paradigm shift from employment support towards teaching/training for employers and employees to break these barriers.

Conclusion Despite government initiatives, employment for Learning-disabled adults and their able Family-Carers remains an unfulfilled dream. More targeted employment, teaching/training and flexible-working acknowledging the fragile inter-dependent relationship between Learning-disabled adults and Family-Carers, may prevent a significant loss of manpower and productivity.

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VIBRATION INDUCED INJURIES IN HANDS IN LONG-TERM VIBRATION EXPOSED WORKERS

L Gerhardsson*, M Hagberg. *Dept of Occupational and Environmental Medicine, Gothenburg University, Gothenburg, Sweden*

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Introduction Long-term vibration exposure may cause neurophysiological disturbances such as dampness and tingling, reduced grip strength and difficulties in handling small objects. Most of the exposed workers are right-handed and thus, the right hand will usually have a higher vibration exposure than the left hand. In this study we are comparing neurophysiological test results in the right and left hand in long-term vibration exposed workers. The underlying hypothesis is that signs of adverse health effects would be more pronounced in the right hand of the workers.

Methods The study is based on 47 (36 males and 11 females; mean-age 50 ± 12 y; mean exposure time 16 y), all former patients from the department of occupational and environmental medicine, Gothenburg university. The comparison group consisted of 29 randomly selected subjects from the general population of Gothenburg. All participants completed several questionnaires and had a standardised medical examination. Thereafter, neurophysiological tests such as muscle strength tests and the determination of thermal and vibration thresholds were performed.

Results No significant differences were found for temperature and vibration thresholds in dig 2 and 5 bilaterally among the workers. Finger muscle tests (Pinch-grip and 3 Chuck grip) were also of the same magnitude in the right and left hand. Hand grip strength (Jamar), however, was significantly higher in the right hand of the workers.

Conclusions Although differences as regards symptoms and neurophysiological test results in the right and left hand of exposed workers have been reported in several studies, the only significant difference noted in this study was a somewhat higher grip strength in the right hand of the workers. That is to be expected, as most of the participants were right handed and therefore probably stronger in their dominant hand.

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EVALUATION OF THE KURTOSIS METRIC IN THE PREDICTION OF HEARING TRAUMA IN HUMANS ASSOCIATED WITH INDUSTRIAL NOISE EXPOSURES

¹Wei Qiu*, ²Mei-bian Zhang, ³Chuck A Kardous, ³Thais C Morata, ³William J Murphy, ¹Roger P Hamernik. ¹State University of New York at Plattsburgh, Plattsburgh, USA; ²Zhejiang Provincial Centre for Disease Control and Prevention, Hangzhou, China; ³National Institute for Occupational Safety and Health, Cincinnati, USA

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Introduction It is clear from numerous experiments that current noise standards underestimated hearing trauma by complex noise (defined as a background Gaussian noise with embedded high-level transients), and that an energy metric alone is not sufficient to characterise a complex noise for hearing conservation purposes. In this study, a statistical metric of the noise amplitude distribution known as the kurtosis, is evaluated in the prediction of hearing trauma in humans associated with industrial noise exposures.

Methods A human database including 1500 subjects exposed to diverse industrial noises (n=650 Gaussian noises, n=850 complex noises) was used to analyse the interaction between an energy metric and kurtosis with respect to noise-induced hearing loss (NIHL). Two kurtosis-corrected NIHL prediction models are studied. One kurtosis correction was made through the exposure time; the other was made through exposure energy. The prevalence of NIHL was determined based on:

- at least of the adjusted hearing threshold levels (HTLs), in either ear, at 3, 4, or 6 kHz is equal to or greater than 30 dB;
- an average of the HTLs for both ears that exceeds 25 dB at 1,2,3, and 4 kHz.

Results The dose-response relation for the complex noise-exposed subjects showed a higher prevalence of hearing loss for a comparable cumulative noise exposure (CNE) than did the Gaussian noise-exposed subjects. By introducing the kurtosis variable into the CNE calculation, the two dose-response curves could be made to overlap, essentially yielding an equivalent noise-induced effect for the two study groups.

Conclusion Kurtosis adjustment of CNE improved the correlation with NIHL and provided a single metric for dose-response effects across diverse types of noise. The kurtosis-adjusted CNE metric may be a reasonable candidate for use in NIHL risk assessment across a wide variety of noise environments

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VOCAL EFFORT IN TEACHERS: DOSE MEASUREMENTS AND CLASSROOM ACOUSTIC PARAMETERS

R Sisto*, D Annesi, P Nataletti, F Sanjust, A Moschetto, L Cerini. *INAIL Research, Department of Occupational and Environmental Medicine, Epidemiology and Hygiene, Monteporzio Catone, Italy*

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Introduction Literature data show that teachers are exposed to increased risk for diseases of the phonatory apparatus. This circumstance is explained by the high phonatory load of teaching and by classroom noise. As passive acoustic requirements of the school buildings are often not respected, the intelligibility inside the classrooms is poor, increasing the teacher's voice loudness. This work is aimed at studying relations between long reverberation times, high noise levels and vocal effort.

Methods Phonatory effort was evaluated in three school complexes, on a sample of nursery (6 subjects), primary (9), junior high (2) and high (8) school teachers. The classrooms were classified as acoustically treated or not. Speech intelligibility was quantified by the speech transmission index (STI). Phonatory doses were correlated to noise exposure levels and to classroom acoustics. The phonatory effort was evaluated with the Ambulatory Phonation Monitor (Kaypentax).

