cigarette smoking (based on smoking rates in a cross-sectional survey) did not influence the estimates.

Conclusions While the results of this analysis did not reach statistical significance, they provide evidence supporting previous studies showing a risk of COPD associated with MWF exposure. The hazards presented are likely to be underestimates of the true association between COPD and MWF, due to the healthy worker effect.

0225 CANCER, MORTALITY AND ACUTE MYOCARDIAL INFARCTION IN WORKERS EXPOSED TO RESPIRABLE CRYSTALLINE SILICA DUST AT A SWEDISH PORCELAIN FACTORY

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Objectives Exposure to silica dust is a health hazard in the ceramic industry. We studied cancer, mortality and acute myocardial infarction (AMI) among workers at a Swedish porcelain factory.

Method Annual average of exposure levels were estimated from 436 personal measurements of respirable crystalline silica dust (RCS) from 1971–2006. We investigated mortality, incidence of cancer, and first time event of AMI in men and women employed for at least one year at the factory in 1958–2009. We also studied the effect of latency, duration and cumulative exposure.

Results RCS-levels among highly exposed workers were five times higher than the OEL and ten times higher in the early 1970s as in 2000.

We found a non-significant elevated risk for lung cancer, (SIR 1.39; 95 % CI 0.79–2.25) and a significant elevated risk of squamous cell carcinoma in men (SIR 2.37; 1.02–4.66).

Mortality from respiratory diseases was increased (SMR 1.75; 1.22–2.44), especially in men (SMR 1.86; 1.22–2.70). Among women, the risk for mortality from diseases of the circulatory system and incidence of AMI was elevated but not statistically significant. We found no dose-response relationship. There were eight cases of silicosis, and seven appeared with more than 30 years latency.

Conclusions The increased risk for lung cancer and mortality from respiratory diseases was expected in view of the well-documented harmful effects of RCS. The tendency among women for increased mortality from diseases of the circulatory system and an increase in the incidence of AMI should be investigated in further studies.

0228 PERCEIVED WORKPLACE DISCRIMINATION AND SELF RATED HEALTH IN THE CHILEAN WORKFORCE

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Objectives Increased research shows that perceived discrimination adversely affects physical and psychological health. Even though discrimination or concealed racism is an important characteristic of the Chilean society, which can be confirmed historically, it is not perceived as an important social problem for mainstream Chile. This paper aims to estimate the prevalence rate of workplace perceived discriminatory experience (WPDE) and its association with self-rated health status in the Chilean workforce

Method Data from the first national survey on employment, work, and health in Chile. Study population of 9720 selected by multistage random sampling drawn to be representative of the entire working population. Study participants were asked about their WPDE (multiple questions) and general self rated health status (one question). Adjusting by demographic and socioeconomic factors, multivariable Poisson-log generalised linear mixed models were used to estimate the association between WPED and self-rated health.

Results Approximately 17% reported being a victim of WPDE. Age, income, education, and minority (nine ethnicities) were strongly associated with WDPE. Female workers showed higher rate (19.6%) of WPDE than male workers (15.6%). After simultaneously controlling for potential confounders, WPDE was positively associated with poor self-rated health (PR = 2.12, CI = 1.46–3.05).

Conclusions There is positive association between WPDE and poor self-rated health in Chile. These results may be used to emphasise the importance of enacting preventive and protective workplace discrimination policies. Further research is required to study the causal mechanism of the link and best preventive and protective measures.

0231 ACUTE INFLAMMATORY RESPONSE TO SECONDHAND SMOKE EXPOSURE AMONG NON-SMOKING CONSTRUCTION WORKERS: A REPEATED MEASURES STUDY

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Objectives This study aimed to characterise the cardiovascular inflammatory response to secondhand smoke (SHS) exposure among non-smoking construction workers.

Method Non-smoking workers (n = 27) were recruited from a local union and monitored inside a union hall while exposed to SHS over approximately 6 h. Using a repeated measures study design, blood samples were taken before SHS exposure (baseline), immediately following SHS exposure (post) and the morning following SHS exposure (next morning). Inflammatory markers including acute phase proteins (SAA, CRP), adhesion molecules (s-ICAM, s-VCAM), and inflammatory cytokines (IL-1, IL-2, IL-6, IL-8, IL-10, TNF-alpha, VEGF) were analysed. Linear mixed effects regression models were used to examine within-person changes in inflammatory markers at post and next morning compared to baseline. Exposure-response relationships with TWA PM2.5 were also examined using mixed effects models. All models were adjusted for age, BMI and circadian variation.

Results There was a decrease in SAA (baseline = 2322 ng/ml, post = 1949 ng/ml, $p = 0.04$) and TNF-alpha (baseline = 9.6 pg/ml, post = 8.4 pg/ml, $p < 0.01$) post exposure, as compared to baseline. There was a decrease in IL-10 (baseline = 5.9 pg/ml, next morning = 6.5 pg/ml, $p < 0.01$) next morning compared to

baseline. Increases in SHS-related PM2.5 exposures were associated with significant ($p < 0.01$) increases in next morning CRP, s-ICAM, and s-VCAM levels.

