators (with values between very low and very high) for key elements of the driving task. Co-morbidity is taken into account by combining risk factors (in the future hopefully supported by empirical data). Under-additive and over-additive effects of combinations of risk factors will be discussed. Already touching on the activity and participation level, effects of risk factors can be empirically verified in a (simulator) driving test and from the crash/violation history and (hetero) anamnesis. Key performance elements of driving are lateral and longitudinal position control, traffic- and hazard- perception, reading and interpreting traffic signs and signals, and monotonous highway driving. Key behavior elements are tendencies to drive when having used alcohol and drugs and when being distracted and tired. It is argued that activity level assessment is a very valuable addition but cannot replace body level assessment because only the body level assessment can give understanding of the problems observed and well-argued expectations of the effects of various possible interventions.

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The Medical-Psychological Assessment (MPA) – On the effectiveness of a traffic safety measure within German legislation

Objective: A close look is taken at the German road traffic safety system. Especially, the role is described that traffic medicine and traffic psychology play in German legislation. Within this traffic law system the Medical-Psychological Assessment (MPA) has a 5 decade old history and tradition based on continuously developing research in the fields of traffic medicine, traffic psychology and toxicology. Due to the importance of this measure the MPA has repeatedly been evaluated in terms of its effectiveness. *Methods:* In the study reported here the recidivism rates of first time and repeat drink driving offenders in Germany who had to submit to a medical-psychological assessment (MPA) and in part attend a driver improvement course (DI) were observed for a probation period of 3 years. The observed cases (MPA-groups) were recruited from the archives of the MPA-organizations TÜV and DEKRA in proportion to the number of MPA drunk drivers who were assessed in 2006 within each organization. The recidivism data were gained from the Central Index for Traffic Offences (VZR) which is operated by the Federal Motor Transport Authority (KBA).The recidivism rates of the MPA-groups were compared with the rates of a control-group which consisted of a group of drunk drivers with a minor DUI-offence (OWi-group with a BAC-level of < 1,1 ‰) and who according to German licensing regulations did not have to undergo an assessment or any other kind of intervention measure. *Results:* The core findings of the current study show that the probation rates are very high and differ neither between the MPA-groups nor in comparison to the OWI-group. The legal probation rates were found at 91,8% for the OWi-group and between 91,7 % and 93,5 % for the MPA-groups (i.e. single vs. repeated offence and positive assessment vs. driver improvement course). In comparison to the findings of earlier evaluation studies (ALKOEVA and EVAGUT) the results of the current study show a further increase in the percentage of drivers without a relapse after having passed the MPA. *Conclusions:* Altogether, the presented results strongly indicate the predictive reliability of the Medical-Psychological Assessment of drunk drivers and demonstrate the effective-ness of the present German licensing procedure in preventing recidivism. The MPA can insofar be regarded as an important traffic safety measure.

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Road safety and road traffic injuries in Kazakhstan

Introduction: Geopolitical role of Kazakhstan as a transit bridge between Europe and Asia is defined by its location in the center of the Eurasian continent, thereby the country possesses a great transit potential, providing single transport connection with Russia and Europe for Asian countries. The share of transport in GDP is 10 %. In Kazakhstan, 85 % of the passengers use cars, which is the main type of transport. The total length of roads is about 150 thousand kilometers. In Kazakhstan there are 68 cars for 1,000 people. *Objective:* To study road safety situation in Kazakhstan and trauma care resources to save patient's life during the "golden hour". *Methods:* We used the data on road traffic injuries received from the Agency of Statistics, Ministry of Internal Affairs and the Ministry of Health of Kazakhstan. *Results:* The epidemiological situation of road traffic injuries in Kazakhstan is quite tense, despite the level of traffic-related injuries has reduced for 1.3 times from 2003 to 2011, the rate of deaths from road traffic injuries tended to decrease (63 %) from 31.9 in 2006 to 19.6 per 100.000 in 2011.

Accident statistics show that 100 accident cases have 19 dead and 139 wounded, accident severity rate – 14 deaths per 100 injured. On the roads of international and national significance occurs every fifth accident, 88 % of road accidents are caused by drivers; more 1/3 of all victims are pedestrians. 75 % of deaths in road accidents occur on-site or on the way of transportation to the medical organization. The problem of road traffic accidents in Kazakhstan has been paid great attention at the departmental, interdepartmental and government levels. Ministry of Health approved the National Plan of actions on implementation of the Decade of Actions on Road Safety and Injury Prevention in the Republic of Kazakhstan for 2011-2020. To improve the medical assistance for victims of road accidents we have developed an innovative project "Creation of interdistrict trauma centers along the most dangerous sections of regional and national highways ". Within this project 40 interdistrict trauma departments

are in the process of opening in district, city and rural hospitals located along emergency hazardous road sections. *Conclusions:* In terms of strengthening trauma care resources in order to save patient's life during the "golden hour": • 3 mobile medical teams comprising traumatologist, neurosurgeon and anesthesiologist have been created; • more than 10 medical and rescue-route centers have been opened, the construction of 40 trace medical and rescue points have been planned till 2015; • air ambulance was reactivated in the country; • work study program "Emergency care for multiple and combined injuries" and algorithms of emergency medical assistance for victims of road accidents have been developed at pre-hospital and hospital stages; • trainings about emergency medical care for victims of road accidents have been provided for general practitioners, traumatologists, surgeons and nurses. 148 doctors and 80 nurses have passed training for 2 years.

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Safemove – Safe mobility for elderly

Objective: Numerous elderly people avoid leaving their home because they feel insecure and stressed outdoors. This can lead to a reduced physical and cognitive activity which might have a further negative influence on physical and cognitive performance . Within the framework of EU-project SAFEMOVE, we aim at enhancing outdoor mobility by two means: i) context-aware navigational support while outdoors and ii) physical and cognitive training programs to help elderly people to maintain physical and cognitive fitness. *Methods:* Chronic medical conditions can lead to physical, sensory or cognitive impairment, which then can cause functional impairment in the ability to perform activities of daily living (ADL) and instrumented activities of daily living (iADL). Outdoor mobility (i.e. walking and using public transportation) is an iADL that requires the integration of high level cognition, vision and motor function and it causes physical load (i.e. use of public transportation) and cognitive load (i.e. complexity of the navigation). We hypothesize that stress occurs when the required physical load is higher than the physical performance of the person; respectively when the cognitive load is higher than the cognitive performance. The cognitive and physical loads are amplified by sensory, physical and cognitive impairment. Sensory impairment increases the cognitive load, which is required to maneuver through a given environment, because impaired vision needs to be compensated elsewise (i.e. hearing, tactile). These compensatory actions require additional cognitive/physical work that adds to the total cognitive/physical load. It is possible to reduce the person's stress by reducing the cognitive/physical load and to enhance the physical and cognitive performance through training that aims at maintaining physical and cognitive fitness. That is why the envisioned SAFEMOVE approach is twofold – a context-aware navigational support that is combined with home-based training. *Expected results:* The project has started in July 2012 and current work is to elaborate a comprehensive view of users and stakeholders needs. This includes the context analysis, scenario definition, use-case analysis, requirement engineering, state-of-the art investigation, definition of evaluation and demonstration scenarios. The technical development will be iterative with the first pilot device available for user trails in mid-2013.

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The effect of visual fatigue on drivers' contingent negative variation (CNV)

The purpose of this study is to explore the influence of visual fatigue on the drivers' attention maintenance, in order to provide neuro-electrophysiological evidence for diagnosing driving fatigue. The research was conducted with the participation of 26 men in right handiness, professional drivers, aged 24-36 (Mean =27±5).The classic

CNV paradigm and self subjective fatigue questionnaire were used to evaluate fatigue processes. The participation were tested for CNV test before watching a video about highway driving for 30 minutes, they were required to finish questionnaire and receive CNV test immediately after watching the video. The subjective fatigue questionnaire shows that subjects appeared visual fatigue after watching the video. In CNV paradigm, the reaction time became longer after visual fatigue. The peak of the average amplitude of CNV was at Cz, indicating that CNV mainly produced in the frontal middle area. The decline of amplitudes of both CNV orienting wave and CNV expectancy wave were significant decrease after visual fatigue, showing that in the processing of cognitive tasks, visual fatigue led to drivers' decline of the attention maintenance, the expectant behaviors, and the function of performance. It suggested that CNV is a feasible reference index in the test of visual fatigue.

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An investigation and analysis of long-distance passenger drivers' EPQ

The study is to probe the personality traits of long-distance passenger drivers and to build a model to forecast safety drivers' personality. A total of 2691 long-distance passenger drivers (12.53 % accident drivers, who had more than once car accidents in the lastest three years) from six cities in Jiangsu Province (China), aged from 27 to 59 (Mean =40±5) were included in this study. Personality traits were measured using Eysenck's Personality Questionnaire – Revised (EPQ-R). The result shows that the passenger drivers get higher scores in extraversion, and lower in neurotic and psychoticism dimension than the norm. Age, driving experience, different degree groups for long-distances passenger driver's personality characteristics influence mainly in extraversion. There are significant difference between safety groups and accident groups in neurotic aspects, Regression analysis shows that the neurotic is the key personality characteristic which influences the safe driving. Compared with the norm population, the general characteristics of passenger drivers in Jiangsu Province are export-oriented, sedate, better adapting to the surrounding environment. Age, driving experience, different degree influence on the forming of passenger drivers' personalities. Drivers of accident groups are more likely to show anxiety, less self control and social maturity compared with safety group.

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The variation of drivers' physiological and psychological functions and relationship with driving behavior on condition of different blood alcohol concentration

Objective: The purpose of the study was to explore the variation of drivers' physiological and psychological functions and relationship with driving behavior on condition of different Blood Alcohol Concentration (BAC). *Methods:* We built system of physiological (including EEG, EMG, blood pressure, heart rate, balance ability, dynamic vision and dark adaptation) and psychological index (including reaction ability, the stability of action, speed estimation ability, depth-perception ability and ability to focus attention on) which is related to driving behavior closely. We selected 42 subjects who were from Nantong University (China), holding a C license, and had some driving experience. Every participant was asked to join in tests of all the physiological, psychological and driving behavior index on condition of different BAC (0, 20, 50, 80, 100 mg/100 ml). All the data we collected were analyzed by repeated measure ANOVA and gray relational analysis. *Results:* The results showed that as BAC increases, the drivers' physiological indexes and psychological functions were changed obviously. The maximum energy values of waveforms of EEG in frontal lobe and parietal lobe were increased in 50 mg/100 ml BAC. Root mean square of EMG and blood pressure decreased significantly in 20 mg/100 ml BAC, but hart rate increased significantly. Drivers' balance ability was decreased with higher BAC, especially when BAC achieved 80 mg/100 ml, imbalance in the number of balance experiments were increased obviously. The drivers' dynamic

vision, dark adaptation time, stability of action, depth-perception ability and ability to focus attention were descent in 50 mg/100 ml BAC. In addition, there was a relationship between drivers' physiological indexes, psychological functions and driving behavior on condition of different BAC. When no drinking, the stability of action, ability to focus attention on, speed estimation ability and reaction ability had higher effect on driving behavior than other indexes. When BAC was 20 mg/100 ml, ability to focus attention on, speed estimation ability, depth-perception ability, stability of action, balance ability and EEG had higher effect. When BAC was 50 mg/100 ml, dark adaptation, blood pressure, heart rate, balance ability, EEG, ability to focus attention on, depth-perception ability and stability of action had higher effect. When BAC was 80mg/100ml or in the state of drunk driving, EEG, EMG, blood pressure, heart rate, balance ability, dark adaptation, reaction ability, ability to focus attention on speed estimation ability and depth-perception ability had higher effect on driving behavior than other indexes. Analysis of the differences in driving behavior showed that as BAC increased, the illegal number of driving behavior, the number of accidents and driving simulator score were decreased significantly. *Conclusions:* The study provided data evidence for strengthening safety education and management, preventing drink driving and drunk driving effectively and promoting the progress of the traffic safety work.

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Run-off-road collision with 4 dead and 2 injured victims

Objective: Transportation-related deaths deals usually with passengers, drivers or pedestrians victims, but traffic accidents with multiple victims non-passengers/non-pedestrians are rare. In metropolitan area they can happen, but they are unexpected in small villages. Forensic expertise focuses in these cases on the cause of death and to identify findings on the victims and in the death scene which may help the reconstruction of the vehicular fatal mishap. *Methods:* We present a multiple non-passengers/ non-pedestrians car accident with 4 dead and 2 injured victims. That happened in a sunny afternoon of June 2009 in a small village of Transilvania (Romania). In front of a fenced-in courtyard, a group of persons were sitting peacefully talking on a bench beside a road. Suddenly a car with high speed appeared from a curve and took away completely, in few seconds, the fence and the bench with all the persons. The run of the car was stopped only by the left frontal wracked wheel. At the end of the accident the car (BMW) remained in the footpath with moderate damages in the left front part including the wheel. The car driver was uninjured (alcohol test: BAC negative). *Results:* As outcome of this traffic accident two adults and two children lost their lives and one other adult and one child remained injured. The forensic expertise was requested for the dead persons (autopsies) and for the living persons (forensic clinical examination). The four autopsies revealed: – Male 63 y. o.: massive blunt trauma injuries of head (relevant fracture of vault and skull basis with meningeal hemorrhage and frontal contusions), thorax and pelvic ring injuries (alcohol test: BAC: 0,155 %); – Female 46 y. o.: thoracic aorta laceration, multiple, bilteral lower limb fractures (alcohol test: BAC: 0,2 %); – Male child 4 y. o.: blunt trauma of face and skull with a complex comminute fracture in the left temporal region irradiated to the cranial base, liver, spleen and right kidney ruptures, thoracic vertebral fractures (T2-T3); – Female child 3 y. o.: complex skull fracture (vault and basis) and brain hemorrhage, multiple, bilateral rib fractures and left clavicle fracture. The two forensic clinical examinations revealed: – Female 35 y. o.: multiple minimal superficial blunt trauma of the lower limbs; – Male child 10 y. o.: blunt trauma of the lower limbs with fractures of the right leg treated with osteosynthesis. *Conclusions:* The lethal injuries were the result of a combination of a direct high velocity impact and projection of the bodies on the ground. The driver was driving sober and was uninjured. In this run-off-road collision, which relevant contributory factors were the loss of control and mis-judging a curve while driving at high speed, two children and two intoxicated adults were killed. The car in the run-off-road striked some fixed object – the fence and the bench – resulting in a direct contact and projections of the persons present on, and probably also near, the bench. Important to prevent such dramatic fatal accidents is the improvement of road safety, creating a clear zone, or separating with guard rails the footpath and the road in towns.

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Retrospective analysis of 36 cases of gustilo III open tibiofibular fractures

Objective: To observe clinical effect of stage treatment of severe open comminuted tibiofibular fractures. *Methods:* A retrospective study was done on 36 patients with open tibiofibular fractures of Gustilo grade-III who were treated from January 1, 2008 to May 31, 2010 at different stages in accordance with the concept of damage control surgery. Debridement, temporary fixation with external fixator and repair of soft issue were performed in the early stage. The internal fixation with plate or intramedullary nails were carried out when the wound reached stabilization. *Results:* Of all, 34 patients had limb survival and two received amputation. Thirty-two patients were followed up for 18-24 months (average 21.35 months). Two patients with infection during hospitalization got recovery after internal fixation posterior to removal of the external fixators and debridement. The other 30 patients got sound wound healing after two stage internal fixation, with no deep infection, malunion or nonunion. According to Johner-Wruhs standard, the effect was rated as excellent in 18 patients, good in 12 and poor in 2, with excellence rate of 94 %. *Conclusions:* For treatment of open tibiofibular fractures of Gustilo III, the external fixator in the first stage and the internal fixation in the second stage take advantages of protection and repair of soft tissues, decrease of limb disability and improvement of the operation quality.

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Finite element analysis of fresh tubular bone

Objective: To establish a practical finite element analysis model (FEM) of the fresh tubular bone and discuss the biomechanical parameters of the model. *Methods:* Four fresh bones were scanned by CT to obtain a continuous tomograms, and the results were imported into MIMICS medical modeling software to generate entity model. The general finite element analysis software HYPERMESH was used for grid and material property assignment to generate finite element model. The stress distribution of finite element model and strain results were obtained by bridling the boundary conditions and simulating the stress state, used for contrast with the measured experimental results. *Results:* The HU values of the fresh tubular bone were -1023 to 2895 in the measured experimental results. According to the anatomical structure and the distribution of CT values, the bone was divided into four layers, ie, periosteal layer, glaze-like bone layer, compact bone layer and cancellous bone layer. The bone was assigned with 802 kinds of material properties, when the simulated structure with range of δ for 1.87-1.98 was the most similar to the actual measured result. *Conclusions:* As the hard bone layer, the "glaze-like bone" layer with CT values of greater than 2000 is insufficient and staggered with the compact bone layer but is of importance for the mechanical properties of fresh bone. The finite element model with δ of 1.87-1.98 and number of units of 50,000-100,000 has a better simulation, with high degree of precision and economical value.

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Animal simulation experiments of neck whiplash injuries

Aims: To date, the mechanism of neck whiplash injuries is not completely understood. One of the main reasons is the lack of effective animal model for studying whiplash-type injuries. The purpose of this paper is to establish a new animal model to examine injury characteristics of cervical whiplash-type injuries due to different posterior accelerations. *Materials and Methods:* A whiplash simulation setup was designed to simulate the following phases of neck whiplash injury during rear-end crashes: extension motion and flexion motion. The modified Gale

method "Combined Behavior Score (CBS)" was used to make a comprehensive assessment on animal functions within 24 hours after spinal injury, including motion, sensation, reflex and limb motion coordination. In order to observe the morphological and structural changes of myeloid tissues after neck whiplash injury clearly, three staining methods (HE staining, Nissl's staining and Holmes argyrophil staining) were used to separately make three types of histopathological sections. *Results:* The behavior function and nerve conduction function of neck spinal cord were impaired and the impairment extent was positively associated with the peak value of head posterior traction acceleration; namely, the greater the posterior acceleration peak was, the severer the related function impairment of neck spinal cord would be. *Conclusions:* This newly developed model system has allowed a simulation of whiplash exposure in the neck of animals.

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Correlations between degree of limb ischemia in MESS (Mangled Extremity Severity Score) score in predicting limb salvage or amputation in severe lower limb injury at Hasan Sadikin Hospital, Bandung, Indonesia

Severe injuries to the lower extremities have proven to be a profound challenge to the surgeon. Complex decisions inevitably center about whether to attempt heroic efforts aimed at limb salvage or to proceed with primary amputation. There are many guidance scores that can objectively help surgeons with the decisions. The usage of MESS score in deciding to prevent amputation is standard operating procedure at the Department of Orthopaedic & Traumatology in Hasan Sadikin Hospital,Bandung, and use MESS score as an objective guidance in deciding whether to salvage or to amputate. The purpose of this study is to find the correlations between degree of limb ischemia in MESS score component in predicting treatment to severe lower limb injury patiens. We reviewed the medical record for patients with severe injuries to the lower leg in five years period of August 2006 to September 2011. The reseach is a retrospective analytic diagnostic study in 61patients with 1,7-80,2 range of age (mean=40.95 year old) who suffered from severe lower limb injury. Data was processed based on MESS score. MESS includes 4 points of observation,which are skeletal &soft tissue injury, degree of limb ischemia, shock and age. *Conclusions:* The degree of limb ischemia in MESS score, plays as an important role in determining the treatment on severe lower limb injury patients.

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Epidemiological studies among the emergency surgery patients in Peking University People Hospital

Objective: To study the characteristics of epidemiology among the emergency surgery patients in a comprehensive hospital. *Methods:* There were 337.518 patients who presented our hospital emergency surgery from January 1, 2007 to December 31, 2011.The patients' data, including sex, age, time distribution, emergency diagnosis, causes, disposition after presentation were retrospectively analyzed. *Results:* Among 337.518 patients, the males outnumbered the females. Male to female ratio was 1.87 to 1.The patients with the highest incidence were between 20 and 29 years old. The patients with the lowest incidence were over 80 years old. Elder patients (≥60 years old) accounted for 14.88 %. The peak time of a day, a week and a year respectively was 09:00~12: 00 am and 07:00~11:00 pm, Saturday and Sunday, and during May to September. The leading three disease categories were animal bite (40.77 %), injuries to unspecified part of trunk, limb or body regions (12.67 %), and injuries to the head (7.06 %). Trauma still was the most important cause. After presentation, 80.15 % of all patients went home safely, 15.5 % needed to stay emergency room for observation, only 2.94 % were hospitalized. *Con-*

clusions: In this study, we demonstrated the emphasis and future direction of the emergency surgery, furthermore we should effectively promote construction of "independence type"emergency surgery.

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Management and survival analysis of patients with spinal cord injury

Objective: To explore the management and survival of spinal cord injury patients. *Methods:* The information of 62 patients with spinal cord injury from December 1, 2006 to December 31, 2007 was gathered by medical records review, face-to-face interview, and telephone follow-up. The gender, age, marital status, living habits, medical history, injury cause, treatment, time of transportation to the nearest hospital, time span from injury to surgery, classification of surgery, location of spinal injury, injury grading, medical insurance, and survival were recorded and statistically analyzed with SPSS software. *Results:* Sixty patients among 62 were male, and the average age was 26.9 years; the age of 2 female patients was 24 and 36 years. Fifty-eight patients (93.55 %) were married, and 45 cases experienced the disease within 3 years after marriage. The disease causes included falling or pounding (70 %) and traffic trauma (28 %). Injuries included complete injuries type A (n = 33, 53.3 %), incomplete type B (n = 25, 40.3 %), and type C and D (n = 4, 6.4 %). The transportation time to hospitals ranged from 4 to 28 hours (mean:11 hours). The affected segments included cervical segments (n = 42, 68.75 %) and thoracic segments (n = 20, 32.25 %). The types of surgeries were: decompression and internal fixation surgeries (n = 23), decompression and internal fixation and bone grafting surgeries (n = 31), simple decompression surgeries (n = 6), and conservative treatment (n = 2). The surgeries were applied 8-32 hours after injuries (mean: 10.4 hours). The duration of surgeries was 1.5-6 hours (mean: 3.2 hours). Six patients could take care of themselves at follow-up, 44 patients totally depended on other people. The social insurance coverage was less than 5 %. The annual family incomes ranged 1.800 to 8.000 yuan (mean: 3.460 yuan). Fifty-seven patients (92 %) had children. *Conclusions:* Most spinal cord injuries occur in young males from low-income families. The treatment and prevention should be carried out appropriately.

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The analysis of 181 cases of Lisfranc's fracture caused by traffic accident from 2009 to 2011 in Shanghai

Objectives: To assess outcome of treatment of different types of Lisfranc's fracture to determine the relationship between severity of Lisfranc's fracture and disability degree. *Methods:* 181 cases of Lisfranc's fracture caused by traffic accident from 2009 to 2011 in Shanghai were collected and analyzed in the sufferer's age, type of traffic, pattern of injury, medical treatment and impairment determination. *Results:* The analysis reveals that over 65 % of the injured were between 30 and 60 years old, and males were injured only 20 % more than females. Based on Nuley and Vertullo classification system, more than 40 % injury were type III, while type I and II occupied 34 % and 24 %, respectively. The treatment was closely related to the type of injury, 77 % type III injury was treated by internal fixation, whereas only 22 % type I injury and 34 % type II injury were treated by surgery. Nearly all type III injurier developed permanent disability, and only 35 % in type I and 63 % in type II developed permanent disability. *Conclusions:* Our results have shown that permanent disability was closely related to severity of Lisfranc's fracture regardless of the surgery or not.

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Effect of hypothermia on coagulation function detected by thromboelastography in major trauma patients

Objective: To explore the effect of hypothermia on coagulation function and assess the role of Thromboelastography (TEG) in major trauma patients. *Methods:* 22 major trauma patients admitted to the emergency intensive care unit (EICU) between January 2010 and June 2011 were enrolled. Bloods were sampled from the vessels and tested for TEG at different temperatures (37, 35 and 33 °C). The indices of TEG included coagulation reaction time (R), clot formation time (K), rate of clot formation (Angle), maximum amplitude (MA), and coagulation index(CI). The characteristic of their changes along with temperatures was analyzed. Patients were divided into two groups based on normal or abnormal CI at 37 °C, and the effect of hypothermia on TEG indices was compared between both groups. *Results:* 1) Among these 22 patients, R and K value were increased while Angle, MA, CI value were decreased along with the decrease of temperatures ($P < 0.001$). 2) K and Angle value, the indicators of fibrinogen function, were inhibited with the temperature decreasing from 37 °C to 35 °C, while other TEG indices had no significant change. All TEG indices were significantly inhibited when the temperature decreased from 35 °C to 33 °C. 3) There were significant difference for trend of inhibition with decreased temperatures among all TEG indices ($P < 0.001$). 4) R and K value were increased while Angle, MA, CI value were decreased along with the decrease of temperatures both in normal and abnormal CI groups. All TEG indices were worse in abnormal group. *Conclusions:* Hypothermia had significant effect on coagulation function in major trauma patients. TEG could be measured at any temperature and reflect the actual coagulation function, which is also helpful to guide an appropriate temperature during hypothermia therapy.

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The association between prolonged stay in emergency room and outcomes in critically ill multiple trauma patients

Objective: The truth that prolonged emergency department length of stay (EDLOS) would increase hospital mortality in critically ill patients had been challenged. The effect on multiple trauma patients had not been studied yet. The aim of the study was to explore the mystery of the association between prolonged EDLOS and prognosis in critically ill multiple-trauma patients. A retrospective cohort study was performed in a major tertiary hospital. Multiple trauma patients admitted from the ED to the intensive care unit (ICU) during the whole year of 2010 were included and divided into two groups, delayed group (EDLOS >6 h) and non-delayed group (EDLOS ≤6 h). Demographic information, characteristic of disease and outcomes were compared between the two groups. Multivariate regression analysis was used to clarify the impact of prolonged EDLOS on patients' prognosis. *Results:* Of 1.115 multiple trauma patients admitted to the ED in 2010, 476 critically ill traumatic patients were enrolled. They had a mean age of 48 ± 16 years and 73.1 % were male, with an Injury Severity Score (ISS) of 29 (22-34,IQR), an EDLOS of 4.0h (2.8-6.4 h, IQR), and a mortality of 9.2 %. Both groups were similar in age, gender and ISS while patients in delayed group were more common presented during night shifts. In multivariate analysis, prolonged EDLOS would increase hospital mortality (OR, 3.19; 95 % CI, 1.28-7.95), especially in non-emergency operation patients (OR, 4.01; 95 % CI, 1.31-12.27). However, this impact disappeared in emergency operation patients ($P = 0.14$). Besides, no clear association was found between prolonged EDLOS and hospital LOS and cost. *Conclusions:* Prolonged EDLOS would increase hospital mortality in critically ill multiple trauma patients, especially in non-emergency operation patients. Strategies should be made both in the ED and ICU.

