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# Workplace Research Monthly

Formerly Emerging Evidence Alert

October 2024

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 September 2024 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 health and wellbeing issues including mortality and cardiovascular risk among young, low-income, self-employed workers, the effect of just-in-time adaptive intervention systems for workplace stress reduction, occupational cancer epidemiology and an assessment tool for healthy lifestyles.*

**Inequality in mortality and cardiovascular risk among young, low-income, self-employed workers: Nationwide retrospective cohort study**

**Background:** Self-employment is a significant component of South Korea's labor force; yet, it remains relatively understudied in the context of occupational safety and health. Owing to different guidelines for health checkup participation among economically active individuals, disparities in health maintenance may occur across varying employment statuses. **Objective:** This study aims to address such disparities by comparing the risk of all-cause mortality and comorbidities between the self-employed and employee populations in South Korea, using nationwide data. We sought to provide insights relevant to other countries with similar cultural, social, and economic contexts. **Methods:** This nationwide retrospective study used data from the Korean National Health Insurance Service database. Participants (aged 20-59 y) who maintained the same insurance type (self-employed or employee insurance) for ≥3 years (at least 2008-2010) were recruited for this study and monitored until death or December 2021-whichever occurred first. The primary outcome was all-cause mortality. The secondary outcomes were ischemic heart disease, ischemic stroke, cancer, and hospitalization with a mental illness. Age-standardized cumulative incidence rates were estimated through an indirect method involving 5-unit age standardization. A multivariable Cox proportional hazards model was used to estimate the adjusted hazard ratio (HR) and 95% CI for each sex stratum. Subgroup analyses and an analysis of the effect modification of health checkup participation were also performed. **Results:** A total of 11,652,716 participants were analyzed (follow-up: median 10.92, IQR 10.92-10.92 y; age: median 42, IQR 35-50 y; male: n=7,975,116, 68.44%); all-cause mortality occurred in 1.27% (99,542/7,851,282) of employees and 3.29% (124,963/3,801,434) of self-employed individuals (P<.001). The 10-year cumulative incidence rates of all-cause mortality differed significantly by employment status (1.1% for employees and 2.8% for self-employed individuals; P<.001). The risk of all-cause mortality was significantly higher among the self-employed individuals when compared with that among employees, especially among female individuals, according to the final model (male: adjusted HR 1.44, 95% CI 1.42-1.45; female: adjusted HR 1.89, 95% CI 1.84-1.94; P<.001). The risk of the secondary outcomes, except all types of malignancies, was significantly higher among the self-employed individuals (all P values were <.001). According to subgroup analyses, this association was prominent in younger individuals with lower incomes who formed a part of the nonparticipation groups. Furthermore, health checkup participation acted as an effect modifier for the association between employment status and all-cause mortality in both sexes (male: relative excess risk due to interaction [RERI] 0.76, 95% CI 0.74-0.79; female: RERI 1.13, 95% CI 1.05-1.21). **Conclusions:**This study revealed that self-employed individuals face higher risks of all-cause mortality, cardio-cerebrovascular diseases, and mental illnesses when compared to employees. The mortality risk is particularly elevated in younger, lower-income individuals who do not engage in health checkups, with health checkup nonparticipation acting as an effect modifier for this association.

**Yun et al. 2024.**
**JMIR Public Health Surveillance, vol. 10.**

**Keywords:** All-cause mortality; cardiovascular disease; effect modification; employee; health checkups; inequality; mental illness; nationwide study; self-employed; socioeconomic status.
**Evidence Level:** 4B
**Link:** https://publichealth.jmir.org/2024/1/e48047

**Toward tailoring just-in-time adaptive intervention systems for workplace stress reduction: Exploratory analysis of intervention implementation**

