

51.7 mcg/dL BPb. Subjects who went to practice 12 or more times a year reported a greater percentage of miscarriages in their partners (24% *vs* 0%). Twelve percent (8) showed an increase ³⁵ in neuropsychiatric symptoms. The BPb multiple linear regression model explains $R^2 = 44.15\%$, as follows: those who had ≥ 12 practice sessions per year $\beta = 0.5339$ and use of PbGC $\beta = 0.3651$.

Conclusions Using firearms and PbGC contribute to increasing BPb in the studied personnel. The BPb concentrations found, despite being low, are a health risk, as evidenced by the prevalence of neuropsychiatric symptoms. The caretakers at the shooting range are at a higher risk.

10 THE ASSOCIATION BETWEEN PARAOXONASE (PON1) POLYMORPHISMS AND CARDIOVASCULAR INJURIES AMONG NANOWORKERS

¹S Liou, ²Y Chung, ²H Liao, ³M Lin, ³C Lin, ⁴W Li, ²C Wang, ²W Wu. ¹National Health Research Institutes, Miaoli County, Taiwan; ²National Health Research Institutes, Miaoli, Taiwan; ³Institute of Occupational Safety and Health, Taipei, Taiwan; ⁴University of Washington, Seattle, United States of America

10.1136/oemed-2013-101717.10

Objectives The market of nanomaterials products is rapidly expanding. The lack of scientific evidence describing accompanying exposure and cardiovascular health risks regarding its guidance and regulation. The objectives of this study was to examine (1) the association between different nanomaterials exposure and cardiovascular biomarkers and (2) effect of *PON1 Q192R* genetic polymorphism on cardiovascular biomarkers among nanoworkers. **Methods** In this cross-sectional study, we recruited 258 workers exposed to nanomaterials and 200 non-exposed controls from 14 nanomaterial handling plants in Taiwan from 2009 to 2011. The non-exposed controls were selected from the same plants, but they did not handle nanomaterials. We used the control banding matrix to categorize the risk level of nanoworkers. For each participant, we collected blood specimens to measure cardiovascular biomarkers and genotyping of *PON1 (Q192R)*. In addition, heart rate variability (HRV) was tested.

Results *PON1 Q192R* genetic polymorphism associated with *PON1* activity and HRV (SDNN, RMSSD, and TP). We also found that different nanomaterials exposure affected particular cardiovascular biomarkers by controlling *PON1 Q192R* genetic polymorphism. Such as nano-carbon tube exposure resulted in a decrease in fibrinogen. Nano-SiO₂, nano-TiO₂ and nano-Ag exposure separately resulted in an increase in fibrinogen, VCT and RMSSD.

Conclusion This study adopted comprehensive cardiovascular examinations to establish the association between different nanomaterials exposure and cardiovascular injuries. We also found possible causal associations that NPs may activate the autonomic nervous system and result in alterations of heart rate variability. Additionally, *PON1 Q192R* genetic polymorphisms were significant variables for *PON1* activity and HRV.

11 SECOND HAND TOBACCO SMOKE EXPOSURE AND CHANGES IN HEART RATE VARIABILITY AMONG CONSTRUCTION WORKERS

¹J Z Zhang, ¹Fang, ¹Mittleman, ¹Christiani, ²Cavallari. ¹Harvard School of Public Health, Boston, United States of America; ²University of Connecticut Health Center, Farmington, United States of America

10.1136/oemed-2013-101717.11

Objective Although it has been well defined that long-term exposure to secondhand smoke (SHS) is associated with cardiovascular mortality, the acute cardiovascular effects of SHS exposure are still being explored. The aim of this study was to examine cardiovascular autonomic response, as measured by heart rate variability (HRV), to short-term SHS exposure among boilermaker construction workers.

Methods Boilermakers were recruited from a local apprentice hall where they were monitored while exposed to SHS for approximately 6 hours. A repeated measures study design was used where resting 5-lead ECGs were taken from individuals before SHS exposure (baseline), following SHS exposure (post) and the morning following SHS exposure (next-morning). The ECG recording was analysed in time (SDNN, rMSSD) and frequency (LF, HF) domain parameters in 5-minute averages. Personal SHS exposure was monitored through SidepakTM Aerosol Monitor and quantified by fine particulate matter (PM_{2.5}). Separate linear mixed-effects regression models were used to compare post- or next-morning after controlling for baseline. Exposure-response relationships with PM_{2.5} were examined.

Results 52 male boilermakers, including 30 non-smokers, were monitored between June 2010 and June 2012. The mean SHS exposure was 167 ug/m³. After SHS exposure post 5-minute SDNN, rMSSD, LF and HF were significantly ($p < 0.05$) lower than before SHS exposure. We observed significant ($p < 0.05$) differences in SDNN, rMSSD, LF and HF between smoker and non-smokers. However, this effect had no linear dose-response relationship with PM_{2.5}. The next morning SDNN, rMSSD, LF and HF were also significantly ($p < 0.05$) lower than the baseline, but no linear dose-response with PM_{2.5} was observed.

Conclusion We observed a change in HRV both immediately and the next morning following SHS exposure. However, results indicated that there was no linear dose-response relationship between PM_{2.5} and HRV. It is unclear whether SHS-derived PM_{2.5} or other factors contributed to the altered cardiovascular autonomic response.

12 MORTALITY AND ACUTE MYOCARDIAL INFARCTION IN RCS EXPOSED WORKERS AT A SWEDISH PORCELAIN FACTORY

¹E K Wiebert, ²Alderling, ³Svartengren, ¹Gustavsson, ¹Plato. ¹Karolinska Institute, Stockholm, Sweden; ²Stockholm County Council, Stockholm, Sweden; ³Swedish Work Environment Authority, Stockholm, Sweden

10.1136/oemed-2013-101717.12

Objectives Exposure to silica dust is a health hazard in the ceramic industry. The Swedish porcelain factory Gustavsberg started production in 1827, and have since 1971 performed occupational measurements of respirable crystalline silica dust (RCS). We have studied mortality and incidence of acute myocardial infarction (AMI) among workers at the factory.

Methods Exposure data from 436 personal measurements of RCS and respirable dust from 1971–2006 were processed and annual average of exposure levels were calculated. Exposure before 1971 was estimated. Analyses of mortality included 648 men and 315 women, employed for at least one year at the factory in 1958–2009. Forty three different causes of death were studied. Separate analyses of incidence of first time event of AMI included 358 men and 217 women.

Analyses were performed for all workers and for men and women separately. We also studied the effect of latency, duration and cumulative exposure to RCS and respirable dust.