working population denominator is derived from 2001 Australia Bureau of Statistics census data.
Results There were 4773 initial claims and 416 repeat claims for OCD amongst Victorian workers from January 1985-December 2009. The yearly average for initial claims was approximately 9.4 per 100,000 part-time and full-time working Victorians. The mean cost of repeat claims ($7,556) was higher than the mean cost of initial claims ($4,940). These differences between initial and repeat claims are also reflected in the reported days away from work. The mean days away from work for initial claims was 40 and the mean days away from work for repeat claims was 51.
Conclusions Victorian workers' compensation claims data indicate that the cost and impact of contact dermatitis, as measured by days away from work, increases with repeated workers' compensation claims. Effort needs to be put in place to protect workers from initially developing OCD. For those workers who have developed OCD, a workplace plan needs to be in place for the avoidance or elimination of workplace exposures before the workers return to work.

124 DIFFERENCES OF MORTALITY RATES BY OCCUPATION IN KOREA: 14 YEARS FOLLOW-UP STUDY

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Objectives The mortality rates of workers can be influenced by socioeconomic factors as well as occupational ones. This study was performed to observe the mortality rates in various occupations of Korean workers.
Methods We constructed a cohort with workers who have entered the Employment Insurance during 1995–2000. The information of death for the cohort was obtained by matching with database of the National Statistics Office. Nine subcohorts were constructed according to the Korean Standard Occupational Classification. Age-standardised mortality rates (ASR) were calculated.
Results The total cohort included 11,342,816 workers and 141,442,957 person-years. There were 292,763 deaths during 1995–2000. The ASR for death by all causes was 342.6 per 100,000 in male and 141.6 per 100,000 in female. The highest ASR showed in Agricultural, Forestry and Fishery Workers (M: 563.0, F: 206.0) and followed by Elementary Occupations (M: 499.0, F: 163.4) and Plant, Machine Operators and Assemblers (M: 380.3, F: 157.8). Professionals and related workers showed the lowest ASR (M: 209.1, F: 93.3)Elementary Occupations (M: 146.4, F: 163.4) showed the highest ASR from neoplasm (C00-D48). Professionals and related workers (M: 93.2, F: 46.9) and Managers (M: 92.1, F: 41.0) showed the lowest ASR. Agricultural, Forestry and Fishery Workers showed the highest ASR from external causes of death (V01-Y89) (M: 235.1, F: 74.7) and Professionals and related workers showed the lowest ASR (M: 36.2, F: 15.1).
Conclusion We found a profound difference of mortality rate by occupations. Occupations related to low socioeconomic position like Agricultural, Forestry and Fishery Workers and Elementary Occupations showed higher mortality rates and those related to high socioeconomic position such as Managers or Professionals showed lower mortality rates. Further study on mortality rates of workers related to socioeconomic factors as well as work-related ones is needed.

125 HEALTH RISKS FROM OCCUPATIONAL EXPOSURE TO EXTREMELY LOW FREQUENCY MAGNETIC FIELDS (ELF-MF) AND ELECTRICAL SHOCKS; AN ANALYSIS IN NOCCA

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Objective Previous epidemiological studies have suggested possible increased health risks of occupational exposure to extremely low frequency magnetic fieds (ELF-MF), in particular cancer (brain, leukaemia), neurological diseases (e.g Amyotrophic Lateral Sclerosis, ALS), and suicide. However, results varied strongly. We aim to assess the association between occupational exposure to ELF-MF and electrical shocks and these priority health outcomes in a large population-based cohort. This could help to increase the knowledge on these health effects and potentially disentangle health risks from ELF-MF and electrical shocks, which has been put forward in particular with respect to ALS.
Methods Case-control risk analyses will be performed in the established Nordic Occupational Cancer (NOCCA) database. The pooled NOCCA population covers over 15 million adult males and females from five Nordic countries with a follow-up of cancer incidence and mortality up to 45 years in 2006. Considering the size and follow-up time of NOCCA, we aim to also study rare outcomes and occupationally exposed females, which will enrich this field of research. Exposure assessment will be based on individual job histories obtained through repeated census data, which will be linked to job exposure matrices for ELF-MF and electrical shocks.
Results/Conclusions Results of the risk analyses will be presented at the conference.

126 THE EPIDEMIC OF CHRONIC KIDNEY DISEASE OF UNCONVENTIONAL ORIGIN IN CENTRAL AMERICA - A CALL FOR TRANSDISCIPLINARY RESEARCH AND ACTION

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Background Central Americahas seen a dramatic increase of chronic kidney disease, unexplained by conventional risk factors (CKDu), primarily affecting adult male agricultural labourers. Increases of CKDu are also reported from Sri Lanka and India. Alleged risk factors include environmental toxins. However, observations from Nicaragua and El Salvadorindicate that repeated dehydration due to strenuous work in tropical climate may be a major risk factor that urgently needs to be explored using epidemiologic, experimental and interventional approaches. If heat stress and dehydration prove to be risk factors in themselves, or in combination with others, climate change will dramatically increase the population under risk in the near future. CKD increase in developing countries, regardless

of conventional or unconventional origin, is overwhelming the healthcare systems.

