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Workplace Research Monthly

Formerly Emerging Evidence Alert

September 2023

This Workplace Research Monthly includes the latest peer-reviewed articles, reports and evidence on a range of workplace health and safety, prevention, recovery at work and return to work topics that were published in August 2023 only.

Contents

Description of Evidence Levels Definitions Used in this Review

1. **Level of Evidence** – Certain study designs are scientifically stronger at answering a question. The scoring hierarchy we provided is presented below.

Level of Evidence	Description
Level 1	Evidence from a systematic review or meta-analysis of relevant studies.
Level 2	Evidence from a randomised controlled trial
Level 3	Evidence from a controlled intervention trial without randomisation (i.e. quasi-experimental).
Level 4	Evidence from a case-control or cohort study.
Level 5	Evidence from a single case study, a case series, or qualitative study.
Level 6	Evidence from opinion pieces, reports of expert committees and/or from literature reviews (scoping or narrative).

2. **Relevance** – Research carried out in Australia or similar countries is most relevant to Australian readers.

Level	Description
A	Study conducted in Australia or the study has been conducted outside Australia but confounders unlikely to affect relevance
B	Study conducted outside Australia and confounders likely to affect generalisability

Enabling Healthy and Safe Workplaces

Health and Wellbeing

This month we explore the effects on workers' health and wellbeing of nature-adapted lighting solutions, meaningful work, Mediterranean diet adherence, physical activity and diet and risky sexual behaviour. In COVID-19 related research we explore the effects of picking your nose on COVID-19 risk.

Effects of nature-adapted lighting solutions ("Virtual Sky") on subjective and objective correlates of sleepiness, well-being, visual and cognitive performance at the workplace
Background: Exposure to natural daylight benefits human well-being, alertness, circadian rhythms and sleep. Many workplaces have limited or no access to daylight. **Methods:** Thus, we implemented a light-panel ("Virtual Sky"), which reproduced nature-adapted light scenarios. In a laboratory office environment, three lighting scenarios were presented during the day: two lighting conditions with nature-adapted spectral light distributions, one with static and one with dynamic clouds, and a standard office lighting condition. We compared the impact of the three lighting scenarios on subjective and objective measures of alertness, cognitive performance, wellbeing, visual comfort, contrast sensitivity, and cortisol levels in 18 healthy young male volunteers in a within-participant cross-over study design. **Results:** We found no evidence that an 8-h lighting scenario with static or dynamic clouds during the waking day (9am-5pm) was associated with any significant effect on objective and/or subjective alertness, cognitive performance and morning cortisol concentrations compared to standard workplace lighting. However, the dynamic light scenario was accompanied with lower levels of perceived tensionafter completing cognitive tasks and less effort to concentrate compared to the static lighting scenarios. **Conclusions:** Our findings suggest that apart from smaller effects on tension and concentration effort, nature-adapted lighting conditions did not improve daytime alertness and cognitive performance in healthy well-rested young participants, as compared to standard office lighting.
Schöllhorn et al. 2023.
PLoS One, vol. 18, no. 8.

Keywords: Sleepiness; well-being; performance; cognitive; visual; workplace.
Evidence Level: 3B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0288690

Meaningful work, well-being, and health: Enacting a eudaimonic vision
Background: Work is one of the most enduring and consequential life domains regarding how meaning and purpose impact health and well-being. **Methods:** This review first examines scientific findings from the MIDUS (Midlife in the U.S.) national longitudinal study that have linked work to well-being and health. Most have focused on adverse work or work conditions as influences on poor health, with a few recent findings investigating links to purpose and other aspects of eudaimonic well-being. Organizational scholarship is then selectively reviewed to show how meaningful work is often linked to motivation, performance, and commitment. **Results:** Paradoxically, meaning can also lead to the exploitation and erosion of health and well-being when managed without regard for decent working conditions. Recent workplace phenomena known as the Great Resignation and Quiet Quitting underscore the societal consequences of work without meaning or adequate working conditions. Both the scientific and organizational literature are enriched by a vision of meaningful work rooted in Aristotle's writings about virtue, ethics, and the realization of potential. Evidence-based practices tied to these eudaimonic ideals are examined at multiple levels, including the societal context (public policy), organizational conditions (culture, human resource practices, leadership), and individual strategies to find meaning, engagement, and fulfillment in work. **Conclusions:** A concluding section highlights strengths and omissions in the scientific and organizational literature and, going forward, calls for greater interplay among researchers, practitioners, and policymakers in enacting eudaimonic ideals.
Soren et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 16.

Keywords: Great Resignation; quiet quitting; burnout; decent work; eudaimonia; eudaimonic design; exploitation; health; meaningful work; positive deviance; well-being.
Evidence Level: 4B
Link: https://www.mdpi.com/1660-4601/20/16/6570

Why not to pick your nose: Association between nose picking and SARS-CoV-2 incidence, a cohort study in hospital health care workers

Background: Hospital health care workers (HCW) are at increased risk of contracting SARS-CoV-2. We investigated whether certain behavioral and physical features, e.g. nose picking and wearing glasses, are associated with infection risk. **Aim:** To assess the association between nose picking and related behavioral or physical features (nail biting, wearing glasses, and having a beard) and the incidence of SARS-CoV-2-infection. **Methods:** In a cohort study among 404 HCW in two university medical centers in the Netherlands, SARS-CoV-2-specific antibodies were prospectively measured during the first phase of the pandemic. For this study HCW received an additional retrospective survey regarding behavioral (e.g. nose picking) and physical features. **Results:** In total 219 HCW completed the survey (response rate 52%), and 34/219 (15.5%) became SARS-CoV-2 seropositive during follow-up from March 2020 till October 2020. The majority of HCW (185/219, 84.5%) reported picking their nose at least incidentally, with frequency varying between monthly, weekly and daily. SARS-CoV-2 incidence was higher in nose picking HCW compared to participants who refrained from nose picking (32/185: 17.3% vs. 2/34: 5.9%, OR 3.80, 95% CI 1.05 to 24.52), adjusted for exposure to COVID-19. No association was observed between nail biting, wearing glasses, or having a beard, and the incidence of SARS-CoV-2 infection. **Conclusion:** Nose picking among HCW is associated with an increased risk of contracting a SARS-CoV-2 infection. We therefore recommend health care facilities to create more awareness, e.g. by educational sessions or implementing recommendations against nose picking in infection prevention guidelines.
Lavell et al. 2023.
PLoS One, vol. 18, no. 8.

Keywords: SARS-CoV-2; nose; healthcare workers.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0288352

Effect of a nutrition intervention on mediterranean diet adherence among firefighters: A cluster randomized clinical trial

Background: US firefighters are a working population at risk of chronic diseases, including obesity, cardiovascular disease, and cancer. This risk may be mitigated by a healthy diet. **Objective:** To evaluate the effect of a Mediterranean nutrition intervention using a behavioral/environmental approach (firefighter/fire station/home) at the individual participant level. **Design, setting, and participants:** This 12-month cluster randomized clinical trial included US career firefighters from fire stations and homes within 2 Indiana fire departments. Participants were randomized by fire station to either Mediterranean diet or control (usual care). The study was conducted from October 2016 to December 2019, and data were analyzed in November 2022. **Intervention:** For the first 12 months of the study, firefighters located at fire stations randomized to the intervention group were provided with access to supermarket discounts and free samples of Mediterranean diet foods, online nutrition education platforms, email announcements and reminders, family and peer education and support, and chef demonstrations. Firefighters in fire stations allocated to the control group received no intervention and were instructed to follow their usual diet. **Main outcomes and measures:** Change in dietary habits at 12 months as measured by a modified Mediterranean diet score (range, 0 to 51 points) at baseline and 6-month and 12-month follow-up. Cardiometabolic parameters were secondary outcomes. **Results:** Of 485 included firefighters, 458 (94.4%) were male, and the mean (SD) age was 47 (7.5) years. A total of 241 firefighters (27 fire stations) were randomized to the Mediterranean nutrition intervention, and 244 (25 fire stations) were randomized to usual diet. Outcomes were analyzed using generalized linear mixed models for modified Mediterranean diet score at 6 months (n

= 336) and 12 months (n = 260), adjusting for baseline age, sex, race and ethnicity, fire department, physical activity, and waist circumference. In the intervention group compared with the control group, the modified Mediterranean diet score significantly increased by 2.01 points (95% CI, 0.62-3.40; P = .005) at 6 months and by 2.67 points (95% CI, 1.14-4.20; P = .001) at 12 months. Among secondary outcomes, changes in cardiometabolic risk factors were not statistically significant at 1 year. Results from analyses with multilevel multiple imputation for missingness were similar. **Conclusions and relevance:** In this Mediterranean nutrition intervention of multicomponent behavioral/environmental changes, career firefighters had increased adherence to a Mediterranean diet. **Trial registration:** ClinicalTrials.gov Identifier: NCT02941757.

Hershey et al. 2023.

JAMA Network Open, vol. 6, no. 8.

Keywords: Nutrition; mediterranian diet; firefighters.

Evidence Level: 2B

Link: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2808462

Exploring university and healthcare workers' physical activity, diet, and well-being during the COVID-19 pandemic

Background: The COVID-19 pandemic affected well-being and health behaviors, especially among healthcare workers and employees in other fields. This is of public health concern because health behaviors and well-being influence long-term negative health outcomes. The purpose of this study was to explore health behaviors and well-being among university and medical center staff during COVID-19. **Methods:** EMPOWER (Employee Well-being during Epidemic Response) was a three-wave observational study (wave 1: 1,994; wave 2: 1,426; wave 3: 1,363) measuring health behaviors and well-being of university and medical center staff. Surveys were disseminated online to all employees between April and September 2020. Descriptive statistics explored trends across waves for health behaviors (physical activity [PA], diet), and well-being (mental well-being [MWB], depression, anxiety, and stress). Logistic regressions explored associations between health behaviors and well-being factors adjusting for demographics and clinical role. Interactions explored moderation by clinical role. **Results:** Most participants reported same/healthier changes in PA (54-65%) and diet (57-73%) and decreased MWB across waves (62%-69%). Nonclinical workers were less likely than clinical workers to experience worse MWB and moderate/severe anxiety and stress (odds ratios [ORs] ranged from 0.38 to 0.58 across waves and well-being outcomes). Participants who maintained/increased PA and diet were less likely to experience worse well-being (ORs ranged from 0.44 to 0.69 across waves and well-being outcomes). Interactions by clinical role were not significant. **Conclusion/application to practice:** Maintaining/increasing health behaviors during COVID-19 may be protective of mental health/well-being in some healthcare workers. These findings support health promotion efforts focused on maintaining or improving diet and PA.

Gilbert et al. 2023.

Workplace Health & Safety, vol. 71, no. 8.

Keywords: Clinical; fitness; nutrition; population health; workplace.

Evidence Level: 4B

Link: https://pubmed.ncbi.nlm.nih.gov/36708021/

Application of machine learning for risky sexual behavior interventions among factory workers in China

Background: Assessing the likelihood of engaging in high-risk sexual behavior can assist in delivering tailored educational interventions. The objective of this study was to identify the most effective algorithm and assess high-risk sexual behaviors within the last six months through the utilization of machine-learning models. **Methods:** The survey conducted in the Longhua District CDC, Shenzhen, involved 2023 participants who were employees of 16 different factories. The data was collected through questionnaires administered between October 2019 and November 2019. We evaluated the model's overall predictive classification performance using the area under the curve (AUC) of the receiver operating characteristic (ROC) curve. All

analyses were performed using the open-source Python version 3.9.12. **Results:** About a quarter of the factory workers had engaged in risky sexual behavior in the past 6 months. Most of them were Han Chinese (84.53%), hukou in foreign provinces (85.12%), or rural areas (83.19%), with junior high school education (55.37%), personal monthly income between RMB3,000 (US$417.54) and RMB4,999 (US$695.76; 64.71%), and were workers (80.67%). The random forest model (RF) outperformed all other models in assessing risky sexual behavior in the past 6 months and provided acceptable performance (accuracy 78%; sensitivity 11%; specificity 98%; PPV 63%; ROC 84%). **Discussion:** Machine learning has aided in evaluating risky sexual behavior within the last six months. Our assessment models can be integrated into government or public health departments to guide sexual health promotion and follow-up services.

Zhang et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: HIV/STIs; logistic regression; machine learning; random forest model; risky sexual behaviors.

Evidence Level: 5B

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1092018/full

Work Health and Safety

This month we explore the influence of communication determinants on safety commitment in a high-risk workplace, characterising factors for occupational health impacts due to nonfatal injuries and illnesses, and lymphohematopoietic cancer mortality among semiconductor manufacturing workers. In COVID-19 related research we explore the relationship between vaccination, time lost from work, and COVID-19 infections.

Influence of communication determinants on safety commitment in a high-risk workplace: A systematic literature review of four communication dimensions

Background: Health, safety, and environment (HSE) are critical aspects of any industry, particularly in high-risk environments, such as the oil and gas industry. Continuous accident reports indicate the requirement for the effective implementation of safety rules, regulations, and practices. **Methods:** This systematic literature review examines the relationship between safety communication and safety commitment in high-risk workplaces, specifically focusing on the oil and gas industry. The review comprises 1,439 articles from 2004 to 2023, retrieved from the Scopus and Web of Science databases following the PRISMA comprehensive guidelines. This study considers safety communication, communication climate, and communication satisfaction to evaluate their influence on safety commitment under occupational health and safety. **Results:** This study identifies safety commitment issues and their underlying factors, discussing measures for preventing and reducing accidents and incidents and highlighting preventive measures for future research. It also signifies the variables influencing accident and incident rates. The research underscores the importance of communication dimensions and the need for workers to possess adequate skills, knowledge, and attitudes regarding occupational safety and health procedures.
Conclusions: Moreover, the study contributes to the industrial and academic domains by improving organizational safety commitment, promoting a safety culture, and developing effective communication strategies. Furthermore, practitioners may benefit from this comprehensive overview in developing, evaluating, and enhancing occupational safety.

Zara et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: Communication climate; communication satisfaction; high-risk workplace; occupational accidents; occupational injuries; occupational safety; safety commitment; safety communication.

Evidence Level: 1A

Link: https://pubmed.ncbi.nlm.nih.gov/37614453/

Vaccination, time lost from work, and COVID-19 infections: A Canadian healthcare worker retrospective cohort study

Background: The COVID-19 pandemic highlighted hurdles for healthcare delivery and personnel globally. Vaccination has been an important tool for preventing severe illness and death in healthcare workers (HCWs) as well as the public at large. However, vaccination has resulted in some HCWs requiring time off work post-vaccination to recover from adverse events. **Methods:** We aimed to understand which HCWs needed to take time off work post-vaccination, for which vaccine types and sequence, and how post-vaccination absence impacted uptake of booster doses in a cohort of 26,267 Canadian HCWs. **Results:** By March 31, 2022, more than 98% had received at least two doses of the approved COVID-19 vaccines, following a two-dose mandate. We found that recent vaccination and longer intervals between doses were associated with significantly higher odds of time-loss, whereas being a medical resident and receiving the BNT162b2 vaccine were associated with lower odds. A history of lab-confirmed SARS-CoV-2 infection was associated with lower odds of receiving a booster dose compared with no documented infection, aOR 0.61 (95% CI: 0.55, 0.68). Similarly, taking sick time following the first or second dose was associated with lower odds of receiving a booster dose, aOR 0.83 (95% CI: 0.75, 0.90). As SARS-CoV-2 becomes endemic, the number and timing of additional doses for HCWs requires consideration of prevention of illness as well as service disruption from post-vaccination time-loss. **Conclusions:** Care should be taken to ensure adequate staffing if many HCWs are being vaccinated, especially for coverage for those who are more likely to need time off to recover.

Okpani et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: COVID-19; healthcare workers; occupational health; side effects; vaccination.
Evidence Level: 4B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1214093/full

System approach for characterizing and evaluating factors for occupational health impacts due to nonfatal injuries and illnesses for the use in life cycle assessment

Background: Occupational injuries and illnesses are major risk factors for human health impacts worldwide, but they have not been consistently nor comprehensively considered in life cycle impact assessment (LCIA) methods. **Methods**: In this study, we quantified occupational health impacts as disability-adjusted life years (DALYs) for nonfatal injuries and illnesses in all US industries. We further applied an economic input-output model of the US economy to develop a new data set of characterization factors (CFs) that links direct and indirect occupational health impacts to product life cycle final demand. **Results:** We found that the CF data set varies significantly by industry, ranging from 6.1 to 298 DALYs per billion dollars. About 20% of final demand in the US economic system contributes nearly 50% of the total impacts of occupational health, suggesting occupational health impacts are concentrated in a small portion of industries. To verify the feasibility of the CFs and demonstrate their importance, we included a case of an office chair. The occupational health impacts caused by nonfatal injuries and illnesses during the production of an office chair are of the same order of magnitude as those caused by chemical emissions across the chair's life cycle, with 1.1×10^{-5} and 1.4×10^{-5} DALYs per chair, respectively. **Conclusions:** Results and data sets derived from this study support the integration of occupational health impacts with LCIA methods.

Huang et al. 2023.
Environmental Science and Technology, vol. 57, no. 32.