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Annual variation of mortality and discharge against medical advice in major trauma patients admitted to a Chinese ICU

Objective: To observe the annual variation of mortality and discharge against medical advice (DAMA) in major trauma patients admitted to a Chinese ICU, and to improve the quality of trauma care. *Methods:* A retrospective analysis was performed on major trauma patients who died or were discharged against medical advice in the emergency ICU of a university hospital from 2003 to 2008. These information included demographic data, cause of injury, Injury Severity Score (ISS), Acute Physiology and Chronic Health Evaluation II (APACHE II), Glasgow Coma Scale (GCS), length of stay in ICU, etc. For these patients with DAMA, they were classified as dying, deteriorative or improved according to their situation of discharge. The dying patients were analyzed as death. The annual variation of mortality and discharge against medical advice were observed in these 6 years. These parameters were compared between the two periods (2003 to 2005 and 2006 to 2008). *Results:* 1) A total of 2109 major trauma patients were admitted into the emergency ICU from 2003 to 2008. 268 patients were recruited to the study, including 212 males (79.1 %) and 56 females (20.9 %), with a mean age of 47 ± 16 years. The main causes of injury were traffic injury (65.3 %) and high fall (23.5 %). The mean ISS and APACHE II were 27.4 ± 9.4 and 17.2 ± 7.1 respectively, and 70.1 % of them were with GCS <9. The mean ICU length of stay was 9.3 ± 11.0 days. 2) The mortality of 2109 major trauma patients in EICU was 7.6 % (88 patients died in the hospital, and 73 patients were dying when discharged). The rate of DAMA was 5.1 % (79 cases deteriorative and 28 cases improved). The mean age (45 yrs vs. 50 yrs), male ratio (73.9 % vs. 86.9 %), APACHE II (19.4 ± 6.2 vs. 14.1 ± 7.2), proportion of those with GCS <9 (83.5 % vs. 53.3 %), ICU length of stay (7.8 d vs. 11.5 d) were statistically significant between the two groups. ISS in both two groups had no difference (27.8 ± 9.3 vs. 26.7 ± 9.6)] (P = 0.343). 3) The annual mortality from 2003 to 2008 was 9.0 %, 9.8 %, 10.8 %, 6.2 %, 7.3 % and 5.6 % (P = 0.078), respectively. The annual rate of mortality plus DAMA was 14.1 %, 12.6 %, 17.0 %, 10.4 %, 13.1 %, 11.2 %, 12.7 % (P = 0.200) respectively. For patients included from 2003 to 2005 (95 cases) and these included from 2006 to 2008 (145 cases), there were no statistical significance for ISS and APACHEII, except the mortality (9.8 % vs. 6.4 %, P = 0.004), the rate of deteriorative discharge (2.5 % vs. 4.5 %, P = 0.018) and the total rate of death plus DAMA (14.5 % vs. 11.7 %, P = 0.062). *Conclusion:* From 2003 to 2008, the outcome of major trauma patients in this ICU was improved. The rate of discharge against medical advice had an influence on judging the quality of care, and cautions should be taken when such analysis was performed.

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First aid for pelvis fractures

Objective: The purpose of this review is to supply a contemporary view of the diagnosis and therapy of patients with this important group of injuries. *Methods:* The Pubmed database was researched by computer to search documents published between January 1980 and January 2011 with key words of "Pelvic fracture, treatment, shock, Trauma" in English. Repetitive articles were excluded. A total of 83 articles were collected and 32 were analyzed. *Results:* The major challenge for clinicians assessment and management of patients with a pelvic fracture is to determine the most immediate threat to life and to control this threat. *Conclusions:* The different treatment depending on whether the main threat from pelvic fracture hemorrhage associated injuries or both. The results point of view of the function in the long-term outlook depends on the fracture of rigid internal fixation quality, as well as the pelvic nerve and visceral injury situation.

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An investigation on biomechanical response of impact brain stem injuries

Studies showed that contact head impacts led to higher injury parameters, compared to non-contact head impacts, and shear stress was a reasonable predictor for brain stem injury. Impact-induced brain stem injuries occur with a low incidence in road traffic accidents (RTAs), but the injuries initiated tragic outcomes very frequently. Few investigations, however, have been focused on the mechanisms of brain stem injury as yet, especially with a detailed head-neck finite element model (FEM). To investigate the injury mechanisms of primary brain stem injury induced by impacts, a detailed head-neck FEM (THUMS V4.0) was implemented. Head impacts with different directions, speeds, as well as varied stiffness materials were simulated, and shear stress in brain stem was studied in these impacts. Impact direction was strongly relative not only to the shear stress value, but also to the stress distribution in brain stem. Lateral impact resulted in the highest shear stress, compared with the other impacts in the anterior-posterior, and the inferior-superior. Controlling the impact speed and increasing the stiffness of the impactor might improve significantly the shear stress loading in the brain stem. The conclusion might be drawn that the shear stress in the brain stem was associated with impact speed, material stiffness of impactor, as well as impact direction. We still have not understood clearly that the shear stresses were as the direct results of the impact, impact-induced rotational/translational acceleration, or both of them. Further studies would be still needed to fully characterize biomechanical response of the brain stem to varied impacts related to RTAs and to develop targeted injury prevention strategies based on study results.

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Predictive value of multi-sliced spiral computed tomography for hypovolemic shock in severe multiple injury patients

Objective: To investigate the predictive value of Multi-slice Spiral Computed Tomography(MSCT) for hypovolemic shock in severe multiple injury patients. Methods: The clinical and MSCT data of 63 severe multiple injury patients admitted to our Trauma Center from Jan. 2008 to Dec. 2011 were reviewed in this study. Blood pressure, heart rate, shock index and Injury Severity Score (ISS) were collected and analyzed. According to the occurrence of hypovolemic shock in 24 hours after CT scan, the patients were divided into Shock group and Stable group. Transverse and anteroposterior diameter of inferior vena cava(IVC) , diameter of abdominal aorta, CT value of abdominal organs both in early and delayed phase of enhanced CT were measured. The differences between the two groups were compared by Student's t-test. To investigate the predictive value of above indexes that had significant difference between two groups for hypovolemic shock, Receiver Operating Characteristic Curve(ROC) and Logistic Regression Analysis were used. *Results:* The collapsibility index (T/AP) of IVC in shock group was significantly greater than that in stable group in 4 abdominal levels ($P < 0.05$). The mean CT value of spleen in early phase in shock group was significantly lower than those in stable group (93 ± 16 HU vs 112 ± 24 HU), while the adrenal gland was higher (153 ± 35 HU vs 131 ± 24 HU).In delayed phase, the mean CT value of renal medulla showed a significant difference between the two groups (193 ± 57 HU vs 228 ± 534 HU). The cutoff value of shock index, ISS, T/AP, CT value of spleen and adrenal gland in early phase, CT value of renal medulla in delayed phase were 1.19, 19.5, 3.02, 115 HU, 150 HU, 184 HU , respectively. ISS, T/AP, CT value of adrenal gland in early phase, CT value of renal medulla in delayed phase were committed to have statistically significant value in predicting the occurrence of hypovolemic shock. *Conclusions:* Collapsed IVC, decreased enhancement of the spleen and increased enhancement of adrenal grand in early phase, decreased enhancement of renal medulla in delayed phase have predictive value in predicting the occurrence of hypovolemic shock in severe multiple-injury patients.

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Investigation of pedestrian chest injury risk using multi-body dynamics method

Objective: To investigate the effects of impact speed, front shape of vehicle and impact position on injuries of pedestrian chest in vehicle vs. pedestrian accidents. *Methods:* Constructing three types of vehicle models (car, SUV, minibus) with different front-ends using multi-body dynamics method, and a multi-body model of the human body is used to simulate the traffic accidents. Then conduct orthogonal simulation experiments 45 times at different impact speed (20, 30, 40, 50, 60 km/h), different types of vehicles, different impact position (front, lateral and rear of pedestrian). *Results:* pedestrian chest injury severe when impact velocity higher than 40 km/h. Vehicle impact velocity has the most significant influence on the injury severity of the pedestrian chest. The higher the impact speed, the more serious pedestrian chest injury is. Front shapes of vehicles and impact position on human body are important factors to influence the pedestrian chest injury. Pedestrian chest is more vulnerable to be injured when impact the front of pedestrian chest and is more serious when minibus impact pedestrian chest than SUV and car impact. *Conclusions:* On the places with more pedestrians, reduce vehicle speed to 40 km/h or less can effectively relieve pedestrian chest injury severity in vehicle vs. pedestrian accidents.

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The characteristics of traffic injuries among elderly people in Chongqing between 2000 and 2006

Objective: To study the epidemic characteristics of traffic injuries of the population above the age of 60 in Chongqing and to analyze the related factors. *Method:* Files of traffic accidents were collected from each Traffic Police Division in the selected districts of Chongqing. Data of road traffic injuries involving elderly people were obtained. Epidemiologic characteristics of traffic injuries among the elderly people were analyzed. *Results:* Between 2000 and 2006, the number of traffic accidents involving the elderly people that happened in the selected districts of Chongqing, is 1916 with 2025 victims. The average mortality rate and average injury rate are 9.86/100.000 and 67.22/100.000 respectively, higher than that of the contemporary national average. The age group of 70-79 suffers the highest risk to traffic injuries. Pedestrians account for the highest proportion of victims with the mortality of 91.51 % and the injury rate of 73.84 %. Injuries in the head and neck (37.56 %) were the most common traffic injuries and primary cause of death. The drivers bear more responsibility in juvenile traffic injuries (89.32 %). Over 94 % of the traffic accidents occurred in areas with no traffic signals or traffic police. *Conclusions:* It is important to enhance the traffic safety consciousness of drivers and the elderly people, strengthen preventive measures and improve the level of traffic management to provide the elderly people a safe traffic environment.

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Interpersonal and instrumental violence in conflicts in traffic

Aggressive behavior in traffic is a wide spread phenomenon. Up to one third of the population report being involved in mild cases of road rage. However, more dramatic cases like injury to people or damage to vehicles are far less common. In the years 2002 through 2012, the Department of Forensic Medicine at the University Hospi-

tal Hamburg-Eppendorf examined 116 cases of people being injured as a result from conflicts in traffic. To describe and analyze the characteristics of the damaged and accused person, their relationship towards each other, type and quality of violence as well as further medical treatment, descriptive statistics and correlation of selected variables were used. There is a significantly higher number of males (75,9 % of damaged and 89,7 % of accused) involved in road rage, most accused are lone perpetrators (75,9%), the accused and the injured person usually do not know each other (92,2 %), the violence applied is mostly physical (81,8 %), followed by instrumental violence (31,0 %), which in more than half the cases involve using the vehicle as a weapon, the trauma is mostly blunt and applied to the face and upper and lower extremities, the appropriate medical treatment can be done as outpatient care in most cases while 10,3 % of the cases needed to be hospitalized. There are significant differences amongst the two genders, the time and place of incident, the type of vehicle, the type of force applied as well as the severity and pattern of injury.

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Epidemiology of road traffic injuries and disability profile in El-Gharbia governorate during 2010 to 2012: A comprehensive study

Road traffic accidents (RTA) cause the death of more than 1.2 million and the injury of between 20 and 50 million people annually worldwide with more than 90% of deaths in low and middle income countries. The current study aimed at evaluating the pattern of RTA in El-Gharbia governorate – Egypt via retrospective descriptive analysis of demographic distribution of the accident/injury and accident/disability profiles. The data were collected from the medico-legal reports of road traffic victims during 2010 to 2012. The total number of the reported road injured victims was 356 cases. The highest percentage of sustained injuries were in the lower limbs followed by skull/ brain and skin/soft tissues (56,1 %, 47,2 % and 45,5 % respectively). Delayed complications recorded were; amputation (6.7 %), osteomylitis (3.6 %) and others (18.8 %). Deaths constituted (1.7 %) of the recorded cases. The disabilities among the survived victims were 87.9 %.The most common part involved in disabilities were lower limbs (55.9 %), then skin/soft tissue (33.8 %). Seventy two cases showed disabilities between 10-19 %.

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Brugada syndrome and sudden death: Interest of molecular autopsy

Objective: Sudden death of cardiac origin especially in young subjects can be related a genetic trait. One of these is Brugada syndrome (BRS). *Causes:* In approximately 25 % of cases, BRS is due to an abnormal sodium channel caused by a mutation of the SNC5A gene located on chromosome 3. This gene is involved in the reduction of the sodium current density. In 75% of cases, BRS is caused by a mutation of the glycerol-3-phosphate dehydrogenase 1-like (GPD1-L) gene resulting in alterations of the sodium current at the cell surface. *Interest of molecular autopsy:* BRS is associated with a high risk of ventricular arrhythmias, which can lead to sudden death through ventricular fibrillation. *Diagnosis:* The diagnosis of BRS is based on ADN extraction and the search for mutated genes encoding the SCN5A subunit of sodium channel during post-mortem examination. The role of necropsy is to protect the life of the patient's offspring, forebears and siblings as much as possible. *Management:* The management of patients with BRS includes the implantation of a defibrillator in those with a history of near-sudden death. In these patients as well as those with a family history of BRS, programmed ventricular stimulation is needed. If stimulation is positive, the implantation of a defibrillator is absolutely required. If stimulation is negative, it is recommended to closely follow those patients in whom treatment with drugs that inhibit the cellular entry of sodium ions such as Ic class antiarrhythmics, local anesthetics except xylocaine and tricyclic antide-

pressants should be avoided. ECG monitoring and treatment with low dose quinidine are necessary in case of ECG anomalies (augmented ST segment, right bundle branch block).

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Evidence of somatic injuries after whiplash trauma

Objective: The purpose of this presentation is to give the attendee an update on the current status of discrete somatic injuries following whiplash trauma. Whiplash injuries are common in the western world and affect approximately 3 ‰ of the population annually. Most often these injuries are sustained in acceleration-/deceleration traumas (whiplash trauma), 30–40 % of patients will continue to suffer from chronic symptoms with approximately 10 % experiencing permanent impairment/disability. Because the most common painful symptom is neck pain, the cervical spine has been a focus for research investigating identification of somatic injuries. The diagnosis whiplash injury is typically applied to individuals subjected to high-energy as well as low-energy trauma, showing that the diagnosis is not defined by the severity of the trauma, e. g. property damage, velocity changes or extent of tissue damage. As there is no pathognomonic whiplash injury, investigations of deceased individuals exposed to high- as well as low-energy trauma are relevant to improve the understanding of whiplash trauma and injury. The ccurrence of non-fatal cervical spine injuries in individuals exposed to injurious loading of the cervical spine during fatal road traffic crashes, but dead due to other causes, gives insight into the extent of somatic injuries in patients with whiplash injury. *Methods:* Systematic reviews and numerous postmortem studies have been performed of road traffic crash fatalities with the aim of identifying damage to cervical spine structures. As several studies have highlighted the important role of microscopic postmortem investigations in elucidating traumatic pathology that is not otherwise apparent, this study has focused on investigations that include control groups, microscopy and histological methods, and advanced diagnostic imaging procedures where applicable. *Results:* Besides from the obvious extensive injuries, a range of discrete somatic injuries have been identified in postmortem studies of people killed in road traffic crashes. These include discrete non-fatal injuries to the facet joints (articular cartilage, subchondral bone, synovial fold and haemarthrosis), ligaments, intervertebral discs, nerve roots and musculature. Many of these injuries cannot be detected on conventional x-ray, CT or MRI. Hence, clinically available imaging procedures do not reliably identify all discrete injuries present in the cervical spine following trauma, although some injuries can be detected. Recently, PET/CT studies have identified inflammatory conditions in the cervical spine of chronic neck pain patients supportive of the postmortem findings. *Conclusions:* There is substantial evidence in the literature supporting the presence of somatic injuries following acceleration-/deceleration (whiplash) trauma to the cervical spine in some patients. The distribution and incidence of such injuries is unknown, and current imaging procedures do not reliably address this issue, neither by identification nor exclusion of these injuries. Although the injuries all have nociceptive potential, their exact clinical relevance is unknown. In clinical settings, discrete cervical spine injuries need to be considered a possible source of symptoms in patients with neck pain after whiplash injury.

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Background of the alcohol and traffic courses in Denmark

Through 1970 and around 1995 there were a large number of people killed and injured by drink drivers, and the Danish authorities started to consider the initiatives that could be launched to reduce the number of drink drivers. It appears from the Road Traffic Act § 60 paragraph 2, that all who have a ruling on drink driving must undergo a course on Alcohol and Traffic, before they can go to the driving test. There is a rich curriculum for the

content and form of the course, from the Justice Department in Denmark. The course is offered by the 5 Regions in Denmark. The curriculum contains the topics to be discussed, the purpose of the course, the method bakkground, teachers qualifications, structure of the course, content of the plan of instruction and the evaluation of the Alcohol and Traffic Courses.

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Alcohol and driver's fitness

Objective: In this presentation the relationship between alcohol consumption and fitness to drive is examined. The legal basis for the mandatory assessment of driver's fitness (i.e. 0,16 % in Germany for first time offenders) is empirically analyzed from a medical, psychological and toxicological point of view. Finally, recommendations based on scientific findings for the improvement of the current legal situation and administrative practice of driver assessment is presented. Thus, the results contribute to the principles of law certainty and equality before the law. *Methods:* More than 100 published articles have been analyzed. Studies with an experimental design and meta-analyses were included. They had to be comprehensive and complete. The qualitative and quantitative interpretation of the data are shown based on a selected example. The other results are summarized. The danger and risk of causing an accident under the influence of alcohol was estimated. *Results:* On the quantitative level, it appears that the majority of approximately 97 % of the documented impairments occur at a maximum BAC of 0,1 – 1,1 %. Numerous skills are impaired by low doses of alcohol: attention, electrophysiological and brain activity, driving skills, memory, cognitive and intellectual skills, psychomotor skills, simple and choice reaction time, visual functions, tracking, inhibitory control and perception. Several studies have shown that the crash risk under the influence of alcohol is 10 times higher with a BAC of 0,10 %. *Conclusion:* The medical, psychological, and toxicological results prove that the assessment of drivers' fitness should be mandatory at a BAC of ≥0,1 % if based on scientific knowledge. From a scientific point of view DUI offenders with a BAC of 0,1 % or more belong to the group of high risk offenders. That is why this group should have to pass an assessment examining medical and psychological aspects of their behavior. The driver's assessment serves individual justice. A harmonization of procedures or measures for drivers under the influence of alcohol within the European Union is necessary. The question for politics is: Which risk of causing a crash under the influence of alcohol is a state willing to take?

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Medicolegal aspects of traffic medicine in Australia

Objective: To present forensic and medico-legal issues surrounding presentation evidence regarding traffic crashes in court. Recent high profile Australian cases will be presented to illustrate these. *Discussion:* Driving and traffic crashes are among the most common reasons for civil litigation and criminal prosecutions in Australia. Many cases involve areas relevant to Traffic Medicine including injury interpretation, drunk or drugged driving and the contribution of medical illnesses to fitness to drive and crash causation. Recent court cases in Australia have highlighted the importance of a sound scientific understanding of these subjects. The presentation will cover the most serious cases that have had an impact on the way Traffic Medicine is practiced. They include a case of epilepsy and sleep apnoea that let to the Court questioning the relevance of licensing fitness guidelines, another case of epilepsy that almost led to criminal prosecution of a doctor and a coroner's inquest which investigated the effectiveness of compulsory medical reporting of unfit drivers.

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Study on psychoactive substances among killed drivers in Bavaria/Germany

Objective: In 2001 over 54.000 people died due to traffic accidents in the European Union (EU). The EU resolved in the so called "White Paper" to improve the road safety and to reduce the number of victims by half until 2010. For scientific support, the project "Driving Under the Influence of Drugs, Alcohol and Medicines (DRUID)" was created by EU. To analyse different issues, the project was divided into 7 Work Packages (WP). One objective of the WP2 was to collect epidemiological data concerning prevalence and accident risks of driving under the influence of alcohol and other psychoactive substances. The Institute of Forensic Medicine in Munich took part in the culpability studies of killed drivers in WP2. *Methods:* The acceptance criteria in these studies were as follows: killed car driver, 18 years and older, died within 10 hours after the accident, forensic autopsy performed. The cases were collected from autopsies in 2003 to 2008 in the southern part of Bavaria. Whole blood samples were analyzed prospectively and retrospectively for alcohol and other psychoactive substances. The DRUID project focused on 23 substances for toxicological analysis, additionally a screening on a lot of further substances was performed. The responsibility analysis for the culpability study was done by the Biomechanics and Accident Analysis Unit. *Results:* 233 killed car drivers matched the above mentioned criteria. The blood alcohol concentration could be measured in 227 of 233 cases (97.4 %) and ranged between 0.00 and 3.56 g/L. The toxicological analysis for further psychoactive substances was performed in 207 of 233 cases (88.8 %). 45 different substances (psychoactive substances as well as non psychoactive substances) were detected. In 44 of 233 cases (18.8 %) an impairment due to psychoactive substances like alcohol, opioids, THC, amphetamines, benzodiazepines or antidepressants could be assumed. In further 21 of 233 cases (9.0 %) an impairment was considered possible. Alcohol was the most widely used substance. For 200 subjects complete accident and toxicological data for the responsibility analysis could be obtained. *Conclusions:* Many different substances were detected but only a low number of each substance could be found. Therefore, an odds ratio calculation was only possible for alcohol. It could be shown that a relevant number of drivers was under the influence of psychoactive substances. Each killed car driver should be autopsied and a toxicological screening should be performed, especially for psychoactive substances.

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Drug, pharmaceutical and alcohol consumption in Mecklenburg (Northern Germany): Analysis of records from 2002 to 2012

Within the context of an ongoing study, results are presented with respect to drug, medicine and alcohol consumption in Mecklenburg between 2002 and 2012. The study aimed at investigating changes in drug consumption in the years prior to 2002 as well as examining changes within the last ten years by analysing blood and urine samples, also with regard to delinquency. In addition, a retrospective data analysis was performed to highlight trends in drug consumption and raise awareness to higher authorities to potentially expand the spectrum of target compounds for futures forensic-toxicological analyses. To record the consumption of drugs, which probably have not been observed, an advanced GC-MS method has been applied for many years on a routinely basis in order to determine frequently used drugs. Thus, the results presented here give a realistic overview on drug consumption in Mecklenburg.

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Dried blood spots – An approach worth considering in cases of driving under the influence of drugs?

Objective: Analysis of dried blood spots (DBS) is an increasingly accepted method in therapeutic drug monitoring. DBS sampling can be performed by a finger prick thus enabling roadside sampling to reflect actual impairment by drugs. The aim of our study was to investigate whether determination of benzodiazepines (n = 59), risperidone (n = 10) and 9-hydroxyrisperidone (n = 14), zopiclone (n = 45), amphetamine-type stimulants (n = 94) as well as opioids (n = 92) from DBS is as reliable as from whole blood. *Methods:* DBS and whole blood analysis was performed using a volume of 100 μL. Analysis was by LC/MS/MS following liquid-liquid or solid phase extraction. Analytical assays were fully validated. Mean blood/DBS (B/DBS) concentration ratios and corresponding relative standard deviations (RSD) were calculated for each of the 28 analytes. *Results:* All blood concentrations were within therapeutic ranges or ranges which are usually observed in cases of recreational drug use. Mean B/DBS ratios were within a range from 0.90 (nordiazepam; n = 2) to 1.19 (zopiclone; n = 45). Relative standard deviations ranged from 2.3 % (morphine; n = 7) to 33.3 % (lormetazepam, n = 4). Equivalence of both methods has statistically been confirmed. *Conclusions:* Except zopiclone, which is readily prone to hydrolysis, there was an excellent correlation between DBS and blood data. Therefore, DBS can be considered as an alternative approach for quantitative determination of drugs in cases of driving under the influence.

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Residual delta-9-tetrahydrocannabinol levels after heavy cannabis use

Objective: Interpretation of delta-9-tetrahydrocannabinol (THC) levels in body fluids is an important part of the investigation of traffic crashes. THC behaves in a different way to most other drugs in the body, especially alcohol. Drug levels are often of great importance in criminal cases involving traffic crashes and have been the subject of intense dispute in Australian courts. The increasing THC content of cannabis over the last few years raises the possibility that THC levels formerly considered proof of recent use may now be residual levels from past use. This presentation will describe current research into residual THC levels in heavy cannabis users which is of great relevance to this issue. *Method:* A group of heavy cannabis smokers undergoing detoxification in two residential closed drug clinics volunteered to provide daily blood, urine and oral fluid (saliva) samples daily for seven days after ceasing use of cannabis. The samples were analysed for THC and its carboxy-acid metabolite by HPLC-MS-MS. The study was approved by the appropriate human research ethics committees. *Results:* While some subjects showed low or absent THC blood levels consistent with previous studies, there were some subjects who returned spectacularly high blood THC levels for up to 2 days, a situation never before described in the literature. Other novel findings included detectable THC levels in oral fluid after 2 days, and presence of native THC in urine together with very high levels of its metabolite. *Conclusions:* Increasing levels of THC consumption due to the availability of high potency preparations will require a revision of how THC blood and other body fluid levels are interpreted for forensic purposes. This may make the provision of forensic opinions for traffic and other cases more difficult in the future.

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When has cannabis been used the last time?

Objective: Impairment of performance due to the use of cannabis is not easily correlated to blood concentrations. In daily casework, proof of impairment is regularly based on cannabinoid concentrations determined from a single blood sample. Investigations dating back to the early eighties have attempted to relate blood concentrations of tetrahydrocannabinol and major metabolites with the time after last use. Which data are currently available to approach the problem? *Methods:* A literature search which was restricted to human pharmacokinetics of smoked cannabis has been performed for data related to time or respective models estimated on individual data or pharmacokinetic parameters. Search results have exemplarily been applied to results from an authentic case. *Results:* There is already a wide variation of tetrahydrocannabinol lost during smoking. Even in studies with a rigorous smoking protocol, a wide variability of the bioavailability and the maximum concentration of tetrahydrocannabinol could be observed. The pharmacokinetic evaluations of Sticht and Käferstein as well as the predictive models proposed by Huestis et al. have been considered in addition to individual data from pharmacokinetic studies. *Conclusions:* Applying the available data and models resulted in a wide time interval that may be limited in an individual case. Moreover, their application is restricted to plasma or serum disregarding variable blood-to-plasma ratios. The influence of drugs other than cannabis or ethanol has only tentatively been studied. Data obtained from heavy users during the late elimination phase >6-8 hours following smoking are difficult to be classified with regard to last use of cannabis.

