to obtain mortality and cancer registration data for the cohort. The intention is to produce SMRs and SIRs and, where sufficient number of events allow, subanalyses including by cumulative exposure will be undertaken.

Results & Conclusion The international study will be statistically the most powerful study to have examined the carcinogenicity of styrene to date. As well as cohorts from the UK, the updated study will include cohorts from Denmark, Finland, Italy, Norway, Sweden and the USA.

Musculoskeletal disorders

0-21 ASSOCIATION BETWEEN WORK ABILITY INDEX AND LOW BACK PAIN AMONG PRINTING WORKERS

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Introduction and Objectives Low back pain is one of the most common musculoskeletal disorders and important causes of early retirement due to disability in employees in industrialized and developing countries. The present study aimed to determine the work ability index and its relationship with low back pain among employees of Tehran offset printing industry.

Methods A cross-sectional study was performed within six months in 2020. Data from 220 employers working in offset printing industry were collected through survey questionnaire including Nordic Musculoskeletal Questionnaires (NMQ) and Work Ability Index (WAI). Data analysis was performed using SPSS software version 24 with a significance level of P-Value <0.05.

Results In generally, more than half of the participants (%62.5) indicated high symptoms of Low Back Pain. Also, the results of Pearson correlation test showed that there is a positive and significant correlation between level of work ability and severity of low back pain (p<0.001).

Conclusion Job analysis and identification and correction of work procedures that put the body position during work in hard and unconventional conditions and impose a lot of workloads on the back area can be effective in preventing low back pain in work environments.

Shift work

O-205 NIGHT SHIFT WORK AND SLEEP DEPRIVATION IN RELATION TO VACCINE INDUCED SARS-COV-2 ANTIBODY RESPONSES IN A GENERAL POPULATION COHORT (COVICAT STUDY)

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Introduction Night shift work and sleep deprivation have been associated with lower antibody responses induced by vaccination against seasonal influenza, meningitis-C and hepatitis A. We examined the association of exposure to night shift work and sleep deprivation with antibody levels induced by COVID-19 vaccines.

Materials and Methods This study was nested in an ongoing population-based cohort in Catalonia, Spain. Blood samples were collected in 2021 from a random subsample of 1,090 participants. We measured 3 immunoglobulins (IgM, IgG, and IgA) antibodies against 5 SARS-CoV-2 antigens, including RBD (receptor-binding domain), S (spike-protein), and S2 (subunit 2 from spike-protein). We collected data on night shift work (current night work, frequency, duration) and sleep metrics (sleep duration, sleep problems, changes in sleep duration since the beginning of the pandemic). We adjusted linear regression estimates (% change) for individual- and area-level covariates, time since vaccination, vaccine doses and type.

Results Analyses were restricted to participants without previous COVID-19 infection (N=639). Infection status was defined as recently infected (positive RT-PCR in the month before sampling) or confirmed as recovered (positive RT-PCR and positive serology). We observed no significant association between exposure to night shift work and antibody responses induced by vaccination. A trend toward lower IgM antibody levels for participants working at least 3 shifts/week was observed. Differences in IgG levels were not statistically significant. In general, participants working long hours (i.e., >10 hours) showed lower antibody levels than those working fewer hours. These results suggest that sleep quality is an important confounder in analyzing the association between exposure to night shift work and vaccine-induced immune responses.

Conclusions Further research in larger studies is needed to evaluate the influence of night shift work and impaired sleep on vaccine-induced immune responses and risk of breakthrough infections.

Exposure assessment

0-212 APPLYING SENSORS FOR ASSESSMENT OF OCCUPATIONAL EXPOSURES IN EPIDEMIOLOGICAL STUDIES: EVALUATION OF SENSORS AND PRELIMINARY FINDINGS

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Introduction Low cost sensors have potential for occupational exposure assessment by providing information on exposure profiles rather than time weighted averages (TWA). High resolution exposure data may advance our knowledge on how exposure patterns may affect (acute) health. We aimed to...
develop and deploy a multi-sensor box for assessing working life exposures (exposure at and outside work) during a working week in a case study on respiratory health as part of the EU Exposome Project for Health and Occupational Research (EPHOR) project.

**Material and Methods** A multi-exposure sensor box (particulate matter (PM), noise, light, UV and temperature) has been developed and is currently being deployed with the aim to assess exposures during a working week in relation to acute respiratory health among 300 mild asthma patients. The sensors were evaluated against conventional equipment separately. Several PM sensors were co-located in different occupational settings with gravimetric samplers and the Aerodynamic Particle Sizer (APS). Sensors for noise, light, UV and temperature were tested against conventional instruments in various environmental settings.

**Results and Conclusions** Low-cost PM sensors and the APS correlated reasonably well in different occupational settings (high-resolution data) (R²=0.4–0.6). Comparing the low-cost PM2.5 mass concentration from the sensors with the respirable gravimetric results (TWA) showed a moderate correlation (R²=0.5). A semi-quantitative comparison of TWA exposures with PM mass concentrations showed higher correlations (R²>0.75). A method for calibrating the PM sensor results to reflect different workplace and nonworkplace aerosols is being developed. The noise, light, UV and temperature sensors demonstrated R² values of 0.9 and above with reference monitors in laboratory or field comparisons. Calibration equations have been developed based on these relationships. Along with the evaluation results of the different sensors, the preliminary results of the multi sensor box among ~25 case study subjects will be presented.