**Background:** Integrating stress-reduction interventions into the workplace may improve the health and well-being of employees, and there is an opportunity to leverage ubiquitous everyday work technologies to understand dynamic work contexts and facilitate stress reduction wherever work happens. Sensing-powered just-in-time adaptive intervention (JITAI) systems have the potential to adapt and deliver tailored interventions, but such adaptation requires a comprehensive analysis of contextual and individual-level variables that may influence intervention outcomes and be leveraged to drive the system's decision-making. **Objective:** This study aims to identify key tailoring variables that influence momentary engagement in digital stress reduction microinterventions to inform the design of similar JITAI systems. **Methods:** To inform the design of such dynamic adaptation, we analyzed data from the implementation and deployment of a system that incorporates passively sensed data across everyday work devices to send just-in-time stress reduction microinterventions in the workplace to 43 participants during a 4-week deployment. We evaluated 27 trait-based factors (ie, individual characteristics), state-based factors (ie, workplace contextual and behavioral signals and momentary stress), and intervention-related factors (ie, location and function) across 1585 system-initiated interventions. We built logistical regression models to identify the factors contributing to momentary engagement, the choice of interventions, the engagement given an intervention choice, the user rating of interventions engaged, and the stress reduction from the engagement. **Results:** We found that women (odds ratio [OR] 0.41, 95% CI 0.21-0.77; P=.03), those with higher neuroticism (OR 0.57, 95% CI 0.39-0.81; P=.01), those with higher cognitive reappraisal skills (OR 0.69, 95% CI 0.52-0.91; P=.04), and those that chose calm interventions (OR 0.43, 95% CI 0.23-0.78; P=.03) were significantly less likely to experience stress reduction, while those with higher agreeableness (OR 1.73, 95% CI 1.10-2.76; P=.06) and those that chose prompt-based (OR 6.65, 95% CI 1.53-36.45; P=.06) or video-based (OR 5.62, 95% CI 1.12-34.10; P=.12) interventions were substantially more likely to experience stress reduction. We also found that work-related contextual signals such as higher meeting counts (OR 0.62, 95% CI 0.49-0.78; P<.001) and higher engagement skewness (OR 0.64, 95% CI 0.51-0.79; P<.001) were associated with a lower likelihood of engagement, indicating that state-based contextual factors such as being in a meeting or the time of the day may matter more for engagement than efficacy. In addition, a just-in-time intervention that was explicitly rescheduled to a later time was more likely to be engaged with (OR 1.77, 95% CI 1.32-2.38; P<.001). **Conclusions:** JITAI systems have the potential to integrate timely support into the workplace. On the basis of our findings, we recommend that individual, contextual, and content-based factors be incorporated into the system for tailoring as well as for monitoring ineffective engagements across subgroups and contexts.

**Suh et al. 2024.**
**JMIR Mental Health, vol. 11.**

**Keywords:** JITAI; engagement; just-in-time; just-in-time adaptive intervention; microintervention; psychotherapy; stress reduction; workplace stress.
**Evidence Level:** 5B
**Link:** https://mental.jmir.org/2024/1/e48974

**Five decades of occupational cancer epidemiology**

**Background:** In this discussion paper, we provide a narrative review of past and present occupational cancer studies in the journal with a viewpoint towards future occupational cancer research. **Method:** We reviewed all references in the journal that mentioned cancer according to relevance to etiology, cancer type, agent type, study design, and study population. **Results:** The Scandinavian Journal of Work, Environment & Health has published over 300 manuscripts on occupational cancer over the 50 past years. Although studies of cancer represent the primary health outcome in the journal overall, the relative ranking of cancer manuscripts has declined somewhat over time. A large body of evidence from studies of occupation and industry was apparent both in early research and continuing in recent years. There are several examples of the utility of pooled multi-country collaborative studies. Studies also took advantage of available high-quality national population and cancer registers in Nordic countries. There have been notable shifts in focus with regard to the cancer types examined, with increases in publications examining

female breast cancer over the decades. The interplay of studies of occupational and environmental cancer has also been apparent. **Conclusions:** The journal offers a unique viewpoint to consider the evolution of occupational cancer evidence over time. Studies of occupational cancer have played a central role in global cancer hazard identification efforts. Although much has been gained, there remains a need for renewed global support for occupational cancer research. Concerted efforts will be needed to ensure a future robust evidence-base for occupational and environmental cancer worldwide.
**Turner et al. 2024.**
**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 7.**

