

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*-phenylmercapturic acid (*s*-PMA)