Objectives Collaborative efforts are needed to identify the aetiology of CKDu, and its prevention. To identify current knowledge and gaps, and to propose future research, the university-based program Salud, Trabajo y Ambiente en América Central (SALTRA) sponsored a workshop in Costa Rica, November 2012.

Method Over 50 researchers from 15 countries participated, with expertise in epidemiology, occupational health, clinical and experimental nephrology and nephropathology, environmental and social sciences. Recent findings were reported, including the first biopsy study in CKDu cases from the region, demonstrating an unexpected mixed pattern of glomerular and tubular sclerosis. A mechanistically plausible link between concomitant dehydration and high NSAID consumption, driven by extreme ergonomic work load and musculoskeletal strain, leading to kidney damage was also proposed.

Results Papers summarising current knowledge, and working group reports and recommendations are made openly available on a website. Summary presentations will be published in international peer-review journals. A Research Consortium (SALTRA coordinating) was initiated.

A Statement was issued noting the high prevalence of CKDu in Central America, poverty and deplorable work conditions as driving forces, and the lack of treatment. Urgent actions are demanded.

Session: Q. Exposure assessment III

127 CHANGE IN SUBJECTIVE THERMAL SENSATION AND PREDICTED DISSATISFACTION AS A RESULT OF USING SUNSCREENS AND SUN-PROTECTIVE GLOVES

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Objectives Sunscreens and long-sleeved sun-protective gloves (gloves) were commonly used in Taiwan for protection against excess solar ultraviolet radiation. However, their use in the warm-and-humid weather typically encountered in Taiwan might significantly alter thermal comfort of the users. This study investigated the change in subjective thermal sensation of people as a result of using sunscreens and gloves to evaluate potential thermal stress.

Methods Three groups of participants (sunscreens, gloves, and control) each consisting of ten females were evaluated for their subjective sensation by thermal sensation vote (TSV) before and after adaptation to different thermal status in a microclimatic chamber. The status inside the chamber corresponded to a temperature of 22, 25, 28, 31, or 34°C and a relative humidity of 45, 60, or 75%. In each experiment, the participants in designated treatment were acclimatised in the chamber for 30 min, and the TSV was gauged at the beginning and end of acclimatisation. The data were analysed for temperatures of thermal neutrality and magnitudes of 80% thermal acceptability and comfort zones. The TSV were also compared to the skin temperature to define a thermal neutrality-equivalent thermoregulatory index.

Results As the percentage-of-predicted-dissatisfied modelling indicated, the percentage of thermal dissatisfaction among glove users was greater than that of sunscreen users. The neutral temperature increased after thermal adaptation for sunscreen users (25.5–26.4°C) but not for glove users. The thermal comfort zone narrowed down in both the glove and sunscreen groups during adaptation.

Conclusions The use of gloves facilitated formation of a thermal pocket independent of the ambient thermal environment between the gloves and the skin surface, and as a result the heat accumulated inside the gloves was not sufficiently dissipated and causing thermal discomfort. The users should be alert of potential thermal stress.

128 DEVELOPMENT OF A JOB-EXPOSURE MATRIX (JEM) TO DESCRIBE PESTICIDE EXPOSURE IN SPANISH WORKERS (1996–2005)

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Objectives Pesticides are intensively used in Spain in a wide range of economic activities such as agriculture, farming, wood treatments or pest control, reaching in 2005 a consumption of more than 100,000 ton/year. Exposure to these substances has been proven to have negative effects on human health. However, there is little information available regarding the levels and frequency of exposure for workers, or the job titles associated with the worst exposure indicators. This study aimed to collect the available information on occupational pesticide exposure in Spain as a job-exposure matrix (JEM).

Methods The work was carried out in the context of MatEmESp Project, which aims to build a Spanish general JEM for the period 1996–2005. Data from the Finnish JEM (FINJEM), Spanish companies risk assessments and the review of available literature was used to identify exposed occupations and relevant chemical agents in the study period as well as to establish the exposure estimates.

Results Ten active ingredients were selected as reference agents of the study period including fungicides, herbicides and insecticides. Of the 482 occupations in the Spanish job coding system, 45 were identified as exposed, with sufficient information to establish the exposure estimates. Regarding fungicides and herbicides, 39 occupations showed a low level of exposure whereas 6 were found to have a medium level. Within insecticides, a low exposure was found in 19 occupations while 26 showed a medium level.

Conclusions This is the first systematic collection of the available data on occupational exposure to pesticides in Spain following the JEM development methodology. Although low availability of measurements reduced the accuracy of the estimates established, they can be useful for epidemiological studies and health and safety management programs, amongst other uses. All collected data as well as the exposure estimates established can be found in the MatEmESp website (www.matemesp.org).

129 URINARY BENZENE AS A BIOMARKERS OF LOW-LEVEL EXPOSURE TO BENZENE

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We compared the ability of the urinary excretion of *trans, trans*-muconic acid (*t,t*-MA), *s*-phenilmercapturic acid (*s*-PMA)