**Keywords:** Occupational cancer; epidemiology.
**Evidence Level:** 6A
**Link:** https://www.sjweh.fi/article/4190

**Developing an assessment tool for the healthy lifestyles of the occupational population in China: A modified Delphi-analytic hierarchy process study**
**Background:** Lifestyle is an important factor affecting people's health. Evaluating and promoting healthy lifestyles among occupational population can not only improve work ability and efficiency, but also contribute to the prevention a variety of potential diseases. **Methods:** This study developed a preliminary index system based on literature review and group discussion. Two rounds of expert consultation were conducted on 12 experts using Delphi method. **Results:** The questionnaire recovery rate of the two rounds of Delphi survey was over 85%, the expert authority coefficient was over 0.70, and Kendall W was 0.450 and 0.446, which were significant ($P < 0.001$). The weighting coefficient of each indicator was calculated using the hierarchical analysis method. Among them, the weighting coefficients of physical health lifestyle, mental health lifestyle, social adaptation lifestyle and occupational health lifestyle were 0.4133, 0.2922, 0.1078 and 0.1867, respectively. The consistency index CI = 0.024 and the consistency ratio CR = 0.027 of the first-level index judgment matrix. The weighting coefficient is acceptable and the indicators do not cause logical confusion. The healthy lifestyle assessment tool of the occupational population constructed in this study consists of 4 primary indicators, 13 secondary indicators and 45 tertiary indicators, which can provide a standardized and operable assessment tool for monitoring and evaluating the healthy lifestyle of the Chinese occupational population. **Conclusions:** At the same time, the weight analysis of various indicators through the analytic hierarchy process can also provide reference for the key areas of occupational health intervention.
**Min et al. 2024.**
**Scientific Reports, vol. 14, no. 1.**

**Keywords:** Analytic hierarchy process; Delphi method; evaluation indicator system; healthy lifestyle; occupational population.
**Evidence Level:** 5B
**Link:** https://www.ncbi.n https://pubmed.ncbi.nlm.nih.gov/38465395/
lm.nih.gov/pmc/articles/PMC11369144/

## Work Health and Safety

*This month we explore work health and safety issues including cancer risk among air transportation industry workers, the impact of physiological and psychological fatigue on work efficiency, industry 4.0-compliant occupational chronic obstructive pulmonary disease prevention and designing a practical fatigue detection system.*

**Cancer risk among air transportation industry workers in Korea: A national health registry-based study**
**Background:** Flight attendants face various risk factors in their working environments, particularly occupational exposure to cosmic radiation. This study aimed to assess cancer risk among air transportation industry workers, including flight attendants, in Korea by constructing a cohort using national health

registry-based data and analyzing cancer incidence risk. **Methods:** We used the Korea National Health Insurance Service database from 2002 to 2021 to construct a cohort of 37,011 workers in the air transportation industry. Cancer incidence was defined using the tenth version of the International Classification of Diseases. We calculated the age- and sex-specific standardized incidence ratios (SIRs) and 95% confidence intervals (CIs) by applying the cancer incidence rate of the general population between 2002 and 2019. **Results:** Approximately 5% of the cohort developed cancer. Overall, the cancer incidence in the cohort was similar to or lower than that of the general population, with the SIRs for all cancers being lower. However, significantly higher SIRs were observed for nasopharyngeal cancer (SIR, 3.21; 95% CI, 1.71-5.48) and non-Hodgkin lymphoma (SIR, 1.57; 95% CI, 1.02-2.32) in male workers and breast and genital cancer (SIR, 1.51; 95% CI, 1.34-1.70) and thyroid cancer (SIR, 1.25; 95% CI, 1.05-1.47) in female workers. **Conclusions:** The lower overall cancer incidence among air transportation industry workers observed in this study could indicate the "healthy worker effect"; however, the incidences of certain cancers were higher than those in the general population. Given that these workers are exposed to multiple occupational and lifestyle-related risk factors, including cosmic radiation, further studies are necessary to determine radiation-induced cancer risk while considering potential confounding factors.