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The role of synthetic cannabinoids in fitness to drive testing

Objective: Herbal mixtures, such as 'Spice', containing cannabimimetic compounds, are easily available on the Internet and have become increasingly popular among people having to undergo urine drug testing, as these compounds are not detected in standard testing procedures so far. For analysis of urine samples, a thorough knowledge of the metabolism is necessary as the unchanged compounds are not found in urine after consumption. Aim of this study was the evaluation of the positive rates of synthetic cannabinoids in urine samples from individuals undergoing a fitness to drive testing in Germany. *Methods:* 350 urine samples from individuals undergoing a fitness to drive testing which were tested negative for cannabis were analysed using a comprehensive, highly sensitive LC-MS/MS method covering the major metabolites of 15 different synthetic cannabinoids (AM-694, AM-2201, JWH-007, JWH-018, JWH-019, JWH-073, JWH-081, JWH-122, JWH-203, JWH-210, JWH-250, JWH-307, MAM-2201, RCS-4 and UR-144). For sample work-up, an alkaline liquid-liquid extraction after incubation with β-glucuronidase was applied. The LC–MS/MS system consisted of an API 5000 mass-spectrometer fitted with a TurboIonSpray interface and a Shimadzu Prominence HPLC system. Separation was achieved on a Luna C18 column (150 mm × 2 mm, 5 µm particle size) and gradient elution. *Results:* From all analysed urine samples about 8 % were positive for metabolites of at least one synthetic cannabinoid. In most cases metabolites of more than one compound were found. Interestingly, the positive rates differed considerably for different Federal States. For Baden-Württemberg, Hessen, Mecklenburg-Vorpommern, Saarland and Sachsen there were no positive urine samples while Nordrhein-Westfalen (1.6 %) ranged below and Berlin (7.6 %) within the average. Thüringen (9 %), Brandenburg (11.1 %), Bayern (11.5 %) and Rheinland-Pfalz (17.4 %) showed positive rates above the average. *Conclusions:* Based on the results of our study synthetic cannabinoids seem to play a noticeable role as substitutes in fitness to drive testing in Germany. Hence an implementation in standard procedures for urine testing should be aspired. However, for effective abstinence control comprehensive and highly sensitive methods using LC-MS/MS are needed.

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Study on characteristics and causes of traffic crashes and injuries in different road users in Chongqing, China

Objective: This study was conducted on analyzing traffic crashes and injury characteristics of different road users in Chongqing, China so as to provide theoretical support for the interventions of different road users' traffic safety. Study design - Descriptive study. *Methods:* Based on the Road Traffic Crash Database, traffic crash and casualty data of different road users at one downtown, one suburb and one rural area in Chongqing, China between 2000 and 2006 were selected to evaluate the responsibility, casualty and injury characteristics of different road users in traffic crashes. *Results:* There were 90.64 % of road traffic crashes caused by drivers, while the ratios of serious crashes caused by pedestrians and passengers were significantly higher than that caused by drivers. The number of crashes and casualties caused by drivers was the most. The mortality per one hundred road traffic crashes (RTCs) caused by passengers was the most (52.38 people/100 crashes), followed by pedestrians (28.51 people/100 crashes). The death of the injured people from crashes was mainly pedestrians (49.46 % of the mortality), which was higher than that of drivers and passengers (P = 0.000). The mortality of the injured pedestrians occupying 9.82 % was significantly higher than that of injured drivers and passengers. The ratio of severe injuries among the non-fatal injured and dead was 4.38 % in pedestrians, which was markedly higher than that of drivers and passengers. Head injury (26.49 %) of pedestrians was higher than the percentage of drivers and passengers. Lower limb injury (20.71 %) of drivers was higher than the percentage of passengers and facial injury (13.09 %) of drivers was higher than the percentage of pedestrians. Facial injury (13.53 %) of passengers was higher than the percentage of pedestrians. Thoracic injury (22.78 %) and spinal injury (4.44 %) of severely injured passengers were both higher than the percentages of severely injured drivers and pedestrians. *Conclusions:* Road traffic crashes in Chongqing of China are mostly caused by drivers, but crashes due to passengers or pedestrians can more easily lead to serious casualties. Almost half road traffic deaths were pedestrians. There were significant differences in both injury severity and injury regions of different road users in road traffic crashes. According to types of road users, corresponding measures and methods should be taken in traffic crash prevention and injury care.

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Magnitude and characteristics of multiple severe injuries in road traffic accidents

Beside fatalities, victims who sustain multiple severe injuries in road traffic accidents have come into focus in Germany over the last couple of years. Survivors after such life-threatening trauma bear a great risk of permanent disability. However, the German national accident statistics do not discriminate any further among inpatients. The share of multiple severe injuries among casualties is therefore largely unknown. Our study aimed at determining the number and type of road users sustaining multiple severe injuries, their typical injury patterns and accident mechanisms causing them. The study was designed as a prospective survey in a coherent and representative region consisting of eight German counties and larger cities with a population of 1.3 million. It aimed at capturing all patients with an Injury Severity Score ISS >15 from road traffic accidents between November 2007 and December 2008 within the boundaries of this region. Their injuries were coded according to AIS-98 and preclinical and trauma center care was documented. Accident sequence, vehicle damage and use of protection devices like seat belts, airbags or helmets were determined through police and fire departments. Dispatch centers provided information on types of rescue means and rescue times. Altogether, 149 road users clinically treated were included

in the study and 22 of them deceased during the hospital stay. 76 victims died at the accident scene. Car occupants represented the largest portion in both groups (45 % and 65 %, respectively). Among seniors, the share of pedestrians and bicyclists (18 % and 26 %, respectively) was twice as high and the odds of dying 4.3 times as high as in younger victims. Frontal impacts caused the largest number of critically and fatally injured motor vehicle occupants, followed by side impacts. Roll-overs were relevant mainly for unbelted occupants. Motorcyclists presented the highest injury severity on average (median ISS 34). They sustained multiple severe injuries mostly in collisions with cars or trucks. Two thirds of them showed serious pelvis or extremity fractures (AIS 3 +). Also, more than half of the motorcyclists and car occupants received rib fractures and lung injuries. AIS 3 + head injuries played a major role in pedestrians and in car occupants after side impacts. Serious injuries among cyclists concentrated around the thorax, arms and particularly the head, some of them as isolated traumatic brain injury. Comparison with the number of seriously injured in official statistics suggests that one in ten inpatients due to road traffic accidents sustained multiple severe injuries. The Federal Highway Research Institute, the German Road Safety Council and other stakeholders propose the introduction of an additional category to identify this group in national accident statistics. MAIS 3+ in combination with intensive care treatment is deemed a pragmatic approach to capture these patients. Due to the great risk of complex injury patterns, motorcyclists need to receive more attention. For belted car occupants protected by airbags, injuries to the thorax and lower extremities become more important. Pedestrian airbags covering the lower portion of the windshield area may reduce the risk of serious head trauma for vulnerable road users.

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Epidemiologic and injury characteristics of 1328 road traffic injuries in Shenzhen

Objective: To analyze epidemiologic and injury characteristics of traffic injuries in Shenzhen through emergency department. *Methods:* A questionnaire was pre-designed to collect data of patients admitted to six general emergency departments of six districts in Shenzhen from January 2007 to December 2007 for clinical analysis. *Results:* There were l328 patients with road traffic injuries, at age range of 2-84 years (average 31 years). According to occupation, most patients were local workers and migrant workers (57.8 %). The accidental vehicles were mostly cars (48.5 %). Most accidents (78.6 %) occurred in urban streets. As for time distribution of traffic injuries, most injuries happened on Friday and Saturday(accounting for 17.8 % and 18.7 % respectively), especially on Friday($r = 0.166\,0$, $P < 0.\ 01$). There was central tendency around 15:35 pm in one day ($r = 0.286$, $P < 0.01$). The age of male was (32.36 ± 8.70) years and that of female (29.96 ± 4.32) years, with statistical differences ($P < 0.05$). Of patients followed up, 84.4 % patients could work on their original jobs, 8.5 % needed change of their jobs and 7.1 % lost the ability of work. *Conclusions:* It is necessary to strengthen road safety education among local workers and migrant workers to improve traffic awareness of road safety. Traffic administrators and road safety marks should be added in the chief period and districts where road traffic injuries happen most frequently. Controlling the number of small cars may he effective to reduce traffic accidents.

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Epidemiological study of road traffic injuries in Beijing: A report of 980 cases

Objective: To investigate the epidemiological features and risk factors of road traffic injury in Beijing. Methods: Data of road traffic injuries of Beijing Changping Hospital in 2010 was collected for statistical analysis of the epidemiological features. *Results:* A total of 990 cases of road traffic injuries were treated in Beijing Chang-

qing Hospital in 2010, with a mule ⁄ female ratio of 2.57:1 and at average age of 45 years. There were 21 cases aged < 18 years, 703 cases aged 18-55 years and 266 cases aged ≥ 56 years. Self-employed individuals and farming production staffs were the risky populations that were easily subjected to road traffic injuries. Summer and autumn were the accident-prone season. The most common injury site was the lower limbs, next with the neck and head. The hospital stay was mainly in a range of 5-10 days (12.8 days on average). Conclusion: Male self-employed individuals and agricultural producers are the high-risk groups of road traffic accidents in the area, where shows a high occurrence of road traffic accidents in the summer and autumn. Thereby, traffic safety education and prevention-control measures based on these characteristics should be carried out effectively reduce the number and severity of the local traffic injuries.

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Confusing manner of death in decapitated railway victim – A case report

Decapitation or complete severance of head from the body is imminently fatal condition without any exception. In September 2011, a decapitated body was found in isolated railway road. No eye witness, meanwhile all circumstantial evidences and autopsy findings were confusing about the manner of death. The police arise a question about the manner of death, is it an accidental, suicidal or homicidal?

This work is an attempt to analyze data gathered to reach the most applied scenario.

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Road traffic injuries in Republic of Macedonia

Problem under study: Road traffic injuries (RTI) are a major cause of death and disability worldwide, especially in developing countries. Data from Global Burden of Disease Study (2004 update) suggest approximately 41.2 million disability adjusted life years lost (DALYs) as a result of RTI globally, and about 90 % occurred in developing countries. *Objectives:* The study analyses the magnitude and characteristics of RTI as a priority public health problem in Republic of Macedonia, emphasizing the burden and challenges for policy intervention. *Methods:* This is a retrospective study with description of the RTI frequency and dynamics, distribution by age and sex, incidence and mortality, causes and victims, applying standard statistical method. Data from Ministry of Internal Affairs, medical records for RTI and WHO HFA database have been used. *Results:* In Macedonia RTI participate with 34 % of all injuries and 50 % of all causes of death in children and youth. Since 2000 RTI have a significant increasing trend, with peak in 2008 and with slight decreasing in 2009 and 2010. The standardized death rate from RTI (0-65) for 2009 is 5.18 (160 deaths), which is a much lower rate than in Serbia 8.56, Greece 13.08, Bulgaria 7.4, but is higher than in many developed countries, like Germany 4.28, Netherland 3.07, Sweden 3.15, Switzerland 3.62. The seasonal epidemic wave is May-September, critical days Thursday to Saturday, and "rush hours" 16-18 pm. Main causes are errors of drivers participating with 88.8 %, then pedestrians 6.27 %, vehicles in 0.39 %, roads in 0.22 %, passengers in 0.19 % and other reasons in 0.29 %. The most common cause of accidents is collision between moving vehicles occurring in inside build-up areas (61.13 %), knocking down or running over pedestrians 14.99 %, run-off road accidents 14.72 % etc. Most of the injured are the drivers of motor vehicles 44.3 %, pedestrians 30 %, bicyclists and motor-bicyclists 8.75 %, motorcyclists 6.25 %. Most deaths are in 20-24 age group (13.75 %), and most injured in 15-29 age groups (37-45 %). One third of the injured who asked for medical treatment are hospitalized in tertiary level hospital. 28.28 % of them are with severe injuries and admission in the intensive care units. 32 % are with head injuries, 35.45 % with poly- and multitrauma. Males have three to four times higher rates than females. *Conclusions:* The study has confirmed the significance and complexity of the problem and the need for cooperation among all relevant sectors for implementation of preventive interventions. Macedonia has a National Strategy for improvement of road traffic safety, as a platform for

the decade for action for road safety 2011-2020, but still does not have comprehensive laws which address all risk factors of RTI, and the enforcement of the existing is not on satisfactory level.

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Development of traffic medicine in Qatar

Objective: Population of the state of Qatar is 1.6 million. Qatar has one of the highest rates of traffic accidents in the world resulting in 1355 deaths over the last 5 years along with 3224 cases resulting in severe injuries. The National Road Safety Strategy has been introduced in 2011 to create an accident free traffic system in the country. To achieve that collaboration of the health sector with traffic department, traffic laws and public works department is recognized as crucial. The aim of this paper is to describe the process of establishment of traffic medicine policies, strategies and department in the state of Qatar which will reduce the health risks and hazards involved in traffic. The aim of the future traffic medicine department in Qatar will be a comprehensive program which will evaluate the ability and driving skills of potential future drivers and people with physical, sensory and cognitive disabilities who were already involved in traffic accidents or have another disabling condition. *Methods:* – Compiling the data through surveys, research and statistics for the past 5 years and by recording the rate of morbidity and mortality caused by traffic accidents in Qatar. – Studying international standards in traffic medicine through suitable methodologies and systems. – Design and equip simulation laboratory with the latest technologies which enables challenged drivers to be functionally assessed their driving skills practicing in a zero-risk environment. – Educating and developing a competent team who can assess the ability and fitness to drive for the target group of people. *Results:* Up to this point of time the health sector has been taking initiatives in developing the strategy for traffic medicine department in Qatar. Series of meetings between the Physical Medicine & Rehabilitation Department of Rumailah Hospital, Hamad Medical Corporation, and the Traffic Department of the Ministry of Interior are being held which has led to the decision that the new 220 bed Rehabilitation Hospital in Doha which will be opened in 2014 will house the Traffic Medicine Department which will fulfill the above said objectives. *Conclusions:* Qatar is one of the fastest developing countries in the world with high rate of traffic accidents resulting in deaths and severe injuries. The country has an advanced traffic system undergoing vast upgrades in response to the country's rapidly rising population. Establishment of the Traffic Medicine Department has been initialized by Hamad Medical Corporation in cooperation with the Ministry of Interior as one of the major initiative to create the accident free Qatar.

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Road traffic accident (RTA) cases in Menoufiyia Governorate-Egypt: A retrospective study from 2009 through 2011

Background: Road traffic injuries are a major cause of death and disability globally, with a disproportionate number of occurrences in developing countries. Developing countries account for over 85 % of the deaths, and close to 90 % of the disability caused by road traffic crashes globally. In developing countries rapidly increasing motorization is outpacing the development of transportation infrastructure. This fact is the primary reason for the increasing numbers and rates of motor vehicle injuries in developing countries. This problem draws significant attention in Egypt where road accidents are high and still increasing. *Aim:* The present study aimed at exploring the pattern of road traffic accidents (RTA) and disabilities in Menoufiyia Governorate- Egypt during 2009 through 2011. *Methods:* The data were collected from the files of the Medicolegal authority – Ministry of justi-

ce- Egypt. *Results:* The total number of cases were 475, injuries sustained covered all body parts, disabilities encountered were analyzed according to Egyptian law and compared to international guidelines.

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In the decade of action for road safety (UN 2011/20), in which way an NGO could help to improve traffic safety in a developing country?

Traffic safety is a matter and a primary responsibility of the Government (besides being the responsibility of each individual citizen). When the Government does not fulfil that responsibility, many citizens feel powerless and, at the same time, want to contribute solutions to put order in traffic, to help increase traffic safety and decrease the number of fatalities and injuries. The purpose of this presentation is to share the contributions for the increase of traffic safety made by an NGO working for almost 23 years in a developing country, Argentina, in which, like in most of these cases, authorities do very little about this subject. Although tasks carried out in these years were and are a lot, in this paper we will refer specifically to the actions developed in line and cooperation with the Decade of Action for Road Safety, with the objective of encouraging and motivating all individuals and the NGOs interested in traffic safety to renew their efforts to reach significant goals in traffic safety with the humble experience of Luchemos por la Vida. Starting from zero, with very little resources and the help of a few enthusiastic volunteers, we developed a multiple-approach plan aimed at the individual "in the community" to generate a social change of attitudes towards traffic accidents and behavior on the streets, and a better awareness about traffic as a system in order to provoke changes in the system of individual beliefs and attitudes. To do this, we decided to influence public opinion with a view to generating spaces of reflection and self-examination, and of social debate regarding the problem of accidents and its relationship with individual and social behaviors of all citizens, in general, and authorities, in particular. With this in view, we decided to privilege work among: mass media, government and traffic safety education. Some of our accomplishments are: • Creating and maintaining a permanent traffic safety teaching and awareness campaign on the main TV and radio media of our country for over 20 years, to this day. • Promoting laws for greater traffic safety. • Demanding their effective enforcement by means of effective controls and punishment. In particular, regarding the Decade of Action for Road Safety, we carried out and are still carrying out the following activities: 1. Promoting the inclusion of crimes against traffic safety in the Crime Code. 2. Mass campaigns on radio, TV and cinemas promoting helmet use: "You have a brain… use it", the use of Child Restraint Systems: "Safe Kids", helmet use among cyclists: "Helmet at Bike". 3. 2 seminars for adults and traffic safety workshops for elementary schools. 4. Distribution of brochures and leaflets. 5. "World Day of Remembrance for Traffic Victims": 10,000 free posters to every christian church and parochial school in Argentina, a letter to each bishop of the country, churches and to ministers from other religions to promote the day, a letter to all the Argentinian mass media. One of the most important results of these actions was to have made traffic safety a concern for all of society and, especially, for politicians, who have been forced to include it in their agendas.

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Analysis of causes for data error of China road traffic injury

Objective: Road traffic injuries (RTI) have increased dramatically in recent years in China. However, domestic and foreign researches hold debate on the data of Chinese RTI. The aim of the study was to survey road traffic accidents (RTA) and RTI so as to analyze the differences and causes between official data of RTI and the real data in China. *Methods:* (1) Sampling survey was made on the original police files of all RTA in a city in 2000-2006 to investigate accidents, casualties, time of death, etc. as well as the released data of police every year, etc. (2) The data about the inpatients due to wounds and RTI from 210 Chinese hospitals in 2001-2007 were chosen

to analyze the casualties and trends of RTI hospitalized. *Results:* The regional RTA & RTI and inpatients with RTI of 210 hospitals tended to increase slowly as a whole. The actual number of deaths and injuries due to RTA were 3.09 times and 5.59 times of the released one respectively; resulting in data loss rates of 67.62 % and 82.10 %, even up to 89.93 % and 95.73 % in the rural-urban fringe zone respectively. 26.71 % of the deaths due to RTA after being hospitalized had ever been injured for 7 days before death. *Conclusions:* This research showed differences between Chinese official data of RTI and the reality, and indicated the reasons for which involves the statistical standards and methods of Chinese RTA and casualties and the management mechanism of police system, etc.

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Socioeconomic inequality in road traffic injuries in Tehran

Background: Globally, the burden of road traffic injuries is on the rise. The majority of fatal and non-fatal traffic injuries occur in low and middle income countries. There is an increasing evidence for the inverse relationship between socioeconomic status and occurrence of traffic injuries. The degree of this inequality in different population groups has not been adequately described yet. *Objective:* The objective of this study is to quantify the extent of socioeconomic inequality in traffic injuries in different age, gender and road user groups. *Methods:* The baseline data of Urban HEART project is used in this study. The study population was 81.418 inhabitants of Tehran, Iran who were randomly selected by a three-stage cluster sampling scheme. In each household, the respondent was asked to describe injuries occurred for any of the household members during past 12 months which required treatment in a medical center or was severe enough to cause one day loss of normal life activities. We applied principal component analysis on household asset data to determine the socioeconomic status of each household. Concentration indices, adjusted odds ratios and population attributable risks were calculated to measure inequalities of traffic injury occurrence across socioeconomic groups, for each age, gender and road user category. *Results:* Annual incidence rate of traffic injuries was 16.2 (CI 95 %: 15.1-17.3) per 1000 person years. Crude odds ratio for poorest versus richest quintile was 1.7 (CI 95 %: 1.36-2.13). The concentration index was –0.07 (CI95 %: –0.11 to –0.03) for all the population. The highest inequality which means lowest concentration index was observed for boys less than five years of age (concentration index = –0.25, $p < 0.01$) followed by 5-14 years boys (concentration index = –0.20, $p < 0.005$). Among different road users the greatest inequality found in motorcycle related injuries in men and women (concentration index = –0.24, $p < 0.001$ and –0.24, $p < 0.005$ respectively) followed by pedestrian women (concentration index = –0.21, $p < 0.05$). There was no significant inequality in car passenger injuries. It is expected if people in all socioeconomic groups were at risk as the reference group (the richest quintile), traffic injuries decline by 23 %. The highest reduction is expected to occur in children less than five years of age. *Conclusions:* This study emphasized that traffic injuries occur more frequently among lower socioeconomic groups. The extent of this inequality is not constant among different population groups. The inequality is higher more among younger age groups, motorcyclists and pedestrians. Developing specific strategies to reduce the observed inequality in each group is needed.

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Comparison of acceleration-injuries of the upper cervical spine caused by lower speed range car accidents and their judicial consideration prior and after the German Federal Court of Justice judgement of Jan 28th 2003

The retrospective comparative survey at hand examines the impact of the decision of the German Federal Court of Justice (Bundesgerichtshof / BGH) of Jan 28th 2003 VI ZR 139/02 concerning "the rejection of a general limit of inoffensiveness in low speed car-accidents". The influence on subjective symptoms, verifiable physi-

cal correlates, their judicial appraisal as well as the amount of compensation for the claimants who have reported disorders with their upper cervical spine after a car accident is reviewed. The survey was executed on the basis of a comparison of 43 cases after 2003 and 59 cases prior 2003 for which the Department of Legal Medicine of the Frankfurt University delivered biomechanical expert opinions. For the evaluation of the cases prior 2003 excerpts of an inhouse dissertation from 2005 named "Whiplash associated disorders after car collision with low speed differences" were used. These had been compared to 43 cases of biomechanical expert opinions carried out between 2003 and 2012, examined with a questionnaire in which data such as type of accident, speed difference, given symptoms, diagnostically verifiable changes and the judicial decision were collected. About possible changes in given symptoms, verifiable diagnostic findings and their judicial appraisal in reference to the BGH judgement will be reported.

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A study on the Characteristics of alcohol-positive drivers involved in non-fatal traffic crashes in Shanghai, China, over a 4-year period (2008–2011)

Objective: To investigate the characteristics of alcohol-positive drivers (with a blood-alcohol concentration (BAC) at or over the legal limit of 0.20 mg/mL) involved in non-fatal traffic accidents in Shanghai, one of largest cities in China. *Methods:* A study was conducted on 1226 alcohol-positive drivers involved in non-fatal traffic crashes during 2008-2011, in terms of mean BAC, age, gender, vehicle types and time of the day when the accidents happened. *Results:* The mean BAC of these alcohol-positive drivers was 1.41 mg/mL, and 82.7 % of them had a BAC at or over 0.80 mg/mL (the limit for criminal offense). The mean age of all drivers was 38 years old, and drivers aged between 30 and 39 years old represented the highest proportion (34.5 %). The vast majority of drivers were men (96.9 %). The mean BAC of men drivers was higher than that of women drivers (1.42 mg/mL vs 1.20 mg/mL), and the mean age of men drivers was higher as well (38 vs 33). Distributions of vehicle types involved were studied. Car represented the highest proportion (56.4 %), followed by motorcycle (32.8 %), electric bicycle (6.8 %), truck (1.5 %), and bicycle (0.8 %) in that order. It was found that, these alcohol related traffic crashes most often happened during the time period of 19:00-22:59, representing 48.1 % (n = 590) of the total 1226 cases. *Conclusions:* Driving while impaired by alcohol was a serious problem in Shanghai. More measures besides stricter traffic law may be required to reduce alcohol-related traffic crash.

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Measuring the impairment of different doses of alcohol on driving related skills: A calibration study

Medication and illicit drugs can have detrimental side effects which impair driving performance. A drug's impairment potential should be determined by well validated, reliable, and sensitive tests and ideally be calibrated by benchmark drugs and doses. In the field of drugs and driving, there is no consensus on which psychometric tests are best suited for initial screening of a drug's impairment potential. The aim of this calibration study is to indicate which performance tests are useful to determine drug-induced impairment and to compare their psychometric quality. Alcohol is used as benchmark, as its effects on test performance can be used as reference values to quantify drug effects. We selected eight existing laboratory tests frequently used for measuring driving performance in various fields of research, and compared their sensitivity to the impairing effects of increasing doses of alcohol. Twenty four healthy young volunteers (12 females and 12 males; mean age 22.7 years) participated in a double-blind, 4-way crossover, study. Treatments were placebo and three different doses of alcohol leading to blood alcohol concentration levels of 0.2, 0.5, 0.8 mg/ml. Effects on performance were measured using tests for

tracking, divided attention, psychomotor vigilance, digit symbol substitution, digit span, concept shifting, postural balance, and an attention network task which assesses alerting, orienting, and executive control. Results showed significant dose effects of alcohol in all tests, except at the digit span test. Compared with placebo, performance in the Divided Attention Test was significantly impaired after all alcohol doses; performance in the Psychomotor Vigilance Test and the Balance Test was impaired after a moderate and a high dose, and performance in the Attention Network Test and the Digit Symbol Substitution was significantly worse compared with placebo only after a high dose of alcohol. Effects on tracking and concept shifting were inconsistent. Form the tests used in this study, three tests seem to be more preferable over others to evaluate a drug's impairment potential. The Divided Attention Test, the Psychomotor Vigilance Test, and the Postural Balance Test were sufficiently sensitive to detect effects of alcohol while BACs are 0.5 mg/ml, which is the legal limit for driving in most countries. These tests therefore seem to be the most preferable for measuring drug induced impairment in a young population. Further research should investigate sensitivity of these tests compared with other benchmarks and their validity in predicting actual driving ability as assessed in real life scenarios.

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Determination of hordenine and its glucuronide in serum after beer consumption

Objective: Hordenine (N,N-Dimethyltyramine) is an alkaloid formed during germination of barley by decarboxylation and dimethylation of tyrosine. Therefore hordenine is formed during malting of barley grain within a brewing process. Aim of the study is to examine if hordenine is a reliable marker of beer consumption. We developed an ESI+ LC/MS method for the determination of hordenine in serum. *Methods:* In a self-experiment 2 liter beer (hordenine concentration 3 mg/l) were drunk within 2 hours. Afterwards blood samples were taken for 6 hours after drinking. D4-hordenine was synthesised as an internal standard by dimethylation of tyramine by reductive amination using deuterium labelled formaldehyde and sodium cyanoborhydride. Hordenine was extracted from 600 μl serum (before and after enzymatic cleavage) by fluid-fluid extraction with dichloromethane/diethyl ether after addition of d4-hordenine. The serum extracts were analysed by LC/MS. We determined the concentrations of hordenine, its conjugated metabolite and of alcohol (BAC) at different time intervals. Three transitions (m/z 166 [M+H+] > 121; 118; 103) in 'multiple reaction monitoring' mode were used for identification, one transition was used for quantification (m/z 166 [M+H+] > 121). *Results:* Hordenine can be determined in serum with a LOQ of 300 pg/ml and a LOD of 150 pg/ml. The highest (total) concentration of free and conjugated hordenine in serum was 13.4 ng/ml (BAC 1.37 ‰). Free hordenine was not detected after 2.5 hours. Hordenine glucuronide could be detected up to 6 hours after drinking. We observed a linear degradation of hordenine (free and conjugated) which correlates to alcohol degradation. Hordenine concentrations (in ng/ml) divided by 10 correlated approximately to BAC (in ‰). *Conclusions:* First investigations show that hordenine is a potential marker for beer consumption. In addition to congener alcohol analyses it can be used to differentiate between beer and consumption of other alcoholic beverages. In further studies we intend to determine the kinetics of hordenine and its metabolites in detail.

