

Oral presentation

0012 A HOLISTIC APPROACH TO CALCULATING A MULTIMORBIDITY SCORE: THE USEFULNESS OF MULTI-CORRESPONDENCE ANALYSIS

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Objectives Most frequently, multimorbidity measures available in the literature are heavily dependent on one outcome. We propose a method to construct a global multimorbidity score that incorporates chronic and non-chronic health conditions as well as health-related behaviours and symptoms, regardless of any specific outcome.

Method Cross-sectional study of 373 905 Spanish workers who underwent a standardised medical evaluation in 2006. By applying an algorithm based on the results of a multi-correspondence analysis we computed a multimorbidity score separated by sex. The score distribution was described by age groups and occupational social class for both sexes.

Results Two dimensions were generated by the multi-correspondence analysis that explained around 80% of the total variability in both sexes. The main dimension was related to cardiovascular chronic conditions and personal habits, whereas the second dimension included symptoms, in addition to sleep disturbances in women. As compared to women, men showed a higher prevalence of multimorbidity (78% vs 17%), higher scores [mean 14 (SD 11.9) versus mean 9 (SD 9.5)], and a rising trend with age. No differences were found by occupational social class.

Conclusions Multimorbidity can reflect clustering of health-related conditions, providing information on its burden and distribution in a specific population. By calculating a multimorbidity score that considers both health-related conditions and symptoms, we provide a more holistic approach to multimorbidity, applicable to any database.

0018 VALIDATION OF A WEARABLE REAL-TIME MONITOR OF EXPOSURE TO NAPHTHALENE

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Objectives Direct reading instruments are valuable tools for assessing exposure in the workplace. Adaption of such instruments to serve as valid and efficient tools to provide personal exposure data for environmental surveillance and occupational epidemiology studies fulfils a critical research need.

Method A project is underway to validate new sensor technology that utilises native fluorescence of molecules excited by ultraviolet light with the goal of delivering laboratory-quality data for qualitative and quantitative analyses. The initial chemical of focus with this technology is naphthalene. The project is proceeding in two stages: independent laboratory validation and an exposure assessment field study, which is being conducted in two Phases: Phase I examines the degree to which the instrument serves as a sensor of naphthalene by assessing the concordance between measured personal air levels and those measured with conventional technologies e.g. active samplers; Phase II evaluates the validity of the instrument to serve as a dosimeter, correlating instrument-measured naphthalene levels in air with biological markers of exposure from skin, urine and exhaled breath.

Results Independent laboratory evaluations indicate the instrument is accurate within accepted laboratory guidelines, when compared to standard gas chromatography methods. Results from the Phase I field study with US military personnel working with jet propulsion fuels (e.g., JP8 and jet A) as part of their regular work responsibilities support laboratory validation findings. Phase II data efforts are in progress.

Conclusions This technology permits real-time evaluation of task-specific variations in personal naphthalene exposure levels, data that are currently not available with conventional active sampling processes.

0019 THE OCCUPATIONAL JP8 EXPOSURE NEUROEPIDEMIOLOGY STUDY; EVALUATION OF NEUROPSYCHOLOGICAL EFFECTS

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Objectives One of the most prevalent workplace chemical exposures historically and currently confronting the global military and civilian workforce is jet propellant (JP) fuel. To date, numerous protective and preventive strategies have been put in place to minimise acutely toxic exposure levels. However, questions remain regarding the effect of repeated exposures at lower (than regulated) levels. The Occupational JP8 Exposure Neuroepidemiology Study was designed to examine the relationships between repeated-workday occupational JP8 exposure among Air Force (AF) personnel and specific aspects of central nervous system function, including neuropsychological task performances.

Method Seventy-four AF personnel consented to participate in the 6-day study and were administered two distinct neuropsychological task batteries (labelled 'Day 1' and multi-day 'Repeated Day'). JP8 exposure was measured by personal breathing zone total hydrocarbons, naphthalene, benzene, toluene, ethylbenzene, and xylene and urinary biomarkers (e.g., 1- and 2-naphthol). Multivariate linear regression analyses were conducted to examine relationships between current and historical levels of JP8 exposure and neuropsychological performances. Linear mixed effects analyses were conducted to examine relationships between workday JP8 exposure on neuropsychological functioning over a work week.

Results Reduced proficiency of tasks involving verbal memory and attention was demonstrated among those with higher versus

lower, current JP8 exposure. Significant associations were not observed between repeated-workday exposure to JP8 and neuropsychological performances.

Conclusions Results suggest that repeated JP-8 exposure, at levels not exceeding regulatory limits, does not significantly contribute to reduced neuropsychological proficiencies. We discuss potential explanations and implications for these findings.