**Park et al. 2024.**

**BMC Public Health, vol. 24, no. 1.**



**Keywords:** Aircrew; cosmic radiation; neoplasms; occupational exposure; pilot**.**

**Evidence Level:** 4B

**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19904-w

**The impact of physiological and psychological fatigue on work efficiency: A case study of parcel sorting work**

**Background:** The popularity of online shopping in China has increased significantly, creating new development opportunities for the express delivery industry. However, the rapid expansion of the express industry has also created challenges in the parcel sorting process. The demanding nature of parcel sorting work, which is characterized by intense and prolonged repetitive tasks, makes individuals particularly vulnerable to the effects of fatigue. Fatigue is a complex condition that encompasses both physiological and psychological exhaustion. It often results in reduced energy levels and diminished functionality, significantly impacting an individual's performance at work and their overall well-being. **Methods:** This study aimed to investigate how physiological and psychological fatigue affects sorting efficiency and to identify appropriate rest periods that will allow employees to maintain their performance levels.
The research involved fifteen participants who took part in a 60 min continuous sorting experiment and a similar experiment with scheduled breaks. During both trials, we collected data on participants' electromyography (EMG) and electrodermal activity (EDA), as well as subjective fatigue ratings (RPE). Signal features such as the median frequency (*MF*) of EMG and the skin conductance level (*SCL*) were analyzed to assess physiological and psychological fatigue, respectively. **Results:** The results show that physiological fatigue mainly affects sorting efficiency in the first 30 min, while psychological fatigue becomes more influential in the following half-hour period. In addition, subjective fatigue levels during the first 30 min are primarily determined by psychological factors, while beyond that point, both physiological and psychological fatigue contribute to subjective fatigue. Rest periods of 415-460 s, based on EDA recovery times, effectively support sorting efficiency and participants' recovery. **Conclusions:** This study highlights the complex ways in which fatigue affects parcel sorting performance and provides valuable theoretical and practical insights for establishing labor quotas and optimizing work schedules in the parcel sorting industry.

**Li et al. 2024.**

**Sensors, vol. 24, no. 18.**



**Keywords:** Electrodermal activity (EDA); electromyography (EMG); intermittent rest; labor quota; parcel sorting; physiological fatigue; psychological fatigue; work efficiency.

**Evidence Level:** 5B

**Link:** https://www.mdpi.com/1424-8220/24/18/5989

**Industry 4.0-compliant occupational chronic obstructive pulmonary disease prevention: Literature review and future directions**
**Background:** Chronic obstructive pulmonary disease (COPD) is among prevalent occupational diseases, causing early retirement and disabilities. **Methods:** This paper looks into occupational-related COPD prevention and intervention in the workplace for Industry 4.0-compliant occupation health and safety management. **Results:** The economic burden and other severe problems caused by COPD are introduced. Subsequently, seminal research in relevant areas is reviewed. The prospects and challenges are introduced and discussed based on critical management approaches. **Conclusions:** An initial design of an Industry 4.0-compliant occupational COPD prevention system is presented at the end.
**Jiang et al. 2024.**
**Sensors, vol. 24, no. 17.**

**Keywords:** COPD; OHS; health monitoring; sensor networks; vital signs monitoring; wearable sensors.
**Evidence Level:** 6A
**Link:** https://www.mdpi.com/1424-8220/24/17/5734

**Designing a practical fatigue detection system: A review on recent developments and challenges**
**Background:** Fatigue is considered to have a life-threatening effect on human health and it has been an active field of research in different sectors. Deploying wearable physiological sensors helps to detect the level of fatigue objectively without any concern of bias in subjective assessment and interfering with work. **Methods:** This paper provides an in-depth review of fatigue detection approaches using physiological signals to pinpoint their main achievements, identify research gaps, and recommend avenues for future research. The review results are presented under three headings, including: signal modality, experimental environments, and fatigue detection models. Fatigue detection studies are first divided based on signal modality into uni-modal and multi-modal approaches. Then, the experimental environments utilized for fatigue data collection are critically analyzed. At the end, the machine learning models used for the classification of fatigue state are reviewed. **Practical applications:** The directions for future research are provided based on critical analysis of past studies. Finally, the challenges of objective fatigue detection in the real-world scenario are discussed.
**Imran et al. 2024.**
**Journal of Safety Research, vol. 90.**

**Keywords:** Fatigue; fatigue detection; fatigue monitoring; machine learning; mental fatigue; physical fatigue; physiological signal; sensor; wearable sensor.
**Evidence Level:** 6A
**Link:** https://www.sciencedirect.com/science/article/pii/S002243752400077X?via%3Dihub

## Risk Assessment

*This month we explore risk assessment issues including the prevalence of occupational injuries and associated risk factors among workers in iron and steel industries and emerging occupational risks in green jobs.*

**The prevalence of occupational injuries and associated risk factors among workers in iron and steel industries: A systematic review and meta-analysis**
**Background:** The iron and steel industries are among the most dangerous workplaces in the world compared to other manufacturing industries. Workers are exposed to multiple occupational hazards, which predispose them to high risks of both fatal and non-fatal injuries. Currently, the data on the global prevalence and associated risk factors for occupational injuries in the iron and steel industries is fragmented and incomplete. This study was undertaken to address this issue by pooling data relating to the prevalence of occupational injuries and its associated factors among workers in iron and steel industries studies around the world. **Methods:** The search was conducted systematically using PubMed, HINARI,