Keywords: Disability-adjusted life years; economic input−output model; life cycle impact assessment; work environment.
Evidence Level: 5B
Link: https://pubs.acs.org/doi/10.1021/acs.est.3c00188

Lymphohematopoietic cancer mortality among Korean semiconductor manufacturing workers
Background: We aimed to examine the lymphohematopoietic cancer mortality in a cohort of workers at a semiconductor manufacturing company in South Korea according to their jobs. **Methods:** A retrospective cohort was constructed using the personnel records of semiconductor manufacturing workers who were employed in a semiconductor company in South Korea in 1998-2012. Data on their vital status and causes of death were obtained from the National Statistical Office of South Korea. The standardized mortality ratios (SMRs) of lymphohematopoietic cancer were calculated. **Results:** A total of 288 deaths were reported, of which 22 were caused by lymphohematopoietic cancer, among 65,782 workers in 878,325 person-years. The SMRs for lymphohematopoietic cancer were 0.78 (95% confidence interval [CI] = 0.39-1.40; the number of observed cases [Obs] = 11) among male workers and 1.71 (95% CI = 0.85-3.06; Obs = 11) among female workers. Among female operators, excess deaths due to lymphohematopoietic cancer (SMR = 2.59, 95% CI = 1.24-4.76) and leukemia (SMR = 2.92, 95% CI = 1.26-5.76) were observed. However, they were not observed among office workers, facility managers, utility managers, or process managers. **Conclusion:** Female operators involved in the semiconductor wafer fabrication process had higher risk of mortality from lymphohematopoietic cancer.
Lee et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Leukemia; lymphohematopoietic cancer; occupational disease; semiconductor industry.
Evidence Level: 4B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-16325-z

Risk Assessment

Analysis of factors affecting nonalcoholic fatty liver disease in Chinese steel workers and risk assessment studies
Background: The global incidence of nonalcoholic fatty liver disease (NAFLD) is rapidly escalating, positioning it as a principal public health challenge with significant implications for population well-being. Given its status as a cornerstone of China's economic structure, the steel industry employs a substantial workforce, consequently bringing associated health issues under increasing scrutiny. Establishing a risk assessment model for NAFLD within steelworkers aids in disease risk stratification among this demographic, thereby facilitating early intervention measures to protect the health of this significant populace.
Methods: Use of cross-sectional studies. A total of 3328 steelworkers who underwent occupational health evaluations between January and September 2017 were included in this study. Hepatic steatosis was uniformly diagnosed via abdominal ultrasound. Influential factors were pinpointed using chi-square (χ^2) tests and unconditional logistic regression analysis, with model inclusion variables identified by pertinent literature. Assessment models encompassing logistic regression, random forest, and XGBoost were constructed, and their effectiveness was juxtaposed in terms of accuracy, area under the curve (AUC), and F1 score. Subsequently, a scoring system for NAFLD risk was established, premised on the optimal model.
Results: The findings indicated that sex, overweight, obesity, hyperuricemia, dyslipidemia, occupational dust exposure, and ALT serve as risk factors for NAFLD in steelworkers, with corresponding odds ratios (OR, 95% confidence interval (CI)) of 0.672 (0.487-0.928), 4.971 (3.981-6.207), 16.887 (12.99-21.953), 2.124 (1.77-2.548), 2.315 (1.63-3.288), 1.254 (1.014-1.551), and 3.629 (2.705-4.869), respectively. The sensitivity of the three models was reported as 0.607, 0.680 and 0.564, respectively, while the precision was 0.708, 0.643, and 0.701, respectively. The AUC measurements were 0.839, 0.839, and 0.832, and the Brier scores were 0.150, 0.153, and 0.155, respectively. The F1 score results were 0.654, 0.661, and 0.625, with log loss measures at 0.460, 0.661, and 0.564, respectively. R^2 values were reported as 0.789, 0.771, and 0.778, respectively. Performance was comparable across all three models, with no significant differences observed. The NAFLD risk score system exhibited exceptional risk detection capabilities with an established cutoff value of 86. **Conclusions:** The study identified sex, BMI, dyslipidemia, hyperuricemia, occupational dust exposure, and ALT as significant risk factors for NAFLD among steelworkers. The traditional logistic regression model proved equally effective as the random forest and XGBoost models in assessing NAFLD

risk. The optimal cutoff value for risk assessment was determined to be 86. This study provides clinicians with a visually accessible risk stratification approach to gauge the propensity for NAFLD in steelworkers, thereby aiding early identification and intervention among those at risk.
Meng et al. 2023.
Lipids in Health and Disease, vol. 22, no. 1.

Keywords: Influencing factors; NAFLD; risk assessment; risk scoring system; steel workers.
Evidence Level: 4B
Link: https://lipidworld.biomedcentral.com/articles/10.1186/s12944-023-01886-0

Chronic Health Issues

This month we explore the workplace issues related to the chronic health conditions of sarcoma patients, cardiovascular disease and traumatic brain injury.

Working situation and burden of work limitations in sarcoma patients: Results from the multi-center prospective PROSa study
Background: We investigated predictors of limitations in work performance, odds of drop out of work, and odds of receiving disability pension in sarcoma patients. **Methods**: We measured clinical and sociodemographic data in adult sarcoma patients and recorded if the patients received a (1) disability pension at baseline or (2) had dropped out of work 1 year after initial assessment. (3) Work limitations were assessed using the Work-limitations questionnaire (WLQ©). We analyzed exploratively. **Results**: (1) Amongst 364 analyzed patients, odds to receive a disability pension were higher in patients with abdominal tumors, older patients, high grade patients and with increasing time since diagnosis. (2) Of 356 patients employed at baseline, 21% (n = 76) had dropped out of work after 1 year. The odds of dropping out of work were higher in bone sarcoma patients and in patients who received additive radiotherapy ± systemic therapy compared with patients who received surgery alone. Odds of dropping out of work were less amongst self-employed patients and dropped with increasing time since diagnosis. (3) Work limitations were higher in woman and increased with age. Patients with bone and fibrous sarcomas were more affected than liposarcoma patients. Patients with abdominal tumors reported highest restrictions. Sarcoma treatment in the last 6 months increased work limitations. **Conclusion**: Work limitations, drop out of work and dependence on a disability pension occurs frequently in patients with sarcoma adding to the burden of this condition. We were able to identify vulnerable groups in both the socioeconomic and disease categories.
Zapata Bonilla et al. 2023.
Journal of Cancer Research and Clinical Oncology, vol. 149, no. 9.

Keywords: Disability pension; drop out of work; limitations at work; rare diseases; return to work; sarcoma; work-limitations questionnaire; working situation.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00432-022-04556-3

Psychosocial job conditions and biomarkers of cardiovascular disease: A cross-sectional study in the Swedish CArdioPulmonary bioImage Study (SCAPIS)
Background: The aim of this study was to investigate associations between psychosocial work exposure and the presence of biological and imaging biomarkers of cardiovascular disease. **Methods:** This cross-sectional study was conducted in a sub-cohort of the Swedish CArdioPulmonary bioImage Study (SCAPIS). Psychosocial exposure was evaluated with the job demand-control model, and analysed according to the standard categorization: high strain, active, passive and low strain (reference). Biomarkers (blood pressure, high-density lipoprotein (HDL) and low-density lipoprotein (LDL) cholesterol, coronary artery calcification (CAC) and metabolic syndrome) were measured, or derived through measurements, from clinical

examinations. Gender-specific prevalence ratios (PRs) and 95% confidence intervals (CIs) were calculated with regression models and adjusted for age, education, smoking, physical activity, general life stress and body mass index (BMI). **Results:** The analyses included 3882 participants (52.5% women). High strain (high demands-low control) was linked to increased PR for low HDL cholesterol in women, adjusted for all covariates (PR 1.76; 95% CI 1.25-2.48). High strain was also related to moderately increased PR for metabolic syndrome in men, after adjustments for all covariates except BMI (PR 1.25; 95% CI 1.02-1.52). In addition, passive work (low demands-low control) was associated with diastolic hypertension in women (fully adjusted: PR 1.29; 95% CI 1.05-1.59). All relationships between psychosocial factors and LDL cholesterol or CAC (both genders), or hypertension (men), were non-significant. **Conclusions:** Poor psychosocial job conditions was associated with the presence of low HDL cholesterol and diastolic hypertension in women, and metabolic syndrome in men. These findings contribute to the knowledge of potential pathways between stressful work and coronary heart disease.

Söderberg et al. 2023.

Scandinavian Journal of Public Health, vol. 51, no. 6.

Keywords: Job demand–control; cardiovascular disease; cholesterol; coronary artery calcification; hypertension; metabolic syndrome.

Evidence Level: 4B

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10350706/

Cardiovascular disease risk factors predict the development and numbers of common musculoskeletal disorders in a prospective cohort

Background: The aim of the study is to assess risk of common musculoskeletal disorders (MSDs) based on cardiovascular disease (CVD) risk scores. **Methods:** Data from a 9-year prospective cohort of 1224 workers in three states were analyzed. Baseline data included questionnaires, structured interviews, physical examinations, anthropometric measurements, nerve conduction studies, and individualized measurement of job physical factors. Monthly follow-ups were conducted. Framingham risk scores were calculated. A priori case definitions were constructed for carpal tunnel syndrome, lateral epicondylopathy, medial epicondylopathy, and rotator cuff tendinopathy. **Results:** Adjusted RRs for one or more MSDs increased to 3.90 (95% confidence interval, 2.20-6.90) among those with 10-year cardiovascular disease risk scores greater than 15% and 17.4 (95% confidence interval, 3.85-78.62) among those with more than 4 disorders. **Conclusions:** Cardiovascular disease factors are strongly associated with the subsequent development of common MSDs. Risks among those with multiple MSDs are considerably stronger.

Hegmann et al. 2023.

Journal of Occupational and Environmental Medicine, vol. 65, no. 8.

Keywords: Musuloskeletal disorders; cardiovascular disease; risk factors.

Evidence Level: 4B

Link:
https://journals.lww.com/joem/fulltext/2023/08000/cardiovascular_disease_risk_factors_predict_the.14.aspx

Occupation and risk of traumatic brain injury in the millennium cohort study

Background: Traumatic brain injury (TBI) is an occupational health hazard of military service. Few studies have examined differences in military occupational categories (MOC) which take into consideration the physical demands and job requirements across occupational groups. **Methods:** This study was approved by the University of Texas Health Science Center at Houston Institutional Review Board. Data for this cross-sectional study were obtained from the Naval Health Research Center's Millennium Cohort Study, an ongoing DoD study. Univariate analyses were employed to calculate frequencies and proportions for all variables. Bivariate analyses included unadjusted odds ratios (OR) and 95% CI for the association between all variables and TBI. Multivariable logistic regression was used to calculate adjusted ORs and 95% CIs to

assess the association between MOC and TBI, adjusted for potential confounders: sex, race/ethnicity, rank, military status, branch of service, before-service TBI, and panel. Logistic regression models estimated odds of TBI for each MOC, and stratified models estimated odds separately for enlisted and officer MOCs. **Results:** Approximately 27% of all participants reported experiencing a service-related TBI. All MOCs were statistically significantly associated with increased odds of service-related TBI, with a range of 16 to 45%, except for "Health Care" MOCs (OR: 1.01, 95% CI 0.91-1.13). Service members in "Infantry/Tactical Operations" had the highest odds (OR: 1.45, 95% CI 1.31-1.61) of service-related TBI as compared to "Administration & Executives." Among enlisted service members, approximately 28% reported experiencing a service-related TBI. Among enlisted-specific MOCs, the odds of TBI were elevated for those serving in "Infantry, Gun Crews, Seamanship (OR: 1.79, 95% CI 1.58-2.02)," followed by "Electrical/ Mechanical Equipment Repairers (OR: 1.23, 95% CI 1.09-1.38)," "Service & Supply Handlers (OR 1.21, 95% CI 1.08-1.37)," "Other Technical & Allied Specialists (OR 1.21, 95% CI 1.02-1.43)," "Health Care Specialists (OR 1.19, 95% CI 1.04-1.36)," and "Communications & Intelligence (OR: 1.16, 95% CI 1.02-1.31)," compared to "Functional Support & Administration." Among officer service members, approximately 24% reported experiencing a service-related TBI. After adjustment the odds of TBI were found to be significant for those serving as "Health Care Officers" (OR: 0.65, 95% CI: 0.52-0.80) and "Intelligence Officers" (OR: 1.27, 95% CI: 1.01-1.61). **Conclusions:** A strength of this analysis is the breakdown of MOC associations with TBI stratified by enlisted and officer ranks, which has been previously unreported. Given the significantly increased odds of service-related TBI reporting within enlisted ranks, further exploration into the location (deployed versus non-deployed) and mechanism (e.g., blast, training, sports, etc.) for these injuries is needed. Understanding injury patterns within these military occupations is necessary to increase TBI identification, treatment, and foremost, prevention. Results highlight the importance of examining specific occupational categories rather than relying on gross categorizations, which do not account for shared knowledge, skills, and abilities within occupations. The quantification of risk among enlisted MOCs suggests a need for further research into the causes of TBI.

Jannace et al. 2023.

Military Medicine, vol. 188.

Keywords: Traumatic brain injury; military; occupation; risk.

Evidence Level: 4B

Link: https://academic.oup.com/milmed/article/188/9-10/e3057/6540071?login=true

Occupational Exposure

This month we explore the issues associated with occupational exposure to Borrelia burgdorferi sensu lato and tick-borne encephalitis virus, mpox, hazardous chemicals including ortho-phthalaldehyde and lead, hazardous gases including radon and rural occupational vapor-gas and fumes (VGDF), dusts and/or fibres (silica, asbestos and coal, wildfire fine particulate matter, wood dust and insulating materials), low and high air temperatures, solar and ionizing radiation and electromagnetic fields.

Seroprevalence for Borrelia burgdorferi sensu lato and tick-borne encephalitis virus antibodies and associated risk factors among forestry workers in northern France, 2019 to 2020

Background: Lyme borreliosis (LB) is the most common tick-borne disease (TBD) in France. Forestry workers are at high risk of TBD because of frequent exposure to tick bites.AimWe aimed to estimate the seroprevalence of *Borrelia burgdorferi* sensu lato and tick-borne encephalitis virus (TBEV) antibodies among forestry workers in northern France. We compared seroprevalence by geographical area and assessed factors associated with seropositivity. **Methods**: Between 2019 and 2020, we conducted a randomised cross-sectional seroprevalence survey. *Borrelia burgdorferi* sl seropositivity was defined as positive ELISA and positive or equivocal result in western blot. Seropositivity for TBEV was defined as positive result from two ELISA tests, confirmed by serum neutralisation. We calculated weighted

seroprevalence and adjusted prevalence ratios to determine association between potential risk factors and seropositivity. **Results**: A total of 1,778 forestry workers participated. Seroprevalence for *B. burgdorferi* sl was 15.5% (95% confidence interval (CI): 13.9-17.3), 3.5 times higher in the eastern regions than in the western and increased with seniority and with weekly time in a forest environment. Seroprevalence was 2.5 times higher in forestry workers reporting a tick bite during past years and reporting usually not removing ticks rapidly. Seroprevalence for TBEV was 0.14% (95% CI: 0.05-0.42). **Conclusion**: We assessed for the first time seroprevalence of *B. burgdorferi* sl and TBEV antibodies among forestry workers in northern France. These results will be used, together with data on LB and tick-borne encephalitis (TBE) incidence and on exposure to tick-bites, to target prevention programmes.

Septfons et al. 2023.
Eurosurveillance, vol. 28, no. 32.

Keywords: Borrelia burgdorferi; Lyme borreliosis; forestry workers; seroprevalence; tick; tick-borne encephalitis; tick-borne encephalitis virus.
Evidence Level: 4B
Link: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2023.28.32.2200961

The prevalences and levels of occupational exposure to dusts and/or fibres (silica, asbestos and coal): A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury

Background: The World Health Organization (WHO) and the International Labour Organization (ILO) are developing joint estimates of the work-related burden of disease and injury (WHO/ILO Joint Estimates), with contributions from a large number of individual experts. Evidence from human, animal and mechanistic data suggests that occupational exposure to dusts and/or fibres (silica, asbestos and coal dust) causes pneumoconiosis. In this paper, we present a systematic review and meta-analysis of the prevalences and levels of occupational exposure to silica, asbestos and coal dust. These estimates of prevalences and levels will serve as input data for estimating (if feasible) the number of deaths and disability-adjusted life years that are attributable to occupational exposure to silica, asbestos and coal dust, for the development of the WHO/ILO Joint Estimates. **Objectives:** We aimed to systematically review and meta-analyse estimates of the prevalences and levels of occupational exposure to silica, asbestos and coal dust among working-age (≥ 15 years) workers. **Data sources:** We searched electronic academic databases for potentially relevant records from published and unpublished studies, including Ovid Medline, PubMed, EMBASE, and CISDOC. We also searched electronic grey literature databases, Internet search engines and organizational websites; hand-searched reference lists of previous systematic reviews and included study records; and consulted additional experts. **Study eligibility and criteria:** We included working-age (≥ 15 years) workers in the formal and informal economy in any WHO and/or ILO Member State but excluded children (< 15 years) and unpaid domestic workers. We included all study types with objective dust or fibre measurements, published between 1960 and 2018, that directly or indirectly reported an estimate of the prevalence and/or level of occupational exposure to silica, asbestos and/or coal dust. **Study appraisal and synthesis methods:** At least two review authors independently screened titles and abstracts against the eligibility criteria at a first stage and full texts of potentially eligible records at a second stage, then data were extracted from qualifying studies. We combined prevalence estimates by industrial sector (ISIC-4 2-digit level with additional merging within Mining, Manufacturing and Construction) using random-effects meta-analysis. Two or more review authors assessed the risk of bias and all available authors assessed the quality of evidence, using the ROB-SPEO tool and QoE-SPEO approach developed specifically for the WHO/ILO Joint Estimates. **Results:** Eighty-eight studies (82 cross-sectional studies and 6 longitudinal studies) met the inclusion criteria, comprising > 2.4 million measurements covering 23 countries from all WHO regions (Africa, Americas, Eastern Mediterranean, South-East Asia, Europe, and Western Pacific). The target population in all 88 included studies was from major ISCO groups 3 (Technicians and Associate Professionals), 6 (Skilled Agricultural, Forestry and Fishery Workers), 7 (Craft and Related Trades Workers), 8 (Plant and Machine Operators and Assemblers), and 9 (Elementary Occupations), hereafter called manual workers. Most studies were performed in Construction, Manufacturing and Mining. For occupational exposure to silica, 65 studies (61 cross-sectional studies and 4 longitudinal studies) were included with > 2.3

