

## 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