EMBASE and Google Scholar for published studies in English that reported on occupational injuries and associated risk factors among workers in iron and steel industries. MetaXL version 5.3 software was used in the meta-analysis to estimate the pooled prevalence of occupational injuries and associated risk factors among workers in the iron and steel industries. The study protocol has been registered with PROSPERO, number CRD42022344258. **Results:** Of the 447 articles identified, 15 studies from 9 countries met the inclusion criteria. The pooled prevalence estimate of occupational injury was 0.55 (95% CI: 0.15, 0.93). The pooled results indicated that the odds of having an occupational injury were 4.06 times higher among workers who did not use personal protective equipment compared to those who used such equipment. Likewise the odds of occupational injuries was increased by 1.65 among night shift workers compared to the counterpart. **Conclusions:** The global prevalence of occupational injuries in iron and steel industries was 55%. The results indicate that night work shift and the lack of use of personal protective equipment has a higher impact than other factors in the occurrence of occupational injuries in the iron and steel industries.
**Shabani et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**
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**Keywords:** Meta-analysis; occupational injury; pooled prevalence; systematic review.
**Evidence Level:** 1A
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-20111-w

**Emerging occupational risks in green jobs: A review**
**Background:** Green jobs are to be understood as those jobs directly associated with specific sustainability issues and activities related to the efficiency, quality and innovation of goods and services offered, from an eco-sustainability perspective. The objective of the research was to fill knowledge gaps of new and emerging environmental and occupational risks related to sustainable activities and to understand the impact these might have on workers' psychological and physical well-being. **Methods:** A selection of several scientific articles and a critical analysis of the selected articles was carried out from the perspective of defining the concept of "emerging occupational risks in green jobs," using different keywords in the title or abstract as search criteria. **Results:** Emerging occupational risks, most prevalent in the green sector are those determined by the rapid introduction of new technologies, new materials, new processes and work organizations **Conclusions:** In order to be able to improve prevention and protection at work, it is necessary to act on a more careful and adequate risk assessment, the definition of new professional figures expert in green issues, the expansion of research and development of scientific knowledge, and the improvement of ergonomic aspects.
**Vitale et al. 2024.**
**International Journal of Occupational Medicine and Environmental Health, vol. 37, no. 3.**
**User License**: *Creative Commons - Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) (https://creativecommons.org/licenses/by-nc/4.0/)*
**Keywords:** Ecological transition; emerging occupational risks; green economy; green ergonomics; green jobs; innovative materials and technologies.
**Evidence Level:** 6A
**Link:** https://ijomeh.eu/Emerging-occupational-risks-in-green-jobs-a-review,190941,0,2.html

## Chronic Health Issues

**Type 2 diabetes severity in the workforce: An occupational sector analysis using German claims data**
**Background:** Individuals of working age spend a significant amount of time at the workplace making it an important context for disease prevention and management. The temporal development and prevalence of T2D have been shown to differ in the working population based on gender, age group and occupational sector regardless of socioeconomic status. Given potential differences in risk factors associated with different work environments, this study aims to define vulnerable occupational groups by examining T2D severity and its trends in working men and women with T2D of two age groups and among nine

occupational sectors. **Methods:** The study is based on claims data of the statutory health insurance provider AOKN. The study population consisted of all insured working individuals with T2D. T2D severity was measured using the adapted diabetes complications severity index-complication count (DCSI-CC). Mean DCSI-CC scores were calculated over four time periods between 2012 and 2019 for men and women of the age groups 18-45 and 46+ years and among nine occupational sectors. Trends of DCSI-CC were investigated using ordinal logistic regression analyses to examine the effect of time-period on the odds of having higher DCSI scores. **Results:** Overall, there was a significant rise in T2D severity over time in working men and women of the older age group. Moreover, the study displayed occupational sector differences in T2D severity and its trends. Over all, working men of all sectors had higher DCSI-CC scores compared to working women. Individuals working in the sector "Transport, logistics, protection and security" and "Construction, architecture, measuring and building technology" had higher T2D severity, while those working in the "Health sector, social work, teaching & education" had relatively lower T2D severity. There was a gender-specific significant increase over time in T2D severity in the above-mentioned occupational sectors. **Conclusion** The study displayed gender, age group and occupational sector differences in T2D severity and its trends. Working individuals could thus benefit from personalized prevention interventions that consider occupational contexts. As a next step, examining T2D trends and severity in specific occupations within the vulnerable occupational sectors is needed.
**Safieddine et al. 2024.**
**PLoS One, vol. 19, no. 9.**