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A preliminary investigation on the kinetics of ethyl glucuronide formation

Objective: Ethyl glucuronide (EtG), a minor metabolite of ethanol, is used as a marker of alcohol consumption in various clinical and forensic settings. At present there is only a single investigation on glucuronosyltransferases (UGT) responsible for catalyzing EtG formation. Also, interactions with common ingredients in foodstuff, such as e.g. flavonoids, have not been investigated. *Methods:* First, incubation conditions and isolation of EtG from the incubation mixture have been optimized, followed by establishing respective kinetics and possible inter-

action with flavonoids. The following incubation conditions were optimized with regard to previously published ones: buffer, substrate concentration and incubation time. Recombinant UGT enzymes (UGT 1A1, 1A3, 1A4, 1A6, 1A9, 2B7, 2B10, 2B15) were screened for their activity towards ethanol. Then, kinetic data were established for. Quercetin and kaempferol were chosen to study their possible influence on the glucuronidation of ethanol. Isolation was by solid phase extraction which partly followed the published protocol; analysis was performed by LC/MS/MS with EtG-d5 as the internal standard. *Results:* Optimization of both, the incubation and isolation procedures resulted in minor matrix effects. EtG formation could be observed for all enzymes under investigation; respective kinetics followed the Michaelis-Menten model so that the Michaelis-Menten constant Km and the maximum velocity Vmax values could be calculated. Accordingly, the highest rate of glucuronidation could be observed with UGT 1A9. Formation of EtG was significantly reduced following co-incubation with both flavonoids. *Conclusions:* The results show that multiple UGT isoforms are responsible for the glucuronidation of ethanol and that formation of EtG is inhibited by flavonoids irrespective of the particular enzyme. It seems that nutritional components will influence conversion of ethanol to EtG. This observation may partly serve as an explanation of its variable formation in man.

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Cocaine testing in a driving capacity assessment setting: Comparison between hair analysis, urinalysis and self-reports

Objective: Today, cocaine is a widely-used drug. Driving under the influence of cocaine has an important influence on road safety. Therefore, the evaluation of a possible cocaine use is of high importance in assessing driving capacity. The aim of this study is to compare self-reports and the results of urinalysis and hair analysis for the detection of cocaine consumption in a driving capacity assessment setting. *Methods:* A retrospective study was carried out on 273 subjects with a history or suspicion of drug use (249 male, 24 female; mean age 32.7 years, range 18-62 years), who attended a driving capacity assessment between 2010 and 2012. In each case, a single-sandwich immunoassay urine test (cut-off value 300 ng/ml) was performed following the directions of the manufacturer. Further, a hair analysis for drug detection was carried out in two different forensic laboratories (LC-MS/MS-technique, type of specimen: 193 head, 62 leg, 14 chest, 4 arm). The mean time overlooked by hair analysis was 4.3 months (range 1-12 months). In each subject, a systematic history of drug use was taken. The analysis of the self-reports was limited to the period of time overlooked by the hair analysis. Results: 35 subjects admitted the use of cocaine. Of these, 6 showed also a positive result in urinalysis and 27 tested positive in hair analysis. Of the 238 subjects, who negated the consumption of cocain, no one tested positive in urinalysis, but in 50 cases a positive result in hair analysis was obtained. 50 subjects (21 %), who had a negative urinalysis and negated cocaine consum, showed a positive result for cocain in hair analysis. All subjects with a positive urinalysis tested positive in hair analysis. *Conclusions:* Hair analysis is more effective than urinalysis and self-reports in identifying cocaine users in a driving capacity assessment setting. In this study, the detection rate of cocaine use with hair analysis is approximately 13 times that of urinalysis. Hair analysis should be included in every driving capacity assessment in subjects with suspicion of cocaine use.

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Hypoglycaemia in traffic cases – Complex of problems and analytical possibilities

Objective: A lot of fatal traffic accidents originate from hypoglycaemic episodes in diabetics driving a vehicle. Diabetics sometimes are not able to notice their low blood sugar (“hypoglycaemia unawareness”) and can loose consciousness while driving. The detection of this diabetic metabolism disorder raises problems in forensic prac-

tice. Glucose concentration is not stable and can only be interpreted correctly when a blood sample is taken directly at the time of the event. The detection of the cause for a hypoglycaemia presents a challenge for forensic analytics. The complex of problems and the analytical possibilities are presented. Possible questions for physicians and jurisdiction are discussed. *Methods:* Analytical methods for the detection of the cause of a hypoglycaemia have been developed and validated. Human insulin and synthetic insulins (lispro, detemir, glulisine, aspart, glargine) are isolated from human plasma by immunoaffinity precipitation with insulin-antibody-coated magnetic beads. The analytes are separated over a C18 analytical column. Quantification of the insulins is achieved by the five fold protonated molecule mass traces [M+5H]5+ and identification by their specific fragment ion finger print (enhanced product ion scan, ESI) in LC/MS. Oral antidiabetics are detected by LC/MS in multiple reaction monitoring mode after liquid extraction. *Results:* The successfully validated LC-MS assays allow identification and quantification of human and synthetic insulins and oral antidiabetics plasma. *Conclusion:* Possibilities of these analytical methods are discussed. Furthermore, informative values of glucose, C-peptide and proinsulin concentrations are discussed as well as the behaviour of the emergency doctors in cases of traffic accidents to guarantee a safe proof of the hypoglycaemia and its cause.

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Study on first aid and medical care criterions for road traffic injuries in China

There are about 1.2 millions died and 30-50 millions wounded per year all around the world. Traffic injury is the first death reason for under 45 and cause more than 200 thousand death per year. The death rate and disability rate of traffic injuries were much higher than that of developed countries. The death rate per 100 thousand persons reached to 21. The high death rate and disability rate related to a long time of pre-hospital first aid, lack of standard training for first aid persons at traffic scene, insufficiency of information exchange between traffic scene and hospital, short of special groups for dealing with mass injury and multiple injuries because of medical branch too meticulous, lack of standard treatment process for both pre-hospital and in-hospital medical care, and et al. Supporting by specific research project of health pro bono sectors of National Ministry of Health, we are carrying on the project of study and spread of severe trauma care criterion (201002014). This project is aimed to improve medical care ability, decrease the death rate and disability rate of traffic injuries all around China by means of establishing series standards and criterions of medical process and special medical care for traffic injuries.This project contained four parts: (1) establishment and application of severe traffic injury database. (2) study on standards and criterions for severe traffic injury medical care and standard training. (3) study and application of medical cooperation system for severe traffic injury. After this project, Every study district will achieve 2 interlinkages (between pre-hospital information and in-hospital information, between emergency information and each special branches' information), construct 3 standard severe traffic injury treatment groups (pre-hospital first aid group, emergency group, and special branch group). Series standards and criterions of medical techniques and processes for severe traffic injury will be provided, and will be used for wide range training. The pre-hospital time will be largely shorter (less than 12 min in big city and less than 8 min in small city), severe traffic injury database and assess system for injury severity will be established, series standards will be provided, national training base for severe trauma medical care will be founded, and the death rate and disability rate will be decreased by 10-20 %. Now, the death rate of severe traffic injury has decreased 62 % in some experimental hospitals.

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Analysis of emergency rescue characteristics of traffic injury in Beijing emergency center from 2004 to 2008

Objective: To analyze emergency rescue epidemiologic features and vulnerate characteristics of critical traffic accident injury in Beijing. *Methods:* Critical traffic accident injury cases were collected from Beijing 120 emergency center database from 2004. 1～2008.12. Data analysis was done in SPSS 18.0 by using $P < 0.05$ as statistical significance. *Results:* There were 667 cases in total, male 477 cases, the average age of which was 35.8, and female 190 cases, the average age of which was 37.8. 195 cases were dead on arrival. Average time from emergency alarm bell to arrival was 11.4 minutes. Most common injury part was head, the most common collision types was non-motor to motor, amounting to 315 in total. Patients of different sexes or injury part had no statistical significance in age. Collision type and injury part differed in the survival of patients. *Conclusions:* Characteristics of critical traffic accident injury are that vulnerate process is complicated, and has high incidence rate of multiple injury and mortality, which can be prevented. The policy should be made according to the characteristics of injury and to arouse the attention of the whole society to reduce its damage and increase its remedy rate.

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Analysis of pedestrian traffic injuries in different areas in Chongqing, China

Objective: The aim of the study was to analyze accidents involving pedestrians in Chongqing from 2000 to 2006 so as to understand responsibility distribution, accident causes and injury characteristics. *Methods:* The data of pedestrian road crashes and injuries in three districts including one district in downtown, one in suburb and one in county from 2000 to 2006 were collected from "Road traffic crashes and road traffic injuries database" to analyze responsibility distribution, exact causes, casualties, action and location of pedestrians in crashes. *Results:* The road crashes led to 7934 pedestrian injuries, accounting for 24.74 % of all injuries, and to 867 pedestrian deaths, accounting for 49.46 %. Intensities of pedestrian road crash were higher than that of other crashes. Of all pedestrian casualties in the 3 districts, 68.64 %, 52.03 %, 56.77 % were due to illegally crossing driveway respectively, and 21.49 %, 11.51 %, 17.80 % of the casualties were on the crosswalk. Pedestrians with severe injuries accounting for 52.46%, more than that with minor or mild injuries. Head injuries were the most injuries for pedestrian. *Conclusions:* The intensities of pedestrian road crash were higher than that of other crashes. It should be noticed that the main injuries of pedestrian are head injuries. Illegally crossing driveway is the main cause for these crashes. It is worth noticing that a rather high proportion of pedestrians are impaired on the crosswalks, indicating that we should pay more attentions to protecting right of pedestrians on the crosswalks during transportation law enforcement and safety education in the future.

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Analysis of 259 road traffic deaths in Beijing

Objective: By investigating the characteristics of the death caused by traffic injury in Beijing to provide information on making polices about traffic injury prevention for relevant departments. *Methods:* According to different factors such as gender, age, occupation, timing, cause of death and the vehicle type etc. The death cases re-

corded by Beijing Emergency Medical Center from 2004 to 2009 were analyzed. *Results:* In all the 259 recorded cases, the proportion of male to female was 2.45 to1. The death was mainly in people between 21 to 50 years old (69.11 %). The accidents mainly happened from 23 o'clock to 1 o'clock; the highest rate of lethal traffic injury was observed in Jul., Aug., Oct. and Nov. The accidents mainly occurred on weekend, but lowest on Wednesday. Most death was observed in workers and farmers. The common injury was head injury (81.85 %). There were more injuries occurred on people who were walking in comparison to by bike. The roadhouse had higher accident rate than other vehicles. After 2005, severe traffic injury had a decreased trend. *Conclusions:* It is necessary to provide more road safety education for pedestrians and drivers. The relevant department should strengthen supervisory control especially during night, put efforts on control and management of electric motor car, emphasize on the safety construction of track traffic.

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Initial study of one stage "hybrid approach" in the treatment of trauma

Objective: To explore the role of one stage "hybrid approach" in the treatment of trauma patients. *Methods:* Clinical data of 6 trauma cases received one stage "hybrid approach" in our hospital from Ju1. 2005 to Mar. 2009 were reviewed. These patients included 2 cases of femoral arterial injury with infective pseudoaneurysm, 1 case of hematoma after closed fracture of left femur, 1 case of spinal canal abscess and rectum fistula after perforating wound of perineum, 1 case of metal foreign body after perforating abdominal trauma, and 1 case of hemorrhage of right renal with abdominal compartment syndrome after multiple injury. Imageological diagnosis combined with treatment of blood vessels intervention and traditional surgery were performed at the same place and the same time. *Results:* Five patients healed successfully and one patient died because of trauma lethal triad (hypothermia, metabolic acidosis and coagulopathy). *Conclusions:* In trauma patients, one stage "hybrid approach" is a combination of modern senior diagnostic imaging technology, blood vessels intervention and traditional surgery at the same place and the same time for the diagnosis and management, which is not limited in the same organ or anatomic site but the whole injured body, especially for the multi-injury patients. As a novel treatment, it needs further investigation.

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Helicopter crash: A case report

Objective: Aviation has experienced major changes since the early 1990s in industrialized areas of Italy and private helicopter use is today frequent also for covering short distances, just to avoid the highway traffic during weekends. A pilot error in flight operations, sudden difficult weather conditions or a faulty engine are the pivotal questions in aviation fatalities. *Methods:* On 20 January 2008 around 15.30 hrs. a private helicopter (EUROCOPTER AS350B2) owned and piloted by an Italian entrepreneur (43 y. o.), began a flying trip back home after lunch, as passenger the pilot's wife (46 y. o.). Near the east highway of Milan the helicopter crashed on the ground and then set in flames. The crash was around 15-20 minutes after departure with an air distance between departure and crash site of few kilometers (10 Km). The helicopter was owned by the entrepreneur's company, who had a 15 years long not professional aviation experience and was used as aero-taxi service. The helicopter was first registered in 2001 and was in good conditions, but as old model was without black box. *Results:* As consequence of this civilian aviation accident the pilot and his wife perished. One cadaver sustained severe external carbonization, mutilation of the lower trunk and pelvis area and a gross gender identification was possible only by thorax morphology (man). The abdominal wall was open with complete avulsion of the bowel and the pelvic organs. The lower limbs were disarticulated from the trunk and the distal segments were charred (feet absence). Some plastic residue were fused with cervical body parts. Section revealed in the man a severe blunt force trau-

ma with multiple fractures of face and skull (vault and cranial basis), deformation of the rib cage with multiple rib and sternal fractures, multiple lung lacerations and contusions, tracheal wall complete laceration (at bifurcation), pericardial and myocardial lacerations, thoracic aorta complete wall circumferential laceration, T5-T6 vertebro-medullary fractures, bilateral diaphragm lacerations, multiple lacerations of stomach, liver and bowel. The passenger-wife presented a skull crash, multiple rib fractures, tracheal wall complete laceration (at bifurcation), pericardial and myocardial lacerations, thoracic aorta complete wall circumferential laceration, T5-T6 vertebro-medullary fractures, bilateral diaphragm lacerations with partial liver herniation, multiple lacerations of liver and spleen, pubic fracture and multiple pelvic and upper and lower limbs fractures. Soot was not present in the upper airways of both bodies. For the pilot toxicological analysis a blood sample from the thoracic region and a brain tissue sample were taken. The toxicological results were: blood alcohol 0.35 g/L and brain alcohol: 0.15 g/Kg, carboxyhemoglobin: undetectable; metahaemoglobin: 10.5 %. *Conclusions:* The pilot and his passenger/wife were killed on impact with the ground when the helicopter crashed, and then were wrapped by flames. Both deaths were caused by a severe blunt force trauma determining severe craniocerebral, skeletal, soft tissue and organ injuries and the man was involved after death also in a post-crash fire. Engine/mechanical failure was excluded and a pilot error/inexperience in difficult weather conditions (fog with high reduced visibility) was considered the primary cause of this aviation fatality.

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New equipment, technologies and methods for in-depth investigation and analysis of traffic accidents

Objective: The development of digital technology, communication technology and analysis techniques and advent of new equipment in recent years drives the huge development of all walks of life. The aim of the study was to discuss how to employ these new equipment, technologies and methods for in-depth investigation and analysis of traffic accidents. *Methods:* The 3D laser scanner, aerial photography, monopod photography, laser range finder, GPS positioning system were employed to acquire scene data of traffic accidents. CT body scanning and 3D reconstruction were used to obtain the injury details of the body; photogrammetry technology was used for collecting data on vehicle deformation and field information; the modified DLT (direct linear transformation) video analysis technology was used to obtain the driving state and speed of the accident vehicles; and Pc-crash, Madymo and Ls-dyna were used to reconstruct the accidents process. Furthermore, THUMS model and simulation technology from Toyota Corporation, Japan, were also introduced to reproduce human body injury in typical traffic accident to explore the occurrence of the accident, the cause of the accident and the injury mechanism and explore tolerance limit of various organs. *Results:* The above-mentioned methods were employed in more than 100 typical traffic accidents and the results showed that the introduction of new technologies, methods and equipment could greatly improve the efficiency of traffic accident data collection and analysis, greatly reduce error due to human factors and promote depth research. *Conclusions:* Effective application of new technologies, methods and equipment can increase the efficiency and standardization in data collection and analysis of traffic accidents. The reproduction of traffic accidents plays an important role in cause analysis and responsibility confirmation. Reproduction of human injury plays a positive role in investigating human injury mechanism and even exploring the tolerance limit of the human organs.

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A study on the application of trace evidence in reconstruction of traffic accident scenes

With the increasing of automobile amount, traffic accidents amount has also been increasing. Meanwhile, demand for traffic accidents forensic service increases, which has promoted the development of technology for traffic accidents forensic examination and brought new challenges to it. Reconstruction of traffic accident scenes requires multiplied application of many subjects, including trace science, vehicle engineering, kinematical mechanics, forensic medicine, trace evidence and so on. As is found in practice, trace evidence plays an important role in the reconstruction of traffic accident scenes, especially in the determination of car-to-car and car-to-person touches and driver judgment. Applications of trace evidence including paint, fibers, plastics and so on in scene reconstruction are introduced in this paper, so as to reveal and analyze the trace evidence in traffic accidents forensic examination.

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A study on passenger car-adult pedestrian crashes in multi-areas of China

Objective: To investigate the relative likelihood of having adult pedestrian injuries based variables from person and vehicular factors in China. *Methods:* A team was established and collected passenger car-pedestrian accident cases occurring between 2006 and 2011 in Beijing, Shanxi province and Chongqing, China. Some key variables for person and vehicle-related factors on pedestrian injuries were analyzed using multivariate logistic regression analysis to determine relative-risk/likelihood. Pedestrians were classified according to injury outcome (slight, severe and fatal injuries) and age (16-25, 26-45, 46-60, and over 60 years). Pedestrian head injuries were scored with AIS 2005. *Results:* A total of 285 vehicle-pedestrian crashes were collected and analyzed, 30 in Beijing, 20 in Shanxi province, and 235 in Chongqing. The impact speeds differed significantly among these injury outcome groups, with the speeds of 64 ± 22 km/h in fatal group, 48 ± 14 km/h in severe group, as well as 36 ± 14 km/h in slight group, respectively. The distribution in vehicle impact speed, vehicle type and pedestrian age by injury outcome showed significant differences. The impact speeds were strong associated with the AIS 2-6 injury distributions of the head, thorax and abdomen, but not for the extremity. The AIS 2-6 injuries of the head and thorax were significantly related to pedestrian age, while the thorax AIS 2-6 injuries showed a strong association with pedestrian behaviors prior to the crash. A higher pedestrian severe injury risk was associated with the impact speeds of 40-69 km/h, and sustaining AIS 2-6 injuries in the head, thorax, and abdomen, but not for the extremity. Among the survived victims, SUV and aged 25-45 years were significant related to a lower severe injury risk. Similarly, a higher risk of fatality was associated with ages over 25, impact speeds over 40 km/hr, and a likelihood of the victim's head sustaining AIS 5-6 injuries. *Conclusions:* Pedestrian age, vehicle impact speed, and vehicle type were common pertinent factors for the risk of pedestrian injury distributions and the risk of death. Further studies would be valuable to fully characterize vehicle-pedestrian crashes in China and to develop targeted injury prevention strategies based on surveillance results.

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Differences in injury severity of drivers between standard vehicles and the Kei-car in Japan

Objective: Kei-cars, which belong to Japan's tiny 660 cc mini-car class with a length less than 3.4 m and width less than 1.48 m, have become popular in Asian countries, especially in Japan. Because Kei-cars are convenient to drive and have economic benefits, such as low cost and tax, and good fuel economy, they represent approximately 35 % of all cars sold in Japan. Although Kei-cars are required to comply with the same vehicle safety standards as standard passenger vehicles in Japan, the differences in occupant injury severity in frontal collisions between Kei-cars and standard vehicles have not been examined. To evaluate the safety of Kei-car drivers in frontal collisions, we compared the injury severity of drivers between Kei-cars and standard vehicles involved in frontal collisions. *Methods:* Data were extracted from the records of the Institute for Traffic Accident Research and Data Analysis (ITARDA) in Japan. Among in-depth real collision data from 1993 to 2010, frontal collisions in bonnet-type vehicles were selected. Light trucks and sport-utility vehicles were excluded. The type of vehicle (Kei-car or standard vehicle), collision speed (delta-V), seatbelt use, and airbag deployment were examined. We obtained information on age, injured region, and type of injury from the subjects' medical data. We then scored the Abbreviated Injury Scale (AIS) and calculated the Injury Severity Score (ISS) in each subject. *Results:* Under previously described criteria, 379 drivers (Kei-car: 264; standard vehicle: 115) were selected for inclusion in this study. Their age ranged from 18 to 85 years (mean: 36.8 ± 15.6 years) with a mean body mass index of 22.3 ± 3.3. To compare the injury severity of the drivers, we divided them into four categories (seatbelt wearing, Y/N; airbag deployment, Y/N). The mean ISSs were lower in restrained drivers with airbag deployment in the Kei-car (2.5 vs 3.5 in the standard vehicle) but were higher in unrestrained drivers with airbag deployment (Kei-car: 7.9; standard vehicle: 8.3). No significant differences were found in ISS and AIS scores of any body regions of drivers between Kei-cars and standard vehicles among the four categories. *Conclusions:* This report confirms that drivers in the Kei-car suffer from the same severity of injuries as those in standard vehicles in frontal collisions, with similar delta-Vs. Although the Kei-car is smaller than the standard vehicle, it has sufficient safety for drivers in a frontal collision.

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An investigation on biomechanical response of brain stem related to head impacts

Studies showed that contact head impacts led to higher injury parameters, compared to non-contact head impacts, and shear stress was a reasonable predictor for brain stem injury. Impact-induced brain stem injuries occur with a low incidence in road traffic accidents (RTAs), but the injuries initiated tragic outcomes very frequently. Few investigations, however, have been focused on the mechanisms of brain stem injury as yet, especially with a detailed head-neck finite element model (FEM). To investigate the injury mechanisms of primary brain stem injury induced by impacts, a detailed head-neck FEM (THUMS V4.0) was implemented. Head impacts with different directions, speeds, as well as varied stiffness materials were simulated, and shear stress in brain stem was studied in these impacts. Impact direction was strongly relative not only to the shear stress value, but also to the stress distribution in brain stem. Lateral impact resulted in the highest shear stress, compared with the other impacts in the anterior-posterior, and the inferior-superior. Control for the impact speed, increasing the stiffness of the impactor might improve significantly the shear stress loading in the brain stem. The conclusion might be drawn that the shear stress in brain stem was associated with impact speed, material stiffness of impactor, as well as impact direction. We still have not understood clearly that the shear stresses were as the direct results of the impact, impact-induced rotational/translational acceleration, or both of them. Further studies would be still needed

to fully characterize biomechanical response of brain stem to varied impacts related to RTAs and to develop targeted injury prevention strategies based on study results.

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Development of a Traffic Safety Accident Database (SAD) from autopsy cases at forensic medicine – Identification of relevant countermeasures to reduce fatality rates at car, truck, pedestrian, motorcycle and bicycle accidents

German fatal traffic accidents have increased around 10 % from 2010 until 2011. To reach the goal to reduce 50 % of traffic fatalities from 2010 to 2020 especially catastrophic accidents with fatalities have to be investigated to establish relevant and sustainable prevention strategies. At the Institute of Forensic Medicine from Munich University since 2004 around 150 traffic accidents with fatalities have been documented and investigated per year. Currently the accident years 2004 – 2007 have been analyzed. Many car occupants have not been belted, alcohol, drugs and pharmaceuticals play a significant role, which is often underestimated. Senior car drivers show a surprisingly high accident causation incidence with acute medical problems at the steering wheel up to 38 % related to accident causators >65 years of age. Most of the bicyclists were wearing no helmet (93 %). In contrast to this group the motorcyclists showed a helmet wearing rate of 99 %, but here up to 25 % of the helmets were lost during the crash where the protection capacity is lost. A high proportion of pedestrians is over 65 years old, this risk group should be specially focussed. The detailed analysis of severe traffic accidents with fatal outcome shows priorities for accident prevention: Increased and improved drug and pharmaceutical testing, advanced passive and active safety systems in cars as well relevant driver vigilance control systems should be developed. The bicycle helmet quote should be increased, motorcycle helmets should be improved. Interdisciplinary dialogue of street architecture, safety design, biomechanical research and forensic medicine seems to be essential as well a continuous monitoring of fatal traffic accidents to detect effects of safety prevention measures.

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Introduction

Objective: • To explain and discuss the visual and cognitive demands of the driving task from a traffic psychological and neuropsychological point. • To give a brief overview of 3 visual rehabilitation projects with regard to driving (Auto-Mobility, InZicht-Hemianopia, Slow Motorized Traffic) in the Netherlands.

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Some recent changes in the official regulations with regard to fitness to drive in the case of visual impairments and the role of on-road assessment

Objective: To explain the European and Dutch directives with regard to fitness to drive in the case of impairments of visual acuity and visual fields and the role of the on-road driving test (practical fitness to drive) in the assessment. *Methods:* Discussion of procedures which are available in assessment and decision making and recent changes in the system. *Results:* Numbers of visually impaired persons officially assessed with regard to fitness the drive in the last three years and the results of the assessments. *Conclusions:* Using the on-road to assess fitness to drive in drivers with visual impairments previously excluding them from driving, it is found that in many cases safe driving is possibly when visual functions are somewhat below the regular cut off scores of 0,5 for visual acuity and 120 degrees for visual fields.

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Driving in nystagmus patients

Objective: To describe limitations of patients with nystagmus and visual acuity between 0.2 and 0.5 with regard to lateral position control (LPC), also in the light of learning to use a bioptic telescope. *Methods:* Observations from the Auto-Mobility project and systematic driving simulator training of LPC involving 12 nystagmus patients and 12 healthy controls without previous driving experience. *Results:* LPC can be a problem in nystagmus patients. Simulator training does improve LPC to values within the normal range. *Conclusions:* Nystagmus patients are able to reach adequate LPC; however, further research is needed with regard to combining steering with the use of the bioptic telescope.