Result Vocal effort was associated to school degree, showing an increasing at the primary school where the pupils are noisier. A significant association was found between the sound level evaluated 15 cm from the speaker's mouth and the noise level (coefficient=1.45, p value=0.016). Multivariate linear regression models explained the sound pressure level emitted by the speaker (SPL) by phonation percentage and reverberation time. Average reverberation times at 1 kHz were 0.8 and 2.3 s, while average STI, evaluated by a theoretical model, were approximately 0.6 (sufficient) and 0.4 (poor), in treated and untreated classrooms, respectively. In untreated classrooms the SPL was on average 30% higher ($p=0.041$).

Discussion The high phonatory load of teaching is significantly worsened by the classroom inadequate acoustic parameters. Long reverberation times and, consequently, poor speech intelligibility, high noise levels and vocal effort are significantly related. Improved acoustic design of the classrooms would reduce the risk for vocal apparatus pathologies.

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HEALTHIER WORKERS, HAPPIER WORKERS' PROGRAMME: A PERSON-CENTRIC APPROACH TO APPROACHING HEALTH & SAFETY AT THE WORKPLACE FOR BUS-DRIVERS IN SINGAPORE

¹CHNG Jocelyn, ²Sim Beng Khoon. ¹Senior Assistant Director (Total Workplace Safety and Health), Workplace Safety and Health Council (Singapore), Tripartite Alliance Limited; ²Director (Workplace Health and Outreach Division), Health Promotion Board, Ministry of Health (Singapore)

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Introduction 54% of Singapore's workforce are 40 years and above. Keeping this ageing population safe and healthy is crucial. As part of Singapore's Action Plan for Successful Ageing, we focused on sectors with a higher prevalence of lower-income mature workers with limited access to healthcare. They have low to moderate health literacy and fare poorer in health. Their unstructured workplaces with multiple shift patterns make it difficult for them to participate in structured programmes. One of our priorities is the transport sector. Using a person-centric approach, we aimed to impact bus drivers by understanding their needs and addressing both age- and work-related issues through a customised programme brought to their doorstep.

Methods 2114 bus drivers from 2 market leaders were recruited. The holistic programme comprised:

- Onsite 9 month Health Intervention Programme ($n=1,114$) Basic profiling showed higher disease rates. Fasting blood Chronic Disease Health Screening was conducted at 4 am at depots with a lifestyle survey. Using the results, bus drivers received monthly group health coaching at interchanges, where they build practical skills to manage chronic disease & bodily pain, and other OSH issues like glare. 8 months later, a post screening was conducted to track improvements.
- Workplace Risk Assessment ($n=1,000$) conducted by OH specialists over 3 phases: risk identification, evaluation & management. This involved evaluating occupational hazards at depots, interchanges and within bus cabins, assessing actual driving, surveys on ergonomics & fatigue and focus groups with supervisors & staff.

- Mental Wellbeing Training—90% of supervisors trained to pick up mental wellbeing issues in staff and make suitable referrals.

Results Our person-centric approach was well-received and results were encouraging. ~50% of those with abnormal screening results improved in at least 1 chronic condition by post-screening. Significantly, 1 in 4 improved from abnormal to normal health status in 9 months. After Workplace Risk Assessment, short-term interventions like driving ergonomics training and sunglass issuance have been put in place. Longer-term recommendations for national policies have also been submitted.

Discussion We achieved impact by seeing issues through the bus drivers' lenses, working around operational schedules and challenging conventions. We were able to scale up quickly to impact all 10 000 bus drivers in Singapore. Going forward, we will strengthen efforts to ensure sustainability.

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SAFETY MANAGEMENT SYSTEMS: PEER-TO-PEER RATINGS IN THE SHARING ECONOMY

¹E MacEachen, ¹E Reid Musson, ¹E Bartel, ¹J Carriere, ¹SB Meyer, ¹S Varatharajan, ²A Kosny, ¹P Bigelow, ²R Saunders. ¹University of Waterloo, Waterloo, Canada; ²Institute for Work and Health, Toronto, Canada

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Introduction To ensure the health and safety of workers, most jurisdictions have implemented workplace inspection and audit systems. This presentation examines OHS in the context of the growing 'sharing economy', taking the case of Uber ride-sharing, who claim to keep self-employed drivers safe through measures including peer-to-peer ratings. We address the question: what is the Uber peer-to-peer rating system and how does it work (or not) as part of an occupational health and safety system?

Method We conducted a critical interpretive study of ride sharing with Uber drivers, passengers and management, taxi managers and related policy makers in Ontario, Canada. Data include interviews and focus groups with 50 participants. These were recorded verbatim, coded and analysed using systematic strategies of constant comparison, consideration of deviant cases, and narrative analysis.

Results Despite Uber drivers being classified as 'self-employed' and Uber touting their ability to rate and choose their passengers, we find that drivers had few free choices. Drivers could not easily avoid undesirable passengers as they received app warnings that cancelled rides or non-pick up (despite passenger rating) could result in removal from the app. Driver ratings of passengers were tempered by having to rate them at ride end, before passengers 'rate drivers back'. To avoid low ratings by passengers, drivers rated them high. They also engaged in unsafe activities, including agreeing to carry excessive passengers and speeding. In addition, passenger ratings of drivers were idiosyncratic; low ratings of drivers sometimes reflected refusal to engage in unsafe activity.

Conclusion Peer-to-peer rating systems are created in complex circumstances of pressure from Uber and passengers. If drivers freely exercised their choice to decline unsafe rides, they could lose access to the Uber app and their income source. Overall, ratings were a source of stress for drivers and not an indicator of safety.