**Keywords:** Type 2 diabetes; workforce; disease prevention and management.
**Evidence Level:** 4B
**Link:** https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0309725

## Occupational Exposure

*This month we explore occupational exposure issues including occupational heat exposure and the effectiveness of a heat stress prevention intervention, exposure to radiofrequency fields on cancer risk, exposure assessment for vibration-exposed workers, benzene exposure and colorectal cancer, exposure limits for reproductive toxicants, occupational exposure and new-onset asthma, and the impact of VOCs*

**A harmonized occupational biomonitoring approach**
**Background:** Biomonitoring has been widely used in assessing exposures in both occupational and public health complementing chemical risk assessments because it measures the concentrations of chemical substances in human body fluids (e.g., urine and blood). Biomonitoring considers all routes and sources of exposure. **Methods:** An occupational biomonitoring guidance document has been elaborated (OECD Occupational Biomonitoring Guidance) within the OECD framework and specifically, the Working Parties on Exposure and Hazard Assessment by scientific experts from 40 institutes and organizations representing 15 countries. **Results:** The guidance provides practical information for assessing chemical exposures in occupational settings including the three common routes of exposure: inhalation, skin absorption and ingestion due to hand to mouth contact. The elaborated stepwise approach for conducting biomonitoring is tailored for occupational health professionals, scientists, risk assessors, and regulators. It includes methods for selecting appropriate biomarkers, devising sampling strategies, and assessing laboratories for validated analytical methods for the biomarker of interest, and ensuring timely feedback of results. Furthermore, it describes procedures for setting up efficient biomonitoring programs based on the Similar Exposure Group (SEG) approaches. Derived health-based human exposure biomarker assessment values called Occupational Biomonitoring Levels (OBLs) are proposed for use in occupational exposure and risk assessment. It also helps with the interpretation of biomonitoring results routinely collected and procedures for communicating biomonitoring results at individual, collective, and workplace levels. Ethical considerations associated with biomonitoring are also discussed. **Conclusions:** The ultimate goal of this biomonitoring

approach is to promote harmonized application and interpretation of biomarkers as well as evidence-based occupational risk management measures.
**Hopf et al. 2024.**
**Environment International, vol. 191.**

**Keywords:** Biological monitoring; effect biomarkers; exposure biomarkers; risk assessment; risk management; toxicokinetics.
**Evidence Level:** 6B
**Link:** https://www.sciencedirect.com/science/article/pii/S0160412024005762?via%3Dihub

**Examining management and employees' perceptions of occupational heat exposure and the effectiveness of a heat stress prevention intervention on safety and well-being among natural gas construction workers: A qualitative field-based study**
**Background:** Numerous risk factors have been identified as significantly influencing outdoor workers' risk for heat stress and heat-related conditions, impacting their health, well-being, and productivity. However, the specific effects of these factors on construction workers' safety, health, and well-being remain under-researched. With climate change increasing temperatures, assessing heat stress among construction workers is imperative. **Objective:** To identify the barriers and facilitators influencing the safety of natural gas construction workers and evaluate an implemented heat stress intervention. **Methods:** In the summer of 2023, two semi-structured interviews and six focus groups were conducted with twenty-one stakeholders at a Texas natural gas construction site. **Results:** Key facilitators include employee preparedness, use of employer-provided resources, hydration logs, and real-time communication tools. Contrarily, the barriers include daily work schedules, access to dehydrating beverages, and generational differences with the non-implementation of mandatory rest breaks. The heat stress program was perceived as effective, surpassing recommended guidelines. **Conclusion:** To advance construction workers' safety, health, and well-being, both employee involvement and employer management are needed, along with no-cost accessible resources. Additionally, implementing a required routine rest break and comprehensive heat stress education, particularly for older workers, will significantly promote safety and safe work practices in hot environments. Note: in this study, the terms 'worker' and 'employee' are used interchangeably.
**Idris et al. 2024.**
**International Journal of Environmental Research and Public Health, vol. 21, no. 9.**

**Keywords:** Barriers; construction workers; facilitators; heat stress; heat stress prevention program; heat-related conditions; well-being; worker safety.
**Evidence Level:** 5B
**Link:** https://www.mdpi.com/1660-4601/21/9/1255