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Driving with a bioptic telescope

Objective: To describe the contents and results of the training program for using a bioptic telescope. *Methods:* History, development and contents of the assessment and training procedures. *Results:* Results of the assessment and training procedures and remaining questions. *Conclusions:* If accompanied by adequate multidisciplinary assessment and training procedures, bioptic telescopes are important aids to facilitate safe mobility in drivers with low vision.

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Daytime simulated driving performance and vigilance level of untreated insomanic patients

Sleepiness is one of the most causes of road accidents and may be linked to various sleep disorders, sleep deprivation, hypnotic consumption. Among sleep disorders, insomnia is one of the most prevalent. Insomnia patients consistently self-reported daytime fatigue and cognitive impairments which could contribute to traffic crashes. Although epidemiological studies have demonstrated the role of sleepiness in driving accidents, it is not clearly established if suffering from insomnia increases the risks of driving accidents. The purpose of this work was thus to assess the driving performance of insomnia patients. Nineteen insomniacs and sixteen good sleepers were included in the study. After a sleep recording night in the sleep unit, the participants were brought to the laboratory to perform laboratory tests. At 9.00 am and at 2.00 pm, a monotonous simulated driving performance was completed by the participants. They were instructed to drive as straight as possible within the right traffic lane while maintening a constant speed of 110 km/h. After completing the monotonous driving test, participants performed a Psychomotor Vigilance Test (PVT) which is a sustained-attention, reaction-timed task. Participants completed a subjective driving performance scale and the Karolinska Sleepiness scale. The main driving parameter was the standard deviation of the lateral position (SDLP), which is an index of driving safety. The standard deviation of speed (SDS) and the number of road exits were also calculated. Performance at the PVT test was assessed with the mean reaction time and the number of lapses (reaction time greater than 500 ms). Our results revealed that the driving performance was impaired in the untreated insomnia group in comparison to the good sleepers group, as revealed by the significantly increase of the SDLP and the number of road exits. There was no difference between the two groups for the SDS. Subjective scales revealed that insomnia patients evaluated their driving performance worse than did good sleepers and do not felt drowsier than did good sleepers. No significant effect was found between the two groups for the percentage of lapses and the mean RT of the PVT. These results revealed that insomnia patients had an impaired simulated monotonous driving performance in comparison to good sleepers. From a safety point of view, it's interesting to observe that the patients were aware of their level of driving performance. For the PVT, no impairment was found in insomnia patients in comparison to good sleepers. This result is different from classical impairments observed during the PVT after experimental sleep deprivation studies. This suggests that the impaired driving performance in the insomniac group may probably not be explained only by a lower vigilance level.

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Electroencephalographic correlates of on-the-road driving fatique in untreated insomniac patients

Insomnia patients consistently self-reported daytime fatigue and cognitive impairments which could contribute to traffic crashes. However, the model of hyperarousal was proposed to explain the lack of objective evidence of cognitive dysfunction in patients with primary insomnia because of the contribution of psychological and physiological arousal to daytime functioning. In this case it is not clear that insomnia patients could suffer from sleepiness which could contribute to traffic crashes. Electroencephalography recordings during driving were previously used to assess sleepiness and fatigue during a driving task. It appeared that an increase in the theta, alpha and beta band is linked to a higher fatigue. In addition, a recent study showed that insomnia patients have a higher power spectra in the beta band during wakefulness which could be linked to a hyperarousal state. We expected that insomnia patients will not have a decrement in their driving performance associated with EEG correlates of less fatigue. The purpose of the present study was thus to compare the electroencephalographic correlates of sleepiness and fatigue during a driving task in insomniac patients and in good sleepers. Nineteen older insomni-

acs and nineteen older good sleepers were included in the study (aged between 55 – 75 years). After a sleep recording night in the sleep unit, the participants performed an on-the-road highway driving task in the morning. The real driving performance was evaluated with a one hour standardized driving test in actual traffic. Participants were instructed to maintain a constant speed of 95 km/h and a steady lateral position between the delineated boundaries of the slower traffic lane. The vehicle's speed and lateral position are continuously recorded. Electroencephalography was also recorded during the driving task. The main driving parameter was the standard deviation of the lateral position (SDLP), which is an index of weaving; the standard deviation of speed (SDS) was also quantified. The sleepiness and fatigue EEG correlates were assessed by quantification of the absolute power spectra in the theta, alpha and beta bands. Results show that driving performance was not impaired in the insomnia group in comparison to the good sleepers group, as revealed by the results for the SDLP and the SDS. Preliminary analysis of EEG recorded revealed that good sleepers had a higher power spectrum in the theta, alpha and beta bands. It is concluded that older chronic insomnia patients appear to be able to successfully perform a one hour highway driving task in real traffic. EEG results suggested that insomniacs were less fatigued than good sleepers which could explain the lack of difference in the driving performance. This could be in line with the hyperarousal model proposed to explain to lack of cognitive dysfunction in insomnia patients. The preliminary EEG results will be correlated to the driving performance in order to better interpret the difference in fatigue between both groups.

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Car driving performance and the effect of compensatory scanning training in hemianopia patients

Homonymous hemianopia, the most common form of Homonymous Visual Field Defects (HVFD), refers to a loss of perception for half the visual field, affecting both eyes, due to acquired postchiasmatic brain injury. This partial blindness may lead to a disorganized visual search strategy and particular difficulties with visual exploration. A new Compensatory Scanning Training (CST) protocol has been developed, which aims to improve awareness, scanning and mobility in daily life.

Twenty-seven hemianopia patients performed an on-road driving test before the onset of training, during which driving performance was evaluated by driving experts using a standardized scoring form. Fifteen patients were evaluated as safe to drive. It was found that impaired visual scanning behavior was the most important reason for failing the test ride, but performing operations in the car and making tactical choices were also rated significantly lower in the group that failed the test ride. Nine of the twelve patients that failed the first driving test performed a second test after finishing the compensatory scanning training. The effect of training will be examined at a case-by-case level and the most relevant results will be presented.

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Practical fitness to drive after right hemisphere (RH) stroke

For assessing fitness to drive in neurological disorders information from various sources is used, medical diagnosis, general level of IADL functioning, neuropsychological test performance, and observation and measurement of performance in driving tests, either in a simulator or on the road. Also patient and proxy views are taken into account. In our assessment of fitness to drive the 12DRIVE procedure is applied in persons who according

to medical diagnosis and functional performance level have a relatively high a priori probability to be unfit to drive. It consists of a battery of driving-related neuropsychological tests (in RH cases always including neglect tests) and a standardized test drive in the driving simulator. Following the assessment, a report is written to advise patient and doctor about further steps, for example, visual strategy training, driving lessons and official reporting their disorder to the driver licensing authority (CBR). The CBR can decide to assess the patients with an on-road test of practical fitness to drive and advise the patient to take additional driving lessons and/or to get a technical adaptation, for example enabling manipulation of winking indicators and other essential controls without taking the right hand from the steering wheel (code 35.04 on the driving license). RH stroke patients have a relatively high probability of visual-spatial impairments and lacking awareness which could cause unfitness. In the present study we describe 12DRIVE results and CBR actions and decisions in 15 consecutive RH stroke patients admitted to the 12DRIVE program by a local rehabilitation hospital in the last two years. Also current driving behavior is assessed via an interview by telephone. Profiles of patients who have successfully relicensed or not are compared and discussed.

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Screening for diabetes mellitus in a driving capacity assessment setting

Objective: Driving capacity can be heavily influenced by diabetes mellitus (e. g., hypoglycaemia, chronic complications as diabetic neuropathy or retinopathy). Several studies showed that diabetics have an increased risk for road traffic accidents. Due to possible legal impacts (e. g., driving licence withdrawal) a diabetes mellitus may be withholded by a subject undergoing a driving capacity assessment. Thus, the evaluation of a possible diabetes mellitus is of high importance in assessing driving capacity. The aim of this study was to evaluate the importance of diabetes screening in a non-preselected population in a driving capacity assessment setting. *Methods:* The study population included 310 consecutive subjects (275 male, 35 female; mean age 42.5 years, range 19-84 years) undergoing a driving capacity evaluation. The reason for the driving capacity assessment was isolated substance use problems in 70 %, mental disorders in 5 %, somatic conditions in 13 % and multiple diagnosis in 12 %. In each subject, a semi-quantitative urine test on glucose and ketone (Combur7®-urine test strips) was performed following the directions of the manufacturer.Further, the blood levels of glycated hemoglobin (HbA1c) and random (non-fasting) glucose were determined in a certified clinical laboratory. The following results were considered to suppose a diabetes mellitus: detection of glucose or ketone in urine, HbA1c ≥6.5 % or random glucose ≥11.1 mmol/L in blood (diagnostic criteria for HbA1c and random glucose according the American Diabetes Association). In each case the medical history was taken thoroughly during the assessment. In cases with results suspicious for diabetes, the attending physician was contacted for detailed medical history. *Results:* 24 subjects indicated ananmestically a diabetes mellitus type 1 or 2. Of these, 5 showed a positive result for glucose and 1 for ketone in urine. In 20 cases a HbA1c ≥6.5 % and in 5 cases a random glucose ≥11.1 mmol/L was observed. In the group of the subjects without known diabetes mellitus, HbA1c ≥6.5 % occurred in 4 cases. 2 showed a random glucose level of 14.2 mmol/L and 14.6 mmol/L, respectively. A glycosuria or a ketonuria was encountered in 4 subjects without a known diabetes mellitus. Only in one of the anamnestically non-diabetic cases with abnormal laboratory findings, inquiries by the attending physician revealed a dissimulated diabetes mellitus. None of the subjects with abnormal laboratory findings reported diabetes-specific symptoms. The total costs for detecting the four cases with an elevated HbA1c und thus with a possible diabetes amounted to approx. € 4'000. *Conclusions:* Screening for diabetes mellitus without preselection in a driving capacity assessment setting is an expensive method that gives sparse additional information. Hence, the first step of diabetes screening in a driving capacity evaluation should be to gather medical informations from the subject itself and from its physician. However, in cases with suspicion of a dissimulated diabetes mellitus, HbA1c is the most useful screening tool (detection rate of diabetics in this study approx. 83 %).

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Testing spatial ability as an aspect of fitness to drive

Objective: Traffic accidents can be caused by typical misunderstandings in the sphere of spatial imagination. The basic ability for an appropriate visual imagination is the so called spatial ability, mostly tested by a kind of mental rotation (MR-) paradigm. This contribution presents data from the validation of a new test subsystem for the assessment of spatial ability. The validation was achieved by testing hypotheses concerning cognitive mechanisms and by comparisons of relevant groups. For the first type of validation a finding of Cooper & Shepard (1973) can be used. They found that the reaction time is a linear function of the rotation angle, as if mental rotation would proceed like a physical one. For the second type of validation it can be assumed, according to the German public transport act, where among others a better orientation ability is expected for professional drivers, that they show better results in MR-tests than normal drivers. Secondly, it can be expected, that there are large gender specific differences known from MR-test results, significant on a per mill level (therefore, it was allegeable for a long time that female drivers supposedly cannot back into a parking space well). However, distributions of MR-test performances are bimodal by females (Kail, Carter & Pellegrino, 1979). These findings should be replicated by the evaluated test subsystem. *Methods:* Two tests of the subsystem Corporal S were used, TakeOver - A and – B, in which the subjects had to assign, in which direction a target figure points, seen from the perspective of a reference figure. The tests were first validated by the effects of the rotation angles as main task constituents. Secondly, professional drivers were compared with normal persons. Finally, the test results from males and females were compared. *Results:* Resulting from the first validation step, both test variants show increasing reaction times and number of errors in dependence of the rotation angles 0 °, 90 ° and 180 °, respectively. However, some subjects with higher test scores show a maximum by 90° and decreasing amounts by 180 °. Professional and more experienced drivers solve our test items faster than normal drivers, with a fewer number of errors. Because the reaction time distribution by female is bimodal, only 17,2 % of the female group show notable longer reaction times than the male group. *Conclusions:* Our results verify the assumed task constituents as well as the assumed group relations. The observed divergences concerning the 180 ° rotation angle we can interpret as effect of a strategy, which realize that the whole constellation is mirror inverted, and the response must simply be the inverse of the seen target direction. The subsystem Corporal S can be regarded as a valid test instrument even for the diagnostics of aspects of fitness to drive.

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The prediction value of injury severity score for death of the multiple trauma patients

Objective: To investigate the prediction value of injury severity score (ISS) for death of the acute multiple trauma patients. *Methods:* The clinical data of patients who were in hospital during March 2007 to May 2011 were collected , and ISS scores and acute physiology and chronic education II (APACHE II) scores were assessed. ISS and APACHE II' area under the receiver operating characteristic curve (AUC) and the best cut-off point were calculated , and their prediction index were calculated and compared. *Results:* The ISS's and APACHE II's score in non-survivors were higher than the survivors. This difference had statistically significant difference ($P < 0.05$). In prediction of death of the trauma patients, ISS scores ≥20 scores, sensitivity was 76.7 %, specificity was 83.7 %, agreement rate was 82.7 % and area under curve (AUC) was 0.835. However for the APACHE II, there were scores ≥17, sensitivity was 80.5 %, specificity was 89.2 %, agreement rate was 88.0 % and AUC was 0.922. It is no statistically significant difference to compare determine value of ISS and APACHE II in severe trauma patients ($P > 0.05$). *Conclusions:* ISS is a useful index to predict the death of the acute multiple trauma patients. It is reasonable to defy severe trauma by ISS value greater than 20 score in multiple trauma patients. ISS is a standard method for evaluating severity of injury. It is simple and practical, therefore it should be recommended in clinical practice.

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Epidemiological analysis and on-scene treatment of pre-hospital care of elderly traffic injury in Beijing

Objective: To analyze the characteristics of road traffic injury based on Beijing people over 60 years old in 2010 so as to provide scientific basis and reference for making effective measures in prevention and on-scene treatment of the elderly traffic injury. *Methods:* The data of 60 years old road traffic injury patients treated in Beijing "120" emergency center in 2010 were collected for a retrospective analysis according to gender, age, time and place of the accidents, damage degree and wound sites. *Results:* Traffic injury mainly occurred in the 60 to 65 age group (40.46 %). The elderly traffic accident had the highest percentage in Xicheng district. The 2nd and 4th quarters were the peak ones through a year (54.34 %). Most injury happened at 8:00 to 10:00 in a day. Head and neck as well as limbs were the most common injury parts. Also craniocerebral trauma for elderly patients with traffic injury was the most common causes of death. *Conclusions:* The traffic injury of the elderly was not allowed to ignore. In the meanwhile, we should strengthen their protective consciousness, provide rational configuration of pre-hospital care resources, and gradually establish a relatively perfect monitoring network of city road traffic injury in order to offer the safe road traffic environment for the elderly.

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Injury characteristics of traffic injuries of 673 cases in Nanjing

Objective: To understand the characteristic of 673 cases of traffic injures in Nanjing urban area. *Methods:* The medical records of the traffic injuries in Nanjing First-aid Center for analysis of the injury site, patients' average age, injury occurrence time and pre-hospital emergency time. *Results:* The study involved 673 patients in Nanjing First-aid Center in 2011, with average age of 38.6 years. Brain and extremities suffered the most, and the highest mortality rate was related to the injuries in chest, abdomen and brain, especially in accidents at night. The average period of ambulance to the accident place lasted 3.9 minutes and the average time of ambulance back to hospital was 5.4 minutes. The accidents happened most in March, April, September, October and November, at 8:00 am to 10:00 am and 4:00 pm to 9:00 pm in one day. *Conclusions:* Traffic accident is the main factor that results in death in urban surroundings. Attention should be paid to corresponding first-aid measures and improvement of the handover procedure from first-aid to emergency room so as to increase the success rate of treatment for traffic accidents.

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Abdominal impact study on pediatric cadaveric subjects

Objective: In order to protect children in car crashes, the use of child restraint systems is recommended by American Academy of Pediatrics (AAP) and the National Highway Traffic Safety Administration (NHTSA). But only very few children use car seat in China and many children begin using the vehicle belt prematurely around the world, which puts them at an increased risk for serious. Previous research focused on the pediatric abdominal injury patterns and mechanisms by using dummy, animal surrogates and retrospective assessments. All these results provided useful information somehow to help prevent the pediatric injury during crashes. But as far as we know, there are not any biomechanical data from the pediatric impact test reported. The purpose of this study was to provide structural response of front abdominal impact in children. *Methods:* Nine unembalmed cadavers were

divided into 2 groups. A young cohort aged 2-4 years (4 cadavers) was impacted by a 2.5 kg mass impactor, while the older cohort aged 5-12 years (5 cadavers) was impacted by a 3.5 kg mass impactor. The impact location was selected as the position one third the distance from the umbilicus to the bottom of the sternum. An autopsy was performed concentrating on the abdomen to document both soft and hard tissue injuries after the impact. Results: The average velocity of the cadaveric tests was 6.3 m/s (±0.25 m/s). No significant head motion occurs during this period. Motion is predominantly abdominal deformation. Mean peak V*C values were (2.53 ± 0.59) m/s and (1.98 ± 0.41) m/s in old cadaveric cohort and young cadaveric cohort respectively ($P > 0.05$). The maximum deformation and mean peak forces were (9.27 ± 0.21) cm, (530.30 ± 102.62) N and (9.88 ± 1.50) cm, (929.16 ± 133.24) N in young cohort and old cohort separately ($P < 0.05$). Eight of the nine cadavers showed various injuries in abdominal organs. *Conclusions:* The peak viscous criterion (V*C) values and maximum abdominal compression for two groups are not statistically different, but the peak force values and the maximum deformation values are statistically different. Good force-deformation data may be derived from the cadaveric response data, and force/deformation corridors have been derived for both subject populations. In the cadaver children, the force response was much less stiff as the abdominal viscera compressed into the spinal region. In addition, abdominal injuries suffered by the subjects in the testing do not correlate well with the standard injury criteria.

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Abdominal and pelvic injuries caused by motor vehicle traffic accidents in mainland China from 2001 to 2007

Objective: To study the frequency, characteristics, and effect on outcome of abdominal and pelvic injuries (API) caused by motor vehicle traffic accidents of the inpatients in Mainland China. *Methods:* Data were acquired from Chinese Database of Traumas. Patients with *ICD-9-CM* coding of 863.x-869.x (Internal injury of abdomen and pelvis) and supplementary external causes of injury and poisoning coding of E810-E819 from 2001 to 2007 were identified. Variables assessed included patient demographics, etiology, segmental distribution, and outcomes. *Results:* From 2001 to 2007,the number of the hospitalized victims with API caused by motor vehicle traffic accidents in all Chinese military hospitals were 11,514, accounted for only 2.9 % of all injuries(393,130). Of those hospitalized, 8,963 (77.8 %) men and 2,551 (22.2 %) women (male/female = 3.5; $P < 0.001$). The average age of inpatients was 33.8 ± 14.5. There was a staggering increase in the number of API from 2001 to 2007, which was consistent with the annual increasing incidence of all injuries during the same period. The peak incidence of API occuring in the months from August to October.The injuries mainly occurred in the 16-45 age stage.The group of 26-35 years old suffers the highest ratio which accounting for 25.6 % among the total. Inpatients with spleen injuries accountted for the highest proportion of injury type with the ratio of 24.0 %, followed by kidney (16.7 %) and multiple abdominopelvic organs (12.9 %). Compared to patients without API, those with API were significantly more likely to undergo surgery, to be admitted to an intensive care unit, to be transfused ($P < 0.001$). The median NISS and the mortality rate were significantly higher for victims with API than without (8 vs. 4, $P < 0.001$;5.1 % vs.1.9 %, $P < 0.001$). Age, open wound into cavity, body site and injury severity of patients were correlative factors affecting the mortality of API patients. In multivariate analysis the mortality rate of victims with 65+ years old, open wounded, multiple abdominopelvic injuries and severe injuries (NISS ≥ 16) was much higher than others. *Conclusion:* There was a staggering increase in the number of API from 2001 to 2007 caused by motor vehicle traffic accidents in Chinese military hospitals. The injury severity and the mortality rate were significantly higher for victims with API than those without API. We shall focus on improving the diagnosis and treatment level of API caused by motor vehicle traffic accidents.

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Time distribution characteristics of traffic injury in different age groups in Beijing from 2004 to 2008

Objective: To analyze the time distributions of traffic accidents happening in different age groups in Beijing from 2004 to 2008, and to provide information on the prevention and rescue. *Methods:* The traffic injury cases recorded by Beijing Emergency Medical Center from 2004 to 2008 were analyzed, and the data were separated by age: the youth (0-17 years old), the adult (18-64 years old) and the senior adult (above 65 years old). The constituent ratios of hours and months were calculated to describe the states and time distributions of all the cases. *Results:* The high peaks of accidents for the youth group occurred in the periods 7:00 to 8:00 (6.77 %, 39) and 16:00 to 18:00 (10.38 %, 60; 10.73 %, 62), and for the senior adult group appeared in the period 9:00 to 11:00 (11.19 %, 151; 11.04 %, 149). The adult group showed a stable trend during the period 8:00 to 24:00. The amount of traffic injury happening in these three groups had the same status monthly, which turned out that most traffic accidents happened in October for all the groups (12.11 %, 70; 10.38 %, 1 257; 12.30 %, 166), and February had the smallest number (4.15 %, 24; 5.28 %, 640; 5.26 %, 71). *Conclusions:* The time distributions of traffic injury within these three groups do not show the same situation daily but do monthly. The emergency treatment team and traffic control personnel should pay attention to this and have special protocol for different cases to increase the efficiency of the pre-hospital rescue.

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Pattern of injuries due to road traffic accidents (RTA): A retrospective study on cases referred to Kasr Al-Aini hospitals

Background: In Egypt, the rapid increase in the number of vehicles, in addition to the overpopulation and the lack of proper strategy for prevention of road traffic accidents (RTAs), all of these factors contribute to make Egypt one of the highest world's road accidents rate. *Aim of work:* This work would retrospectively overview 200 cases of road traffic accidents in Egypt examined at the emergency department, in Kasr Al Aini hospital, through the year 2010. *Material and Methods:* The data collection sheet for all cases include demographic data, injuries pattern data, type of vehicle, status at admission, lab investigations, imaging, period of hospital stay, treatment, outcome and police notification. *Results:* The majority of cases were between the age of 18 -44, the most common site of injuries were head and neck. (62.5 %). Death was the outcome of 20.8 % of head and neck injured cases. *Conclusions:* Most of RTA victims suffered from multiple injuries, and head and neck injuries topped the list of these injuries. We recommend a form of data collection sheet for RTA cases to ensure proper documentation and protect victims rights.

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Methods on judging motorcycle driver and passengers

Objective: To judge motorcycle drivers and passengers in accident by accident form and human injury, and to provide basis to traffic police. *Methods:* The traffic accident site plot, accident site photos, inquiring notes, photos and medical records of injured, photos and necropsy report of dead were compared and analysed to judge the mo-

torcycle driver and passengers. *Results:* When motorcycle impacts fixture frontally, the passengers are thrown firstly and farer than driver without holding handle. So the thrown nearer is driver and the thrown farer are passenger. When driver or passengers impact objects that can be avoided while the motocycle is running, the driver can avoid the object with the widen view. So the injured by the object are passengers. When driver or passengers impact objects that can not be avoided while the motocycle is running, the frontal driver will be impact firstly while the passengers will be injured lightly for the driver shelter. The driver holds handle firmly while impacting, and so the thenar eminence of driver will be injured. The driver is thrown later than passengers while impacting, and so the driver's femoribus internus will be injured because of moving forward on motorcycle. *Conclusion:* The practical cases proved that motorcycle driver and passengers can be judged by thrown distance, the position and degree of injury, the injury of thenar eminence and the injury of femoribus internus.

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Urban crashes involving delivery vehicles: A multidisciplinary in-depth study

Objective: The aim of this study was to gain insight into the factors and circumstances that influence the occurrence and consequences of crashes involving delivery vehicles in urban areas. Method: A total of 60 crashes involving delivery vehicles were studied based on interviews with the people involved, road inspections of all crash locations and vehicle inspections. Next, a subgroup of 23 crashes were analysed in detail. This subgroup consisted of crashes in which the behaviour of the driver of the delivery vehicle (DoDV) probably played an important role in the occurrence of the crash. These crashes were selected based on the fact that the DoDV did not give way to another road user. For each of these 23 crashes, the in-depth team tried to determine the course of events and which factors had contributed to the occurrence of the crash and possible injuries. A distinction was made between contributory factors related to the road users involved, their vehicles, the road, and general conditions at the time of the crash. All relevant factors were selected, as the starting point of the analysis was that a crash is the consequence of a confluence of events and that multiple factors play a role in the causation of crash and injury. After all 23 crashes had been described in this manner, crashes with similar crash processes (comparable combination of contributory factors) were grouped into types of crashes involving delivery vehicles. *Results:* Five types of crashes were identified: the DoDV 1) reverses and crashes into a pedestrian walking behind the delivery vehicle, 2) turns right and crashes into a cyclist or light moped rider that is going straight on a cycle track, 3) is not alert to intersecting traffic, because of his behaviour, physical or mental state, 4) the DoDV and his intersecting traffic cannot see each other due to a very short approach sight distance, 5) the DoDV drives in an unclear traffic situation that requires extra attentiveness. The first two types are the ones that are most related to the characteristics of the delivery vehicle. The others could also have occurred if the driver would have driven a passenger car. The first type of crashes has the most serious consequences (i. e. death or serious injury). It occurs when the DoDV reverses and crashes into a pedestrian who is walking behind the delivery vehicle. The pedestrian falls and then ends up under the delivery vehicle. Countermeasures to prevent this type of crash are already available. Examples are a mandatory acoustic warning signal when reversing for delivery vehicles, a rearview video system or sensor that warns or intervenes when a pedestrian is hit, and education about the blind spot for fellow-road users. *Conclusions:* This study has, among other things, drawn the attention to a subtype of delivery vehicle crashes that has a very serious outcome. Regular Dutch crash studies into delivery vehicle crashes have never reported this subtype. The detailed information from the in-depth study has provided various leads for a set of measures to prevent these crashes in the future.

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The investigation of the causes of the visual illusion road's often-occur accident

Ten people had died in four accidents during a short period of time-six months on a rural road section of a county in China's Xinjiang. All the accident forms are that cars traveled to the road section and rushed down the subgrade collided with the drains, the car with passengers was washed away by the water, fatal car crash. The same road section, same types of vehicle, many accidents occur frequently within a short period of time, during which there is no causal relationship? For the question our staff carried out a detailed inspection on-site road conditions; counted and compared personnel injury and vehicle damage after the incident; carried out a number of site real car simulation in the same season and period; using computer simulation reproduce the vehicle process site of traffic accidents multi-faceted to find the cause of the incident. Through more than nearly a year of joint efforts by the staff of more than, finally we identified that when the water in the drain in the irradiation of the dusk sun or evening light, the diffuse scattering will be formatted, during the spring and summer melting ice and snow. This way, the visual illusion occurs, people in the car will mistake the drains for a road, traffic accident occurs. For the cause of the incident, we put forward a number of ideas and proposals to the local government and road construction department, plan and renovate the section to avoid traffic accidents to the maximum extent.