million measurements collected in 22 countries in all six WHO regions. For occupational exposure to asbestos, 18 studies (17 cross-sectional studies and 1 longitudinal) were included with > 20,000 measurements collected in eight countries in five WHO regions (no data for Africa). For occupational exposure to coal dust, eight studies (all cross-sectional) were included comprising > 100,000 samples in six countries in five WHO regions (no data for Eastern Mediterranean). Occupational exposure to silica, asbestos and coal dust was assessed with personal or stationary active filter sampling; for silica and asbestos, gravimetric assessment was followed by technical analysis. Risk of bias profiles varied between the bodies of evidence looking at asbestos, silica and coal dust, as well as between industrial sectors. However, risk of bias was generally highest for the domain of selection of participants into the studies. The largest bodies of evidence for silica related to the industrial sectors of Construction (ISIC 41-43), Manufacturing (ISIC 20, 23-25, 27, 31-32) and Mining (ISIC 05, 07, 08). For Construction, the pooled prevalence estimate was 0.89 (95% CI 0.84 to 0.93, 17 studies, I^2 91%, moderate quality of evidence) and the level estimate was rated as of very low quality of evidence. For Manufacturing, the pooled prevalence estimate was 0.85 (95% CI 0.78 to 0.91, 24 studies, I^2 100%, moderate quality of evidence) and the pooled level estimate was rated as of very low quality of evidence. The pooled prevalence estimate for Mining was 0.75 (95% CI 0.68 to 0.82, 20 studies, I^2 100%, moderate quality of evidence) and the pooled level estimate was 0.04 mg/m^3 (95% CI 0.03 to 0.05, 17 studies, I^2 100%, low quality of evidence). Smaller bodies of evidence were identified for Crop and animal production (ISIC 01; very low quality of evidence for both prevalence and level); Professional, scientific and technical activities (ISIC 71, 74; very low quality of evidence for both prevalence and level); and Electricity, gas, steam and air conditioning supply (ISIC 35; very low quality of evidence for both prevalence and level). For asbestos, the pooled prevalence estimate for Construction (ISIC 41, 43, 45,) was 0.77 (95% CI 0.65 to 0.87, six studies, I^2 99%, low quality of evidence) and the level estimate was rated as of very low quality of evidence. For Manufacturing (ISIC 13, 23-24, 29-30), the pooled prevalence and level estimates were rated as being of very low quality of evidence. Smaller bodies of evidence were identified for Other mining and quarrying (ISIC 08; very low quality of evidence for both prevalence and level); Electricity, gas, steam and air conditioning supply (ISIC 35; very low quality of evidence for both prevalence and level); and Water supply, sewerage, waste management and remediation (ISIC 37; very low quality of evidence for levels). For coal dust, the pooled prevalence estimate for Mining of coal and lignite (ISIC 05), was 1.00 (95% CI 1.00 to 1.00, six studies, I^2 16%, moderate quality of evidence) and the pooled level estimate was 0.77 mg/m^3 (95% CI 0.68 to 0.86, three studies, I^2 100%, low quality of evidence). A small body of evidence was identified for Electricity, gas, steam and air conditioning supply (ISIC 35); with very low quality of evidence for prevalence, and the pooled level estimate being 0.60 mg/m^3 (95% CI -6.95 to 8.14, one study, low quality of evidence). **Conclusions:** Overall, we judged the bodies of evidence for occupational exposure to silica to vary by industrial sector between very low and moderate quality of evidence for prevalence, and very low and low for level. For occupational exposure to asbestos, the bodies of evidence varied by industrial sector between very low and low quality of evidence for prevalence and were of very low quality of evidence for level. For occupational exposure to coal dust, the bodies of evidence were of very low or moderate quality of evidence for prevalence, and low for level. None of the included studies were population-based studies (i.e., covered the entire workers' population in the industrial sector), which we judged to present serious concern for indirectness, except for occupational exposure to coal dust within the industrial sector of mining of coal and lignite. Selected estimates of the prevalences and levels of occupational exposure to silica by industrial sector are considered suitable as input data for the WHO/ILO Joint Estimates, and selected estimates of the prevalences and levels of occupational exposure to asbestos and coal dust may perhaps also be suitable for estimation purposes.

Schlünssen et al. 2023.

Environment International, vol. 178.

Keywords: Asbestos; coal dust; exposure levels; exposure prevalence; silica; systematic review.

Evidence Level: 1A

Link: https://www.sciencedirect.com/science/article/pii/S0160412023002532?via%3Dihub

An approach to quantify ortho-phthalaldehyde contamination on work surfaces

Background: Ortho-phthalaldehyde (OPA) is used as a high-level disinfectant for reusable medical devices in healthcare settings. The ACGIH recently adopted a Threshold Limit Value-Surface Limit (TLV-SL; 25 µg/100 cm2) for OPA surface contamination to prevent induction of dermal and respiratory sensitization following dermal exposure. However, there is no current validated method to measure OPA surface contamination. **Methods:** This study aimed to develop a standardized approach for sample collection and quantitative determination of OPA from work surfaces for use in risk assessment practices. The reported method utilises readily available commercial wipes to collect surface samples coupled with direct detection of OPA via liquid chromatography time of flight mass spectrometry (LC-ToF-MS). This approach avoided complex derivatization steps commonly required for the analysis of aldehydes. Method evaluation was conducted in accordance with the Occupational Safety and Health Administration (OSHA) surface sampling guidelines. **Results:** Overall recoveries of 25 µg/100 cm2 of OPA from stainless steel and glass surfaces were 70% and 72%, respectively. The reported LOD for this method was 1.1 µg/sample and the LOQ was 3.7 µg/sample. OPA remained stable on the sampling medium for up to 10 days, when stored at 4 °C. The method was demonstrated in a workplace surface assessment at a local hospital sterilising unit, successfully detecting OPA on work surfaces. This method is intended to supplement airborne exposure assessment and provide a quantitative assessment tool for potential dermal exposure. **Conclusions:** When used in conjunction with a thorough occupational hygiene program that includes hazard communication, engineering controls, and personal protective equipment, skin exposure and consequent sensitization risks in the workplace can be minimized.

Rogers et al. 2023.

Annals of Work Exposures and Health, vol. 67, no. 7.

Keywords: o-phthalaldehyde; Threshold Limit Value– Surface Limit (TLV– SL); surface sampling.

Evidence Level: 5A

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10410490/

Effects of short- and medium-term exposures to lower air temperature on 71 novel biomarkers of subclinical inflammation: Results from the KORA F4 study

Background: Increasing evidence has revealed that exposure to low temperatures is linked to a higher risk of chronic diseases and death; however, the mechanisms underlying the observed associations are still poorly understood. **Methods:** We performed a cross-sectional analysis with 1115 participants from the population-based KORA F4 study, which was conducted in Augsburg, Germany, from 2006 to 2008. Seventy-one inflammation-related protein biomarkers were analyzed in serum using proximity extension assay technology. We employed generalized additive models to explore short- and medium-term effects of air temperature on biomarkers of subclinical inflammation at cumulative lags of 0-1 days, 2-6 days, 0-13 days, 0-27 days, and 0-55 days. **Results:** We found that short- and medium-term exposures to lower air temperature were associated with higher levels in 64 biomarkers of subclinical inflammation, such as Protein S100-A12 (EN-RAGE), Interleukin-6 (IL-6), Interleukin-10 (IL-10), C-C motif chemokine 28 (CCL28), and Neurotrophin-3 (NT-3). More pronounced associations between lower air temperature and higher biomarker of subclinical inflammation were observed among older participants, people with cardiovascular disease or prediabetes/diabetes, and people exposed to higher levels of air pollution ($PM_{2.5}$, NO_2, and O_3). **Conclusions:** Our findings provide intriguing insight into how low air temperature may cause adverse health effects by activating inflammatory pathways.

Ni et al. 2023.

Environmental Science and Technology, vol. 57, no. 33.

Keywords: Air temperature; cytokines; inflammation; short- and medium-term effects.

Evidence Level: 4B

Link: https://pubs.acs.org/doi/10.1021/acs.est.3c00302

Occupational exposure to solar radiation and the eye: A call to implement health surveillance of outdoor workers

Background: Globally, hundreds of millions of outdoor workers are exposed to solar radiation (SR) for the majority of their working life. Such occupational exposure is known to induce various adverse health effects to the eyes, mainly related to its ultraviolet (UV) component. **Methods:** The present work is a call-to-action aimed at raising the awareness on the need of health surveillance for the prevention of the chronic ocular diseases in outdoor workers. Photo-chemical chronic damage can induce pterygium at the outer layer of the eye and cataract in the lens. Considering carcinogenic effects, rare squamous-cells tumors of the cornea and/or of the conjunctiva and the ocular melanomas are associated with UV radiation exposure. **Results:** Solar UV-related eye diseases should be considered as "occupational diseases" when there is sufficient exposure in workers, but they are often not recognized, and/or frequently not reported to the national compensation authorities. **Conclusions:** Therefore, to prevent the burden of these work-related eye pathologies, an adequate risk assessment with identification of appropriate preventive measures, and a provision of periodic health surveillance to the exposed workers, in particular considering those at higher risk of exposure or with individual susceptibility, should be urgently implemented.

Modenese et al. 2023.

La Medicina del Lavoro, vol. 114, no. 4.

Keywords: Solar radiation; eye; exposure; outdoor workers.

Evidence Level: 6A

Link: https://www.mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14657

Exposure to insulating materials and risk of coronary artery diseases: A cross-sectional study

Background: Although previous reports link exposure to insulating materials with an increased risk of mesothelioma and chronic respiratory diseases, studies evaluating their associations with the risk of coronary artery diseases (CAD) are lacking. **Aims:** We aimed at evaluating the associations between exposure to insulating materials and the 10-year risk of CAD among insulators. **Methods:** In this cross-sectional study, we recruited 643 adults (≥18 years), full-time insulators from the Local 110 Heat and Frost Insulators and Allied Workers Union in Edmonton, Alberta. We obtained demographic information, personal and family history, and job-exposure history, including experience (years) and types of exposure to insulating materials. Clinical profiling including Framingham risk scores (FRS) was assessed. **Results:** Of all insulators, 89% were men (mean ± SD age: 47 ± 12 years), 27% had a parental history of cardiac diseases, and 22% had a comorbid chronic respiratory disease. In total, 53% reported exposure to asbestos, while 61, 82, and 94% reported exposure to ceramic fibers, fiberglass, and mineral fibers, respectively. In single-exposure multivariable regression models adjusted for experience, marital status, and body mass index (BMI), asbestos was found to be associated with higher FRS (β: 1.004; 95%CI: 0.003-2.00). The association remained consistent in multi-exposure models and a higher association was found between asbestos exposure and FRS among insulators with comorbid chronic respiratory disease. **Conclusion:** Our study demonstrates that apart from cancer and chronic respiratory diseases, asbestos exposure may also have a cardiac effect, thus warranting the need for systematic surveillance to protect workers from the adverse effects of these materials.

Moitra et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: Framingham risk score; asbestos; chronic respiratory disease; occupational exposure; worker's health.

Evidence Level: 4B

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1235189/full

Short-Term total and wildfire fine particulate matter exposure and work loss in California

Background: Few studies investigated the impact of particulate matter (PM2.5) on some symptom exacerbations that are not perceived as severe enough to search for medical assistance. We aimed to study

the association of short-term daily total PM2.5 exposure with work loss due to sickness among adults living in California. **Methods**: We included 44,544 adult respondents in the workforce from 2015 to 2018 California Health Interview Survey data. Daily total PM2.5 concentrations were linked to respondents' home addresses from continuous spatial surfaces of PM2.5 generated by a geostatistical surfacing algorithm. We estimated the effect of a 2-week average of daily total PM2.5 exposure on work loss using logistic regression models. **Results**: About 1.69% (weighted percentage) of adult respondents reported work loss in the week before the survey interview. The odds ratio of work loss was 1.45 (odds ratio [OR] = 1.45, 95% confidence interval [CI]: 1.03, 2.03) when a 2-week average of daily total PM2.5 exposure was higher than 12 μg/m3. The OR for work loss was 1.05 (95% CI: 0.98, 1.13) for each 2.56ug/m3 increase in the 2-week average of daily total PM2.5 exposure, and became stronger among those who were highly exposed to wildfire smoke (OR = 1.06, 95% CI: 1.00, 1.13), compared to those with lower wildfire smoke exposure (OR = 1.04, 95% CI: 0.79, 1.39). **Conclusions**: Our findings suggest that short-term ambient PM2.5 exposure is positively associated with work loss due to sickness and the association was stronger among those with higher wildfire smoke exposure. It also indicated that the current federal and state PM2.5 standards (annual average of 12 μg/m3) could be further strengthened to protect the health of the citizens of California.

Meng et al. 2023.

Environment International, vol. 178.

Keywords: Air pollution; particulate matter; wildfire; work loss due to sickness.

Evidence Level: 4B

Link: https://www.sciencedirect.com/science/article/pii/S0160412023003185?via%3Dihub

A case of occupational transmission of mpox

Background: Between May 2022 and January 2023, a global mpox outbreak affected more than 84,000 patients across all continents. Transmission of mpox occurs through large respiratory droplets and direct contact with skin lesions. **Case presentation:** We present the case of a 31-year-old previously healthy male with mpox-Infection following occupational exposure to mpox from a needle stick injury with a sterile needle through a contaminated glove. The patient presented with a three-day history of fever, malaise, and an increasing erythema and swelling of one fingertip. The patient works as a medical doctor with regular exposure to patients infected with mpox. Mpox-PCR from a swab of the lesion and an oro-pharyngeal swab were positive. The lesion on his finger evolved into a necrotic skin lesion finally healing, leaving a scar. He did not develop any secondary pox on his skin and recovered fully. **Discussion:** Only a minority of patients with mpox infection develop illness with pronounced local complications as in this case. **Conclusion:** Mpox can potentially be transmitted in an occupational context. Medical personnel should be informed about this possible route of transmission.

Miguad et al. 2023.

Infection, vol. 51, no. 4.

Keywords: Monkeypox; Mpox; Needle-stick injury; Nosocomial; Occupational.

Evidence Level: 5A

Link: https://link.springer.com/article/10.1007/s15010-023-01989-x

Evaluation of temporal trends of lead exposure in Korean workers using workplace monitoring data

Background: Lead, which is widely used in various industrial settings, is a major health hazard for manufacturing workers. Therefore, control of lead exposure has been implemented in an effort to prevent lead-related health problems. In this study, our aim was to evaluate temporal trends in occupational lead exposure in Korean lead workers using data from monitoring of workplace exposure. **Methods:** A nationwide work environment monitoring database, data from a work environment monitoring institution, and data extracted from a review paper were utilized. Different versions of standard industrial classification codes were aligned with the 10th Korean Standard Industrial Classification, which is generally consistent with the 4th revision of the International Standard Industrial Classification. The multiple data sources were combined and temporal trends over the period from 1994-2021 were estimated. In addition, separate

estimation of temporal trends in the storage battery manufacturing industry over the period from 1987-2021 was also performed. **Results:** A total of 444,296 personal airborne lead measurements were used for the estimation process. The temporal trends in occupational exposure to lead declined by -6% annually over the study period. In particular, levels of lead exposure in the storage battery manufacturing industry showed a steeper decline of -12% annually. **Conclusions:** Findings of our study showed that occupational exposure to lead declined over the period from 1994 to 2021 in Korea. However, adverse effects of exposure to lead on health should be regarded with caution. The results will be useful in conduct of epidemiological studies examining lead-related effects on health.

Koh et al. 2023.

Journal of Korean Medical Science, vol. 38, no. 34.

Keywords: Carcinogen; exposure; korea; lead; occupational exposure; temporal Trend.

Evidence Level: 4B

Link: https://jkms.org/DOIx.php?id=10.3346/jkms.2023.38.e271

Radon exposure concentrations in Finnish workplaces

Background: The aim of this study was to obtain information on the radon concentrations to which Finnish workers are exposed. **Methods:** Radon measurements were conducted as integrated measurements in 700 workplaces, supplemented by continuous radon measurements in 334 workplaces. The occupational radon concentration was calculated by multiplying the result of the integrated measurements by the seasonal correction factor and the ventilation correction factor (ratio between the working time and the full-time radon concentration obtained from continuous measurement). The annual radon concentration to which workers are exposed was weighted by the actual number of workers in each province. In addition, workers were divided into three main occupational categories (working mainly outdoors, underground, or indoors above ground). Probability distribution of the parameters affecting radon concentration levels were generated to calculate a probabilistic estimate of the number of workers exposed to excessive radon levels. **Results:** With deterministic methods, the geometric and arithmetic mean radon concentrations in conventional, above-ground workplaces were 41 and 91 Bq m -3 , respectively. The estimated geometric and arithmetic mean annual radon concentrations that Finnish workers are exposed to were assessed as 19 and 33 Bq m -3 , respectively. The generic ventilation correction factor for workplaces was calculated as 0.87. Assessed with probabilistic methods, there are approximately 34,000 workers in Finland whose exposure to radon exceeds the reference level of 300 Bq m -3 . Although radon concentrations are generally low in Finnish workplaces, many workers are exposed to high levels of radon. **Conclusions:** Radon exposure in the workplace is the most common source of occupational radiation exposure in Finland.

Kojo et al. 2023.

The Radiation Safety Journal Health Physics, vol. 125, no. 2.

Keywords: Radon; exposure; Finnish.

