

**Objectives** Low wage and immigrant workers suffer an excess of injuries and are often difficult to reach. There is a need to identify alternative forums for health and safety training. The aim of this study was to determine whether injured workers cluster by geographic area; this would serve as a basis for targeting occupational health and safety interventions at the community level.

**Method** Work-related injuries from the Illinois Trauma Registry were extracted and mapped by residential zipcode for 2000–2009. Injury data was merged with employment data.

**Results** There were 23 200 work-related injuries. Of the 1382 zipcodes, 79.3% of the injuries occurred among residents living in 20% of the zipcodes. 21.2% of the work-related injuries (N = 4914) occurred in the 25 zipcodes with the highest counts. We identified six spatial clusters. In the 25 ZIP codes with the highest rates of injuries among employed persons, less than 1% of the injuries occurred in these zipcodes (N = 99).

**Conclusions** Training at the community level could reduce workplace injury and is needed to augment the void in workplace training. Alternative datasets, not originally designed for occupational surveillance, could be useful for identifying communities with occupational injury and illness clusters. The validity and usefulness of these datasets should be further assessed, and the communities in which these clusters occur should be mapped to identify community level infrastructure that could be leveraged for training interventions. A bridge should be created between occupational medicine, governmental institutions, social work and community advocacy in order to make a community intervention program viable.

#### 0084 A CASE-CONTROL STUDY OF OCCUPATIONAL EXPOSURE TO METALWORKING FLUIDS AND BLADDER CANCER RISK AMONG MEN

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**Objectives** Metalworking has been associated with bladder cancer risk in many studies. Metalworking fluids (MWFs) are suspected as the putative exposure, but epidemiologic data are limited. Based on state-of-the-art, quantitative exposure assessment, we examined MWF exposure and bladder cancer risk in the New England Bladder Cancer Study.

**Method** Male cases (n = 895) and population controls (n = 1031) provided occupational histories and information on use of each of three MWF types: (1) straight (mineral oil, additives), (2) soluble (mineral oil, water, additives), and (3) synthetic (water, organics, additives) or semi-synthetic (soluble/synthetic hybrid), in response to exposure-oriented modules administered during personal interviews. We estimated the probability, frequency, and intensity of exposure to each MWF type and, if probability exceeded 50%, cumulative exposure. Logistic regression was used to calculate odds ratios (ORs) and

95% confidence intervals (CIs), adjusting for smoking and other risk factors.

**Results** Risk was increased for men reporting use of straight MWFs (OR=1.7, 95% CI=1.1–2.8), with a significant trend with increasing cumulative exposure (p = 0.024). Use of soluble MWFs conferred a 50% elevated risk (95% CI=0.96–2.5). ORs were nonsignificantly elevated for synthetic MWFs, based on small numbers. Men who were never metalworkers, but held jobs with possible exposure to mineral oil, had a 40% increased risk (95% CI=1.1–1.8).

**Conclusions** In the most comprehensive assessment of MWF exposure in a bladder cancer case-control study, exposure to straight MWFs significantly increased bladder cancer risk, as did employment in non-metalworking jobs with possible mineral oil exposure. Our results strengthen prior evidence for mineral oil as a bladder carcinogen.

#### 0085 PSYCHOSOCIAL WORKING ENVIRONMENT FOR PATIENTS WITH ISCHAEMIC HEART DISEASE AND ASSOCIATION TO ADVERSE CARDIAC EVENTS

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**Objectives** During the last decades a possible association between the psychosocial working environment and increased risk of Ischaemic heart disease (IHD) has been debated. A systematic review from 2009 found moderate evidence that high psychological demands, lack of social support and iso-strain was associated with IHD. Whether the psychosocial working environment plays a role for patients with existing cardiovascular disease on the risk of new cardiac events and readmissions is unknown

**Method** A cohort of patients under 65 years and treated with Percutaneous Coronary Intervention was established in 2006. Three months after the procedure the patients answered a questionnaire about their psychosocial working environment. A total of 528 patients had returned to work 12 weeks after the procedure, while 97 were still sick-listed. Patients were followed in registers for 3+ years to determine cardiac readmissions and events. We examined the association between psychosocial working environment and adverse events among those who had returned to work at 3 months by Cox Regression analysis.

**Results** We were not able to detect any significant associations between psychosocial working environment in terms of quantitative and cognitive demands, workload, involvement, influence, tolerance, social support, the combinations of effort-reward and demand-control and the risk of adverse events.

**Conclusions** Reporting of problems in the psychosocial working environment are not associated with risk of adverse cardiac events. However, tendencies of a lower risk of cardiac event were present for employees reporting the worst psychosocial environment. This unexpected finding may be explained by vulnerable persons not returning to work.