0021 SENSITISATION TO RATS AND MICE AMONG LABORATORY STAFF AND RESEARCHERS

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Objectives To identify modifiable factors associated with sensitisation to laboratory animals.

Method Animal husbandry staff (group 1) and researchers (group 2) were recruited from a University animal facility together with health researchers not working with animals (group 3). Sensitisation was evaluated using skin prick tests to rat and mouse allergens. Current tasks, job history and demographic information were recorded.

Results The 3 groups comprised: 57; 57; and 50 subjects. Among group 1, 88% were currently working with rats, and 88% with mice: 51% were sensitised to rat, 28% to mouse. In group 2 the numbers exposed were lower (75% rat, 58% mice) as was the rate of sensitisation (32% rat, 12% mouse). No one in group 3 was exposed or sensitised. Among those currently exposed, sensitisation to rat was associated with shaving of fur and disposal of soiled litter, and with less frequent use of female rats. Sensitisation to mice was higher in those with contact with mouse urine and saliva, but not related to specific tasks. In multiple regression models, sensitisation to rat was only associated with use of female rats (OR 0.25, 95% CI 0.01–0.64). Sensitisation to mouse was greater in women (OR 6.67, 1.20–36.98), those born on a farm (OR 4.65, 1.05–20.55) and with exposure to mouse saliva (OR 4.26, 1.23–14.76).

Conclusions Exposures were highly correlated, making it difficult to identify specific modifiable risk factors. However it is of note that, since male rats use urine to mark territory, the greater use of exclusively female rats should serve to reduce sensitisation.

0028 MULTI-SITE MUSCULOSKELETAL PAIN AND PHYSICAL WORKING CONDITIONS AS PREDICTORS OF SICKNESS ABSENCE DUE TO MUSCULOSKELETAL DIAGNOSES

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Objectives To investigate the importance of multi-site musculoskeletal pain as a predictor of sickness absence days due to musculoskeletal disorders (MSD) among blue-collar employees, and to study what extent such a relationship might be confounded by physical loading at work.

Method Survey responses from 901 employees were linked to a food industry company's record of sickness absence due to MSD

(≥ four days). Generalised Linear Models (GLM) with negative binomial distribution assumption was used in order to determine associations between the occurrence of multi-site pain (no pain, one-site and multi-site pain), individual variables, work related variables and sickness absence days due to MSD during a four-year follow-up.

Results The high exposure group had about 92 and the low exposure about 72 all-cause sickness absence days yearly, and corresponding figures for absence due to MSD were 36 and 28. The share of MSD absence is about 40% irrespective of the exposure. Single site pain did not predict absence, whereas multi-site pain turned out as an independent predictor. Multi-site pain predicts absence in the group with low biomechanical exposure, but not in the group with high exposure. The p-values for interaction show that the groups differ significantly both in case of repetitive movements and in case of awkward postures.

Conclusions This prospective cohort study revealed very high level of sickness absence in biomechanically strenuous work, represented by manual work in food industry. On average, the employees were absent over 80 calendar days, i.e. almost three months, yearly.

0030 HEALTH AND SAFETY IN COLLISION REPAIR SHOPS AFTER 2 YEARS OF PARTICIPATION IN COLLISION AUTO REPAIR SAFETY STUDY (CARSS)

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Objectives This study evaluated the sustainability of health and safety improvements in small collision shops 1 year after completion of targeted intervention activities.

Method Workplace health and safety evaluations were conducted at baseline, after 1 year, and after 2 years. During Year 1, owners received quarterly phone calls, written reminders, safety newsletters, and had access to online services and in-person assistance with creating safety programs and respirator fit testing. During Year 2, owners received up to 3 postcard reminders regarding the services and resources available from study staff and website.

Results Forty-nine shops received baseline assessments, 45 were visited for 1-year follow-up and 33 were visited for 2-year follow-up. At baseline, the 33 shops had 19-60% deficient items (mean = 45% items, SD = 10%). At the end of Year 1, there were 19-30% deficient items (mean = 27% items, SD = 11%). At the end of Year 2, there were 11-37% deficient items (mean = 27% items, SD = 9.5%). Statistically significant changes (p < 0.05) from Year 1 to Year 2 were identified in three of the eight survey sections: compressed gasses (-8% deficient items), personal protective equipment (-7%), and respiratory protection (+6%). There was no difference in the magnitude of change in shops that received 0-2 reminder cards vs. shops that received 3 cards.

Conclusions Results indicate that most business owners were able to maintain the health and safety improvements implemented during Year 1 of the CARSS intervention. The number of reminder cards sent to each business did not make a difference in the degree to which safety improvements were maintained.