**The effect of exposure to radiofrequency fields on cancer risk in the general and working population: A systematic review of human observational studies - Part I: Most researched outcomes**
**Background:** The objective of this review was to assess the quality and strength of the evidence provided by human observational studies for a causal association between exposure to radiofrequency electromagnetic fields (RF-EMF) and risk of the most investigated neoplastic diseases. **Methods:** Eligibility criteria: We included cohort and case-control studies of neoplasia risks in relation to three types of exposure to RF-EMF: near-field, head-localized, exposure from wireless phone use (SR-A); far-field, whole body, environmental exposure from fixed-site transmitters (SR-B); near/far-field occupational exposures from use of hand-held transceivers or RF-emitting equipment in the workplace (SR-C). While no restrictions on tumour type were applied, in the current paper we focus on incidence-based studies of selected "critical" neoplasms of the central nervous system (brain, meninges, pituitary gland, acoustic nerve) and salivary gland tumours (SR-A); brain tumours and leukaemias (SR-B, SR-C). We focussed on investigations of specific neoplasms in relation to specific exposure sources (i.e. E-O pairs), noting that a single article may address multiple E-O pairs. **Information sources:** Eligible studies were identified by literature searches through Medline, Embase, and EMF-Portal. Risk-of-bias (RoB) assessment: We used a tailored version of

the Office of Health Assessment and Translation (OHAT) RoB tool to evaluate each study's internal validity. At the summary RoB step, studies were classified into three tiers according to their overall potential for bias (low, moderate and high). **Data synthesis:** We synthesized the study results using random effects restricted maximum likelihood (REML) models (overall and subgroup meta-analyses of dichotomous and categorical exposure variables), and weighted mixed effects models (dose-response meta-analyses of lifetime exposure intensity). Evidence assessment: Confidence in evidence was assessed using the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach. **Results:** We included 63 aetiological articles, published between 1994 and 2022, with participants from 22 countries, reporting on 119 different E-O pairs. RF-EMF exposure from mobile phones (ever or regular use vs no or non-regular use) was not associated with an increased risk of glioma [meta-estimate of the relative risk (mRR) = 1.01, 95 % CI = 0.89-1.13), meningioma (mRR = 0.92, 95 % CI = 0.82-1.02), acoustic neuroma (mRR = 1.03, 95 % CI = 0.85-1.24), pituitary tumours (mRR = 0.81, 95 % CI = 0.61-1.06), salivary gland tumours (mRR = 0.91, 95 % CI = 0.78-1.06), or paediatric (children, adolescents and young adults) brain tumours (mRR = 1.06, 95 % CI = 0.74-1.51), with variable degree of across-study heterogeneity ($I^2$ = 0 %-62 %). There was no observable increase in mRRs for the most investigated neoplasms (glioma, meningioma, and acoustic neuroma) with increasing time since start (TSS) use of mobile phones, cumulative call time (CCT), or cumulative number of calls (CNC). Cordless phone use was not significantly associated with risks of glioma [mRR = 1.04, 95 % CI = 0.74-1.46; $I^2$ = 74 %) meningioma, (mRR = 0.91, 95 % CI = 0.70-1.18; $I^2$ = 59 %), or acoustic neuroma (mRR = 1.16; 95 % CI = 0.83-1.61; $I^2$ = 63 %). Exposure from fixed-site transmitters (broadcasting antennas or base stations) was not associated with childhood leukaemia or paediatric brain tumour risks, independently of the level of the modelled RF exposure. Glioma risk was not significantly increased following occupational RF exposure (ever vs never), and no differences were detected between increasing categories of modelled cumulative exposure levels. **Discussion:** In the sensitivity analyses of glioma, meningioma, and acoustic neuroma risks in relation to mobile phone use (ever use, TSS, CCT, and CNC) the presented results were robust and not affected by changes in study aggregation. In a leave-one-out meta-analyses of glioma risk in relation to mobile phone use we identified one influential study. In subsequent meta-analyses performed after excluding this study, we observed a substantial reduction in the mRR and the heterogeneity between studies, for both the contrast Ever vs Never (regular) use (mRR = 0.96, 95 % CI = 0.87-1.07, $I^2$ = 47 %), and in the analysis by increasing categories of TSS ("<5 years": mRR = 0.97, 95 % CI = 0.83-1.14, $I^2$ = 41 %; "5-9 years ": mRR = 0.96, 95 % CI = 0.83-1.11, $I^2$ = 34 %; "10+ years": mRR = 0.97, 95 % CI = 0.87-1.08, $I^2$ = 10 %). There was limited variation across studies in RoB for the priority domains (selection/attrition, exposure and outcome information), with the number of studies evenly classified as at low and moderate risk of bias (49 % tier-1 and 51 % tier-2), and no studies classified as at high risk of bias (tier-3). The impact of the biases on the study results (amount and direction) proved difficult to predict, and the RoB tool was inherently unable to account for the effect of competing biases. However, the sensitivity meta-analyses stratified on bias-tier, showed that the heterogeneity observed in our main meta-analyses across studies of glioma and acoustic neuroma in the upper TSS stratum ($I^2$ = 77 % and 76 %), was explained by the summary RoB-tier. In the tier-1 study subgroup, the mRRs (95 % CI; $I^2$) in long-term (10+ years) users were 0.95 (0.85-1.05; 5.5 %) for glioma, and 1.00 (0.78-1.29; 35 %) for acoustic neuroma. The time-trend simulation studies, evaluated as complementary evidence in line with a triangulation approach for external validity, were consistent in showing that the increased risks observed in some case-control studies were incompatible with the actual incidence rates of glioma/brain cancer observed in several countries and over long periods. Three of these simulation studies consistently reported that RR estimates > 1.5 with a 10+ years induction period were definitely implausible, and could be used to set a "credibility benchmark". In the sensitivity meta-analyses of glioma risk in the upper category of TSS excluding five studies reporting implausible effect sizes, we observed strong reductions in both the mRR [mRR of 0.95 (95 % CI = 0.86-1.05)], and the degree of heterogeneity across studies ($I^2$ = 3.6 %). **Conclusions:** Consistently with the published protocol, our final conclusions were formulated separately for each exposure-outcome combination, and primarily based on the line of evidence with the highest confidence, taking into account the ranking of RF sources by exposure level as inferred from dosimetric studies, and the external coherence with findings from time-trend simulation studies (limited to glioma in relation to mobile phone use). For near field RF-EMF exposure to the head from mobile phone use, there was moderate certainty evidence that it likely does not increase the risk of glioma, meningioma, acoustic neuroma, pituitary tumours, and salivary gland tumours in adults, or