Evidence Level: 5B

Link: https://journals.lww.com/health-physics/fulltext/2023/08000/radon_exposure_concentrations_in_finnish.2.aspx

The association of forced expiratory volume in one second with occupational exposures in a longitudinal study of adults in a rural community in Iowa

Background: The Keokuk County Rural Health Study (KCRHS) is a longitudinal population-based study conducted in rural Iowa. A prior analysis of enrollment data identified an association of airflow obstruction with occupational exposures only among cigarette smokers. The current study used spirometry data from all three rounds to investigate whether level of forced expiratory volume in one second (FEV_1) and longitudinal change in FEV_1 were associated with occupational vapor-gas, dust, and fumes (VGDF) exposures, and whether these associations were modified by smoking. **Methods:** This study sample comprised 1071 adult KCRHS participants with longitudinal data. A job-exposure matrix (JEM) was applied

to participants' lifetime work histories to assign exposures to occupational VGDF. Mixed regression models of pre-bronchodilator FEV_1 (millimeters, ml) were fit to test for associations with occupational exposures while adjusting for potential confounders. **Results:** Mineral dust had the most consistent association with change in FEV_1, including ever/never (- 6.3 ml/year) and nearly every level of duration, intensity, and cumulative exposure. Because 92% of participants with mineral dust also had organic dust exposure, the results for mineral dust may be due to a combination of the two. An association of FEV_1 level with fumes was observed for high intensity (- 91.4 ml) among all participants, and limited to cigarette smokers with results of - 104.6 ml ever/never exposed, - 170.3 ml high duration, and - 172.4 ml high cumulative. **Conclusion:** The current findings suggest that mineral dust, possibly in combination with organic dust, and fumes exposure, especially among cigarette smokers, were risk factors for adverse FEV_1 results.
Henneberger et al. 2023.
International Archives of Occupational and Environmental Health, vol. 96, no. 6.

Keywords: Job-exposure matrix; lifetime work history; longitudinal study; obstructive pulmonary disease; rural adults.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00420-023-01979-4

Occupational exposure to electromagnetic fields-different from general public exposure and laboratory studies
Background: The designs of in vivo, in vitro and in silico studies do not adequately reflect the characteristics of long-term occupational EMF exposure; the higher exposure levels permitted for employees are nevertheless extrapolated on this basis. Epidemiological studies consider occupational exposure only in a very general way, if at all. **Results:** There is a lack of detailed descriptive data on long-term occupational exposure over the duration of the working life. Most studies reflect exposure characteristics of the general population, exposures which are long-term, but at a comparably low level. Occupational exposure is often intermittent with high peak power followed by periods with no exposure. Furthermore, the EU EMF-Directive 2013/35/EU states a demand for occupational health surveillance, the outcome of which would be of great help to epidemiologists studying the health effects of EMF exposure. **Conclusions:** This paper thus aims to outline and specify differences between public and occupational exposure and to increase the understanding of specific aspects of occupational exposure which are important for long-term health considerations. This could lead to a future protection concept against possible hazards based on adequate descriptions of long-term exposures and also include supplementary descriptive features such as a "reset time" of biological systems and accurate dose quantities.
Hansson Mild et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 16.

Keywords: Biological effects; electromagnetic field; general population; health surveillance; workers.
Evidence Level: 6B
Link: https://www.mdpi.com/1660-4601/20/16/6552

Broad scale spatial modelling of wet bulb globe temperature to investigate impact of shade and airflow on heat injury risk and labour capacity in warm to hot climates
Background: While shade and air flow are recognised factors that reduce outdoor heat exposure, the level of reduction in terms of labour capacity at varying air temperature and humidity levels is poorly understood. **Methods:** This study investigated cooling effects on the commonly used heat index, wet bulb globe temperature (WBGT), and subsequent impact on labour capacity, for a range of air flow and shade conditions in warm to hot climates. We modelled heat exposure using a physics-based method to map WBGT for a case study region which experiences a range of heat categories with varying levels of health risks for outdoor workers. **Results:** Continent-scale modelling confirmed significant spatial variability in the effect of various shade and wind speed scenarios across a range of real-world mid-summer daytime conditions. At high WBGTs, increasing shade or air flow for outdoor workers lowered heat exposure and increases labour capacity, with shade giving the greatest benefit, but cooling varied considerably depending

upon underlying air temperature and humidity. Shade had the greater cooling effect; reducing incident radiation by 90% decreased WBGT by 2-6 °C depending on location. **Conclusions:** Wind had a lower cooling effect in the hottest regions, with a decreasing exponential relationship between wind speed and WBGT observed.
Hall et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 15.

Keywords: Australia; WBGT; global warming; heat categories; heat injury; labour capacity; relative humidity; shade; wind speed.
Evidence Level: 5A
Link: https://www.mdpi.com/1660-4601/20/15/6531

Length of employment in workplaces handling hazardous chemicals and risk of cancer among Japanese men
Background: In Japan, the risk of developing cancer among workers employed in workplaces where chemical substances are handled is unclear. This study aimed to assess the association between cancer risk and employment in workplaces handling hazardous chemicals. **Methods:** The Inpatient Clinico-Occupational Survey of the Rosai Hospital Group data of 120 278 male patients with incident cancer and 217 605 hospital controls matched for 5-year age group, hospital (34 hospitals) and year of admission (2005-2019) were analysed. Cancer risk in relation to lifetime employment in workplaces using regulated chemicals was assessed while controlling for age, region and year of diagnosis, smoking, alcohol consumption and occupation. Further analysis stratified by smoking history was performed to examine interaction effects. **Results:** In the longest group of employment in tertiles, ORs were increased for all cancers (OR=1.13; 95% CI: 1.07 to 1.19) and lung (OR=1.82; 95% CI: 1.56 to 2.13), oesophageal (OR=1.73; 95% CI: 1.18 to 2.55), pancreatic (OR=2.03; 95% CI: 1.40 to 2.94) and bladder (OR=1.40; 95% CI: 1.12 to 1.74) cancers. Employment of 1+ years was associated with risk for lung cancer; 11+ years for pancreatic and bladder cancers; and 21+ years for all cancers and oesophageal cancer. These positive relationships were particularly obvious among patients with a history of smoking; however, no significant interaction between smoking and length of employment was observed. **Conclusions:** There is a high risk of cancer among workers, especially smokers, employed in workplaces handling regulated chemicals in Japan. Thus, future measures for chemical management in workplaces are needed to prevent avoidable cancers.
Fukai et al. 2023.
Occupational and Environmental Medicine, vol. 80, no. 8.

Keywords: Chemical Hazard Release; epidemiology; medical oncology; risk assessment; smoking.
Evidence Level: 4B
Link: https://oem.bmj.com/content/80/8/431.long

Wood dust in France. Trends in the population of exposed workers between 1982 and 2017 based on a job-exposure matrix assessment
Background: Many occupations and industries use wood as a raw material and wood dust is a well-known carcinogen. This study presents trends in occupational exposure to wood dust for all workers (employees and self-employed workers) in France between 1982 and 2017 and focuses on the exposed workers in 2017. **Methods:** Exposures to this carcinogen were assessed using the Matgéné job-exposure matrix. Trends in the prevalence and proportion of exposure over the study period were estimated by linking the matrix with population data from the 1982, 1990, 1999, 2007, and 2017 censuses and are described for selected industry groups. **Results:** The number of exposed workers to wood dust has decreased significantly over the last 40 years, from 466,900 potentially exposed workers in 1982 to 305,000 workers in 2017. The proportion of exposed workers has also decreased over time, although not uniformly across industries. Increases in the proportion of exposed workers are observed in certain industries, such as "Sawmilling and logging" (from 61.2% to 73.6% over the period for men) and "Finishing of sale premises" (from 3.3% to 6.2% for women). **Conclusion:** This article is the first to describe occupational exposure to

wood dust in France for all workers and to follow its evolution over the last 40 years. Occupations and industries still at risk in 2017 are also described with the aim of helping to improve prevention policies.
Garras et al. 2023.
Annals of Work Exposures and Health, vol. 67, no. 7.

Keywords: 40-year trend; Job-exposure matrix; occupational exposure; prevalence; wood dust.
Evidence Level: 4B
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10410493/

Duration-response association between occupational exposure and pancreatic cancer risk: Meta-analysis
Background: Evidence is lacking on the occupational exposure time window to chemical agents related to pancreatic cancer risk. **Aims:** This study performed meta-regression and meta-analysis to examine the dose-response association between occupational exposure duration to chemical agents and pancreatic cancer risk. **Methods:** We searched and reviewed studies on exposure duration and pancreatic cancer in five databases (Cochrane Library, EMBASE, PubMed, ScienceDirect and Web of Science) from inception to 16 May 2022. Exposure refers to the years a worker was exposed to any chemical agent, and outcome variables were pancreatic cancer incidence and mortality. **Results:** We identified 31 studies, including 288 389 participants. In the meta-regression, the positive dose-response association indicated pancreatic cancer risk increased slightly with every additional year of exposure duration (slope = 1.01; 95% confidence interval [CI] 1.00-1.02). Pancreatic cancer risk increased with an exposure duration of 1-10 (relative risk [RR] = 1.04; 95% CI 1.02-1.06), 11-20 (RR = 1.11; 95% CI 1.05-1.16), and 21-30 years (RR = 1.39; 95% CI 1.12-1.73). **Conclusions:** Pancreatic cancer risk increased as occupational exposure duration increased, with an exposure time window ranging from 1 to 30 years.
Boonhat et al. 2023.
Occupational Medicine, vol. 73, no. 4.

Keywords: Occupational exposure; pancreatic cancer; chemical; agents risk; cancer.
Evidence Level: 1A
Link: https://academic.oup.com/occmed/article/73/4/211/7143670?login=true

Occupational heat stress, heat-related effects and the related social and economic loss: A scoping literature review
Background: While there is consistent evidence on the effects of heat on workers' health and safety, the evidence on the resulting social and economic impacts is still limited. A scoping literature review was carried out to update the knowledge about social and economic impacts related to workplace heat exposure. **Methods:** The literature search was conducted in two bibliographic databases (Web of Science and PubMed), to select publications from 2010 to April 2022. **Results:** A total of 89 studies were included in the qualitative synthesis (32 field studies, 8 studies estimating healthcare-related costs, and 49 economic studies). Overall, consistent evidence of the socioeconomic impacts of heat exposure in the workplace emerges. Actual productivity losses at the global level are nearly 10% and are expected to increase up to 30-40% under the worst climate change scenario by the end of the century. Vulnerable regions are mainly low-latitude and low- and middle-income countries with a greater proportion of outdoor workers but include also areas from developed countries such as southern Europe. The most affected sectors are agriculture and construction. There is limited evidence regarding the role of cooling measures and changes in the work/rest schedule in mitigating heat-related productivity loss. **Conclusion:** The available evidence highlights the need for strengthening prevention efforts to enhance workers' awareness and resilience toward occupational heat exposure, particularly in low- and middle-income countries but also in some areas of developed countries where an increase in frequency and intensity of heat waves is expected under future climate change scenarios.
De Sario et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: Climate change; economic costs; occupational heat exposure; productivity loss; scoping review; workers.
Evidence Level: 6A
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1173553/full

Chromosomal aberrations, micronuclei, blood parameters and received doses in workers exposed to ionizing radiation
Background: The aim of this study was to analyze the impact of low doses of ionizing radiation on healthcare workers using dosimeter data and several biomarkers of effects, and to asses the suitability of those tests. **Methods:** Data from the last medical examinations, obtained from the medical records of 148 employees were analysed. They were divided into three groups: nuclear medicine, interventional radiology and general radiology. The examination included hematological parameters and cytogenetical tests: unstable chromosomal aberrations (UCA) and micronucleus test (MNT). The received cumulative 5-year dose was calibrated into personal dose equivalents Hp(10). **Results:** A statistically significant difference was found between the groups in the UCAs (c2=6.634, p=0.036) with the highest UCA frequency in nuclear medicine. The ANOVA showed a statistically significant difference in the values of erythrocytes (F(2,140)=3.715, p=0.027), monocytes (F(2,127)=3.326, p=0.039) and platelets (F(2,135)=4.209, p=0.017), with higher erythrocytes and lower platelets in interventional radiology and lower monocytes in nuclear medicine, all with small effect size. The dose was significantly different among the groups (c2 =22,191; p<0.001). The nuclear medicine workers received a higher dose compared to interventional radiology (U=458, p<0.001) and general radiology (U=510.5, p<0.001). **Conclusions:** Nuclear medicine employees are at a higher risk of developing neoplastic and blood-related diseases due to consistent exposure to low doses of ionizing radiation. Results suggest that UCA test might be more suitable for detecting radiation-induced damage at low doses than MNT. Compulsory monitoring of the health status at periodic examinations is required to prevent occupational diseases, esp. among the nuclear medicine workers.
Djokovic et al. 2023.
La Medicina del Lavoro, vol. 114, no. 4.

Keywords: Chromosomal aberrations; micronuclei; blood parameters; healthcare workers.
Evidence Level: 5B
Link: https://www.mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14280

Occupational exposure to ionizing radiation in medical staff: Trends during the 2009-2019 period in a multicentric study
Bsckground: Health workers exposed to ionizing radiation account for + 50% of workers exposed to man-made radiation in France. Over the last decade, the use of radiation in medicine has increased due to the introduction of new practices. The EXposition des Professionnels de santE aux RayonnemenTs ioniSants study aims to evaluate and characterize the trends in radiation exposure of health workers in France between 2009 and 2019. **Methods:** This retrospective study includes all health workers with at least one dosimetric record in the system for occupational dosimetry registration (Système d'information de la surveillance de l'exposition aux rayonnements ionisants) database for each of the years 2009, 2014, and 2019, in the hospitals included in the study. Individual external doses and socio-professional data were collected. Statistical analyses include descriptions, graphs, and logistic regressions. **Results:** A total of 1457 workers were included (mean age: 39.8 years, 59% women). The average exposure significantly decreased between 2009 and 2019 (-0.008 mSv/year, p < 0.05). There were large discrepancies in trends according to professions, departments, hospitals, and gender. Over the 10-year study period, radiologic technologists and physicians were the most exposed (0.15 mSv (95%CI 0.14-0.16) and 0.13 mSv (0.06-0.21), respectively), but their exposure tended to decrease. Workers in nuclear medicine departments had the highest radiation exposure (0.36 mSv (0.33-0.39)), which remained stable over time. Thirty-eight percent of recorded doses were nonzero in 2009, decreasing to 20% in 2019. **Conclusions:** This study allowed to identify physicians and radiologic technologists in nuclear medicine departments as the most exposed medical workers in France, and to show an overall decrease trend in radiation exposure. This should be instructive for radiation

monitoring and safety of exposed medical workers. **Key points:** Radiation exposure of healthcare workers in most medical departments has steadily decreased between 2009 and 2019 in several French hospitals. The number of zero doses consistently increased during the study period. Workers in nuclear medicine departments are the most exposed, especially radiologic technologists and physicians.
Baudin et al. 2023.
European Radiology, vol. 33, no. 8.

Keywords: Medical staff; occupational exposure; radiation, ionizing.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00330-023-09541-z

Musculoskeletal Health

This month we explore the issues associated with the economic burden of work-related musculoskeletal pain, the impact of personal factors, habitual factors, and work-related factors on work-related musculoskeletal disorders, the relationship between cervical musculoskeletal impairments and pressure pain sensitivity and shoulder tendinopathies and occupational biomechanical overload.

The humanistic and economic burden of work-related musculoskeletal pain: A cross-sectional survey of workers in the United Kingdom
Background: The aim of this study was to evaluate the impact of work-related musculoskeletal (MSK) lower body pain on health-related quality of life (HRQoL) and work productivity in a large sample of workers in the United Kingdom, as well as evaluating the potential economic impact of MSK pain. **Methods:** Participants with self-reported work-related MSK pain were recruited from an online panel maintained by a third party (Qualtrics LLC). Participants completed three validated instruments online: the Brief Pain Inventory (BPI), the Assessment of Quality of Life Instrument (AQoL-4D), and the 6-item Work Productivity and Activity Impairment Questionnaire (WPAI). Sociodemographic details, work patterns and healthcare resource utilisation were also reported. One-way analysis of variance (ANOVA) and t-tests were used to explore differences between variables. Linear regression was applied to determine the impact of work-related MSK pain on HRQoL. **Results:** All 1035 recruited participants completed the survey (57.4% female; mean age 43.4 years). Participants reported spending all (25.2%) or most (53%) of their time at work on their feet. Mean pain severity was 4.63 (standard deviation: 2.07); mean pain interference was 4.37 (2.49). There was a linear relationship between length of shift, time on feet and pain. Mean AQoL-4D scores were 0.609 (0.254). A mean of 4.12 h was lost per week due to pain. Absenteeism (last 7 days) was 9.5% (20.7%), and presenteeism 33.3% (24.9%). An average 1.55 visits were made to family practitioners (total cost: £19,866) and 1 hospital visit (£37,320) due to work-related MSK pain. **Conclusion:** This study demonstrated that work-related lower body pain has a significant impact in terms of individual HRQoL and as an economic societal burden.
Smith et al. 2023.
BMC Research Notes, vol. 16, no. 1.