Conclusions Our results indicate that exposure to SHS can lead to a cardiovascular inflammatory response approximately 18 h following SHS exposures, further supporting a pathway between SHS exposure and adverse cardiovascular outcomes.

0235 BARRIERS AND FACILITATORS OF SUPPLYING A TREADMILL WORKSTATION TO OFFICE WORKERS: USABILITY, SAFETY, COMFORT, AND PRODUCTIVITY. A QUALITATIVE STUDY

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Objectives Characterise usability, safety, comfort, and impact on productivity of treadmill workstations in real worksites.

Method Office workers volunteered to try out for six months a treadmill workstation consisting of a height adjustable electric desk, a walking treadmill, and their own sitting device (chair or "sitting ball"). They were instructed to set up and use the workstation at will. Monthly individual and group meetings were performed to gather qualitative data.

Results USABILITY: Difficult set up of the workstation, which demanded use of wireless mouse and keyboards and generated creative arrangements. Unanimous love for the adjustable electric desk. Difficult to talk to people while walking (disrespectful, "On the treadmill we are taller" - affect hierarchies). SAFETY: There was no event of either trips or falls. COMFORT: An important difficulty was during the first weeks to get used to longer time in standing position. In average it took two weeks for discomfort symptoms in foot and knees to recede. PRODUCTIVITY: faster speed implies faster impact on productivity. 7–.8 mph was the most used and comfortable speed. Walking on the treadmill was not compatible with drawing or working with spreadsheets.

Conclusions Treadmill workstation did not meet workers' expectations but the electric adjustable desk exceeded those expectations. Guiding and external motivation to increase use would be accepted and expected. DESIGN RECOMMENDATIONS: Reduce maximum speed. Even 2.0 mph is too much. Additional design study needed to improve global workstation setup without decreasing flexibility and adaptation of the station.

0239 INDUCIBLE NITRIC OXIDE SYNTHASE GENE METHYLATION AND PARKINSONISM IN MANGANESE-EXPOSED WELDERS

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Objectives To assess whether parkinsonism in manganese (Mn)-exposed welders is associated with methylation of NOS2, a methylation-regulated gene that codes for inducible nitric oxide synthase (iNOS). We hypothesised that parkinsonian welders would have lower NOS2 methylation than other welders, consistent with greater iNOS activity and an inflammatory pathogenesis.

Method In a cohort of U. S. shipyard welders we conducted a nested case-control study of parkinsonism and DNA methylation of a NOS2 region previously suggested to be altered with welding exposure. A movement disorders specialist examined each subject using the Unified Parkinson Disease Rating Scale motor subsection 3 (UPDRS3). We included 50 parkinsonian welders as cases (UPDRS3≥15), 105 welders with normal exams (UPDRS3 <6), and 50 welders with an intermediate UPDRS3 score (≥6 to <15), all non-Hispanic Caucasian men 25–65 years of age. We used DNA from whole blood and a pyrosequencing assay for 3 CpG (methylation) sites in NOS2 exon 1. We used unconditional polytomous logistic regression to assess the age-adjusted association between parkinsonism and mean NOS2 methylation.

Results CpG sites were highly methylated (90.8–98.5% mean methylation) among all subjects. Welders with parkinsonism had significantly lower NOS2 methylation than normal welders (odds ratio [OR]=0.69, 95% confidence interval [CI] 0.49–0.97 per 1% absolute increase in methylation). The welders with intermediate UPDRS3 scores also had lower methylation compared to normal welders (OR=0.88, 95% CI 0.65–1.20) (p trend = 0.03). Adjustment for smoking did not alter the results.

Conclusions This study suggests that inflammation mediated by NOS2 gene expression may underlie the pathophysiology of parkinsonism in Mn-exposed welders.

0253 HAIRDRESSERS ARE OCCUPATIONALLY EXPOSED TO ORTHO- AND META- TOLUIDINE

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Objectives Hairdressing work is classified as carcinogenic based on excess risk for bladder cancer. We aimed at evaluating if current hairdressers are exposed to established/suspected bladder carcinogens (aromatic amines) and indicate possible sources of exposure.

Method Hairdressing salons listed in the telephone book were contacted for personal visits, 295 hairdressers were recruited (an estimated half of the eligible invited subjects). For comparison we included 32 consumers and 60 controls employed at our hospital. The study was restricted to female non-smokers. Questionnaires including frequency of performed work tasks were filled in by the hairdressers, and all subjects reported personal hair dye use, and exposure to environmental tobacco smoke. Blood samples were taken for analysis (gas chromatography-tandem mass spectrometry; GC-MS/MS) of ortho (o)-, meta (m)-, and para (p)-toluidine; 2-, 3-, and 4-ethylaniline, 2,3- and 3,4-dimethylaniline as haemoglobin adducts.

Results Adduct concentrations did not differ significantly between hairdressers, consumers and controls. However, for hairdressers, o- and m-toluidine concentrations increased with the weekly performed number of permanent hair dyeings ($p = 0.026$), and hair waving treatments ($p = 0.020$). o- and m-Toluidine concentrations also tended ($p = 0.076$ and 0.080, respectively) to increase with the frequency of light colour permanent