Introduction Increasing evidence supports a association between exposure to ambient air pollution and ischemic heart disease, but only few studies have investigated if occupational exposure to dust is associated with cardiovascular disease. The aim of this study is to determine if certain particulate occupational exposures increase the risk of ischemic heart disease.

Methods In this study we will assess the risk of acute myocardial infarction in relation to occupational exposure to mineral dust ( respirable quartz ), organic dust ( endotoxin, wood dust), motor exhaust particles and metal-containing particles. The study is designed as a register-based follow-up study of the entire Danish working population with data on exposure ( 1976-2019 ) to specific types of dust based on quantitative job exposure matrices and with data on ischemic heart disease from the National Patient Registry ( 1995-2019 ). Demographics, comorbidities, and socio-economic factors will be included in the analyses as well as other working environment conditions such as noise, physically demanding work, sedentary work, stress, and outdoor air pollution. The study will include about one million people with information on occupational exposure to dust through approximately 40 million person-years.

Results The data analysis is on-going and preliminary results will be presented at the conference.

Conclusions We expect that this study will contribute with new knowledge on the risk of acute myocardial infarction following different kinds of particulate exposures at work, thus providing the basis for appropriate preventive actions in the working environment.

Carcinogens/Cancer

Objectives A positive association between work as a pilot and skin melanoma has been observed in most previous studies, which may be caused by occupational exposure to cosmic and solar ultraviolet A radiation. However, existing evidence is especially limited by lack of information on leisure-time sun habits. The aim of this study was therefore to explore the risk of skin melanoma in pilots, including detailed information on potential confounders.

Methods This nested case-control study was based on a large nationwide Danish military population comprising 199 male cases with skin melanoma diagnosed between 1990–2003 and 1,126 male cancer-free controls. Data on this population included job history relating to both military service and other jobs as well as socioeconomic and lifestyle characteristics, e.g. sun exposure habits, which had been obtained from a structured questionnaire. Odds ratios ( ORs ) and corresponding 95% confidence intervals ( CI ) were estimated by unconditional logistic regression.
Results Adjusted results indicated a positive association between work onboard aircrafts and skin melanoma (OR=2.30, 95% CI: 1.06–4.97) and the risk seemed only to be elevated in the subgroup of pilots (OR=7.08, 95% CI: 2.51–19.93). Longer duration of employment as pilot was further indicated to increase the risk of skin melanoma (OR per year=1.07, 95% CI: 1.01–1.14).

Conclusions Findings from our study, adjusted for potential confounders, support existing evidence suggesting that pilots have an occupational related increased risk of skin melanoma. However, the association need to be confirmed by future large-scale studies, including detailed objective information on dimensions of exposure and potential confounders.

Psychosocial exposures

Introduction While psychosocial working conditions have been associated with morbidity, their associations with mortality, especially cause-specific mortality, were less studied. Additionally, few studies considered the potentially time-varying aspect of exposures. We aimed to examine trajectories of job demand-control status in relation to all-cause and cause-specific mortality, including cardiovascular diseases (CVD), suicide, alcohol-related, and dementia mortality.

Material and Methods The study population consisted of around 4.8 million individuals aged 16 to 60 years in Sweden in 2005. Job control and job demands were measured using Job Exposure Matrices (JEMs). Trajectories of job control and job demands throughout 2005–2013 were identified, and job demand-control categories were subsequently classified. Deaths were recorded in the national death register until the end of 2019. Cox regression models were used.

Results A total of 148,399 individuals died in 2006–2019. Most individuals appeared to stay in a similar occupational category over the years and thus had stable levels of job control and job demands assessed using JEMs. Low control and passive jobs were associated with higher all-cause, CVD, and suicide mortality in both men and women. High strain jobs were associated with higher all-cause and CVD mortality in men. While low control, passive jobs, and high strain jobs were associated with higher alcohol-related mortality in women, they were associated with higher dementia mortality in men.

Conclusion Psychosocial working conditions are related to all-cause and cause-specific mortality, and there are sex differences in the associations. Future studies considering the time-varying aspect of job exposures using JEMs should note that most workers do not change occupations.

Nanoparticles

Introduction Due to the increasing demand of engineered nanomaterials (ENMs) in industrial application, the health of engineered nanoparticle (ENPs) exposed workers is engaging more attention. Metal and metal oxide nanoparticles are often used as industrial catalysts which can generate reactive oxygen species leading to increased oxidative stress in humans after inhaling. However, more understanding is needed to clarify the physiological effects and plausible biological mechanisms associated with ENPs. This study aimed to assess long-term changes in oxidative stress and DNA methylation damage in workers exposed to metal oxides nanoparticles.

Material and Methods 376 participants from 15 factories completed a questionnaire interview, blood and urine samples donation during their annual physical examinations from 2010 to 2012. Urinary 8-hydroxy-2-deoxyguanosine (8-OHdG) and N7-methylguanine (N7-MeG) were identified as biomarkers of oxidative and methylated DNA damage, respectively. Plasma superoxide dismutase (SOD) and glutathione peroxidase-1 (GPx-1) were identified as biomarkers of antioxidants. Based on the ENMs handled by the participants, they were divided into four groups: nano-titanium dioxide (nano-TiO2) and nano-silver (nano-Ag) co-exposed, nano-Ag exposed, nano-TiO2 exposed, and reference group.

Results After adjusting for confounders in generalized estimating equation (GEE) model, a significant increase in log N7-MeG of 112.4% (β = 0.327, 95% C.I. = 0.171 to 0.484) and a significant decrease in log GPx-1 of 6.6% (β = -0.030, 95% C.I. = -0.052 to -0.007) were found in the nano-Ag exposed group compared with the reference group. A significant decrease in log SOD of 13.4% (β = -0.062, 95% C.I. = -0.122 to -0.003) was found in the nano-TiO2 and nano-Ag co-exposed group compared with the reference group.

Conclusion Elevated methylated DNA damage and reduced enzymatic antioxidant activity were observed in workers exposed to Nano-Ag. Notably, this study also observed a reduced enzymatic antioxidant activity in the nano-TiO2 and nano-Ag co-exposed workers.