

Results There were 600 cases of lung cancer in the highest exposed group and 668 in the lowest exposed group. The relative risk comparing high and low exposed decreased the years after exposure had stopped. It was 1.8 during the decade when the exposure came to an end, decreased to 1.5 (95% CI 1.3–1.9) the next decade, to 1.2 (95% CI 1.0–1.5) the decade later and finally to 1.0 (95% CI 0.8–1.2) three decades after the exposure to asbestos had stopped.

Conclusions The time pattern of asbestos related lung cancer seem to follow a similar pattern as the risk of lung cancer in ex-smokers.

0055 ASSOCIATION OF OCCUPATIONAL TRAJECTORIES WITH ALCOHOL USE DISORDERS IN A LONGITUDINAL NATIONAL SURVEY

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Objectives We posited mutually-reinforcing longitudinal pathways between occupation and alcohol use disorders (AUD).

Method Longitudinal trajectories of work substantive complexity were constructed by growth mixture modelling (GMM) of occupational data from the National Longitudinal Survey of Youth 1979 and O*NET work variables. AUD was determined using a set of 25 questions that map onto 9 criteria for alcohol dependence. Prevalent AUD was one occurred at or before the first alcohol questionnaire in 1989; an incident AUD was a new case between 1989 and the 1994 survey. The association between work trajectories and AUD was modelled using Poisson regression in a generalised linear model adjusting for covariates.

Results Lower work trajectories were associated with higher AUD prevalence (prevalence ratio 1.41; 95% confidence interval 1.04–1.91 for lowest versus highest class). Incident AUDs were associated with risk of a decline in work trajectory class in both high (OR=2.68; 95% CI 1.34–5.35) and low (OR=1.62 95% CI 1.01–2.60) initial classes. Interval educational attainment was not associated with AUD within a specific occupational trajectory class.

Conclusions Low occupational trajectories are associated with increased AUD prevalence. Incident AUDs may be followed by a decline in work SC. These findings suggest self-reinforcing relations between the development of AUD and both prior and subsequent work.

0056 PATTERNS OF SITE-EMPLOYMENT OF CONSTRUCTION WORKERS ON AND OFF COMMERCIAL CONSTRUCTION SITES IN NEW ENGLAND AND THE RELATIONSHIP TO MUSCULOSKELETAL PAIN

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Objectives Construction workers who work on multiple jobsites have a high prevalence of musculoskeletal disorders. Yet, scant quantitative information exists in the scientific literature on the relationship between worksite mobility patterns and musculoskeletal disorders.

Method Self-reported musculoskeletal pain, as defined as pain experienced in one of seven body areas in the past month, work

history, and demographics were collected from 776 Boston area workers on their first day at one of seven commercial construction projects. Workers were classified as long-term workers (on-site greater than or equal to 30 days) or short-term workers (less than 30 days). Bivariate and multiple logistic regression analyses tested the relationship between term length and prevalence of self-reported musculoskeletal pain, adjusting for relevant covariates.

Results Of the 776 new workers, 344 (44%) were on-site after one month, 164 (21%) remained after two months, and only 74 (10%) remained after three months. Thirty-three percent of workers reported musculoskeletal pain at baseline. Short-term workers were 2.02 times (95% CI: 1.32, 3.08) more likely to report any musculoskeletal pain at baseline than long-term workers, when controlling for trade and tenure. Reporting of single- and multi-site pain was also associated with term length, with statistically significant adjusted odds ratios of 2.00 and 2.35, respectively.

Conclusions The observed excess of self-reported pain in short-term workers when compared to long-term workers mirrors disparities between temporary and non-temporary workers in other industries. This observed effect highlights the need to consider worksite mobility when analysing and interpreting data aimed at improving construction worker health and safety.

0058 COLORECTAL CANCER RISK AND SHIFT WORK IN A POPULATION-BASED CASE-CONTROL STUDY IN SPAIN (MCC-SPAIN)

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Objectives Epidemiological cancer studies on shift work have focused on breast cancer while evidence on other tumours is limited. We evaluated colorectal cancer risk in relation to night and rotating shift work and genetic variation, in a population based case-control study in Spain.

Method 1066 male and 592 female incident colorectal cancer cases and 3388 randomly selected population controls of both sexes, enrolled in 11 regions of Spain, were included. Information was collected on socio-demographic, lifestyle, medical history and other variables by face-to-face interviews. Lifetime occupational history on daily time schedule of each job, day/night/rotating shifts, light at night exposure, and duration of different jobs, was used for exposure assessment. We used unconditional logistic regression adjusting for potential confounders.

Results Among controls 10% of males and 4% females had ever worked full time in permanent night shifts (working between midnight and 6am) and 24% of males and 14% of females in rotating shifts for ≥ 1 year. Having ever performed rotating shift work was associated with an increased risk for colorectal cancer

(adjusted Odds Ratio 1.33, 95% CI 1.15–1.55) compared to permanent day workers. ORs increased with cumulative years of rotating shift work and the OR for more than 30 years work 1.54 (1.22–1.94). Having ever worked in permanent night shift was not associated with colorectal cancer risk. Analysis on gene-environment interactions with genes in circadian, melatonin and sleep pathways are ongoing and will be presented.