Keywords: Absenteeism; economic cost; health-related quality of life; lower body pain; presenteeism; questionnaire; work productivity; work-related musculoskeletal pain.
Evidence Level: 4B
Link: https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-023-06461-5

Structural equation modelling of work related musculoskeletal disorders among dumper operators
Background: The aim of this study is to investigate the impact of personal factors, habitual factors, and work-related factors on work-related musculoskeletal disorders (WRMSDs) among dumper operators. **Methods:** In total, 248 dumper operators working in an iron ore mine were considered for this study. A questionnaire was developed and administered to collect dumper operators' personal, habitual, and work-related data. The reliability of the questionnaire was cross-checked by Cronbach alpha and the test-retest method. **Results:** The values of Cronbach alpha for all latent variables were above 0.7, and the correlation coefficient of the questionnaire items at Time 1 and Time 2 was above 0.82. After verifying the validity (i.e., convergent and divergent) of the questionnaire data, the relationship between the factors under consideration was examined by structural equation modeling (SEM). The SEM demonstrated a moderate fit, with [Formula: see text] value of 1.386, comparative fit index (CFI) of 0.86, goodness-of-fit index (GFI) of 0.72, adjusted goodness-of-fit index (AGFI) of 0.69, Tucker-Lewis Index (TLI) of 0.83, normed fit index (NFI) of 0.71 and root mean square error of approximation (RMSEA) of 0.051. The SEM analysis revealed a positive relationship between WRMSDs and personal factors (with path coefficient = 0.313 and $p < 0.05$) as well as work-related factors (with path coefficient = 0.296 and $p < 0.05$). However, the relationship between WRMSDs and habitual factors was not statistically significant (with path coefficient = 0.142 and $p > 0.05$). **Conclusions:** Overall, this study provides valuable insights into the factors that influence the prevalence of WRMSDs among dumper operators. The findings highlight the significance of personal and work-related factors by which one can make a positive decision to prevent and reduce the incidence of WRMSDs among dumper operators.
Kar et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Musculoskeletal disorders; dumper operators; work-related disorders.
Evidence Level: 5A
Link: https://www.nature.com/articles/s41598-023-40507-9

Cervical musculoskeletal impairments and pressure pain sensitivity in office workers with headache
Background: Office workers are specifically vulnerable to headache conditions. Neck pain is reported by almost 80% of patients with headaches. Associations between currently recommended tests to examine cervical musculoskeletal impairments, pressure pain sensitivity and self-reported variables in headache, are unknown. The aim of this study is to evaluate whether cervical musculoskeletal impairments and pressure pain sensitivity are associated with self-reported headache variables in office workers. **Methods:** This study reports a cross-sectional analysis using baseline data of a randomized controlled trial. Office workers with headache were included in this analysis. Multivariate associations, controlled for age, sex and neck pain, between cervical musculoskeletal variables (strength, endurance, range of motion, movement control) and pressure pain threshold (PPT) over the neck and self-reported headache variables, such as frequency, intensity, and the Headache-Impact-Test-6, were examined. **Results:** Eighty-eight office workers with a 4-week headache frequency of 4.8 (±5.1) days, a moderate average headache intensity (4.5 ± 2.1 on the NRS), and "some impact" (mean score: 53.7 ± 7.9) on the headache-impact-test-6, were included. Range of motion and PPT tested over the upper cervical spine were found to be most consistently associated with any headache variable. An adjusted R^2 of 0.26 was found to explain headache intensity and the score on the Headache-Impact-Test-6 by several cervical musculoskeletal and PPT variables. **Discussion:** Cervical musculoskeletal impairments can explain, irrespective of coexisting neck pain, only little variability of the presence of headache in office workers. Neck pain is likely a symptom of the headache condition, and not a separate entity.
Ernst et al. 2023.
Musculoskeletal Science and Practice, vol. 66.

Keywords: Cervical; endurance; headache; movement control; pressure pain threshold; range of motion; strength.
Evidence Level: 4B
Link: https://www.sciencedirect.com/science/article/pii/S2468781223001017?via%3Dihub

Shoulder tendinopathies and occupational biomechanical overload: A critical appraisal of available evidence

Background: The aim of this study is to evaluate the association between occupational exposure to biomechanical risk factors and shoulder tendinopathies. **Methods:** We updated recent systematic reviews about specific shoulder disorders and work-related risk factors. MEDLINE was searched up to September 2022. Studies satisfying the following criteria were included: i) the diagnosis was based on physical examination plus imaging data (when available), and ii) the exposure assessment was based on video analysis and/or directly measured. **Results:** Five studies met the inclusion criteria: three cross-sectional studies identified from published systematic reviews and two cohort studies retrieved from the update. Two studies investigated shoulder tendinitis, one supraspinatus tendinitis, and the other two rotator cuff syndrome. The diagnosis was based on physical examination, not supported by imaging techniques for all the included studies. In four out of five studies, the exposure was assessed by experienced ergonomists with the support of video recordings. In two studies, the exposure assessment was further supplemented by force gauge measurements or direct measurements of upper arm elevation. Only the combined exposure of working with arms above shoulder level with forceful hand exertion appears to be associated with rotator cuff syndrome: i) a cohort study reported an HR=1.11 (95%CI 1.01-1.22) for each unit increase in forceful repetition rate when the upper arm is flexed ≥45° for ≥29% of the working time; and ii) a cross-sectional study showed an OR=2.43 (95%CI 1.04-5.68) for the combination of upper arm flexion ≥45° for more than 15% of the time with a duty cycle of forceful exertions more than 9% of the time.
Conclusions: There is moderate evidence of a causal association between shoulder tendinopathy and combined exposures of working above shoulder level with forceful hand exertion. The evidence is insufficient for any single biomechanical exposure on its own. High-quality cohort studies with direct exposure measures and objective diagnostic criteria are needed. The occupational origin of shoulder tendinopathies is still an open question that must be properly answered.
Curti et al. 2023.
La Medicina del Lavoro, vol. 114, no. 4.

Keywords: Shoulder tendinopathies; occupational biomechanical overload; shoulder disorder.
Evidence Level: 1B
Link: https://www.mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14537

Guiding and Supporting Mental Health and Wellbeing

Mental Health

This month we explore the workplace mental health issues associated with health care utilisation, use of probiotics on depressive disorders, structural racism and workforce diversity, psychopathic personality and the effectiveness of workplace mental health screening.

Developing prognostic models for health care utilization in patients with work-related mental health problems

Background: The long-term prognosis for employees with work-related mental health problems is unclear. We aim to describe long-term trends in health care utilization (HCU) and develop multivariable prognostic models for long-term mental health care utilization. **Methods:** From the Danish Occupational Medicine Cohort we included mental health patients (N = 17,822) assessed from 2000 to 2013 at Departments of Occupational Medicine. Outcomes were general health (general practitioner, somatic hospital) and mental health (psychiatrist/psychologist, psychiatric hospital) HCU obtained from registries five years before/after assessment. The 10-year period was divided into phases relative to assessment: 5 - 3 years before, 2 years before/after, and 3-5 years after. We developed gender-stratified Lasso-penalized multivariable prognostic models for HCU 3-5 years after assessment assessing both calibration and discrimination. **Results:** Prevalent

HCU for general practitioner, psychiatrist/psychologist and psychiatric hospital services was relatively stable 5 - 3 years prior to assessment, then rising during the 2 years before/after. At 3-5 years after assessment prevalent general practitioner HCU declined to previous levels, while prevalent HCU for psychologist/psychiatrist and psychiatric hospital services remained elevated compared to previous levels during years 5 - 3. Prognostic models for long-term psychologist/psychiatrist and psychiatric hospital HCU indicated acceptable calibration and modest discrimination. **Conclusions:** Prevalent HCU rose two years before/after assessment and remained elevated for psychiatrist/psychologist and psychiatric hospital HCU 3-5 years after. Gender-stratified prognostic models were developed for long-term mental health HCU, but discrimination and calibration should be further improved before out-of-sample application for personal prognosis. **Trial registration:** The study was registered at clinicaltrials.gov (Identifier: NCT04459793) prior to analyses.
Willert et al. 2023.
BMC Health Services Research, vol. 23, no. 1.

Keywords: Epidemiology; occupational disease; occupational health; prediction model; stress.
Evidence Level: 4B
Link: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-023-09802-z

Influence and selection of probiotics on depressive disorders in occupational health: Scoping review
Depressive disorders have a major impact on occupational health and are costly to the economy and the healthcare system. Probiotics are live, non-pathogenic micro-organisms that, when ingested in adequate amounts, can colonize the intestinal tract and confer health benefits on the patient. In recent years, numerous studies have described the potential usefulness of certain probiotic strains in the treatment and prevention of depressive disorders, with differing results. In order to evaluate the possible efficacy and safety of these microorganisms in preventing or ameliorating these disorders, we systematically searched the bibliographic databases MEDLINE (via Pubmed), EMBASE, the Cochrane library, Scopus and Web of science, using the descriptors "Occupational health", "Probiotics", "Depressive Disorder" and "Depression" and filters "Humans" and "Clinical Trials". After applying our inclusion and exclusion criteria, 18 studies were accepted for review and critical analysis. Our analysis suggests that a combination of different probiotic strains, most of them from the genus *Bifidobacterium* sp. and *Lactobacillus* sp., could be a good mixture as an adjuvant in the treatment of depressive disorders for the working population.
Picó-Monllor et al. 2023.
Nutrients, vol. 15, no. 16.

Keywords: Depression; depressive disorder; occupational health; probiotics.
Evidence Level: 6A
Link: https://www.mdpi.com/2072-6643/15/16/3551

Understanding the factors contributing to farmer suicide: A meta-synthesis of qualitative research
Background: Farming is associated with a range of ongoing occupational stressors that place farmers at an elevated risk for suicide. The increase of farmer suicide in recent years represents an important public health concern and requires an understanding of the circumstances and risk factors that contributed to a farmer's decision to die by suicide, as well as the protective factors that can help farmers manage the stressors. Qualitative research examining farmer suicide has grown in recent years and provides a rich description of the farmers' lives leading up to their suicide that cannot be easily captured from quantitative surveys. Therefore, we conducted a systematic review and meta-synthesis to understand the risk and protective factors preceding the farmers' suicide from the perspectives of their partner, relatives, or individuals who worked closely with them. We used this information to generate a conceptual model to illustrate the intersecting nature of farm culture, work-life stressors and mental health. **Methods:** We conducted a comprehensive literature search for peer-reviewed studies using electronic databases Embase, PsycINFO, Academic Search Complete, PubMed and Scopus using a combination of search terms related to farming and suicide. All searching was conducted by two independent researchers. The selected studies were critically appraised using standardized forms to assess study quality. The qualitative data from each

study was analyzed using meta-ethnography to identify underlying themes related to suicide and new interpretations of the topic while retaining the original meaning of each qualitative study. **Results:** After independently screening studies, our final sample included 14 studies. We identified seven themes that contributed to farmer suicide: maintaining a 'farmer' identity, financial crisis, support and stress of family, the community panopticon, isolation from others, access to toxins and firearms, and an unpredictable environment. Using these themes, we developed a conceptual model called the Farming Adversity-Resilience Management framework (ie FARM framework) to highlight the cyclical and dynamic pattern of farm culture and to illustrate the risk factors that contribute to vulnerability to poor mental health and even suicide. This model also identifies a variety of protective factors that can improve farmers' resilience to such stressors. **Conclusion:** This is the first study to synthesize qualitative data about farmer suicide. While the enduring challenges and stressors of farming in rural areas may never be eliminated, there may be ways to help farmers build resilience to these factors. Our FARM framework presents a new way of understanding farm culture, the occupational stressors and farmers' wellbeing while also providing direction for future research and guidance for practical interventions. Policymakers and healthcare providers should consider developing and delivering mental health literacy programs to farmers and those who work closely with them to identify symptoms of poor mental health and to facilitate attitude change. Greater access to health care should be a priority in rural areas, and clinicians should be familiar with the stressors farmers face so that they can ask questions about their work-life balance to better assess the farmer's mental health and risk of suicide.

Purc-Stephenson et al. 2023.

Rural and Remote Health, vol. 23, no. 3.

Keywords: Mental health; qualitative; review; stigma; suicide; agriculture.

Evidence Level: 1A

Link: https://www.rrh.org.au/journal/article/8189

Structural racism, workforce diversity, and mental health disparities: A critical review

Background: Racial workforce diversity has been suggested as a critical pathway to address persistent racial mental health disparities. However, structural racism has been noted to diminish such workforce diversity efforts. The purpose of this critical review is to identify the mechanisms through which structural racism operates in organizations, including mental health organizations, to undermine workforce diversity efforts and reinforce inequities. **Methods:** Using the theories of racialized organizations, the current review critically draws on literature underscoring the racial character of organizations as mezzo-level racialized structures that may systematically activate and uphold white privilege in the mental health workplace. **Results:** Findings suggest that in the context of institutionalized white dominance, workers of color within mental health organizations may experience race-based cultural exclusion, identity threat, and racialized workplace emotional expression, and be burdened by racialized tasks. The workers of color may also become the means for organizations to attract communities of color due to their diverse characteristics, yet workers' effects to address disparities in mental health are minimized due to potential racialized organizational forces, including the whiteness of organizational leadership and color-blindness. **Conclusions and implications for practice:** Structural racism may create resistance to the efforts and effects of a racially diverse workforce within mental health organizations. This review calls for a race-conscious framework that drastically shifts the traditional organizational structure to an inverted hierarchy (i.e., client-centered management) to maximize diversity efforts in the mental health organizational workforce to address racial disparities in mental health.

Kyere et al. 2023.

Journal of Racial and Ethnic Health Disparities, vol. 10, no. 4.

Keywords: Leadership; mental health disparities; mental health organizations; structural racism; workforce diversity.

Evidence Level: 6B

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9361976/

Validation of the occupational depression inventory in Sweden

Background: The Occupational Depression Inventory (ODI) was recently devised to assess depressive symptoms that individuals specifically attribute to their work. One purpose of the ODI is to overcome limitations in current assessments of job-related distress. This study aimed to validate the Swedish version of the ODI. **Methods:** The study involved 365 individuals employed in Sweden. In addition to the ODI, the study included the Satisfaction with Life Scale, the Effort-Reward Imbalance Questionnaire, the Demand-Control-Support Questionnaire, the GAD-2, and the PHQ-9. We inquired into the factorial validity, dimensionality, scalability, test-score reliability, criterion validity, convergent validity, discriminant validity, and measurement invariance of the ODI. **Results:** Exploratory structural equation modeling bifactor analysis indicated that the ODI's Swedish version meets the requirements for essential unidimensionality (e.g., explained common variance = 0.872). Measurement invariance held across sexes, age groups, and occupational categories. The instrument exhibited strong scalability (e.g., H = 0.662). The observed total scores thus accurately ranked respondents on the latent continuum underlying the scale. The ODI's total-score reliability was high (e.g., McDonald's ω = 0.929). Speaking to the instrument's criterion validity, we found occupational depression to correlate, in the expected direction, with various work (e.g., job support) and nonwork (e.g., general anxiety) variables. Occupational depression showed large correlations with effort-reward imbalance (r = 0.613) and demand-control imbalance (r = 0.566) at work. Multiple regression analyses supported these associations further. As expected, we observed both a degree of convergent validity and a degree of discriminant validity when examining the ODI against the PHQ-9, an attribution-free measure of depression. **Discussion:** This study indicates that the ODI performs well within the Swedish context, consistent with the findings obtained in other linguistic and geographic contexts. The ODI promises to help researchers, practitioners, and public health decision-makers address job-related distress more effectively.

Jansson-Fröjmark et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Anxiety; demand-control imbalance; effort-reward imbalance; factor analysis; job support; measurement invariance; mokken scale analysis; work stress.
Evidence Level: 5B
Link: https://pubmed.ncbi.nlm.nih.gov/37553626/

Where a psychopathic personality matters at work: A cross-industry study of the relation of dark triad and psychological capital

Background: The concepts of Dark Triad and Psychological Capital (PsyCap) have been extensively researched separately, but until one recent study, their interrelation has not been investigated. Purpose of this study was to uncover differences of the relationship of both concepts across work related industries. **Methods:** In total, 2,109 German employees across 11 industries completed a questionnaire on Dark Triad (narcissism, psychopathy and Machiavellianism) and PsyCap. Multiple regression analyses were used to test the association of both concepts across industries. **Results:** Values of narcissism, psychopathy and PsyCap generally differed between industries. No significant differences were found for Machiavellianism. While narcissism relates positively to PsyCap in all industry sectors, psychopathy only showed a negative relation to PsyCap in some sectors. For industries architecture, automotive and consulting, psychopathy did not significantly predict PsyCap. **Conclusions:** We argue that different expectations of employees per industry make it easier or harder for different personalities to assimilate (homogeneity hypothesis) to the work context (measured by PsyCap). Future studies should investigate this further with other variables such as person-organization-fit. This study was, however, the first to simultaneously investigate Dark Triad and PsyCap among employees and their respective industry. It extends previous findings by revealing differences of both concepts across and within industry sectors. The study can help to reconsider in which industries Dark Triad personality affects PsyCap as antecedent of workplace outcomes such as work satisfaction or job performance.

Stephan et al. 2023.
BMC Psychology, vol. 11, no. 1.

Keywords: Dark triad; gender differences; homogeneity hypothesis; narcissism; psychological capital; person-environment fit.
Evidence Level: 4B
Link: https://bmcpsychology.biomedcentral.com/articles/10.1186/s40359-023-01266-4

Workplace mental health screening: A systematic review and meta-analysis
Background: Workplaces are an important location for population mental health interventions. Screening to detect employees at risk of or experiencing mental ill health is increasingly common. **Methods:** This systematic review and meta-analysis examined the efficacy of workplace mental health screening programmes on employee mental health, work outcomes, user satisfaction, positive mental health, quality of life, help-seeking and adverse effects. PubMed, PsycINFO, EMBASE, CENTRAL, Global Index Medicus, Global Health and SciELO were searched (database inception-10 November 2022) and results screened by two independent reviewers. Controlled trials evaluating screening of workers' mental health as related to their employment were included. Random effects meta-analysis was performed to calculate pooled effect sizes for each outcome of interest. Grading of Recommendations Assessment, Development and Evaluation was conducted to evaluate the certainty of findings. **Results:** Of the 12 328 records screened, 11 were included. These reported 8 independent trials collectively assessing 2940 employees. Results indicated screening followed by advice or referral was ineffective in improving employee mental health symptoms (n=3; d=-0.07 (95% CI -0.29 to 0.15)). Screening followed by facilitated access to treatment interventions demonstrated a small improvement in mental health (n=4; d=-0.22 (95% CI -0.42 to -0.02)). Limited effects were observed for other outcomes. Certainty ranged from low to very low. The evidence supporting workplace mental health screening programmes is limited and available data suggest mental health screening alone does not improve worker mental health. Substantial variation in the implementation of screening was observed. **Conclusions:** Further research disentangling the independent effect of screening alongside the efficacy of other interventions to prevent mental ill health at work is required.
Strudwick et al. 2023.
Occupational & Environmental Medicine, vol. 80, no. 8.

Keywords: Mental health; occupational health; public health surveillance.
Evidence Level: 1A
Link: https://oem.bmj.com/content/80/8/469.long

Psychosocial Issues

This month we explore the association of occupational burnout with job characteristics, self-rated general health and life satisfaction, and the effects of work-related and non-work-related stressors on perceived stress level.