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Image-based modelling in the field of forensic biomechanics: Thoracic injuries of elderly accupants

Objective: The bony thorax is an important body part for the analysis of injuries suffered by the occupant during a car crash. Epidemiological studies by American scientists (Kent et al. 2005) show a significant influence of thoracic injuries on the mortality rate. Additionally the thorax is the body region that is most relevant for fatal injuries in elderly people (ages 65 and up) while in younger occupants (16-33 years) it is the head. Additionally further studies (Kent et al. 2008, Bulger et al. 1999) show that rib fractures increase the mortality risk in the elderly much more than in younger people. Those studies show that a more detailed analysis of the factors, which cause this reduced injury tolerance level, is necessary. Numerical human models have a great potential for the forensic reconstruction of car crashes. The Finite Element Human Model Thums 4 (Total Human Model for Safety) by Toyota for example implements many different anatomic structures like the whole skeleton, soft tissues and inner organs as well as their material properties in great detail. However it is still unclear how accurate these models represent the elderly population as they are just based on single individuals. *Methods:* On the basis of over 70 CT datasets of individuals of different age classes, and both sexes, new age-dependant and injury-relevant geometric factors are identified and simulated by the Finite Element Human Model Thums 3. The measurements are conducted on 3D reconstructions of the bony thorax which were constructed via image processing techniques. Measured parameters include angles across the whole thorax, as well as parameters on single ribs. Additionally a morphometric analysis of the thorax parameters is done. The overall aim of the study is to evaluate the methods mentioned above for the acquisition of anthropometric differences in our dataset as well as to test the use of CT images for anthropometric thorax analysis and biomechanical modelling. *Results and Conclusions:* First results show that CT images, analysed by the methods described above, are accurate enough to assess anthropometric problems. Additionally a first step to find age dependant data, which could be used as a basis for the construction of an elderly-specific numerical human model, has been done.

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I3D-scanning-assisted 2D/3D registration based on videos for traffic accident appraisal

Surveillance video systems for traffic or security have been widely used in the world, especially in China. As key evidences, videos that captured accident process and vehicles or humans could promote litigant parties to share the information of the process, and improve the efficiency of justice. With help of videos, vehicle or human exact positions should be located, and in most cases, they could be obtained by methods of computer vision, but in other cases, computer vision methods were inapplicable. In this study, a manual 3D-scanning-assisted 2D/3D method for accurate location of the objects in traffic accidents based on videos was calibrated in six groups of dependent experiments. Every group experiment included two parts: real car driving measurement and record, and computer simulation for car model location. A 3D laser scanner was used to get 3D scene and model of the testing car, while a camera was used to capture motions of the car, and car positions could be measured and recorded with standard tape and protractors at the same time in experiments. After then, analyzing for car position with the methods of 2D/3D registration was maintained by a uninformed researcher, in computer. The process included four steps as follows: (1) correction of the videos; (2) 3D scene and the car model were rebuilt and one of key frames captured from videos was set as background image; (3) 6 freedom degrees (three displacement and three rotation parameters) of the car model were adjusted to get the view of car and its figures in background image matched; (4) other frame images of videos were set as background one by one and redo step 2 and 3, and the positions of the car matching key frames were measured in computer. Finally, the errors of 2D/3D registration method in different conditions were analyzed by comparing the position parameters obtained in computer and measured in car experiments. The results showed that the errors of this method for location varied greatly because of conditions, and the minimum value is less than 10cm, while the maximum is more than 2m when the camera was about 150m far to the car and kept on the vehicle route. As a conclusion, 2D/3D registration was a mature location method, and with the help of 3D laser scanner, two freedom degrees were limited, so more accuracy could be expected. 2D/3D registration could be a good method for traffic accident appraisal and its best application conditions need to be studied and summarized with further experiments.

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Study of developing features of children's consciousness on traffic safety

Objective: The purpose of the study was to research the developing difference on traffic safety consciousness of children of different genders and ages. *Methods:* 73 children were selected randomly from kindergarten (top class) and primary school (Grade 2, Grade 5) in Nantong (China). The numbers of the three grades were 26, 22, 25 respectively. The experiment was used 3*2 experimental design, processing factors were 3 grades, 2 genders (male and female). Each child was asked to complete two tasks: the recognition task which including judgment experiment and eye movement experiment and constructiveness task. *Results:* The results showed that in the recognition task, judgment accuracy of children of high grades was significantly higher than children of low grades; the time to first fixation at the region of interest of kindergarten children was significantly longer than grade 2 and grade 5 students. The fixation length and the fixation counts of kindergarten children in top class and the grade 2 students in watching interest region were significantly shorter than students of grade 5. In the constructiveness task, the scores of children in kindergarten were significantly lower than what the children get from grade 2 and grade 5, besides, the scores of boys is significantly higher than girls of top class in kindergarten and grade Five. *Conclusions:* The research showed that in the recognition task, age effect was significant, but gender effect was not that significant; while in the constructiveness task, age effect and gender effect were both significant.

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Children and youth in motor vehicle collisions (MVC), psychosocial support with special emphasis to POSOM-groups in swedish injury reporting in news media

Background and aim: The purpose of this study was to describe and explore how the media have reported on crisis management and crisis support in relation to Motor Vehicle Collisions (MVC) in each county. The investigation covers the years 2000-2010. During this period, the crisis management work in the municipalities have been developed. The investigation has especially been to describe and examine the crisis group activities (the so-called POSOM groups - Psychological and social care in major emergencies extraordinary events) have been described in media reports (newspapers). What information has the public received by the press about POSOM groups activities and availability? *Material and methods:* This study comprises a total of 460 news stories about POSOM groups during the years 2000-2010. In previous article, especially 21 POSOM-groups has been studied applying a quantitative content analysis method. *Results:* In total 16 people were killed by traumatic events in these articles of which 71 percent consisted of Motor Vehicle Collisions (MVC). 81 percent of those who died were children and young people. The average age of those killed was 16 and it was the most young boys had died. In only half of the events had POSOM activities declared and presented to the reading public. In the majority of cases had POSOM groups have not had a spokesperson who informed the media about the crisis of work for-and post-course. The article discusses media's role and importance as an information channel for both the victims and the public. *Conclusions:* The study has particularly focused on the need for assistance in connection with major accidents. Traffic injuries are one of the greatest public health problem in our risk society. In recent years, POSOM groups' activities have been limited when it comes to support activities in connection with major accidents. Compared to other crisis and trauma areas, the so-called POSOM activities of motor vehicle accidents relatively few in number. When traffic violence occurred in connection with the crashes on the roads, it is primarily in major crashes on the roads as you can see that POSOM groups have been activated.

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A study of driving suitability evaluation standard of long-distance passenger drivers

The study is to build driving suitability evaluation standard of long-distance passenger drivers in Jiangsu Province through analysis of psychological, physiological factors and vocational characteristics of them, which influence safe driving of long-distance passenger drivers. 1413 long-distance passenger drivers in Jiangsu Province were selected as samples to test 13 physiology and psychology indexes.The correlation of physiology and psychology indexes and the situations of traffic accidents were analysed. There are significant differences between accident groups and safety groups in 7 indexes, for example dark adaptation. These differences can be used as suitability evaluation for long-distance passenger drivers and the key factor in selection. The selection standards for long-distance passenger drivers are as follows: dark adaptation (≤8.62 s), dynamic vision standard value (≥0.08), discriminative reaction error probability (≤3.02 second), depth perception (≤0.74 cm), act of attention in the target time (≥14.73 s), act of attention in the target number (≤24.74 second), attention span (≥6.32 points), nervousness (≤55.55 points). By using of mathematical model reseach methods (covariance analysis, K-mean clustering and factor analysis and etc.), we set the suitability test index of the threshold value and the weight of long-distance passenger drivers, and worked out the detection methods of suitability parameters.

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The safety of drivers and passengers in the big city

Objective: It is known that road traffic injuries (RTI) are the main problem in public health. Republic of Kazakhstan has by far the highest mortality rate from RTI in European region (30.6 per 100 000 population). Besides there are the problems concerning reliability of statistical data from the road police. *Methods:* The obtained official statistical data are useful for trauma surveillance. Also we surveyed 842 respondents (252 drivers who owned an automobile and 590 pedestrians) in Astana, the capital of the country. They were asked about observation or violations of traffic riles, the motivated factors influenced on the safety of the subjects of the traffic. *Results:* The analysis of the dynamics of the basic indices of RTI was carried out on the basis of statistical data. More than 2.7 thousands of the people were the victims during road traffic in Kazakhstan in 2011. The number of cases of deaths was 2 707 and 14 000 were seriously injured. The rate of the burden of the consequences on the city's roads was 16,2 deaths among 100 injured, on the highways – 27,3. Another part of our work was devoted to sociological aspects of this problem. The mean age of drivers was 34.1 years and 77.0 % of them were men. The average length of driving was 11.1 years. The survey revealed that 42.9 % had to drunk driving. Moreover, 33.0 % mentioned that it would not be influenced for the safety of driving. About half of drivers consider as not meeting the norms during the traffic were road quality (51.1 %), location of the road signs (46.8 %) and functioning of the traffic lights (46.8). Concerning pedestrians we revealed that the mean age of them was 35.2 years and 39.2 % of them were men. The major contributing factors influenced for the safety of traffic were the great number of motor vehicles in the city (44.7 %), drunk driving (36.8 %) and insufficient organization of traffic in the city. The factors that the pedestrians consider as not meeting the norms are the road quality (70.8 %) and functioning of traffic lights (26.9 %). *Conclusions:* High mortality rate from road traffic injuries of Kazakhstan citizen is alarming. For improving the situation the electronic map of RTI is developed. Any citizen or road policeman could see the situation on RTI in all regions. This interactive system will help to prevent motor-vehicle accident traumatism and improve organization of emergency medical aid to the victims.

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Farm tractor-train crash disaster: A case report

Objective: Railway accidents are rare, but their consequences can be very severe and investigation of rail crashes could be one of the most challenging activities in forensic medicine. *Methods:* We present a farm tractor-train crash disaster happened in a clear September midday of 2012 in the Romanian Covasna County (222.275 inhabitants/3.710 Km^2). A 78 y.o. farm tractor driver going to the fields in Chilieni, with seventeen daily workers in the trailer, was involved in a dramatic tractor-train crash. The train struck directly on the trailer at a crossing point of the Transylvanian rail line Târgu Mureş-Braşov. The passengers inside the trailer were thrown out and fall on the ground in a ray of 30 meters. After the crash only a wreckage of the trailer – the wheel metal support – remained attached to the farm tractor; the upper part of the utility trailer was thrown away over some bodies. In the accident the train remained in the railway line and only slight damages to the cab were found. The train driver and all the train passengers were uninjured. *Results:* As consequence of this traffic accident eight young adults (six female, two men) lost their lives. One died during transfer to the emergency hospital service on the helicopter and seven persons died on the crash site. Another nine persons were injured: eight presented light bodily injuries and one person was initially in critical conditions endangering his life (coma), but he recovers well without complications. The farm tractor's driver was uninjured. The autopsies revealed three different types of considerable body injuries: – two persons presented massive blunt trauma injuries of head, thorax and abdomen; – three persons presented crash of the head, vertebro-medullary trauma (cervical and thoracic level), multiple lacerations of thoracic and abdominal organs and multiple limb's fractures; – two persons were mutilated with extensive disintegration of body parts. *Conclusions:* The lethal injuries were the result of a combination of a direct high velocity impact, the consequent projection of the bodies on the ground and for some also the compression under the trailer was contributing. The extensive mutilations of two bodies were due to the train wheels action. The tractor

driver affirmed he was passing the rail crossing without checking the rail line, unaware of the light and acoustic signal. The most relevant contributory factor in this farm tractor-train crash was the negligence of an old driver, allegedly not hearing the acoustic signal because of the heavy noise of the tractor's engine during motion. In rural areas the regulations to farm tractors and equipment on public roads are not always clear to drivers because of their general lack of awareness of road regulations. This train accident is to be considered one of the most remarkable vehicular accidents of Covasna County. Another dramatic rail crash was previously registered in Romania in 2009 and involved a minibus and train with 14 deaths. Important to prevent such dramatic fatal accidents is information and safety in farmer's vehicle mobility.

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Analysis liver injury energy using plastic material's model

Objective: Liver is more vulnerable to traffic accidents than are other organs, and liver injuries have been associated with high mortality. The traditional studies of liver injury mechanisms are out of abdominal wall, we can't see any relationship between the parameters of force which transfer to liver and homologue liver injuries. Our study objective is to analysis the energy of liver suffered when he injury in abdomen. *Methods:* Using plastic material's model study liver injury energy need three steps. First, the plastic materials for liver model were prepared using a blend of potassium stearate, paraffin liquid and epoxy novolae resin (F-51).The mechanical properties of the materials were investigated via a compression test using Instron. Second, the impact energies were obtained on an impacting system, and the corresponding deformation of plastic material was measured by Faro Laser Scanner Fonton120. The relationship between the impact energy and the deformation of plastic material was installed via curve fittings, including an exponential curve and a second-order polynomial curve. Third, the natural rabbits and the rabbits whose liver was substituted by a plastic material model were impacted at same speed. The energy liver injuries were simulated by plastic material's deformation. *Results:* The plastic material which composited of potassium stearate, paraffin liquid and epoxy novolae resin (F-51) with optimal weight ratio 0.78/0.22/0.04, it not only had outstanding plastic property but also did not have any cracks during impact. The elastic modulus values (Automatic young's) and yield stress data (yield strain 2 %) were 54.44 MPa and 0.04185 MPa, respectively. The deformation increased with impact energy obviously in impact experiment, we fit data with both an exponential curve and a second-order polynomial curve, the formulas were and $E = 0.024281(\text{Delta } V)2 + 0.14781 \text{ Delta } V + 0.9778$, the correlation coefficients were $R2 = 0.9510$ and $R2 = 0.9544$, respectively. The liver of rabbit began to present injuries at impact speed of 11.13 m/s (40 km/h), the impact experiments of rabbits with substituted plastic material liver model are going on at the moment. *Conclusions:* Using a plastic material liver model to assess liver injury energy can tell us much mechanisms information of liver injury in abdomen. This method can be used to study not only liver injury energy, but also other organs, and will as a key to open the secret of abdomen injury mechanisms.

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Experimental observation of whiplash neck injuries in dog

Up to now, the mechanism of neck whiplash injuries is not completely understood. One of the reasons is that it is difficult to establish the animal model (especially, the animal model of cervical spinal cord injury) subject to whiplash-type injuries. For this reason, a new experimental setup was designed to simulate the whiplash extension exposure in the neck of dogs. Based on the related detections (i. e., the behavior assessment, light microscopy, neuropotential measurement, gross observation and MRI auxiliary examination), a consistent finding was as follow: the behavior function and nerve conduction function of neck spinal cord were impaired and the impair-

ment extent was positively associated with the peak value of head posterior traction acceleration; namely, the greater the posterior acceleration peak was, the severer the related function impairment of neck spinal cord would be.

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Epidemiological analysis of 532 limb injuries from road traffic accidents in Shenzhen

Objective: To analyze the characteristics of limb injuries from road traffic accidents in hospital emergency departments in Shenzhen. *Methods:* All patients with limb injuries from road traffic accidents, who were admitted into emergency departments of 6 general hospitals of 6 administration regions in Shenzhen from Jan.2007 to Dec.2007, were recorded and analyzed. Four months after injury, the status of trauma rehabilitation and work recovery was followed up by telephone. *Results:* From Jan. 2007 to Dec. 2007, totally 532 cases of limb injuries from road traffic accidents were collected, with age ranging 2-80. There were significant differences between average age of males (34.56 ± 6.5) and females (30.44 ± 4.31) ; most injures occurred in the age group of 20-40 years; two leading occupations were migrant workers and workers (37.6 %); accidental vehicles mainly were private cars; accident incidence was highest on Thursday and Friday (respectively 28.76 %, 27.82 %) and there was central tendency on Friday about the distribution of injury in a week ($r = 0.1660$, $P < 0.001$); the lower extremity was the most common injury site (64.23 %). Totally 80.47 % patients of road traffic injury could work as before, 14.42 % need change their jobs and 5.12 % were not able to work. *Conclusions:* The lower extremity is the most vulnerable part in road traffic injury, and younger adults are the majority of the victims. It is efficient measures to reduce limb injuries from road traffic accidents by further strengthening the road safety education and improving people's quality.

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Disaggregated crash prediction models for different crash types

Road safety affects health and development worldwide, thus it is essential to examine the factors that influence crashes and injuries. As the relationships between crashes, the severity of injuries, and possible risk factors could vary depending on the type of collision, we attempt to develop disaggregated prediction models for different crash types in terms of number of vehicles involved in the crash (i. e. single- and multi-vehicle crashes). As disaggregated speed data are available from the probe vehicles equipped with GPS, it is possible to determine how average speed and its dispersion affect crashes and injuries. We also examine risk factors including geometric design, weather conditions, and temporal distribution. A comprehensive database is thus established with information on road crashes and other possible risk factors for selected road segments in Hong Kong. In particular, a joint probability model is applied to analyze crash occurrence and severity simultaneously under an integrated modeling framework. As a result, speed plays an important role in road safety performance. Furthermore, rainfall and several geometric factors are also significantly associated with crash occurrence or severity.

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Reprocessing and optimizing of emergence treatment on severe trauma

Objective: To explore the function of optimized emergency treatment process on severe trauma. *Methods:* Reprocessing and optimizing of emergence treatment on severe trauma was implemented with reorganization of the work based on the traditional emergency process, which was applied in practice of treating the 205 severe cases admitted in our hospital between June 2011 and May 2012. The effects of this group were compared to the control group (n = 186) treated with traditional process. *Results:* There was no statistic significance in pre-hospital treatment duration and ISS scores between the two groups. ($P > 0.05$). There was statistic difference in treatment duration in emergency room and success rates between the two groups. ($P < 0.05$). *Conclusions:* Reprocessing and optimizing of emergence treatment on severe trauma can shorten treatment duration in emergency room, decrease mortality and improve success rate.

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The application of IT in trauma treatment

Objective: To apply 3G net, intelligence cell phone, trauma scores software, trauma data, etc. in pre-hospital and inner-hospital emergency treatment, so as to share the information of the patients with trauma and realize seamless connection between pre-hospital and inner-hospital emergency treatment, shorten the duration between pre-hospital and inner hospital treatment, especially for the severe cases, aimed to improve success and decrease mortality and mobility. *Methods:* This project was composed of intelligent platform in the ambulance, information system in the hospital and trauma data in the hospital. The trauma patients were collected as experiment group between June 2011 and May 2012. The data of these patients were inputted, scored and analyzed accordingly. The scores were sent to information system in the hospital, the information of the trauma patients sent from onsite was sent to receiver of the relevant specialists according to the conditions of the accidents. A trauma treatment team was set up and all the members should arrive at emergency department within 5 minutes. The information of the patients should be aware through hospital information system in advance and remote control diagnosis should be done and support onsite treatment. Meanwhile the trauma treatment team waits in emergency room and gets everything necessary prepared in order to win time for treatment as soon as the patients arrive. The trauma patients between June 2010 and May 2011 were collected as control group. The effects of both groups in clouding pre-hospital durations, durations in emergency room and success rates were compared. *Results:* The pre-hospital reaction time was (23.17 ± 8.27) minutes after one year efforts in strengthening of early treatment on trauma patients in experiment group, against $(24.92 + 8.27)$ minutes in control group. The durations in emergency room was (31.58 ± 4.81) minutes against (42.08 ± 5.90) minutes in control group ($P < 0.05$). And success rate were 96.38 % in the experiment group against 94.39 % in control group ($P < 0.05$). *Conclusions:* The seamless connection between pre-hospital and inner hospital treatment on trauma patients through IT can shorten treatment duration in emergency room, decrease mortality and morbidity, which is also helpful to improve prognosis of the patients.

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The analysis of characteristics of sociology and injury of 385 cases suffered from spinal fracture

Objective: To study clinical characteristics of patients who suffered from spinal fracture. *Methods:* From Jan. 1999 to Jun. 2008, 385 cases suffering from spinal fracture are reviewed, information of which get through case

evaluation and telephone follow-up, including sex, age, habit, history of chronic disease, condition of fracture, length of stay and treatment. The epidemiology is analyzed in SPSS. *Results:* In the entire 385 patients, 197 are male, average age 47 and 188 are female, average age 61. Cases of different sex and age groups have significant distinction in the characteristics of injury. The length of stay is influenced by the age of patients. Treatments of different sex and age have significant distinction. *Conclusions:* The most frequent site of spinal fracture is thoracolumbar section and most cases are mid-aged or senile. Traffic trauma is main cause of spinal fracture. The male group has more occupational injury than the female group. The knowledge on clinical characteristics of spinal fracture is beneficial to prevention and treatment.

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Risk factors and clinical significance of trauma-induced coagulopathy in ICU patients with severe trauma

Objective: To investigate the incidence and risk factors for trauma-induced coagulopathy (TIC) and the impact of TIC on outcomes of patients with severe trauma admitted to an emergency intensive care unit. *Methods:* We retrospectively reviewed clinical data from 223 patients with severe trauma admitted to emergency intensive care unit within 24 h after injury. Injury Severity Score (ISS), Acute Physiology and Chronic Health Evaluation II score, coagulation function, routine blood and biochemical tests, and blood gas parameters were obtained from medical records. Patients were divided into two groups according to the presence or absence of coagulopathy. ISS, Acute Physiology and Chronic Health Evaluation II score, and the incidence rates of hypothermia and tissue hypoperfusion were compared. The risk factors of TIC were analyzed and a multivariate logistic regression equation was developed. Coagulation function and the incidence of TIC were also compared between surviving and dead patients. *Results:* Overall, 52/223 (23.3 %) patients fulfilled the diagnostic criteria for TIC. Their mortality rate was significantly higher than that of patients without coagulopathy (36.5 vs. 9.4 %, $P < 0.01$). ISS, incidence rates of hypothermia and tissue hypoperfusion, and the prevalence of severe traumatic brain injury were significantly higher ($P < 0.01$), whereas Glasgow Coma Scale, hemoglobin, hematocrit, and platelet counts were significantly lower ($P < 0.01$) in patients with coagulopathy than those without. Base deficit at least 6, Glasgow Coma Scale 8 or less, and platelet count were independent risk factors for TIC. Compared with surviving patients, the patients who died had significantly reduced coagulation function. *Conclusions:* The incidence of TIC is particularly high among patients with severe trauma. TIC is associated with increased ISS, brain injury, shock and hypothermia, and mortality.

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Situations and factors related to prolonged stay of multiple trauma patients in emergency room

Objective: The aim of this study was to investigate the situation of prolonged lengths of stay (LOS) in the emergency department (ED) for multiple trauma patients in a tertiary hospital and to identify associated factors, thus to promote the quality of treatment. *Methods:* Data of multiple trauma patients presented to the emergency room in a tertiary hospital in 2010 were retrospectively studied, including demographic information, diagnosis, EDLOS, ISS, GCS, and ICU admission or not. Stepwise Cox regression analysis was used to determine possible factors associated with prolonged length of stay. *Results:* During the study period, a total of 1046 multiple trauma patients were admitted from the ED. These patients had a mean age of 49 ± 16 years and 74.5 % were male, a median ISS of 24 (20-34, IQR), a median EDLOS of 4.4 h (2.8-14 h, IQR). Of these patients, 545 patients were

admitted into ICU while 501 patients were admitted to general wards. The ISS of both groups were 29 (22-34) and 22 (17-27) (U = 28283, P < 0.001). And the EDLOS were 4.4 h (2.9-12.9 h, IQR) and 4.3 h (2.7-15.9 h, IQR) (U = 133067, P = 0.479). Of these 1046 patients, 183 cases required emergency operation while 863 patients were treated without emergency operation. Their ISS values were 29 (22-34, IQR) and 25 (20-34, IQR) (U = 31810, P = 0.001); and the EDLOS were 3.3 h (2.5-4.6 h, IQR) and 4.9 h (3.0-17.2 h, IQR) (U = 53086, P < 0.001). Multivariate analysis showed that the main factors contributing to prolonged length of stay were insufficient inpatient beds (including ICU and general wards, OR, 28.57 and 37.04; 95 % CI, 17.24-47.62 and 20.41-66.67, P < 0.001). Day shift arrivals and patients requiring emergency operation had a shorter EDLOS (OR, 0.76 and 0.54; 95 % CI, 0.65-0.89 and 0.44-0.66, P = 0.001 and < 0.001). A further regression analysis among subgroups showed that only non-emergency operation patients would be delayed by insufficient inpatient beds (ICU and general wards, OR, 28.99 and 36.76; 95 % CI, 17.30-50 and 20-67.57, P < 0.001). While motor vehicle crashes and falls (OR, 1.70 and 2.83; 95 % CI, 1.08-2.67 and 1.44-5.56, P = 0.021 and 0.003) were the main factors associated with prolonged EDLOS in emergency operation patients. *Conclusions:* The situation of shunt of multiple trauma patients from emergency room in this hospital was normal. Boarding for unoccupied beds was the main associated factors. Strategies should be made to accelerate patients' pass-through.

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Analysis on the characteristics of 161 major trauma patients dying in ICU

Objective: To analyze the characteristics of major trauma patients dying in the ICU of a university hospital, thus to find measures to improve the care of trauma. *Methods:* We retrospectively analyzed the characteristics of those multiple trauma patients who died or were dying when discharged in the emergency ICU of a university hospital from 2003 to 2008. Patients' information was recorded, including age, sexual, causes of injuries, Injury Severity Score (ISS), Acute Physiology and Chronic Health Evaluation II(APACHEII) within 24-hour admitted in ICU, Glasgow Coma Scale (GCS), length of stay in ICU, operation, transfusion and causes of death. These characteristics were compared between patients included in two periods (2003 to 2005 and 2006 to 2008). *Results:* There were 2109 major trauma patients admitted to the emergency ICU from 2003 to 2008. The total mortality was 7.6 %. 88 patients died in the ICU (4.2 %) and 73 ones were dying when discharged (3.5 %). The causes of injuries mainly included traffic accident (70.8 %) and height fall (16.8 %). 73.9 % of them were male and 83.5 % were with GCS < 9,. The mean age was 45 ± 17 years, with an ISS and APACHEIIof 27.8 ± 9.3 and 19.3 ± 6.2 respectively. ICU length of stay was 7.6 ± 10.1 days. The most common causes of deaths were severely traumatic brain injury (58.4 %), multiple organ failure/sepsis (21.1 %) and hemorrhagic shock (9.9 %). In these three groups classified by the cause of death (severely traumatic cerebral injuries, hemorrhagic shock and multiple organ failure/sepsis), the APACHEII scores were 20.0 ± 5.3, 22.7 ± 7.6, 15.9 ± 5.7respectively, and the proportion of patients with GCS < 9 was 96.8 %, 81.2 %, 53.1 %, the rate of receiving operation being 25.5 %, 81.2 %, 58.8 %, transfusion rate being 69.1 %, 100 %, 85.3 %, the length of stay in ICU being 6.2 ± 5.4, 1.2 ± 0.5, 16.1 ± 17.4 days. There were statistically significant difference for these parameters. From 2003 to 2008, the annual mortality was 9.0 %, 9.8 %, 10.8 %, 6.2 %, 7.3 % and 5.6 % respectively (P = 0.078). Between patients included in the period of 2003-2005 and 2006-2008, the value of ISS and APACHEII were not statistically different, and the total mortality in two periods were 9.8 % and 6.4 % (P = 0.004). The proportion of death due to severe traumatic brain injury was increased (from 51.3 % to 64.7 %, P = 0.085), while the proportion of death due to multiple organ failure/sepsis was decreased (28.9 % to 14.1 %, P = 0.021). *Conclusions:* The annual mortality of major trauma patients in this EICU was gradually decreased from 2003 to 2008. The proportion of death caused by multiple organ failure/sepsis was reduced, while severe traumatic brain injury was still the main cause of death.