Conclusions In this large population based study we found an increase in colorectal cancer risk associated with rotating shift work.

0059 LONGITUDINAL MEASUREMENT OF WORK STRESSORS IN PREGNANCY

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Objectives Pregnancy represents a dynamic period when both work conditions and worker assessment of occupational psychosocial stressors may change. We undertook longitudinal repeated measurements of job control, efforts, reward, and overcommitment in pregnant working women to assess direction and magnitude of change across pregnancy.

Method The Job Content and Effort-Reward Imbalance (ERI) Questionnaires were given to 61 working pregnant women recruited at 8–12 weeks gestation and repeated 3 more times across the pregnancy. Demographic data, self-rated (SR) health and stress measures, and blood pressure (BP) data were also collected at each visit. Results were analysed using multilevel linear regression models and generalised estimating equations.

Results 56 subjects (91%) completed at least two waves; 42 (69%) completed all four. Progressive declines in job efforts, rewards, and overcommitment were noted across pregnancy; ERI remained stable. Job Control increased. Black subjects showed evidence of lower job control but also lower effort-reward imbalance across pregnancy, contrasted with Whites/Hispanics. Overcommitment showed the strongest negative association with indices of maternal health, including BP, and SR stress and health. The strongest associations of job constructs with maternal health were noted at mid-second trimester (20–24 weeks) with a decline thereafter.

Conclusions Correlations between occupational psychosocial stressors and intermediate pregnancy-related outcome variables are greatest in early-to-mid-pregnancy. Declining effort and increased control across pregnancy suggest that, in this group, work conditions may be improved, either by the employer or worker, as pregnancy progresses. The possibility of a critical period when associations between work stressors and pregnancy outcomes is also suggested by these results.

0060 PARTICLE SIZE DISTRIBUTION IN ALUMINIUM MANUFACTURING FACILITIES

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Objectives As part of exposure assessment for an ongoing epidemiologic study of heart disease and fine particle exposures

in aluminium manufacturing, area particle samples were collected in smelters and fabrication facilities to assess instrument reliability and particle size distribution at different process areas.

Method Personal Modular Impactors (PMI) and Minimicro-orifice uniform deposition impactors (MiniMOUDI) were used to collect samples. The coefficient of variation (CV) of collocated samples of the same type was used to evaluate the reproducibility of the impactors. PM_{2.5} measured by PMI was compared to PM_{2.5} calculated from MiniMOUDI data to assess the validity of using PMI to measure fine particles in personal sampling. Mass median aerodynamic diameter (MMAD) was calculated to characterise particle size distribution at different locations.

Results 62 MiniMOUDI and 71 PMI samples were collected at 44 production areas. Most of CVs were less than 30%. The slope of the linear regression of PMI_PM_{2.5} versus MiniMOUDI_PM_{2.5} was 1.12 mg/m³ per mg/m³ (± 0.05), with correlation coefficient of 0.97 (± 0.01). MMADs in fabrications were significantly smaller and less variable than those in smelters (p = 0.001). The fraction of PM₁₀ which was PM_{1.0} or PM_{0.56} was significantly higher in fabrications than in smelters (p < 0.001).

Conclusions The reproducibility for impactors was moderate to high. PM_{2.5} measured by PMI can be a valid measure for fine particle exposure in personal sampling. The concentrations of submicron and quasi-ultrafine particles were similar in fabrications and smelters. PM_{2.5} is not a good surrogate for ultrafine particles in this setting.

0063 INCIDENCE OF KNEE PAIN AND ITS WORK-RELATED RISK FACTORS IN A LARGE WORKING POPULATION

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Objectives This study aims to estimate the incidence of knee pain and its risk factors in a general French working population, representative of the work force.

Method Of 3710 workers of a French region included in a study in 2002–2005 with a self-administered questionnaire, 2332 completed a follow-up questionnaire in 2007–2011. The questionnaires included musculoskeletal symptoms, individual and occupational exposures, and physical limitations (at follow-up only). Incident knee pain in 2007–2011 (i.e. subjects not suffering of knee pain at baseline and suffering of knee pain at follow-up) was dichotomized into sub-chronic knee pain (1–29 days) and chronic knee pain (>30 days). Associations between the incident knee pains and individual and work-related risk factors at baseline were studied separately by gender, using multinomial logistic regressions.

Results Of the 1616 respondents without knee pain at baseline, 122 (7.5%) reported chronic knee pain and 243 (15.0%) reported sub-chronic knee pain; 43% of workers with incident chronic knee pain and 30% of workers with incident sub-chronic knee pain had other chronic pains at baseline, and respectively 51% and 28% reported limitations in climbing stairs. After adjustment for age and BMI, significant associations were found between incident knee pain and handling loads >4 kg (Odds-Ratio (OR) 2.1 (1.2–3.6) among men, OR 2.3 (1.1–5.0) among