Association of job characteristics and burnout of healthcare workers in different positions in rural China: A cross-sectional study
Background: Health workers in rural primary care systems are at increased risk of job burnout, but their associations with different positions have received scant attention in the literature. Thus, this study aims to measure job burnout in different positions in rural China and to identify factors associated with it. **Methods:** A cross-sectional survey was conducted with a total of 15,627 participants from six provinces in China. And job burnout was measured using the Chinese version of the Maslach Burnout Inventory-General Scale (MBI-GS). Multilevel regression analyses were used in examining factors potentially associated with job burnout in different positions. **Results:** Overall, more than half of providers suffered from moderate burnout. The degree of job burnout varied among different positions. Middle managers showed higher levels personal stress, while general staff showed the lowest interpersonal and self-evaluation dimensions of burnout. Job duty, job capability, job treatment, and career advancement are potential factors affecting these results. **Conclusion:** Interventions aimed at providing appropriate training

and development opportunities, developing relevant career planning and management strategies, and implementing reasonable staffing and job design may be promising strategies for alleviating burnout in different positions and improving health system performance.
Zhang et al. 2023.
International journal of Public Health, vol. 3.

Keywords: Burnout; different position; job characteristic; occupational stress; rural healthcare worker.
Evidence Level: 3B
Link: https://www.ssph-journal.org/articles/10.3389/ijph.2023.1605966/full

Estimating the causal effects of work-related and non-work-related stressors on perceived stress level: A fixed effects approach using population-based panel data
Background: Prolonged or excessive stress can have a negative impact on health and well-being, and stress therefore constitutes a major public health issue. A central question is what are the main sources of stress in contemporary societies? This study examines the effects of work-related and non-work-related stressors and perceived social support on perceived stress within a causal framework. **Methods:** Panel data were drawn from two waves (2013 and 2017) of the population-based health survey "How are you?" conducted in the Central Denmark Region. The analytical sample comprised 9,194 subjects who had responded to both surveys. Work-related and non-work-related stressors included major life events, chronic stressors, daily hassles and lack of social support. Perceived stress was measured with the 10-item Perceived Stress Scale (PSS). Data were analysed using fixed effects regression in a fully balanced design. **Results:** The largest effects on PSS were seen in own disease, work situation and lack of social support. Other stressors affecting the perceived stress level were financial circumstances, relationship with partner, relationship with family and friends, and disease among close relatives. Most variables had a symmetrical effect on PSS. **Conclusions:** The results point to the need for comprehensive policies to promote mental health that span life domains and include both the individual and the group as well as organizational and societal levels. The study indicates that there are multiple potential entry points for stress prevention and stress management. However, it also shows that disease, work situation and social support weigh heavily in the overall picture. This points to the healthcare system and workplace as key institutional venues for action.
Larsen et al. 2023.
PLoS One, vol. 18, no. 8.

Evidence Level: 5B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0290410

Occupational burnout, flourishing and job satisfaction among HIV/AIDS healthcare workers in Western China: A network analysis
Background: Healthcare workers suffered with high prevalence of occupational burnout, which might be related with their job satisfaction and well-being. This study aimed to provide evidence of complex interrelations among occupational burnout, flourishing, and job satisfaction, and identify key variables from the perspective of network structure among healthcare workers. **Methods:** A cross-sectional study was conducted between July and October 2021, and 907 (the response rate was 98.4%) HIV/AIDS healthcare workers completed their sociodemographic characteristics, occupational burnout, flourishing and job satisfaction. Network analysis was conducted to investigate the interrelations of occupational burnout, flourishing, and job satisfaction communities, and identify central variables and bridges connecting different communities with different bridge strength thresholds in the network structure. The Network Comparison Test (NCT) was conducted to examine the gender differences in networks. **Results:** In the network, feeling exhausted at work (strength: 1.42) and feeling frustrated at work (1.27) in occupational burnout community, and interested in daily activities (1.32) in flourishing community were central variables. Bridges in the network were job reward satisfaction (bridge strength: 0.31), satisfaction with job itself (0.25), and job environment satisfaction (0.19) in job satisfaction community, as well as interested in daily activities (0.29) and feeling respectable (0.18) in flourishing community, with bridges selected with top 20% bridge strengths. Feeling frustrated at work (0.14) in occupational burnout community and leading

a purposeful and meaningful life (0.11) in flourishing community became bridges when using thresholds of top 25% and 30% bridge strengths, respectively. We also observed higher network densities in females (network density: 0.37) than that in males (0.34), and gender differences in the distribution of partial correlation coefficients (M = 0.27, P = 0.017). **Conclusions:** In the network structure of occupational burnout-flourishing-job satisfaction, feeling frustrated at work in occupational burnout community and interested in daily activities in flourishing community were both central variables and bridges, which may be targeted variables to intervene to alleviate the overall level of symptoms in the network and therefore prevent poor health outcomes in healthcare workers.
Jia et al. 2023.
BMC Psychiatry, vol. 23, no. 1.

Keywords: Flourishing; healthcare workers; job satisfaction; network analysis; occupational burnout.
Evidence Level: 4B
Link: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-023-04959-7

Burnout, self-rated general health and life satisfaction among teachers and other academic occupational groups
Background: Teachers work in a job with specific demands that can strain individual coping capabilities and can pose a risk for the development of psychological problems. Prior studies showed that teachers - in comparison with other occupational groups - had high risks of job-related psychological exhaustion. In our study we compared teachers and other occupational groups on burnout, general life satisfaction and self-rated general health. In addition, we analyzed if sociodemographic and job-related factors were relevant predictors of these outcomes. **Methods:** We analyzed data from a total of 1,500 subjects arising from the Gutenberg Health Study. Binary logistic regression models and descriptive statistics were calculated to determine potential differences between the occupational group membership and the predictive values of sociodemographic and job-related variables. **Results:** The occupational groups did not differ significantly in terms of burnout, self-rated general health and satisfaction with life. Logistic regression models showed which sociodemographic and job-related variables were associated with the outcomes. Female sex, part-time employment as well as work-privacy conflicts showed particular predictive relevance. **Discussion:** Job-related interventions for teachers should aim at specific strains, e.g., arising out of work-privacy conflicts where interventions should focus on support of female teachers.
Beutel et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: Burnout; occupational group comparison; strains; teachers; work psychology; work-related stress.
Evidence Level: 4B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1209995/full

Fostering Work Participation

Return to Work

This month we explore the role of coordinators in return to work models and return to work following lateral closing wedge distal femoral osteotomy.

Coordinators in the return-to-work process: Mapping their work models
Background: In recent decades, many countries have implemented return-to-work coordinators to combat high rates of sickness absence and insufficient collaboration in the return-to-work process. The coordinators should improve communication and collaboration between stakeholders in the return-to-work process for people on sickness absence. How they perform their daily work remains unexplored, and we know little about to what extent they collaborate and perform other work tasks to support people on

sickness absence. This study examines which work models return-to-work coordinators use in primary healthcare, psychiatry and orthopaedics in Sweden. **Methods:** A questionnaire was sent to all 82 coordinators in one region (89% response rate) with questions about the selection of patients, individual patient support, healthcare collaboration, and external collaboration. Random forest classification analysis was used to identify the models. **Results:** Three work models were identified. In model A, coordinators were more likely to select certain groups of patients, spend more time in telephone than in face-to-face meetings, and collaborate fairly much. In Model B there was less patient selection and much collaboration and face-to-face meetings. Model C involved little patient selection, much telephone contact and very little collaboration. Model A was more common in primary healthcare, model C in orthopaedics, while model B was distributed equally between primary healthcare and psychiatry. **Conclusion:** The work models correspond differently to the coordinator's assignments of supporting patients and collaborating with healthcare and other stakeholders. The differences lie in how much they actively select patients, how much they collaborate, and with whom. Their different distribution across clinical contexts indicates that organisational demands influence how work models evolve in practice.
Svärd et al. 2023.
PLoS One, vol. 18, no. 8.

Keywords: Return to work; coordinators; sickness absence; collaboration; communication.
Evidence Level: 5B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0290021

Favorable rates of return to activity and work following lateral closing wedge distal femoral osteotomy for femoral-based symptomatic varus malalignment: An analysis at a mean 6-year follow-up
Background: To evaluate return to sport (RTS), work (RTW) and clinical outcomes following lateral closing wedge distal femoral osteotomy (LCW-DFO) for symptomatic femoral varus malalignment.
Methods: Consecutive patients who underwent LCW-DFO for symptomatic varus malalignment between 12/2007 and 03/2018 were included. The International Knee Documentation Committee (IKDC) Score, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Lysholm score, Tegner Activity Scale, and visual analogue scale (VAS) for pain were collected preoperatively and at a minimum of 24 months postoperatively. RTS and RTW were assessed by questionnaire. **Results:** Thirty-two patients (mean age: 45.9 ± 12.3 years), who underwent LCW-DFO for femoral-based varus malalignment (6.4 ± 3.0°), were included at a mean follow-up of 72.7 ± 39.1 months. The patient collective significantly improved in IKDC (51.8 ± 12.3 to 61.8 ± 21.5, p = 0.010; 95% CI = 3-21), WOMAC (26.7 ± 17.6 to 12.5 ± 13.5; p < 0.001; 95% CI = 21-6) and Lysholm (46.5 ± 19.4 to 67.9 ± 22.8 points (p < 0.01; 95% CI = 9-31)) scores at final follow-up. The VAS for pain reduced significantly postoperatively (4.8 ± 2.3 points to 2.6 ± 2.3 points (p = 0.002; 95% CI = 0-3)). Following LCW-DFO, 96% of patients returned to sports at a mean of 5.3 ± 2.9 months. Yet, a shift to lower impact sports compared to one year preoperatively was observed, with patients participating in a significantly lower number of high-impact disciplines (p = 0.024) and fewer hours in high-impact sports (p = 0.034). Twenty-three out of 24 patients returned to work at a mean 11.4 ± 10.9 weeks, with 18 patients reporting a similar or superior working ability. **Conclusion:** Undergoing isolated LCW-DFO for symptomatic femoral-based varus malalignment enabled the vast majority of patients to RTS and RTW along with a significant functional improvement at mid-term follow-up. However, patients' expectations have to be adequately managed regarding a limited probability to return to high-impact sports and work after surgery.
Level of evidence: Retrospective case series; Level IV.
Rupp et al. 2023.
Knee Surgery, Sports Traumatology, Arthroscopy, vol. 31, no. 8.

Keywords: Clinical outcomes; distal femoral osteotomy; functional outcomes; lateral closing wedge; PROMs; return to sports; return to work; varus deformity.
Evidence Level: 4A
Link: https://link.springer.com/article/10.1007/s00167-022-07303-w

Presenteeism and Absenteeism

This month we explore the associations between absenteeism and low parental education, childhood adversities, and alcohol use, and the role of job satisfaction and presenteeism on the relationship between job stress and turnover intention among workers. In COVID-19 related research we explore sickness absence due to mandatory COVID-19 certificates in the workplace.

Associations between low parental education, childhood adversities and sickness absence in midlife public sector employees

Background: Parental education and childhood adversities are associated with long-term work disability but their contribution to sickness absence is largely unknown. We aimed to examine the associations between parental education, childhood adversities and self-certified and medically-certified sickness absence among midlife employees. **Methods:** The Helsinki Health Study baseline survey data (2000-2002) of 40-to-60-year-old municipal employees were linked with sickness absence data from the employer's register. Self-certified (1-3 days) and medically-certified (>3 days) sickness absence spells were followed from 2003 until the end of 2008. The study included 5728 employees. The analyses were made by Poisson regression and the results are presented as rate ratios (RRs) and their 95% confidence intervals (CIs). **Results:** Low maternal education was associated with self-certified sickness absence (RR 1.32, 95% CI 1.13-1.55) among women only whereas both low maternal (1.49, 1.26-1.77) and low paternal education (1.48, 1.32-1.67) were associated with medically-certified sickness absence. Adjustment for own occupational class mainly abolished these associations. Having experienced any childhood adversity was associated with self-certified (1.18, 1.12-1.25) and medically-certified (1.22, 1.15-1.30) sickness absence. In addition, childhood economic difficulties, childhood illness, parental divorce, parental mental illness, parental alcohol problems and bullying were each associated both with self-certified and with medically-certified sickness absence. The associations mainly remained after adjustments for occupational class, marital status, working condition, body mass index and health behaviours. **Conclusions:** Low parental education and childhood adversities contributed to midlife sickness absence. Promoting well-being of families with children might help sustain adult work ability and prevent sickness absence still in midlife.

Salonsalmi et al. 2023.

Scandinavian Journal of Public Health, vol. 51, no. 6.

Keywords: Sick leave; childhood adversity; life course epidemiology.

Evidence Level: 4B

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10350691/

The mediating role of job satisfaction and presenteeism on the relationship between job stress and turnover intention among primary health care workers

Background: Turnover problems among primary health care workers are a significant contributor to the shortage of health human resources. This study aims to determine the relationship between job stress and turnover intention among primary health care workers, as well as to examine the mediating effects of job satisfaction and presenteeism on this relationship. **Methods:** Stratified random sampling and quota sampling were used to select 703 primary health care workers in Jilin Province, China in January 2020. Validated scales were used to measure turnover intention, job stress, job satisfaction, and presenteeism among primary health care workers. The study utilized a partial least squares structural equation modeling (PLS-SEM) approach to test the research hypotheses. **Results:** The turnover intention score of primary health care workers in Jilin Province was 2.15 ± 1.03, and 19.5% of respondents reported a higher turnover intention. Significant sex and occupation differences were found, with a higher rate of turnover intention for male and doctor groups among primary health care workers. This study also revealed a positive correlation between job stress and turnover intention ($\beta = 0.235$, $P < 0.001$), a significant negative correlation between job satisfaction and turnover intention ($\beta = -0.347$, $P < 0.001$), and a significant positive correlation between presenteeism and turnover intention ($\beta = 0.153$, $P < 0.001$). Moreover, the study revealed a significant indirect effect of job stress on turnover intention which was mediated by job

satisfaction (β = 0.183, P < 0.001) and presenteeism (β = 0.078, P < 0.001). **Conclusion:** We confirmed the positive association between job stress and presenteeism with turnover intention, as well as the negative association between job satisfaction and turnover intention. Moreover, our study confirmed the mediating role of job satisfaction and presenteeism in the relationship between job stress and turnover intention. This study provides scientific evidence to address the turnover problem among primary health care workers.
Ning et al. 2023.
International Journal for Equity in Health, vol. 22, no. 1.

Keywords: Job satisfaction; job stress; presenteeism; primary health care workers; turnover intention.
Evidence Level: 4B
Link: https://equityhealthj.biomedcentral.com/articles/10.1186/s12939-023-01971-x

Is the association between alcohol use and sickness absence modified by socioeconomic position? findings from the Stockholm public health cohort
Background: The distribution of sickness absence tends to be socially patterned less is however known about the underlying mechanisms and pathways of the social gradient found in sickness absence. The present study aims to investigate (i) if the risk function between average volume of alcohol consumption and sickness absence is modified by socio-economic position (SEP), and (ii) whether such an effect modification can be attributed to differences in drinking patterns and other risk factors including other lifestyle behaviours, health status, and working conditions. **Methods:** The study was based on data from the Stockholm public health cohort 2006, with an analytical sample of 13 855 respondents aged 18-64 years. Self-reported information on occupational class (a measure of SEP), alcohol consumption, other lifestyle behaviour, health and working conditions was collected from the survey. The outcome of long-term (> 14 days) sickness absence between 2006 and 2008 was obtained from national registers. Negative binomial regression was used to estimate the Incidence Rate Ratios (IRR) with 95% confidence intervals (CI). **Results:** In the initial analyses, heavy drinking manual workers had a 5-fold increased risk of long-term sickness absence compared to non-manual employees who were moderate drinkers, and approximately 60% of the excess risk among heavy drinking manual workers was attributable to an interaction between alcohol use and SEP. Adjusting for working conditions was associated with the largest attenuation of the risk estimate, compared to other lifestyle behaviors and health. In the fully adjusted model, the IRR was further attenuated for the manual workers and the joint effect of SEP and heavy drinking remained in the final model with an attributable proportion of 49%. **Conclusions:** Individuals in Sweden with lower levels of SEP appear to be more vulnerable to alcohol consumption in relation to sickness absence, where differences in working conditions explained a large part but not all of the differential vulnerability.
Landberg et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Alcohol; health inequalities; lifestyle factors; sickness absence; working conditions.
Evidence Level: 4B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-16341-z

Sickness absence due to mandatory COVID-19 certificates in the workplace
Background: As vaccines for COVID-19 became available, many countries introduced an obligation in 2021 for employees to prove their COVID-19 status at work, known in Germany as the 3G rule (vaccinated, recovered, tested). In view of the controversial debate, there was concern that employees might try to avoid providing mandatory COVID-19 certificates by taking sick leave. The aim of this study was to investigate whether mandatory COVID-19 tests in the workplace led to such an evasive response.
Method: For an empirical panel analysis, we collected data from official sources and combined aggregated health insurance data on sick leave, epidemiological data on laboratory-confirmed COVID-19 infections, and vaccination rates for the German states from September 2021 to January 2022. We used a regional panel data analysis to estimate the impact of the mandatory COVID-19 certificates at the workplace on workers' sick leave. The regional vaccination rate reflected differences in treatment intensity. **Results:** This study contributes to the limited evidence on the potential impact of introducing mandatory COVID-19 certificates

at the workplace on sickness absence rates. In fact, our results showed that after controlling for infection rates, a one percentage point lower vaccination rate led to a 0.021 percentage point increase in the sickness absence rate when the 3G rule came into effect. This effect was measured with high statistical precision. In addition, in robustness checks, we controlled for a number of other possible influencing factors that may have affected sickness behaviours, such as time-varying labour market situations. However, the results remained robust. **Conclusions:** The results of our empirical panel analysis implied that mandatory COVID-19 certificates in the workplace led to evasive responses and to additional days of sick leave of a relevant magnitude. Testing obligations were meant to help contain the epidemic. However, when introducing controversial obligations, it is important to consider evasive responses and to design the rules appropriately and communicate them convincingly.
Wanger et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: COVID-19; mandatory COVID-19 certificate; public health; sick leave; workplace.
Evidence Level: 4B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-16415-y

Working hours

Association between long working hours and unmet dental needs in wage workers
Background: Many previous studies on the reasons behind unmet dental needs focus on economic issues. However, in this research, we aimed to investigate the relationship between long working hours and unmet dental needs while considering the influence of occupational factors in wage workers.
Methods: This study used data from the Korea National Health and Nutrition Examination Survey (2012-2018) and analyzed a sample of 12,104 wage workers. Unmet dental needs were defined as cases in which individuals did not receive dental care, despite their need for examination or treatment, within the last year. Long working hours were defined as exceeding 52 h per week, based on the standard working hours stipulated by the Labor Standards Act. A binomial model was applied to calculate the prevalence ratio through multivariate logistic regression analysis. **Results:** The prevalence of unmet dental needs was observed in 3,948 cases (32.5%), among which 1,478 attributed their presence to lack of time. The prevalence of unmet dental needs showed an inverse relationship with the education level and household income. The wage workers who worked long hours had the highest prevalence of unmet dental needs. Long working hours were found to be 1.18 times (95% CI 1.07-1.29) more likely to result in unmet dental care compared to working less than 40 h. The relationship between long working hours and unmet dental needs were statistically significant only in men (PR 1.24, 95% CI 1.07-1.43). However, the relationship between long working hours and unmet dental needs owing to time were in both men and women (men: PR 1.59, 95% CI 1.20-2.11, women: PR 1.90, 95% CI 1.48-2.43). **Conclusions:** This study confirmed that long working hours and unmet dental needs are related when occupational factors are taken into consideration, despite the absence of oral health indicators. Using this study as a reference, further research is necessary to identify the underlying causes of unmet dental care and to improve access to dental services in the future.
Choi et al. 2023.
BMC Oral Health, vol. 23, no. 1.