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Road traffic injuries in urban Beijing: A single hospital investigation

Objective: To explore regional characteristics of road traffic injury in urban Beijing through analysis of the investigation by a single hospital. *Methods:* Using Emergent Road Traffic Injury Questionnaire we designed, we performed a survey for 2 weeks on all the patients with road traffic injury who had sought medical care in the emergency department of our hospital. A comparison was made between them and other patients at the emergency department at the same period. *Results:* From 8:00 on 25 April 2006 to 8:00 on 8 May 2006, 18 emergent cases of road traffic injuries were treated. They accounted for 0.54 % of all the emergency patients and 4.5 % of all the trauma patients. They were 7 males and 11 females, with an average age of 48.3 ± 14.3 years. The average time to hospital was (26.8 ± 14.4) min. Seventeen cases of injury happened in the street, 1 in the highway, 15 in Xicheng District, 1 in Haidian District, and 2 in the suburbs. They included 8 pedestrians, 9 riders and 1 passenger. They were injured by 12 light vehicles, 2 heavy vehicles, 2 special vehicles, and 2 bicycles. Twelve patients had injury at extremity, 3 at spine, and 3 at multiple sites. They received treatment only in emergency department. No one was dead or hospitalized. *Conclusions:* Contrary to common belief, road traffic injury patients seem to account for a small part of trauma patients and the injury tends to be moderate. Females and extremities may be more likely to get injured.

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Modeling of a rear-end crash pulse generator

The rear-end crash pulse generator has been considered to be a key device for performing car impact safety research under laboratory conditions. According to the international regulation, ECE R44, the polyurethane (PU) tube, was recommended to produce a standard rear-end pulse. However, little literatures on the impact dynamics of PU tube were known. In this study, a finite element model of rear-end crash pulse generator was established under ANSYS/LS-DYNA. With this finite element model, the following conditions to generate the standard rear-end impact pulses were determined: the initial impact velocity of sled was 30 km/h, the resultant mass of sled was 680 kg, number of PU-tubes was three, and outer diameter of olive knob was 46 mm. Compared with the standard deceleration-time curve of actual rear-end crash, this finite element model of rear-end crash pulse generator was preliminarily validated.

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The relationship between adult ADHD and alcohol-related traffic offences

Objective: To survey the probability of ADHD-symptoms in a group of substance abuse traffic offenders and the association between alcohol consumption and ADHD symptoms. *Methods:* Gender and age differences were t-tests and analyses of variance. Categorical group comparisons (norm group and traffic offenders) via contingency tables. Analyses of covariance to survey the influence of alcohol consumption on ADHD-Symptoms. *Re-*

sults: Traffic offenders reported a higher occurrence of ADHD-symptoms than the norm group. The probability of ADHD is nearly 2.5-times higher in the group of alcohol abuse traffic offenders compared to the norm group. Increasing alcohol consumption leads to significantly higher occurrence of ADHD-symptoms. *Conclusions and clinical relevance:* In drivers with substance-related traffic offences a higher occurrence of ADHD can be expected. Attention should be paid to the occurrence of ADHD when treating traffic offenders with alcohol-related offences.

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An epidemiological study of antagonistic attacks against public transport

The 21st century has brought several examples of the devastating effect antagonistic attacks can have in terms of mass-casualty incidents, when public transport modes have been used as weapons or targets. Therefore, interdisciplinary research is required to explore the interconnection between antagonistic violence, public transport and multi-casualty incidents. Through an epidemiological study development in space, time and execution of large scale antagonistic attacks (≥ 10 deaths and/or ≥ 100 injured) against public transport, and associated departure and arrival areas are examined, during the years 1970-2009. The Global Terrorism Database has been used to uncover cases, in addition to complimentary data sources such as scientific journals, reports, books, news channels, newspapers and organizations' websites. Nearly 500 cases of large scale attacks occurred during the period 1970-2009. Half of the incidents took place in Asia, with the Middle East/North African region and Sub-Saharan Africa as the second and third most impacted regions. Flight was the most frequently hit mode of transport in the 70s, but the rail sector was hit more times in total throughout the research period. From the 80s and forward the road bound sector has been the worst hit mode of transport, targeted in more than half of all attacks with more than 10 dead and/or 100 injured. Large scale attacks against water borne modes of public transport have been quite rare, with almost all of the incidents clustered between the mid 80s and mid 90 s. Attacks against terminal buildings and against several modes of public transport during the same day have become more common during the 21st century. Bombings and explosions accounted for more than half of the attacks and the second most used modus operandi was armed assault. Most of the incidents occurred during the 80s and 90 s, while the single incidents with the highest amount of fatalities have transpired since year 2000. Thus, while there appear to be less incidents, the effect in terms of fatally and non-fatally injured from very few incidents is unprecedented. Planning and preparing for such rare, deadly incidents is a pressing issue for future research as well as personnel in the public transport industry and emergency services.

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An engineering strategy for peripheral nerve regeneration

Surgical repair of severe peripheral nerve injuries represents not only a pressing medical need, but also a great clinical challenge. Autologous nerve grafting remains a golden standard for bridging an extended gap in transected nerves. The formidable limitations related to this approach, however, have evoked the development of tissue engineered nerve as a promising alternative to autologous nerve grafts. A tissue engineered nerve is typically constructed through a combination of a neural scaffold and a variety of cellular and molecular components. The initial and basic structure of the neural scaffold that serves to provide mechanical guidance and optimal environment for nerve regeneration was a single hollow nerve guidance conduit. Later there have been several improvements to the basic structure, especially introduction of physical fillers into the lumen of a hollow nerve guidance conduit. Up to now, a diverse array of biomaterials, either of natural or of synthetic origin, together with well-defined fabrication techniques, has been employed to prepare neural scaffolds with different structures and properties. Meanwhile, different types of support cells and/or growth factors have been incorporated into the neural scaffold, producing unique biochemical effects on nerve regeneration and function restoration. In our group,

a set of tissue-engineered nerves have been developed for peripheral nerve repair. We focused our work on various basic components of tissue engineered nerves in terms of their structures, features, supporting cells/growth factors incorporated and nerve regeneration-promoting actions, and we also observed the early repair outcome of biomaterial nerve grafts for clinical nerve reconstruction.

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Car sunshade-induced craniofacial injury: A case report

Introduction: We report the case of a man who sustained a craniofacial injury after spontaneous lateral airbag deployment resulting in his face being struck by a car sunshade. This highlights the potential damage that can be caused by any object placed between a lateral airbag and a car occupant. *Case presentation:* We report the case of a 33-year-old Caucasian man who was the driver in a frontal collision. He had opened the car sunshade and turned it 90° towards the left. As he was driving, he struck a bus, causing the driver's lateral airbag to spontaneously deploy. The airbag pushed the sunshade against his face and injured him. *Conclusions:* Car sunshades can cause significant craniofacial injury. We suggest that sunshade design must be improved to reduce the risk of potential injuries to car occupants. We recommend a new, safer sunshade design.

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Numerical simulations of a rear-end crash pulse generator

Aims: The rear-end crash pulse generator has been considered to be a key device for performing car impact safety research under laboratory conditions. According to the international regulation, ECE R44, the polyurethane (PU) tube was recommended to produce a standard rear-end pulse. However, little literatures on the impact dynamics of PU tube were known. The purpose of this study is to develop and validate a finite element model of the PU-tube rear-end crash pulse generator. *Materials and Methods:* The rear-end crash pulse generator was designed to generate the needed deceleration pulse for simulating the vehicle or car rear-end crash. This device consisted of: impact shaft, olive knob, absorbing tube (PU tube), sleeve, and sled. The sled was simplified as a cuboid rigid body, and the PU tube-sleeve complexes were secured in the sled. Correspondingly, the olive knob-impact shaft complexes were fixed on the surface of rigid impact barrier. During the rear-end crash simulations, PU tubes in the front of sled impacted olive knobs at a prescribed initial impact velocity. A finite element analysis under ANSYS/LS-DYNA was performed to search for the optimal value of outer diameter of olive knob, assuring the resulting rear-end deceleration-time curve to meet the requirements of ECE R44. The rear-end crash pulse deceleration-time curves stated in the related literatures were applied to validate the above finite element model. *Results:* A finite element model of rear-end crash pulse generator was established and preliminarily validated. Besides, the following conditions to generate the standard rear-end impact pulses were determined: the initial impact velocity of sled was 30 km/h, the resultant mass of sled was 680 kg, number of PU-tubes was three, and outer diameter of olive knob was 46 mm. *Conclusions:* The finite element model of rear-end crash pulse generator stated in this study was preliminarily proved to have the capability of generating the needed deceleration pulse for simulating the vehicle or car rear-end crash.

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Are safety deficiencies of young drivers training gaps?

Young drivers differ relatively little from other drivers in terms of accidents on roads in built-up areas. This is certainly contributes to the practical driver training and driving test which substantially take place within built-up areas. On roads outside built-up areas, the differences between young drivers and other drivers in terms of road safety are extreme. The risk of being killed there in an accident as a young driver is 7 times as high as on roads within built-up areas. That leads to the question of whether there are existing gaps in training concerning roads outside built-up areas. For that reason the wrongdoing of young male and female drivers before accidents with fatalities and serious injuries was analyzed. According to that the misconduct on roads outside built-up areas is based essentially on only 3 of 13 misfeatures. This supports a corresponding addendum to the driver training.

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Alcohol-Interlock: An experimental long-term study

In 2011, a consortium of various companies and scientific institutions joined forces to conduct and take part in a log-term experimental study. The goal of the study is to research and evaluate the use of alcohol-interlocks by drivers under the influence of alcohol. The practical part of the study is scheduled for the second half of 2013. Participation in the study is voluntary for the subjects, and certain inclusion and exclusion criteria will be specified. In addition to the testing of the effectiveness of alcohol-interlocks, participants shall learn to reduce their alcohol consumption, as well as to separate alcohol consumption from driving a vehicle, or as the case may be, abstain from alcohol, in order to reduce future incidences of the participants driving under the influence of alcohol. Within the scope of an assessment of fitness to drive, a prediction of handling performance after removal of the alcohol-interlock device will be done. Additionally, the effectiveness of various harmonized rehabilitation methods for restoration of the subject's fitness to drive, as well as the interaction of these methods with one another, will be evaluated. Various working hypotheses form the base of this study: – Participants of an Interlock program have lower DUI recidivism rates then non participants. – Rehabilitation programs reduce recidivism rates and support a behavioral change with respect to alcohol consumption. – Recidivism is more likely among alcohol addicts than among alcohol abusers. – The assessment of driver fitness based on uniform federal assessment criteria is predicting recidivism for the three year period following de-installation of the device. In the study, participants will be separated into experimental and control groups. Alcohol abusers will have an alcohol-interlock installed, accompanied by rehabilitation methods, for six months. Subjects dependent on alcohol will have the interlock for twelve months. The devices will be installed in the participants' vehicles at a professional workshop; the approval and activation will take place at the technical test center. The data from the data logger of the alcohol-interlock will be read out at the test center at regular intervals, and will then be provided to the therapist responsible for the rehabilitation or therapy of the subject. The three-year observation period for all groups will be evaluated using information from the Central Card-Index for Traffic Offenses and alcohol consumption behavior, which will be determined through regular toxicology screenings, as well as psychological questionnaires. This information sheds a light on whether the participant has learned to separate driving and drinking.

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Do we really need driver assistance systems? The effect of intervention and warning strategies

In-depth accident studies show that perceptual errors and inadequate situation awareness are major contributing factors with estimations ranging up to 50 % of all severe accidents. Advanced driver assistance systems (ADAS) may provide information and give warnings in order to prevent these critical situations. However, studies proving these positive effects are still rare and it is unclear how to best support the drivers in these situations. The paper presents driving simulator studies which aim to contribute to these questions. First, an intersection situation is examined where the driver has to yield to oncoming traffic. Accordingly, the attention is focused on these vehicles which leads to a simulated accident when another car suddenly enters the road. In this situation, early information given to the driver by an ADAS succeeds to greatly reduce the numbers of accidents. This effect seems to be due to an increased situation awareness which enables the driver to adapt his behavior and, thus, to react better. Secondly, rear-end crashes are examined. It can be shown that these accidents are quite likely to happen if the preceding car suddenly breaks at locations where the drivers of the following car do not expect such a sudden manoeuvre. A collision warning system was introduced with a multi-step warning strategy including an information ("a car is ahead"), a warning ("the car in front is braking") and an autonomous intervention (emergency brake). Compared to a control group without such system this ADAS is very successful in preventing accidents. A detailed analysis of this effect shows that neither the information nor the warning contributes to preventing the accident. Only the autonomous braking reaction is fast enough to prevent the crash. While these studies show that ADAS may be highly effective in preventing accidents they also point to the fact that an intervention strategy is required which is adapted to the driving situation and the drivers' need in this situation. Furthermore, it is unclear whether such kinds of protective systems may lead to drivers relying on them too much, which may, in turn, counteract these positive effects. Further research is strongly encouraged in the face of the growing number of these systems entering the market.

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Older drivers and new in-vehicle technologies: How we connect well

In many developed and developing countries there is an overall trend of suburbanization among the aging population, creating complex problems in personal mobility. This is clearly evident in the United States where suburban and rural public transportation systems largely do not exist to reasonably support mobility needs. Thus, the personal automobile remains a critical element in maintaining older adults' independence. Older drivers face declines in physiological and psychological functions that impact driving performance, such as reduced flexibility, reaction time, visual acuity and hearing. On the positive side, new vehicle technologies are being introduced that offer potential in supporting the mobility needs of an older operator. For instance, autonomous vehicle technologies such as Assistive Cruse Control and Lane Keeping Aids may make it safer for older adults to traverse the roadway, parking aids can enhance comfort and security in close spaces, and point of interest and navigation systems provide new web enabled content to increase security in unfamiliar areas. However, the implementation of many systems challenge older drivers' understanding and may be ignored rather than used. Rather than forcing drivers to fit technologies, efforts need to focus on designing technologies that accommodate drivers' capabilities. To compensate older drivers' capacity loss and increase new technologies' usability, it is important to understand: older drivers' behavioral patterns while interacting with new technologies; what advanced driver assistance systems have positive influence on older driver mobility; and suggest suitable interface design approaches that encourage leaning and adoption. The MIT AgeLab developed "AwareCar" vehicle platform integrates information on the driver, vehicle and environment to enhance research on older operators' wellbeing. It provides an experimental base for diversified human factors studies, such as detecting the driver's physical and mental state, identifying workload and distraction, and understanding the influence of age and health on performance. This talk will highlight a set of recent studies exploring drivers' visual attention and physiological response to an auditory

presentation–verbal response working memory task, research on semi-autonomous vehicle parking assistance technology, and efforts aimed at evaluating typeface designs in a text-rich automotive HMI. Overall results will demonstrate how drivers' gaze concentration, heart rate and skin conductance level all vary with cognitive demand and how these metrics may be suitable for assessing drivers' mental workload when developing advanced interfaces. When using an assistive parallel parking technology, heart rate and self-reported stress suggest that driver training may be a key element in successfully deploying new technologies. While the debate on driver distraction centers primarily on what should be allowed in the vehicle, recent efforts comparing a "humanist" typeface to a "square grotesque" typeface suggest that, among men, significant reductions in glance time occur. This suggests that optimizing typeface characteristics is a simple and effective method of reducing the demand of in-vehicle HMIs. In summary, multi-modal methods of assessing driver demand using the "AwareCar" platform in human factors studies can enhance our understanding of older drivers' capabilities and aid in the evaluation of methods to optimize new in-vehicle technologies and enhance usability.

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MPA-Expert Manual: A compendium of inspection principles and rating criteria

Objective: In Germany, the Medical-Psychological-Assessment (MPA) is since almost 60 years an important method to assess driver 's requirements for safe driving. According to German legislation a driver has to make sure, that he or she is of good physical and mental condition and did not receive offences for severe or repeatedly violations at traffic. In this sense, personal requirements to drive are more than simply being able to steer a vehicle, as personality aspects (e. g. alcohol consumption style, risk taking, hazard perception) health and performance-related factors (e. g. reaction capacity or concentration) are integrated in the general concept of fitness to drive. *Methods:* The MPA usually consist on four segments: A questionnaire regarding drivers personal and driving biography. Second, a medical examination to check physical condition (e. g. medical history, physical examination, laboratory analyse). Further, a psychological diagnostic interview to find out, if the applicant did some changes in his or her behaviour and attitudes regarding the violations at traffic. And at least, the applicant has to show a minimum of fundamental psychophysical abilities (such as reaction capacity, visual perception or concentration) by the help of computer-based Psychological Performance Test. This methodological mix is a very important challenge for the experts: How can different data from different sources be integrated to achieve an valid outcome? This decision-making procedure is supported by inspection principles and rating criteria, which are outlined in a basic manual, which is to be published at first time in English and is presented in the session. The talk will give a synopsis of data combination during the whole diagnostic process, which starts with the identification of quality and intensity of drivers personal problem (e. g. alcohol addiction, abuse of alcohol, habituation to higher consume levels, risky attitudes to drive under influence of alcohol). Then the experts take a close look at the process of changes, which is to be appreciated, including the applicant's skills and wills to perform changed behaviour also in future. *Results:* The presented manual lays down the minimum standards of requirements connected with driving motor vehicles. Medical-psychological assessment (MPA) has recently been shown to be highly effective in substantially reducing the number of subsequent drink and drive offences, which could be shown in several evaluation studies, especially in a brand new study published in 2012. *Conclusions:* The manual combines the introduction of MPA-system and the decision-making procedure by giving several examples to illustrate the stages of data collection and integration. The special value of this guide book is its interdisciplinary approach. Therefore, it is expected, that comprehension and acceptance by possible users (employees of authority, therapist, judge, lawyer, and not at least the applicant himself) should be enhanced. A standardized examination process, principles and rules of data integration are important contributions towards a fair, transparent and valid driver assessment, which supports the applicant in his or her attempts to get back the withdrawn driving licence.

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Quality assurance in traffic medicine/traffic-medical survey

Introduction: Proper authorities can order a traffic-medical investigation if they have doubts about the driving ability of road users. According to the Fahrerlaubnisverordnung (driving licence order) § 11(2) FeV the authority determines whether the investigation is carried out by a specialist with traffic-medical qualification, a doctor of the health centre, a specialist in occupational medicine, a specialist for legal medicine or a doctor of an assessment centre for driving ability. Following Madea et al, traffic-medical surveys are ordered by the proper authorities most frequently (Madea et al, 2007). But concrete figures are not available. Furthermore there is no external institution monitoring the quality of such survey. So far there are no studies available about numbers, reasons and results of traffic-medical investigations. *Method:* The purpose of this study is to find out about the actual state in traffic-medical investigations by specialists with traffic-medical qualification. Therefore two versions of questionnaires where developed and specialists with traffic- medical qualification as well as driving license authorities in Germany were asked to fill in these questionnaires. *Discussion/Results:* First results about numbers, reasons and contents of traffic-medical investigations will be presented as well as a first analysis of sample survey.

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Stressful life events influence driver's behaviour

Objective: It is known that behavioural decisions in everyday life, including behaviour in traffic, are influenced by personality trait impulsivity. The objective of the study is to clarify how stressful life events are associated with driver behaviour, impulsive personality and biological markers of risk-taking behaviour. *Methods:* The subjects of the study were young car drivers (N = 293; mean age 25.6 (SD = 0.6) years), who participated in the longitudinal Estonian Children Personality Behaviour and Health Study in 2008. The subjects filled in the Estonian version of Manchester Driver Behaviour Questionnaire (Reason et al., Ergonomics1990, 33:1315-1332), Adaptive and Maladaptive Impulsivity Scale (AMIS, Eensoo et. al., J Adolesc Health 2007, 40:311-317) and Stressful Life Events (SLE) questionnaire (Reif et al., Psychopharmacology 2011, 2014:239-248). Platelet monoamine oxidaze (pl-MAO) was measured by radioenzymatic method. Serotonin transporter gene linked polymorphism (5-HTTLPR, was genotyped (Tomson et al., Prog Neuropsychopharmacol Biol Psychiatry 2011, 35:1857-1862). *Results:* Driver violations had stronger correlation with adaptive ($r = 0.35$, $p < 0.0001$) than maladaptive impulsivity ($r = 0.16$, $p = 0.005$) and driver mistakes were correlated significantly only with maladaptive impulsivity ($r = 0.26$, $p < 0.0001$). Young drivers, who reported a higher number of SLE in previous year, had higher scores in driver violations compared to drivers with lower number of SLE ($p = 0.04$; 12.9(7.5) vs 11.1(6.2)). Drivers, who reported a higher number of non-interpersonal SLE, had higher mean score in driver violations ($p < 0.05$; 12.8(7.1) vs 11.1(6.4)) and also higher score in maladaptive impulsivity ($p = 0.003$; 35.0(8.1) vs 31.9(8.1)) compared to drivers with lower number of non-interpersonal SLE. Male drivers with a higher number of non-interpersonal SLE had higher scores in maladaptive impulsivity ($p = 0.03$; 35.2(8.0) vs 31.8(8.3)) compared to male drivers with lower number of non-interpersonal SLE, but no significant association appeared with neither driver violations nor driver mistakes. Female drivers with higher number of non-interpersonal SLE had higher scores in driver violations ($p = 0.03$; 10.8(5.6) vs 8.8(5.0)), and also higher scores in maladaptive impulsivity ($p < 0.05$; 34.7(8.2) vs 31.9(8.0)) compared to drivers with lower number of non-interpersonal SLE. Driver violations, but not driver mistakes, were significantly correlated with a marker of risk-taking behaviour pl-MAO activity ($r = -0.19$, $p = 0.001$). In female drivers with a higher number of non-interpersonal SLE and lower pl-MAO activity appeared significantly higher score in driver violations in comparison with female drivers with lower number of non-interpersonal SLE and lower pl-MAO activity ($p = 0.03$; 11.2(6.0) vs 8.8(5.0)). No significant

5-HTTLPR genotype's main effect on driver behaviour was detected. But females with a higher number of non-interpersonal SLE and 5-HTTLPR L/L genotype had higher score in driver violations compared to lower number of non-interpersonal SLE and 5-HTTLPR L/L genotype (p = 0.03; 12.1(6.1) vs 8.7(4.1)). *Conclusions:* Stressful life events affect young driver's behaviour stronger in females than in males. Female drivers with high number of non-interpersonal stressful life events and low pl-MAO activity have a higher tendency for traffic violations and risk-taking, which may be the reflection of lower functioning of their serotonergic system. Female drivers with 5-HTTLPR L/L genotype may be more vulnerable to non-interpersonal stressful life events.

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Preservation of criminal evidence

The criminal prosecution of drivers, who cause (often heavy) accidents in condition of unfit state for driving, due to illness or high age, is a great challenge for the investigation agency because of real and/or legal problems of evidence. On the basis of current cases from the scope of the justice of Hamburg it will be exemplary illustrated by which circumstances the concerned drivers could have rendered themselves liable to prosecution. It will be pointed out, which special difficulties could arise for the police and the public prosecution department during preliminary proceedings and the following trial. So it may be that available parts of evidence (for example testimonies or patient's files to be found in doctor's office) are often not allowed to be used for giving evidence because of prohibition by law. Actual established facts are of decisive importance for the giving of evidence. Furthermore it will be drawn out, which kind of giving evidence is possible and under which special condition it will be confirmed during the trial. Of special importance in Germany is § 97 StPO (Criminal prosecution law). It allows the using of medical documents in the possession of the accused patient, found e.g. by house search, at court proceedings, without affecting the medical confidentiality. It means, also in the sphere of road traffic regulations the possibilities of criminal prosecution law for the perpetuation of evidence should be exhausted. Considering the far reaching consequences, up to crime of causing death, it is absolutely necessary. The first access of the police is of decisive importance to prevent the impending loss of evidences.

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Alcohol validation of a representative and standardized test course in driving simulation: A method to assess driving ability under psychoactive drugs and neurological conditions

For clinical studies testing the impairing effect of medical drugs on driving performance, the use of driving simulators is a promising approach. A major advantage of simulators is that traffic situations can be standardized and volunteers can drive the identical course under the same conditions. Furthermore, driving under the influence of psychoactive substances may be systematically tested without risk. The comparison of psychopharmacological induced driving impairment with the effect of specific blood alcohol concentrations is an approved and face valid approach to determine the clinical relevance of results. The aim of the present study is to collect alcohol validation data using two different blood alcohol concentrations in a representative test course for several driving performance parameters taken from different data sources, i.e. expert ratings, recorded driving data and questionnaire data. In this double-blind, randomized, cross-over study, 24 subjects drove a test course under the influence of 0.00 %, 0.05 % and 0.08 % blood alcohol concentration. Thereby, the alcohol dose was individually adjusted depending on gender, height and weight. The test course was presented in the WIVW's driving simulator with motion system and lasted about 60 minutes. A representative set of driving scenarios on rural roads, highway and in urban traffic was included in the test course. These scenarios have already proved to be sensitive for the influence of medical drugs and diseases in previous clinical studies. The selection of scenarios ensured that

both tactical and operational aspects of the driving task were addressed. Generally, driving performance was worse under the influence of alcohol ($p < .05$ for raters' assessment, $p < .001$ for total number of errors for both alcohol conditions compared to placebo). However, the performance parameters differentiated distinctly between the alcohol conditions depending on the underlying scenarios. For example, lane keeping performance as part of the operational level and being measured by the standard deviation of lane position deteriorated in easy tracking scenarios ($p < .05$). In contrast, for complex tracking scenarios, the frequency of lane departure as an indicator of very poor tracking was sensitive ($p < .005$). For cognitively demanding driving tasks representing the tactical level, the number of related driving errors was found to be selective ($p < .005$). The present study shows that the selection of driving scenarios and driving performance parameters is very important for a global assessment of driving-related deficits due to psychotropic drugs or diseases in general and alcohol in particular. We recommend to evaluate driving performance as a whole by a profile-like analysis of various parameters at different levels of the driving task in future studies.

