group intervention MARS (Measures Against Work-Related Stress). The present study aims to compare Stop for Stress and MARS in a multicentre randomized controlled trial (RCT).

**Materials and Methods** The RCT is performed as a non-inferiority trial with MARS being treatment as usual. We wish to recruit 220 patients with severe work-related stress referred to the departments of occupational medicine in Aarhus and Odense, Denmark. Patients will be randomised to the two interventions, and outcomes will be measured at 0, 1.5, 3, and 12 months. The interventions are comparable in content, length, and time consumption. Primary outcomes are perceived levels of stress and stressors in the work environment. Additional outcomes are mental health symptoms, daily and cognitive functioning, heart rate variability, and register data on sickness absence, healthcare service utilization, and psychotropic drug prescriptions.

**Results** We will quantify if the interventions show comparable effectiveness. Moreover, we aim to identity indicators of enhanced outcomes for the two interventions based on demographics, degree of stress, and cognitive functioning. This can be used to guide future allocation of patients. Lastly we expect the interventions to be equally effective at the two departments, demonstrating successful dissemination of the interventions.

**Conclusion** The Stop for Stress intervention is a promising format for delivering an intervention for work-related stress. If proven effective, the intervention can decrease inequality in healthcare.

**Musculoskeletal disorders**

**O-110 ASSOCIATION BETWEEN OCCUPATIONAL MECHANICAL EXPOSURES AND CHRONIC LOW BACK PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Introduction** Low back pain (LBP) is a worldwide health problem and a predominant reason for years lived with a disability. LBP increases the risk of sickness leave and is a common cause of early retirement from the labour market. Although LBP often is temporary, 4–20% of the adult population develops chronic LBP (pain >3 months). The aim of this systematic review was to synthesise the evidence on the association between occupational mechanical exposures (lifting/carrying, awkward postures, whole-body vibrations, standing/walking, sitting, and combined exposures) and chronic LBP.

**Methods** We used a systematic review conducted by The Swedish Council on Health Technology Assessment as basis to identify articles published from 1980 to January 2014. For studies published after January 2014, a systematic literature search was conducted in several databases. Two authors independently assessed the data extraction, risk of bias, and certainty of evidence. Random-effects model with weighted odds ratios was used in the meta-analysis and heterogeneity was assessed using I-squared statistics. Sensitivity analyses were conducted by dividing studies on study quality, study design, and outcome measurement.

**Results** Twenty-six articles were included in the meta-analysis, and the pooled odds ratios across all exposures ranged between 1.5 and 2.2. Lifting/carrying loads (OR=1.7), awkward postures (OR=1.5), and combined exposures (OR=2.2) were the only exposures rated as moderate certainty of evidence. The remaining exposures were rated either low or very low certainty of evidence. The sensitivity analyses comparing cohort and case-control studies revealed, in general, a higher odds ratio for case-control studies. Otherwise, no major differences between study quality or outcome measures were found.

**Conclusion** To our knowledge, this is the first systematic review and meta-analysis on the association between occupational mechanical exposures and chronic LBP. To ensure health and safety towards occupational mechanical exposures, high-quality studies are warranted with objective exposure assessments.

**Radiation**

**O-113 ASSOCIATIONS BETWEEN OCCUPATIONAL IONIZING RADIATION EXPOSURE AND CANCER MORTALITY: AN UPDATE OF THE POOLED US NUCLEAR WORKERS STUDY**

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**Introduction** Studies of nuclear workers provide insights into the health effects of ionizing radiation at levels relevant to contemporary workers and the general public. We evaluated the association between penetrating ionizing radiation exposure and cancer mortality subtypes in a large pooled cohort of US nuclear workers. Follow-up was extended an additional decade to improve power and examine cancers with longer latency.

**Materials and Methods** The pooled cohort includes 101,363 workers from five US Department of Energy and Department of Defense nuclear facilities, followed for causes of death between 1944 and 2016. Workers were individually monitored for ionizing radiation exposure with the use of personal dosimeter badges. The association between cumulative external penetrating ionizing radiation exposure and cancer subtypes were modeled as the excess relative rate per Sievert (ERR Sv-1) using Cox regression.

**Results** There were 13,568 cancer deaths during follow-up. We observed positive associations between ionizing radiation exposure and all solid cancer mortality (ERR Sv-1=0.19, 95% CI: -0.10, 0.52), and all lymphatic and hematopoietic cancers (ERR Sv-1=2.10; 95%CI: 0.97, 3.48). These associations were stronger among a contemporary sub cohort of workers first hired 1960 or later for both solid cancer (ERR Sv-1= 2.23; 95% CI: 1.13, 3.49) and all lymphatic and hematopoietic