Keywords: Dental health services; health services accessibility; health services needs and demand; occupational health; time factors; work schedule tolerance.
Evidence Level: 4B
Link: https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-023-03289-0

Wellness Programs

This month we explore the individual and organisational effect of an online wellbeing program (project ECHO), the engagement with web resources to improve diet quality and break up sedentary time for home-working employees, the use of a smartphone app for prevention of depression in workers, and the return on investment of workplace-based prevention interventions.

Using Project ECHO to keep professionals well at work: Individual and organizational outcomes
Background: This study examined the use of the Project ECHO framework to help stress management and emotion regulation to increase individual and organizational health and well-being. Three ECHOs were studied over an 18 month period. Findings suggest that the use of micro-interventions at the organizational level improved over time in the areas of resilience-building and policy-making.
Sprang et al. 2023.
Academic Psychiatry, vol. 47, no. 4.
Keywords: COVID; professional well-being; Project ECHO; secondary traumatic stress.
Evidence Level: 5B
Link: https://link.springer.com/article/10.1007/s40596-023-01754-0

Return on investment of workplace-based prevention interventions: A systematic review
Background: Occupational Safety and Health is an important public health topic. Many employers may regard health promotion or prevention initiatives as an additional cost with few benefits. The aim of this systematic review is to identify the studies conducted on the return on investment (ROI) of preventive health interventions conducted within workplaces, and to describe their designs, topics and calculation methods. **Methods:** We searched PubMed, Web of Science, Science Direct, National Institute for Occupational Safety and Health, International Labour Organization and Occupational Safety and Health Administration from 2013 to 2021. We included studies that evaluated prevention interventions in the workplace setting and reported an economic outcome or company-related benefits. We report the findings according to PRISMA reporting guidelines. **Results:** We included 141 articles reporting 138 interventions. Of them, 62 (44.9%) had an experimental design, 29 (21.0%) had a quasi-experimental design, 37 (26.8%) were observational studies and 10 (7.2%) were modelling studies. The interventions' objectives were mostly related to psychosocial risks (N = 42; 30.4%), absenteeism (N = 40; 29.0%), general health (N = 35; 25.4%), specific diseases (N = 31; 22.5%), nutrition (N = 24; 17.4%), sedentarism (N = 21; 15.2%) musculoskeletal disorders (N = 17; 12.3%) and accidents (N = 14; 10.1%). The ROI calculation was positive for 78 interventions (56.5%), negative for 12 (8.7%), neutral for 13 (9.4%) and undetermined for 35 (25.4%). **Conclusion:** There were many different ROI calculations. Most studies have a positive result but randomized controlled trials have fewer positive results than other designs. It is important to conduct more high-quality studies so that results can inform employers and policy-makers.
Thonon et al. 2023.
European Journal of Public Health, vol. 33, no. 4.

Keywords: Prevention; return on investment; employee health; benefits; public health; occupational health and safety.
Evidence Level: 1A
Link: https://academic.oup.com/eurpub/article/33/4/612/7192365

Planning engagement with web resources to improve diet quality and break up sedentary time for home-working employees: A mixed methods study
Background: As more people work from home, employers may find it difficult to provide health promotion interventions. **Methods:** This mixed-methods study of a web-based self-help intervention incorporated measures of engagement and follow-up interviews. **Results:** Selecting a movement plan was more effective at increasing engagement with the web resources compared to the no-plan condition. In the follow-up interviews, participants indicated that the plan helped to remind participants to engage with the resources

and made it simpler for them to follow the guidance for exercises and meals. Ease of use and being able to fit exercises and meals around work tasks were important factors, while lack of time and worries about how colleagues would perceive them taking breaks to use the resources were barriers to uptake. **Conclusions:** Overall, including plans with online self-help resources could enhance their uptake.
Holford et al. 2023.
Journal of Occupational Health Psychology, vol. 28, no. 4.

Keywords: Diet; sedentary; working from home; employees; engagement.
Evidence Level: 5B
Link: https://psycnet.apa.org/fulltext/2023-99096-001.html

Selective prevention of depression in workers using a smartphone app: Randomized controlled trial
Background: There is increasing evidence that depression can be prevented; however, universal approaches have had limited success. Appropriate targeting of interventions to at-risk populations has been shown to have potential, but how to selectively determine at-risk individuals remains unclear. Workplace stress is a risk factor for depression and a target for intervention, but few interventions exist to prevent depression among workers at risk due to heightened stress. **Objective:** This trial aimed to evaluate the efficacy of a smartphone-based intervention in reducing the onset of depression and improving related outcomes in workers experiencing at least moderate levels of stress. **Methods:** A randomized controlled trial was conducted with participants who were currently employed and reported no clinically significant depression and at least moderate stress. The intervention group (n=1053) were assigned Anchored, a 30-day self-directed smartphone app-based cognitive behavioral- and mindfulness-based intervention. The attention-control group (n=1031) were assigned a psychoeducation website. Assessment was performed via web-based self-report questionnaires at baseline and at 1-, 3-, and 6-month postbaseline time points. The primary outcome was new depression caseness aggregated over the follow-up period. The secondary outcomes included depressive and anxiety symptoms, stress, well-being, resilience, work performance, work-related burnout, and quality of life. Analyses were conducted within an intention-to-treat framework using mixed modeling. **Results:** There was no significant between-group difference in new depression caseness (z score=0.69; P=.49); however, those in the Anchored arm had significantly greater depressive symptom reduction at 1 month (Cohen d=0.02; P=.049) and 6 months (Cohen d=0.08; P=.03). Anchored participants also showed significantly greater reduction in anxiety symptoms at 1 month (Cohen d=0.07; P=.04) and increased work performance at 1 month (Cohen d=0.07; P=.008) and 6 months (Cohen d=0.13; P=.01), compared with controls. Notably, for Anchored participants completing at least two-thirds of the intervention, there was a significantly lower rate of depression onset (1.1%, 95% CI 0.0%-3.7%) compared with controls (9.0%, 95% CI 6.8%-12.3%) at 1 month (z score=4.50; P<.001). Significant small to medium effect sizes for most secondary outcomes were seen in the highly engaged Anchored users compared with controls, with effects maintained at the 6-month follow-up for depressive symptoms, well-being, stress, and quality of life. **Conclusions:** Anchored was associated with a small comparative reduction in depressive symptoms compared with controls, although selective prevention of case-level depression was not observed in the intention-to-treat analysis. When users adequately engaged with the app, significant findings pertaining to depression prevention, overall symptom reduction, and functional improvement were found, compared with controls. There is a need for a greater focus on engagement techniques in future research. **Trial registration:** Australian New Zealand Clinical Trials Registry (ANZCTR) ACTRN12620000178943; https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=378592
Deady et al. 2023.
Journal of Medical Internet Research, vol. 25.

Keywords: Depression; mobile phone; prevention; randomized controlled trial; smartphone app; stress; workplace mental health.
Evidence Level: 1A
Link: https://www.jmir.org/2023/1/e45963

Shift Work

This month we explore the issues associated with shift work and depression and anxiety, oxidative stress and damage, cognitive impairment among middle-aged and older adults, and the effect of an internet-delivered cognitive behavioral therapy-based sleep improvement app.

Lifestyle factors in the association of shift work and depression and anxiety
Background: Shift work may lead to adverse health outcomes. Whether shift work is associated with depression and anxiety, and to what extent lifestyle mediates the associations, remains unknown. **Objective:** To explore the associations of shift work, its type, frequency, and working years with anxiety and depression and to examine the potential mediating role of lifestyles. **Design, setting, and participants:** This cohort study included 175 543 employed or self-employed workers who participated in the UK Biobank baseline survey (2006-2010). Data analysis was conducted from November 2022 to January 2023. **Exposures:** Employment and shift work status information was obtained from baseline. Lifestyles included smoking, physical activity, alcohol consumption, dietary characteristics, sleep duration, sedentary time, and body mass index (BMI). **Main outcomes and measures:** Depression and anxiety were identified based on electronic health records. Cox proportional hazard regression models were used to calculate the association of shift work with anxiety and depression, and cause mediation analyses we used to test the mediating role of lifestyle factors in this association. **Results:** Of the 175 543 included participants (mean [SD] age, 52.6 [7.1] years; 88 290 men [50.3%]; 167 495 White participants [95.4%]), 27 637 participants (16.2%) reported shift work. During a median (IQR) follow-up of 9.06 (8.35-9.75) years, 3956 workers (2.3%) developed depression and 2838 (1.7%) developed anxiety. In the fully adjusted model, individuals who reported engaging in shift work, or shift workers, had a higher risk of depression (HR, 1.22; 95% CI, 1.12-1.33; P < .001) and anxiety (HR, 1.16; 95% CI, 1.04-1.28; P < .001), and the risk was positively associated with shift frequency. Among shift workers, there was no significant difference between night shifts and nonnight shifts. In the dose-association analyses, years of shift work were negatively associated with the risk of depression and anxiety. Smoking, sedentary time, BMI, and sleep duration were identified as the main potentially modifiable mediators. These mediators together explained 31.3% of the association between shift work and depression and 21.2% of the association between shift work and anxiety. **Conclusions and relevance:** In this cohort study, shift work was significantly associated with a higher risk of depression and anxiety, and lifestyle factors partially mediated the associations. These findings not only support that shift work should be considered an occupational hazard, but also provide evidence for the urgent need for the development of public health interventions that promote healthy lifestyles aimed at improving the mental health of shift workers.
Xu et al. 2023.
JAMA Network Open, vol. 6, no. 8.

Keywords: Shift work; depression; anxiety.
Evidence Level: 4B
Link: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2808248

Chrono-modulated effects of external stressors on oxidative stress and damage in humans: A scoping review on night shift work
Background: Oxidative stress and tissue damage (OSD) play a pivotal role as an early-stage process in chronic disease pathogenesis. However, there has been little research to better understand the temporal (χρόνος[chronos]) dimensions of OSD process associated with environmental (non-genetic, including behaviors/lifestyle) and/or occupational stressors, like night shift work. OSD processes have recently attracted attention in relation to time-resolved external stressor trajectories in personalized medicine (prevention) initiatives, as they seem to interact with circadian clock systems towards the improved delineation of the early stages of (chronic) disease process. **Objectives:** This work critically reviewed human studies targeting the temporal dynamics of OSD and circadian clock system's activity in response to environmental/occupational stressors; the case of night shift work was examined. **Methods:** Being a key stressor influencing OSD processes and circadian rhythm, night shift work was evaluated as part of a

scoping review of research in OSD, including inflammatory and metabolic processes to determine the extent of OSD research undertaken in human populations, methodologies, tools and biomarkers used and the extent that the temporal dimensions of exposure and biological effect(s) were accounted for. Online databases were searched for papers published from 2000 onwards, resulting in the selection of 53 original publications. **Results and discussion:** The majority of studies (n = 41) took place in occupational settings, while the rest were conducted in the general population or patient groups. Most occupational studies targeted outcomes of oxidative stress/damage (n = 19), followed by the combination of OSD with inflammatory response (n = 10), and studies focused on metabolic outcomes (n = 12). Only a minor fraction of the studies measured biomarkers related to circadian rhythm, such as, melatonin, its metabolite, or cortisol. Night shift work was associated with select biomarkers of OSD and inflammation, albeit with mixed results. Although much progress in delineating the biological mechanisms of OSD process has been made, an equally thorough investigation on the temporal trajectory of OSD processes as triggered by environmental/occupational stressors in human studies has yet to fully evolve.
Makris et al. 2023.
Environmental International, vol. 178.

Keywords: Chronobiology; circadian disruption; critical life stage; diurnal; oxidative stress; personalized medicine; personalized prevention; precision medicine; shift work.
Evidence Level: 6A
Link: https://linkinghub.elsevier.com/retrieve/pii/S0160-4120(23)00321-5

The association between shift work exposure and cognitive impairment among middle-aged and older adults: Results from the Canadian Longitudinal Study on Aging (CLSA)
Background: Shift work, especially rotating and night shift work, has been linked to a wide range of detrimental health outcomes. Occupational factors like shift work and their potential impact on cognitive functions have received little attention, and the evidence is inconclusive. The objective of our study is to explore associations between shift work exposure and cognitive impairment indicators based on comparisons with the normative standards from the Canadian population. **Methods:** Cross-sectional analyses were performed using baseline Canadian Longitudinal Study on Aging database, including 47,811 middle-aged and older adults (45-85 years). Three derived shift work variables were utilized: ever exposed to shift work, shift work exposure in longest job, and shift work exposure in current job. Four cognitive function tests were utilized, Rey Auditory Verbal Learning Tests (immediate and delayed) representing memory domain, and Animal Fluency, and Mental Alteration, representing the executive function domain. All cognitive test scores included in study were normalized and adjusted for the participant's age, sex, education and language of test administration (English and French), which were then compared to normative data to create "cognitive impairment' variables. Unadjusted and adjusted multivariable logistic regression models were used to determine associations between shift work variables and cognitive impairment individually (memory and executive function domains), and also for overall cognitive impairment. **Result:** Overall, one in every five individuals (21%) reported having been exposed to some kind of shift work during their jobs. Exposure to night shift work (both current and longest job) was associated with overall cognitive impairment. In terms of domain-based measures, night shift work (longest job) was associated with memory function impairment, and those exposed to rotating shift work (both current and longest job) showed impairment on executive function measures, when compared to daytime workers. **Conclusion:** This study suggests disruption to the circadian rhythm, due to shift work has negative impact on cognitive function in middle-aged and older adults and this warrants further investigation.
Khan et al. 2023.
PLoS One, vol. 18, no. 8.

Keywords: Shift work; night shift; cognitive impairment; exposure.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0289718

Effect of an internet-delivered cognitive behavioral therapy-based sleep improvement app for shift workers at high risk of sleep disorder: Single-arm, nonrandomized trial

Background: Shift workers are at high risk of developing sleep disorders such as shift worker sleep disorder or chronic insomnia. Cognitive behavioral therapy (CBT) is the first-line treatment for insomnia, and emerging evidence shows that internet-based CBT is highly effective with additional features such as continuous tracking and personalization. However, there are limited studies on internet-based CBT for shift workers with sleep disorders. **Objective:** This study aimed to evaluate the impact of a 4-week, physician-assisted, internet-delivered CBT program incorporating machine learning-based well-being prediction on the sleep duration of shift workers at high risk of sleep disorders. We evaluated these outcomes using an internet-delivered CBT app and fitness trackers in the intensive care unit. **Methods:** A convenience sample of 61 shift workers (mean age 32.9, SD 8.3 years) from the intensive care unit or emergency department participated in the study. Eligible participants were on a 3-shift schedule and had a Pittsburgh Sleep Quality Index score ≥5. The study comprised a 1-week baseline period, followed by a 4-week intervention period. Before the study, the participants completed questionnaires regarding the subjective evaluation of sleep, burnout syndrome, and mental health. Participants were asked to wear a commercial fitness tracker to track their daily activities, heart rate, and sleep for 5 weeks. The internet-delivered CBT program included well-being prediction, activity and sleep chart, and sleep advice. A job-based multitask and multilabel convolutional neural network-based model was used for well-being prediction. Participant-specific sleep advice was provided by sleep physicians based on daily surveys and fitness tracker data. The primary end point of this study was sleep duration. For continuous measurements (sleep duration, steps, etc), the mean baseline and week-4 intervention data were compared. The 2-tailed paired t test or Wilcoxon signed rank test was performed depending on the distribution of the data. **Results:** In the fourth week of intervention, the mean daily sleep duration for 7 days (6.06, SD 1.30 hours) showed a statistically significant increase compared with the baseline (5.54, SD 1.36 hours; P=.02). Subjective sleep quality, as measured by the Pittsburgh Sleep Quality Index, also showed statistically significant improvement from baseline (9.10) to after the intervention (7.84; P=.001). However, no significant improvement was found in the subjective well-being scores (all P>.05). Feature importance analysis for all 45 variables in the prediction model showed that sleep duration had the highest importance. **Conclusions:** The physician-assisted internet-delivered CBT program targeting shift workers with a high risk of sleep disorders showed a statistically significant increase in sleep duration as measured by wearable sensors along with subjective sleep quality. This study shows that sleep improvement programs using an app and wearable sensors are feasible and may play an important role in preventing shift work-related sleep disorders.

International registered report identifier (irrid): RR2-10.2196/24799.

Ito-Masui et al. 2023.