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Suspension of driving licenses in different types of dementia: Data on 8850 patients from the Swedish Dementia Quality Registry (SveDem)

Objective: Dementia is one of the major public health concerns and is estimated to affect 36 million individuals over the world. By definition, dementia affects memory and one additional cognitive domain. Several of these, such as problems with executive functions, visuospatial dysfunction, behavioural disturbances and problems with orientation affect fitness to drive. In Sweden, there are no general driving fitness examinations of license holders, but mandatory reporting by physicians of patients who are medically unfit to hold a license. Physicians also have the option of making an agreement with the patient to refrain from driving. Using data from the Swedish dementia registry (SveDem), we aimed to investigate if the reporting of driving unfitness by physicians differed with different dementia diagnoses. *Methods:* Data from patients included in the SveDem registry, for which a dementia diagnosis was established between 20070501-20111231 and had a driving license, were included in the study. The registration was made with a web-based questionnaire and information is primarily taken from the patients' medical record. The vast majority of variables analysed was based on questions with yes, no and "do not know" as possible answers. Totally, 8850 patients were included in the analyses. The registry holds information on 8 different dementia diagnoses, established by the physicians based on ICD-10 criteria. In binary logistic regression analyses, the primary outcome was whether the physicians had agreement with patient to quit driving or report the patient to the driving license authority with a recommendation of license suspension. Variables such as age, gender and type of dementia were considered in the model. *Results:* The mean age of the 8850 included dementia patients with driving licenses was 76.6 (8,0) years with a majority (55,1 %) of males (n = 4876). An agreement with the physician not to drive was obtained in 80% cases. In 705 (8.7 %) cases the patients were reported to the Swedish Transport Agency. The highest and lowest rates of reporting of driving licenses were recorded in frontotemporal dementia (FTD) (23.3 %) and dementia with Lewy bodies (DLB) (4.9 %), respectively. Multivariate analyses using binary logistic regression showed that after controlling for age, MMSE score ($P = 0.002$) and gender ($P = 0.001$), FTD [$P = 0.015$], DLB ($P = 0.004$) and Parkinson's disease with dementia (PDD) ($P = 0.014$) were significantly associated with driving license suspension. *Conclusions:* SveDem data demonstrated that for the majority of dementia patients an agreement with the physician not to drive was reached. In less than 9 % the driving license was reported to authorities. Of those, the majority of patients suffered from FTD. The loss of disease awareness in these patients may contribute to difficulties in reaching an agreement not to drive resulting in suspension of the driving license.

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Computer-based cognitive tests but not paper-pencil screening tests can discriminate between older drivers with and without recent crash involvement

Introduction: A number of specific cognitive skills are fundamental for the ability to drive safely. Some of them can be affected by age-related cognitive changes. In this study, we develop a computer-based screening tool to investigate the age-dependent performance in different driving-relevant cognitive tasks and compare it with the outcome of cognitive and motor screening tests. *Method:* A newly developed screening tool that consists of five subtests (maximum duration 3 min.) was used to assess the following driving-relevant cognitive skills: selective and divided attention, eye-hand coordination, executive functions, and regulation of distance and velocity. The tests were presented on a computer screen and the reactions of the participants were captured with a commercially available steering-wheel and foot pedal. Performance in 88 healthy subjects divided into two groups was measured: 30 young active drivers (mean age = 31 years, SD = 5.5), 44 older drivers without recent crash involvement (mean age = 69 years, SD = 5.1), 14 older drivers with recent crash involvement (mean age = 71, SD = 5.0). Participants also completed the Montreal Cognitive Assessment, Trail Making Test A & B, Clock Drawing Test, and the Timed-up-and-go Test. *Results:* In this study, we could show that the five subtests of the screening tool discriminate between younger and older participants, with younger subjects outperforming older subjects. We also found that older subjects with recent accident involvement showed significantly poorer performance in the five subtests compared to older drivers without accidents. Older drivers differed also in simulated driving performance, with crash involved older drivers showing poorer performance compared to non-crash involved older drivers. No significant differences were found in paper-pencil screening tests between the two groups of older drivers. *Discussion & Conclusions:* Results show that the newly developed computer-based screening tool but not the paper-pencil screening test discriminates between younger and older subjects, as well as between older subjects with and without recent crash involvement.

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Feasibility in a GP context of a protocol aiming to detect cognitive deficits that may affect driving in older patients and to help counseling an adapted regulation of driving

Objective: Driving is a complex activity which requires cognitive abilities, in addition to sensorial and motor ones, that can decline with age and affect driving. In France, where there is no specific procedure for monitoring elderly drivers, doctors have an obligation to counseling against medical contraindications to driving. But they do not have validated cognitive tools to assess the potential impact of cognitive impairment on driving ability. The objective was to study the feasibility by doctors and acceptance by older drivers of a protocol aiming to detect cognitive deficits that may interfere with driving. *Methods:* 2804 generalist practitioners (GP) were contacted randomly selected from the professional phone base from FRANCE TELECOM. Each GP having accepted to participate to the study was asked to recruit 5 driver patients, and to offer them a dedicated visit, comprising a questionnaire about their road mobility, two cognitive tests, the Trail Making Test A and B (TMT A and B) and the Digit Symbol Substitution Test (DSST), the 4-IADL scale and the Up and Go test. Two cognitive components proposed were associated in previous French studies with road security concerns, the TMT-B with an increased risk of accident in the five previous years in an epidemiological study, and the DSST with unsafe driving in an experimental driving experiment with a population comprising Alzheimer disease patients and non-demented controls. *Results:* 92 GPs have agreed to participate in the study. They have included 541 drivers aged 70 years or

older. Cognitive tools offered were judged satisfactory by the GPs, as to their feasibility (75 to 99 % depending on the test judged) and their clinical utility (83-86 % depending on the test). A good validity of the coding of cognitive tests was observed (coding compared between the GPs and an experimental psychologist). 70 % of doctors were willing to use this protocol in their practice. *Conclusions:* Finally, in spite of the low percentage of doctors having accepted to participate to the study, these results demonstrate the feasibility by physicians and the acceptance by patients of a protocol aiming to detect cognitive deficits which may disrupt driving among older drivers. This may help physicians counseling patients about regulation of their driving habits adapted to their cognitive state.

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The effect of age on functional visual field and on visual exploration during driving

Objective: The functional visual field is the area where targets on a complex background can be recognized and distinguished from distractors. It is hypothesised that the functional visual field is influenced by age and that it is relevant for safe driving. During driving, it has been shown that older drivers allocate a larger percentage of their visual scan time to a small subset of areas in the driving scene than younger drivers. Therefore, it is hypothesised that older drivers focus on central areas with neglecting peripheral areas for daylight and night driving compared with younger drivers. Methods: We projected 30 pictures of everyday life into a hemisphere (diameter 60 cm) realizing a ± 90 o visual field. In addition to the projected pictures, targets and distractors appeared in a randomised order within the ± 50 o visual field area. Furthermore, subjects had to conduct neuropsychological examinations (UFOV®, TMT A+B, MoCA, Clock Drawing) and take a simulated drive on a motorway route under day and night conditions. 110 healthy subjects (48.17 ± 16.73 years; range: 20-78 years) volunteered for the study. *Results:* Target detection rate decreased with increasing eccentricity of the target ($p < 0.01$). Whereas young subjects showed a very small decrease in target detection rate with increasing eccentricity (10 o ◊ 50 o: 8.83 %), older subjects showed a large drop in target detection rate with increasing eccentricity (10 o ◊ 50 o: 37.54 %). On the other hand, reaction time increased with increasing eccentricity of the target ($p < 0.01$). Older subjects showed a higher reaction time compared to younger subjects independent of target position ($p < 0.01$). During driving, older subjects allocated their gaze more to the central area compared to younger subjects, but the difference was only significant during night driving (day: $p = 0.10$; night: $p = 0.01$). Furthermore, older drivers persist longer on central areas (day: $p = 0.03$; night: $p < 0.01$) whereas younger drivers do more eye movements to scan the scene, but these differences were not significant (day: $p = 0.20$; night: $p = 0.08$). At night, both young and older drivers do less eye movements (younger: $p = 0.01$; older: $p = 0.01$) and persist longer on central areas than during day driving, but the difference reached only significance for older subjects (younger: $p = 0.10$; older: $p = 0.01$). *Conclusions:* The results of the functional visual field test show an age-dependent effect on target detection and reaction time. Older subjects have more problems detecting targets in the periphery. Similar results have been found during simulated driving. Older drivers change their gaze less than younger drivers and persist longer on central areas. A possible impact of these age-dependent effects could be a delayed detection of peripheral hazards during driving for elderly drivers and thus less time for an adequate reaction.

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How to increase user comfort in a driving simulator

Background: Laboratory-based driving simulators are often used to study driving behavior. User comfort during simulated driving is of key importance, since reduced comfort can alter the behavior of the user, confound the experiment and increase dropout rates. A common comfort-affecting factor is the simulator adaptation syndrome, also known as simulator sickness (SS). Symptoms of SS can range from mild discomfort to severe and prolonged nausea, dizziness, and disorientation. SS depends on individual factors of the user (i. e. age, gender, experience), task specific factors (i. e. driving circuit, optical flow) and simulator related factors (i. e. field of view, contrast). During simulated driving, the visual system perceives motion from the optical flow in the retinal image, while the vestibular system senses no self-motion. This intersensory conflict between the visual and the vestibular sense can cause SS (sensory conflict theory). In this study, we propose methods to reduce the optical flow of a virtual driving scene and evaluate whether this reduces SS. *Methods:* For this study, a fixed-frame driving simulator was used to implement the virtual driving scene. The manufacturer provides a virtual scene that is characterized by a high optical flow of 213 pixels/s leading to a high sensory conflict. In contrast to the manufacturer-provided High Sensory Conflict Scene (High-SCS), we developed a Low Sensory Conflict Scene (Low-SCS) that is based on three adaptations: (I) Scene optimizations to reduce the optical flow by 68.9 %, (II) implementation of an independent visual background and (III) reduction of brightness of lateral projection screens by 48.0%. Note that the driving circuit and the task for the driver were not changed. Procedure: 20 young, healthy participants (10 male, mean age = 27.7 ± 2.9 years) drove in both the High-SCS and the Low-SCS scene during 10 min at two different days (same time of day, randomized order). Before and after driving, participants rated SS by completion of the Simulator Sickness Questionnaire (SSQ). A head mounted eye-tracking system was used to measure fixation duration and saccades amplitude. *Results:* After 10 min driving in the High-SCS, the SSQ score increased by 122.9 % ($p < 0.01$) compared to an increase of 3.4 % ($p = 0.878$) after driving in the Low-SCS. Compared to the High-SCS, in the Low-SCS amplitudes of saccades were increased by 16.1 % ($p < 0.01$). *Conclusions:* Results show that the investigated adaptations significantly reduce symptoms of SS in the younger population and the Low-SCS is well accepted by the users. We expect that these measures will improve user comfort and reduce dropout rates.

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The impact of leukoaraiosis, one of aging findings in brain MRI, on traffic involvements

The relationship between traffic crashes and brain tissue changes in healthy elderly drivers have been never elucidated. Leukoaraiosis has been regarded as one of aging findings in brain magnetic resonance imaging (MRI), which is significantly associated with cerebral infarction and cognitive impairements, and is currently recognized from the presence of different histopathological changes such as spongiolosis, demyelination, loss or gain of glial cells, apoptosis of oligodendrocytes, and Wallerian degeneration. A total of 951 elderly drivers (570 men and 381 women; age rainge, 60–87 years) who underwent brain MRI as part of total health check-ups and answered a road traffic involment questionnaire for past 10 years were examined to determine whether asymptomatic leukoaraiosis was associated with various types of traffic involvements. A total of 137 traffic involvemts were classified in crashes in parking lots or garages, crossroad crashes, rear-end collisions, and the other types of crashes. Multiple logistic regression analysis was performed to elucidate the relationship between leukoaraiosis and various types of traffic involvements. Single and multiple leukoaraiosis in cerebral subcortical area were diagnosed in 13.4 % and 37.6 %, respectively. Crashes in parking lots or garages amount to 36, crossroad crashes

to 39, rear-end collisions to 32, and the other types of crashes to 30. Adjusted odds ratios with gender, age, and driving exposures of parking lots crashes, rear-end collisions, and the other types of crashes were not significant for leukoaraiosis at all. However, crossroad crashes were only significant for leukoaraiosis. The adjusted ones of crossroad crashes were 2.098 [95 % confidence interval (CI), 0.765–5.756] for single leukoaraiosis and 2.270 (95 % CI, 1.323-5.800) for multiple leukoaraiosis. Multiple leukoaraiosis in the elderly is significantly associated with traffic crashes, in particular, crossroad crashes. This association is independent of gender, age, and driving exposure. A common brain MRI finding, leukoaraiosis, may be human factors in traffic crashes exception for age.

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School-based first aid training and the implications for traffic injury prevention: A randomized controlled trail

Adolescent injury remains a significant public health concern and is often the result of at-risk transport related behaviours. When a person is injured actions taken by bystanders are of crucial importance and timely first aid appears to reduce the severity of some injuries (Hussain & Redmond, 1994). Accordingly, researchers have suggested that first aid training should be more widely available as a potential strategy to reduce injury (Lynch et al., 2006). Further research has identified schools as an ideal setting for learning first aid skills as a means of injury prevention (Maitra, 1997). The current research examines the implications of school based first aid training for young adolescents on injury prevention, particularly relating to transport injuries. First aid training was integrated with peer protection and school connectedness within the Skills for Preventing Injury in Youth (SPIY) program (Buckley & Sheehan, 2009) and evaluated to determine if there was a reduction in the likelihood of transport related injuries at six months post-intervention. In Queensland, Australia, 35 high schools were recruited and randomly assigned to intervention and control conditions in early April 2012. A total of 2,000 Year nine students (mean age 13.5 years, 39 % male) completed surveys six months post-intervention in November 2012. Analyses will compare the intervention students with control group students who self-reported i) first aid training with a teacher, professional or other adult and ii) no first aid in the preceding six months. Using the Extended Adolescent Injury Checklist (E-AIC) (Chapman, Buckley & Sheehan, 2011) the transport related injury experiences included being injured while "riding as a passenger in a car", "driving a car off road" and "riding a bicycle". It is expected that students taught first aid within SPIY will report significantly fewer transport related injuries in the previous three months, compared to the control groups described above. Analyses will control for sex and socio-economic class of schools. Findings from this study will provide insight into the value of first aid in adolescent injury prevention and provide evidence as to whether teaching first aid skills within a school based health education curriculum has traffic safety implications.

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Vulnerable road users: Pedestrians, experiences and beliefs and their consequences in risky conducts

Objective: Luchemos por la Vida, non-governmental and non-profit organization, that studies and works in Argentina to prevent traffic accidents, decided to observe systematically the pedestrians' behavior in avenues and streets of a city, Buenos Aires, to identify the most common risk behaviors and to define a massive awareness campaign to change the beliefs, attitudes and behavior of this group, the most vulnerable in the traffic system. In the city of Buenos Aires, 44 % of the people who die in the traffic are pedestrians. *Methodology:* We selected representative samples of crossroads in the city and we registered observations of the behaviour of 3,685 pedestrians. This information was complemented with focused interviews to know the motivations of the observed con-

ducts. *Results:* From the different observations carried out, we found that, on average, only 6 % of the pedestrians cross in the correct way on street corners with traffic lights and, without traffic lights, we observed a very low rate of the traffic law observance. The focused interviews provided the most common motivations for these conducts. *Discussion and conclusions:* The results confirm what the traffic psychology explains as the chosen risk. Facing a low perception of the risk for probabilities learning and the perception of benefiting from crossing improperly, people chose this behaviour. Based of the obtained results, we decided to develop an awareness campaign aimed at pedestrians, young and adult people, with the objective to increase the risk perception and to propose measures of self-protection.

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Epidemiological analysis of fatal cases during riding bicycle from medico-legal aspects

Objective: There have been few reports on the analysis of bicycle-related fatal cases, although its prevention is important. Therefore it seems useful for this purpose to elucidate the practical situation of such cases, especially with special note on those during riding bicycle from medico-legal aspects. Methods: The characteristics of the fatal cases during riding bicycle were epidemiologically described using the autopsy and inquest records. *Results:* There were 59 fatalities as such cases from 2007 to 2011 in Okayama Prefecture, Japan, and this corresponded to 0.5 % of total number of unexpected deaths in this district. The mean age was 64.6 years old with range of 4-89, 45 were male, 14 were female. Twenty one of 59 fatalities (35.6 %) were autopsied, occupying 2.0 % of all autopsied cases, while 38 fatalities (64.4 %) were not autopsied, occupying 0.35 % of unexpected deaths without autopsy. Details of cause/manner of death of 21 autopsied cases were due to injury (12 cases), drowning (6 cases) and others (3 cases). Among the other 38 fatalities death due to internal causes (21 cases), drowning (9 cases), injury (4 cases) and other causes (4 cases) were diagnosed only by the external examination. In the analysis of the scene, over half of all cases (30 of 59 cases, 50.9 %) were falling into irrigation channel/side ditch/stream, 10 cases (16.9 %) were overturning on the road and 19 cases (32.2 %) were others. Cases dealt as road traffic accidents by authorities was only 20.3 % (12 of 59 cases), because those occurring in the restricted place recognized as road according to the road traffic act were counted, and the autopsy rate of such cases was 33.3 % (4 of 12 cases). *Conclusions:* It is essentially necessary for the prevention of death during riding bicycle to analyze cases other than traffic accidents with increasing their autopsy rate.

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Evaluation of fatal road traffic crashes in Denmark

Objective: The purpose of this presentation is to acquaint attendees with the practices related to investigations of traffic related deaths in Denmark from a forensic perspective. In the 1970's around 1200 people were killed annually on Danish roads. Since then there has been a continuous reduction in the number of people killed and severely injured, and in 2012 the number of fatalities was the lowest reported since the 1930's when the register was initiated. A limited number of deceased in these crashes are examined in detail during a postmortem/medico-legal investigation. *Methods:* The literature concerning the practices in Denmark regarding the examination of road traffic crash fatalities, including the police and the departments of forensic medicine and the relevant Danish law is reviewed. *Results:* According to Danish law, the police determine whether a medico-legal investigation is to be performed in any given case. If the cause or manner of death is unclear, and/or there are suspicious circumstan-

ces that may have relevance to the police, they generally request a medico-legal autopsy. In Denmark, approximately 20 % of all traffic-related deaths are autopsied, and the remaining is only examined externally during the coroner's inquest. A recent study documented, that in 18 cases of conviction of traffic crash related manslaughter according to The Danish Criminal Code § 241, autopsy was only performed in three (3) of the cases, indicating a potential legal rights issue. When a medico-legal investigation is performed, this includes a whole body CT-scan, a forensic autopsy including an external and internal examination, relevant microscopy, screening for alcohol in the blood and urine, and increasingly a toxicological examination is performed (narcotics and medicine). There are currently no task forces active that examine fatal road traffic crashes, where forensic pathologists routinely are represented. Hence, in the majority of fatal road traffic crashes the information available to the judicial system arises from the police only, without objective data from the medico-legal system, i.e. the three Danish university based departments for forensic medicine. *Conclusions:* In order to conclude precise cause and manner of death, as well ensure relevant documentation of injuries, thorough medico-legal investigations should be requested more often. As a minimum, a full medico-legal investigation, including full toxicological screening should be performed in cases where survivors are charged with traffic crash related manslaughter in order to ensure the legal rights for the affected individuals. Furthermore, data collected from forensic research has historically contributed significantly to the development of safety equipment, prevention of injury and death, as well as improved understanding of the injuries that result from road traffic crashes. Hence, from a societal point of view as well as the individually affected cases, the practices related to investigations of traffic related deaths in Denmark require re-evaluation.

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Traffic therapy – A new treatment for old wounds

There are several possibilities for a person to improve his or her behavior when participating in traffic. First of all he or she can hope that what happened has been a coincident and that it is unlikely that it will happen again. Another possibility is to think over the problematic behavior in a serious and critical way and to avoid this problematic behavior in future intentionally. Thirdly, the person can discuss his or her traffic problem with someone else, like a friend, to obtain information about how somebody else views the problem or how to avoid it in future. A next possibility is to open up for professional information as given in the Internet or in books about problematic behavior in traffic and how to develop a better behavior. As a fifth possibility this person can discuss his or her problem with a professional in person, such as a traffic psychologist, with the aim to get advice, how to avoid it in the future. An even better consequence of the observed problem in traffic could be to participate in a course in a group of other persons who had problems with their behavior in traffic themselves, guided by a specialist, such as a traffic psychologist. Much better would be though, to seek an intervention by a traffic psychologist in an individual setting, to discuss, what happened and how often it happened, to focus the problematic behavior in traffic and to find solutions how to behave in future without getting traffic problems again. The best solution eventually would be to focus on the origins of that problematic behavior, which are to find in the psyche of that person, who is therefore regarded as an entire, whole human being and to solve the psychic problem which is the basis for the problems observed in traffic. This, instead, would be a treatment in a psychotherapeutic way. Therefore it is called traffic therapy. The young discipline of traffic therapy on the basis of cognitive behavioral therapy and traffic psychology uses means that were developed during the last decades of rehabilitation courses of traffic psychology and it uses psychotherapeutic methods from the circle of cognitive behavioral therapy. The aim is to overcome the problems observed in the past, not only in traffic, but in general life, as behavior in traffic is only a part of the general social behavior of a person. Thus problems of the behavior will be solved in a way that they no longer exist, because also the problems functioning as basis of that behavior will be focused and solved. This can confront a problematic attitude of the person, harmful experiences during childhood and youth or certain life events in adult life. By this perspective intrinsic motivation will develop within the patient to improve his or her personal life. This is necessary to reach a significant change. New and fruitful developments concerning attitude, thinking, emotional and behavioral reactions will be elaborated. Reliability of that change is reached by taking responsibility for ones own life and by experiencing the changes created by traffic therapy in real life. Destructive behavior like drinking, taking drugs, impulsive or exaggerated aggressive reactions or rebellion against the rules is therefore in future neither necessary nor useful. But the patient is able to recognize his formerly destructive be-

havior, which he now stands apart from. Thus traffic violations will no longer occur, also because the roots of that destructive behavior are no longer to be found!

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Advantages of mice over trackballs as computer input devices on moving platforms

Objective: For the operation of computer systems on moving platforms, often trackballs are used as input devices because they can be fixed to the workplace. This is intended to prevent motion-induced shifts of the device and the cursor on the computer screen. However, studies of user performance show that computer mice allow for a faster and more precise cursor control than trackballs (Grandt, Pfendler & Mooshage, 2003; Isokoski, Raisamo, Martin & Evreinov, 2007), even in moving environments (Lin, Liu, Chao & Chen, 2010). These studies focused on objective performance during short experimental sessions. Therefore, little is known about differences between mice and trackballs with regard to the experienced strain and muscular fatigue during extended computer operations. The objective of this study was to compare strain and fatigue of mouse users and trackball users in a realistic operational setting on a seagoing platform. *Methods:* A sample of 18 sailors of the German Navy participated in this trial. They performed their usual tasks with a computer system in the operations room of a German Frigate. Tasks included the radar-based detection and classification of airplanes and vessels, acquisition of potential threads, thread engagement and weapon control. Ten participants used a trackball and eight participants used a mouse as input device. To prevent the mice from shifting due to ship movements, they were equipped with a magnet that provided adhesion to ferromagnetic mouse pads. Participants tested the input devices for a period of 26 days with 4-6 hours of computer operation per day during a transit voyage and a weapon exercise. Wave heights during the trial period were between 0.5 and 4 meters. After the end of the trial period, participants gave their subjective evaluation of the input device on a seven-point rating scale with the questionnaire from ISO 9241-420, appendix D.1. This questionnaire contains items regarding characteristics of cursor movements, effort to operate the device, and fatigue of fingers, wrist, arm, shoulder and neck. Ratings of mouse and trackball users were compared with t-tests. Due to the multiple testing, the test-wise alpha level was set to .0051 in order to keep the family-wise alpha level at 0.05 (Šidàk-correction, Abdi, 2007). *Results:* The magnetic mouse received significantly better mean ratings on all performance items of the questionnaire, i.e. speed (6.4 vs. 2.5, $p < .001$), accuracy (6.3 vs. 4.2, $p < .001$) and smoothness of movements (5.8 vs. 3.4, $p < .001$). Moreover, mouse users reported significantly more comfortable levels of force required in the use of their input device (5.8 vs. 3.4, $p = .003$). Significantly less fatigue, as indicated by better and thus higher ratings in the questionnaire, were found for fingers (6.5 vs. 2.9, $p < .001$), wrist (6.4 vs. 2.9, $p < .001$) and arm (6.0 vs. 3.6, $p = .002$) of mouse users. *Conclusions:* Performance advantages of mice over trackballs were replicated with subjective measures in a realistic setting on a moving ship. The data show that in addition to this performance advantage, mouse use leads to less strain of the operators, which is supposed to have positive effects on operators' health and work capability.

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Medical aids to road traffic crash

Because of the huge damage of road traffic crash, it has already been one of the public health problems threatening life safety of human beings. According to the damage level, the traffic crash can be divided into super-serious crash, serious crash, general crash and slight crash. For the injury classification, it can be decided by injury region, characteristics, degree, mechanism, road user and skin integrity. For the pre-hospital emergency care, its purpose is to save lives and recover the physiological function of patients furthest. The western developed countries have a lot of advanced experience and successful practices in the emergency care of traffic crash, they have formed comparatively perfect emergency care systems in the regulation construction of emergency care, institu-

tion setting, rescue teams, first aid scheme and decision, etc. which play an important role in the reduction of traffic crash casualties and property losses. In order to strengthen the integration treatment of pre-hospital, emergency room and intensive care unit (ICU), the first-aid model adopted in most of Chinese cities is that the city medical care center and its subordinate first-aid station are responsible for pre-hospital first aids, and the emergency department of each hospital is responsible for in-hospital first aids, which supports pre-hospital first aids. During emergency care, the "Golden 1 hour" and "Three-link Theory" play a great role in the treatment of multiple injury and massive casualties, what's more, triage and time strategy is very important in the standard treatment in order to save the casualty effectively. Operation stages, correcting lethal triads and indications were introduced in the damage control, and some points were emphasized in the treatment of multiple injury and massive casualties. There are some suggestions on medical aids to road traffic crash in order to provide some help for improving traffic safety, for example the proper organization and support of first-aid are very important, road traffic crash rescue is not only the medical treatment for the injured, but also contains many other aspects such as the control of the crash scene, elimination of chain hidden dangers, and the clean of the crash site, etc., besides, paying attention to our own security and explaining to the victims' families are also important in the process of road traffic crash.

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