# 0087 LONG-TERM DAY-AND-NIGHT ROTATING SHIFT WORK POSES A BARRIER AGAINST THE NORMALISATION OF LIVER FUNCTION

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**Objectives** To evaluate the impact of day-and-night rotating shift work (RSW) on liver health, we analysed the association between long term RSW exposure and the normalisation of plasma alanine transaminase (ALT) levels over a five-year period. **Method** The data from physical examinations, blood tests, abdominal sonographic examinations, personal histories, and occupational records were collected from a cohort of workers in a semiconductor manufacturing company. The sample population was divided into three subgroups for analysis: persistent daytime workers, workers exposed intermittently to RSW (i-RSW), and exposed to persistent RSW (p-RSW).

**Results** Records were analysed for 1196 male workers with an initial mean age of 32.5 years (SD 6.0 years), of whom 821 were identified as rotating shift workers, including 374 i-RSW and 447 p-RSW workers. At the beginning of the follow-up, 275 were found to have elevated ALT (e-ALT): 25.1% day-time workers, 23.0% i-RSW workers and 21.3% p-RSW workers. Of those with e-ALT at the beginning, 101 workers showed normalised serum ALT levels at the end of five-year follow-up: 10.7% of day-time workers, 8.6% of i-RSW workers, and 6.5% of p-RSW workers;  $P = 0.016$ ). By performing multivariate logistic regression analyses, and comparing with the persistent daytime co-workers, after controlling for confounding variables, analysis indicated that the workers exposed to p-RSW were 46% less likely (OR, 0.54; 95% CI, 0.30–0.95;  $P = 0.03$ ) to attain normal ALT levels within a five-year interval.

**Conclusions** Persistent day-and-night RSW pose a vigorous obstacle to the normalisation of e-ALT among workers with pre-existing abnormal liver function.

# 0089 RECOVERY FROM MENTAL CONDITION: IS IT DIFFERENT BETWEEN TBI/NON-TBI

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**Objectives** This study aimed to determine the rates of psychological symptoms among those with traumatic brain injury (TBI) and with non-TBI at 3 months and 12 months after occupational injury and to examine the change in psychological status over time.

**Method** Our study candidates were injured workers in Taiwan who were hospitalised for 3 days or longer and received hospitalisation benefits from the Labour Insurance. A self-reported questionnaire including Brief Symptom Rating Scale (BSRS-50)

and Post-traumatic Symptom Checklist (PTSC) was sent to workers at 3 months and 12 months.

**Results** Among 853 injured workers who completed the questionnaire at 3 and 12 months, regarding to the severity of BSRS score, 7.8% of those with TBI had recovered at 12 months, comparing with 8.1% in those with non-TBI. On the other hand, approximately 11.6% of those with TBI had recovered from post-traumatic stress symptoms at 12 months, comparing with 9.7% among those with non-TBI. Injured workers with TBI had lower rate of recovery from psychological symptoms, comparing with non-TBI.

**Conclusions** A significant proportion of victims with TBI and non-TBI suffered psychological symptoms after injury. The identification and treatment of psychological symptoms are important for optimal adaptation after traumatic injury.

# 0098 OCCUPATIONAL DEAFNESS DUE TO CO-EXPOSURE TO NOISE AND OTOTOXIC AGENTS

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**Objectives** In order to estimate the hearing impairment in occupational environment due to the co-exposure to noise and solvents, we have undertaken a cross-sectional study to evaluating the prevalence of hearing loss due the co-exposure to both solvents and noise.

**Method** We recruited 144 workers, working in electronic materials manufacturing plant, one group is exposed to solvents alone, and the other one exposed to both noise and solvents. In another hand, we followed two other groups in a construction company of farm implements. 136 workers exposed to noise, 96 administrative workers none exposed. The data were collected by means of questionnaire and of an introductory tonal audiometry between 0,125 and 8 KHz

**Results** The prevalence of hearing loss of more 20dB in the group exposed to the noise and solvents was much greater (57.8%) than that of the noise alone (35.3%), and that of administrative workers (27.7%) ( $P < 0.0001$ ).

Multivariate logistic regression analysis showed that the solvents and noise group had an estimated risk for hearing loss >20 dB about 4.4 times higher than that of the noise group.

Hearing impairment was greater for speech frequency than for high frequency.

**Conclusions** Our results suggest that solvents increase potentially the hearing loss in a noisy environment, with a higher impact on the speech frequencies.

# 0099 CHANGES IN VENTILATORY AND HAEMODYNAMIC PARAMETERS DURING EXPOSURE TO ULTRAFINE PARTICLES IN A MANUFACTURING FARM MACHINERY

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**Objectives** To evaluate the influence of occupational exposure to ultrafine particles on cardiopulmonary parameters.