Journal of Medical Internet Research, vol. 22.

Keywords: Fitness tracker; internet-based cognitive behavioral therapy; machine learning; mobile apps; mobile phone; shift worker sleep disorder; subjective well-being.

Evidence Level: 3B

Link: https://www.jmir.org/2023/1/e45834

Work Ability

Work performance among healthcare workers with post COVID-19 syndrome and its relation to antibody response

Background: Health care workers (HCWs) are frontliners in facing Cornoravirus disease (COVID-19) and hence are amongst the high risk groups of acquiring COVID-19 infection. The impact of COVID-19 infection and post-infection sequelae on work performance has deleterious effects on HCWs and the whole community. The aim of the current study is to assess the impact of COVID-19 infection particularly those with post-COVID-19 syndrome on work performance among HCWs and to determine if a possible relationship with antibody response exists. **Methods:** A sample of 69 previously PCR-positive health care workers matched to another group of 69 control PCR-negative health care workers from the same clinical

departments were subjected to full medical history, clinical examination, measuring serum specific immunoglobulins against severe acute respiratory syndrome coronavirus 2 (SARSCoV-2), Health work performance questionnaire short form of absenteeism and presenteeism and Functional dysfunction grading questionnaire. **Results:** The most frequently encountered symptom by patients with post-acute COVID-19 was fatigue while it was dyspnea for those who were chronic COVID patients. Patients with post-acute COVID-19 had a significantly longer time for PCR negative conversion and had a more severe disease. There was no association between post-acute COVID-19 and immunoglobulin positivity. COVID-19 syndrome had a negative impact on work performance manifested by lower relative presenteeism and lower month/year performance ratio ($p < 0.001$, $p < 0.001$). However comparing patients with post-COVID-19 syndrome to patients without the syndrome revealed no significant work performance difference between both groups.
Conclusion: COVID-19 syndrome negatively impacts work performance in HCWs manifested by lower relative presenteeism and lower month/year performance ratio. Although post-COVID-19 results resulted in higher levels of fatigue and functional limitation, it did not have a significant negative impact on work performance. Specific immunoglobulins against SARS CoV-2 were not associated with the post-COVID-19 syndrome.
Fouad et al. 2023.
Infection, vol. 51, no. 4.

Keywords: Healthcare workers; immunological response; post COVID-19 syndrome; presenteeism; work performance.
Evidence Level: 5B
Link: https://link.springer.com/article/10.1007/s15010-022-01942-4

Adapting to the Future of Work

Aging Workforce

This month we explore the issues associated with an aging workforce including mental health around retirement, the contribution of work and health-related lifestyle to educational inequalities in physical health, work-limiting musculoskeletal pain and its association with loss of paid employment, and gender, education, and cohort differences in healthy working life expectancy at age 50 years in Australia.

The contribution of work and health-related lifestyle to educational inequalities in physical health among older workers in Germany: A causal mediation analysis with data from the lidA cohort study
Background: The objective of the study was to investigate the contribution of work factors and health-related lifestyle to educational inequalities in physical health among older workers in Germany by applying causal mediation analysis with longitudinal data. **Methods:** Data from the German lidA study was used. 2653 persons (53% female, 47% male) aged 46 (born 1965) and 52 (born 1959) at baseline were followed up for seven years with exposure and outcome assessments in 2011 (t0), 2014 (t1) and 2018 (t2). The total effect of education on physical health was decomposed into a natural direct effect (NDE) and a natural indirect effect (NIE) by using a sex-stratified causal mediation analysis with an inverse odds weighting approach. Baseline health, partner status and working hours were entered as a first set of mediators preceding the putative mediators of interest. All analyses were adjusted for age and migrant status.
Results: Independent of the first set of mediators, work factors explained 21% of educational inequalities in physical health between low and high educated women and 0% comparing moderate versus high educated women. The addition of health behaviors explained further 26% (low vs. high education) and 20% (moderate vs. high education), respectively. Among men, net of the first set of mediators, work factors explained 5% of educational inequalities in physical health between low and high educated and 6% comparing moderate versus high educated persons. Additional 24% (low vs. high education) and 27% (moderate vs. high education) were explained by adding health behaviors to the models. **Conclusions:** To

reduce educational inequalities in physical health among older workers in Germany, interventions to promote healthy behaviors are promising. Improving working conditions is likely an important prerequisite.
Rohrbacher et al. 2023.
PLoS One, vol. 18, no. 8.

Keywords: Work; lifestyle; physical health; older workers; Germany.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0285319

Mental health around retirement: Evidence of Ashenfelter's dip
Background: Mental health issues among retirees have become increasingly concerning because the aging population presents a significant challenge globally, particularly in Western countries. Previous studies on this issue are plagued with bias owing to lacking panel data and estimation strategies. This study investigated the depression levels of European adults around the time of retirement. **Methods:** We used data obtained from Waves 1-7 of the Survey of Health, Ageing, and Retirement in Europe (SHARE) to create panel data covering the 2004-2017 period. Wave 3 (SHARELIFE) was excluded from the sample because it provided mismatched information. Fixed-effects (FE) and fixed-effects instrumental variables (FE-IV) models with multiple imputations were employed to examine the impacts of retirement on mental health before and after retirement, where being over pension age (normal and early) was used as the instrument variable. **Results:** Our results indicated that retirement based on aspirational motivations ($\beta = -0.115$, $p < 0.001$) and positive circumstances ($\beta = -0.038$, $p < 0.001$) significantly reduced depression, whereas retiring under negative circumstances could deteriorate one's mental health ($\beta = 0.087$, $p < 0.001$). FE and FE-IV models indicated that overall, retiring reduced retirees' depression ($\beta = -0.096$, $p < 0.001$ and $\beta = -0.261$, $p < 0.001$, respectively). The results of FE-IV models showed that adults planning to retire in the next two years experienced less depression compared with others in the workforce ($\lambda = -0.313$, $p < 0.01$). These adults must have adjusted their lifestyles in response to their impending retirement, thereby evincing Ashenfelter's dip. Two years after retirement, when the "honeymoon" phase was over, retirees may have completely adapted to their new lives and the effect of retirement was no longer important.
Conclusions: Retirement improves mental health before it happens, but not after. Increasing the pension eligibility age may postpone the beneficial effects of retirement on health. However, policy implications should be tailored according to the unique situations of each country, job sector, and population. Providing flexible schemes regarding retirement timing decisions would be better than a generalized retirement policy.
Vo et al. 2023.
Global Health and Research Policy, vol. 8, no. 1.

Keywords: Ashenfelter’s dip; instrumental variable; mental health; panel data; retirement; SHARE.
Evidence Level: 4B
Link: https://ghrp.biomedcentral.com/articles/10.1186/s41256-023-00320-3

Work-limiting musculoskeletal pain and its association with loss of paid employment among senior workers: prospective cohort study with register follow-up
Background: A growing population of elderly necessitates a sharpened focus on sustainable employment through aging. Physically demanding work can be challenging, especially for senior workers. Establishing determinants of labor market participation could guide policy development and preventive efforts at the workplaces aiming at keeping senior workers longer in the labor market. **Methods:** We used data from SeniorWorkingLife, a comprehensive questionnaire survey among a representative sample of Danish +50-year workers, and investigated the prospective association between self-reported work limitations due to musculoskeletal pain ('work-limiting pain') in 2018 and register-based loss of paid employment before state pension age at 2-year follow-up among +50-year Danish workers with physically demanding work (n = 3050). **Results:** Results showed that work-limiting pain increased the risk of loss of paid employment before the state pension age in a progressive manner, i.e. the higher degree of work-limiting pain, the higher risk of loss of paid employment ($P < 0.001$). Experiencing a low degree of work-limiting pain was associated

with an 18% increased risk of loss of paid employment [risk ratio (RR): 1.18, 95% confidence interval (CI): 1.14-1.21], whereas experiencing a very high degree of work-limiting pain increased the risk of loss of paid employment by 155% (RR: 2.55, 95% CI: 2.43-2.69) compared to no work-limiting pain. **Conclusion:** In conclusion, work-limiting pain constitutes an important risk factor for loss of paid employment among senior workers with physically demanding work, and effective preventive efforts at both policy and workplace levels should be documented and implemented.
Skovlund et al. 2023.
European Journal of Public Health, vol. 33, no. 4.

Keywords: Musculoskeletal pain; loss of paid employment; paid employment; senior workers.
Evidence Level: 4B
Link: https://academic.oup.com/eurpub/article/33/4/606/7193341?login=true

Gender, education, and cohort differences in healthy working life expectancy at age 50 years in Australia: A longitudinal analysis
Background: We aimed to estimate healthy working life expectancy (HWLE) at age 50 years by gender, cohort, and level of education in Australia. **Methods:** We analysed data from two nationally representative cohorts in the Household Income and Labour Dynamics in Australia survey. Each cohort was followed up annually from 2001 to 2010 and from 2011 to 2020. Poor health was defined by a self-reported, limiting, long-term health condition. Work was defined by current employment status. HWLEs were estimated with Interpolated Markov Chain multi-state modelling. **Findings:** We included data from 4951 participants in the cohort from 2001 to 2010 (2605 [53%] women and 2346 [47%] men; age range 50-100 years) and 6589 participants in the cohort from 2011 to 2020 (3518 [53%] women and 3071 [47%] men; age range 50-100 years). Baseline characteristics were similar between groups. Working life expectancy increased over time for all groups, regardless of gender or educational attainment. However, health expectancies only increased for men and people of either gender with higher education. Years working in good health at age 50 years for men were 9·9 years in 2001 (95% CI 9·3-10·4) and 10·8 years (10·4-11·3) in 2011. The corresponding HWLEs for women were 7·9 years (7·3-8·5) and 9·0 years (8·5-9·6). For people with low education level, HWLE was 7·9 years (7·3-8·5) in 2001 and 8·4 years (7·9-8·9) in 2011, and for those with high education level, HWLE rose from 9·6 years in 2001 (9·1-10·1) to 10·5 years in 2011 (10·2-10·9). Across all groups, there were at least 2·5 years working in poor health and 6·7 years not working in good health. **Interpretation:** Increases in length of working life have not been accompanied by similar gains in healthy life expectancy for women or people of any gender with low education, and it is not unusual for workers older than 50 years to work with long-term health limitations. Strategies to achieve longer working lives should address life-course inequalities in health and encourage businesses and organisations to recruit, train, and retain mature-age workers. **Funding:** Australian Research Council.
Hambisa et al. 2023.
The Lancet Public Health, vol. 8, no. 8.

Keywords: Gender; education; life expectancy; Australia.
Evidence Level: 4A
Link: https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(23)00129-9/fulltext

Technology

This month we explore the issues associated with technology in the workplace including digital job demands and resources, work-family boundaries in the digital age, and the associations of technostressors at work with burnout symptoms and chronic low-grade inflammation.

Digital job demands and resources: Digitization in the context of the job demands-resources model
Background: This study comprehensively investigates the effects of digitization in the workplace, with a specific focus on white-collar employees, using the job demands-resources (JD-R) model as a theoretical framework. By examining the intricate interplay between digital job demands and digital job resources, the research offers valuable insights to help organizations navigate the complexities caused by technological advancements. **Methods:** Utilizing a qualitative triangulation approach, the research combines a systematic literature review with a thematic analysis of 15 interdisciplinary expert interviews. Thereby, the study establishes a robust theoretical foundation for exploring stress, motivation, and the organizational consequences arising from integrating technology in the workplace. **Results:** The JD-R model is extended to incorporate digital job demands and resources, enabling a thorough examination of both the positive and negative aspects of digitization within organizations. Moreover, the study highlights the necessity for the consistent adaptation of the JD-R model across diverse job contexts in the ever-evolving digital landscape. It advocates for organizations to effectively leverage digital resources and proactively manage job demands, aiming to transform digitization into a valuable job asset while preventing the onset of overwhelming burdens. **Conclusions:** In conclusion, the research encourages organizations to embrace the vast potential of digitization while prioritizing digital health in the workplace.
Scholze et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 16.

Keywords: Digital information and communication technology; digitization; job demands-resources model; work design; working conditions.
Evidence Level: 6A
Link: https://www.mdpi.com/1660-4601/20/16/6581

Work-family boundaries in the digital age: A study in france on technological intrusion, work-family conflict, and stress
Background: Since previous studies have shown that the request of off-work technology-assisted supplemental work (off-TASW) can contribute to blurring the boundaries between the work and family domain by increasing work- family conflict (WFC), the purpose of this study is to go further, investigating how this relationship impacts stress perceptions. **Method:** A cross-sectional study that involved a sample of 221 French workers was carried out using a self-reported questionnaire. The data collected were analyzed by IBM SPSS 25.0 software, and a mediation model was tested. **Results:** The results showed that off-TASW was associated with higher levels of WFC (b=.32; p=.000), which was in turn associated with stress perceptions (b=.42; p=.000). **Conclusions:** This study contributes to un- derstanding how the intrusion of technologies during off-work times impacts workers' perceptions of psychological wellbeing through work-family conflict. These findings should encourage the debate on the risks of staying connected to work through technologies during off-work and leisure time and stimulate the promotion of campaigns to make workers aware of their right to disconnection, to the benefits of detachment from work and recovery experiences.
Giunchi et al. 2023.
La Medicina del Lavoro, vol. 114, no. 4.

Keywords: Off-work technology assisted supplemental work (off-TASW); work-family conflict (WFC); stress perceptions
Evidence Level: 4B
Link: https://www.mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14510

Associations of technostressors at work with burnout symptoms and chronic low-grade inflammation: A cross-sectional analysis in hospital employees
Background: Despite the increasing scholarly interest in the phenomenon technostress, associated biological effects on employee health are under-researched. Chronic low-grade inflammation is suggested as a central pathway linking stress experience to disease development. The aim of this study was to assess

associations of technology-related work stressors (technostressors) with low-grade inflammation and burnout symptoms. **Methods:** N = 173 (74.6% women, M_{age} = 31.0 years) university hospital employees participated in a cross-sectional study. Self-report questionnaires were used for the assessment of general psychosocial working conditions (work overload, job control, social climate), a range of different technostressors, burnout symptoms, and relevant confounders. Participants provided capillary blood samples, and high-sensitivity C-reactive protein (hs-CRP) as an inflammatory biomarker was analyzed from dried blood spots. **Results:** Based on a factor analysis, we identified four underlying dimensions of technostressors: techno- and information overload, techno-complexity, interruptions and multitasking as well as usability and technical support. In multivariate linear regressions, techno-/information overload and techno-complexity were associated with core (exhaustion, mental distance) and secondary (psychosomatic complaints) symptoms of burnout. Techno-/information overload was a significant predictor of burnout core symptoms, even when general work overload was controlled for. The technostressors were not associated with hs-CRP. **Conclusion:** This is the first study on technology-related stress at work and chronic low-grade inflammation. The results suggest that (information) overload caused by digital technology use is a distinct work stressor with genuine consequences for psychological health. To what extent these effects also manifest on a physiological level needs to be subjected to future studies, ideally with prospective designs.

Kaltenegger et al. 2023.
International Archives of Occupational and Environmental Health, vol. 96, no. 6.

Keywords: Burnout; C-reactive protein; inflammation; stress; technostress; work.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00420-023-01967-8

Work Environment

This month we explore the issues associated with working remotely, and precarious employment and associated health and social consequences.

To work or not to work remotely? Work-to-family interface before and during the COVID-19 pandemic
Background: This paper provides a brief, evidence-based reflection on the differences between 'old-normal' remote working and mandatory work-from-home during the Covid-19 pandemic. From the perspective of applied psychology in the field of work and organizations, we used self-report instruments to assess variations in work-family conflict and enrichment, frequency of information and communication technologies use, and recovery in two longitudinal studies. **Methods:** The first study involved 148 individuals from the technical-administrative staff of a large Italian University, during an experimentation of remote working (one day per week) in 2019. The second study, conducted during the first lockdown in 2020, involved 144 individuals (occasional sample, heterogeneous by profession). All participants completed a self-report online questionnaire two times six months apart. **Results:** Although the two studies are not directly comparable, the results showed two different situations: in the condition of experimental remote working (one day per week), participants reported a decrease in work-family conflict and an improvement in recovery experiences, while in the emergency remote working condition, a deterioration in work-family enrichment was found. **Conclusions:** These findings highlighted that some differences exist between a planned remote working condition and a mandatory one in an emergency. We briefly discuss these aspects to inform future organizational decisions and actions for the 'new normal'.

Ghislieri et al. 2023.
La Medicina del Lavoro, vol. 114, no. 4.

Keywords: Remote work; work from home; COVID-19 pandemic.
Evidence Level: 5B
Link: https://www.mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14095

Precarious employment and associated health and social consequences; A systematic review
Background: This systematic review aims to identify, evaluate, and summarise the consequences of precarious employment. **Methods:** We included studies published within the last ten years (Jan 2011-July 2021) that employed at least two of three key dimensions of precarious employment: employment insecurity, income inadequacy, and lack of rights and protection. **Results:** Of the 4,947 initially identified studies, only five studies met our eligibility criteria. These five studies were of moderate quality as assessed by the Newcastle-Ottawa Scale. Our review found that the current literature predominantly defines precarity based on the single criterion of employment insecurity. Our review identified evidence for the negative consequences of precarious employment, including poorer workplace wellbeing, general health, mental health, and emotional wellbeing. The findings indicated an increase in the magnitude of these adverse outcomes with a higher degree of job precariousness. **Conclusions:** The rise of employment precariousness will likely continue to be a major issue in the coming years. More research is needed to inform effective policies and practices using a consensus definition of precarious employment. **Implications for public health:** The presence of adverse effects of precarious employment suggests workplace initiatives are essential to mitigate the negative consequences of precarity.
Jaydarifard et al. 2023.
Australian and New Zealand Journal of Public Health, vol. 47, no. 4.

Keywords: Mental health; non-standard employment; precarious work; social determinants of health; workplace well-being.
Evidence Level: 1A
Link: https://www.sciencedirect.com/science/article/pii/S1326020023052512?via%3Dihub