of paediatric brain tumours. For near field RF-EMF exposure to the head from cordless phone use, there was low certainty evidence that it may not increase the risk of glioma, meningioma or acoustic neuroma. For whole-body far-field RF-EMF exposure from fixed-site transmitters (broadcasting antennas or base stations), there was moderate certainty evidence that it likely does not increase childhood leukaemia risk and low certainty evidence that it may not increase the risk of paediatric brain tumours. There were no studies eligible for inclusion investigating RF-EMF exposure from fixed-site transmitters and critical tumours in adults. For occupational RF-EMF exposure, there was low certainty evidence that it may not increase the risk of brain cancer/glioma, but there were no included studies of leukemias (the second critical outcome in SR-C). The evidence rating regarding paediatric brain tumours in relation to environmental RF exposure from fixed-site transmitters should be interpreted with caution, due to the small number of studies. Similar interpretative cautions apply to the evidence rating of the relation between glioma/brain cancer and occupational RF exposure, due to differences in exposure sources and metrics across the few included studies. **Other:** This project was commissioned and partially funded by the World Health Organization (WHO). Co-financing was provided by the New Zealand Ministry of Health; the Istituto Superiore di Sanità in its capacity as a WHO Collaborating Centre for Radiation and Health; and ARPANSA as a WHO Collaborating Centre for Radiation Protection.
**Karipidis et al. 2024.**
**Environment International, vol. 191.**

**Keywords:** Acoustic neuroma; base stations; brain cancer; broadcast transmitters; case-control studies; childhood cancer; cohort studies; cordless phones; epidemiology; glioma; leukaemia; meningioma; mobile phones; neoplasms; occupational exposure; pituitary tumours; radiofrequency electromagnetic fields; salivary gland tumours; systematic review.
**Evidence Level:** 1A
**Link:** https://www.sciencedirect.com/science/article/pii/S0160412024005695?via%3Dihub

**A roadmap for assessing the diagnostic usefulness of neurosensory testing and an updated method for exposure assessment among vibration-exposed workers in northern Sweden**
**Background:** Workers who use handheld vibrating machines such as grinders, hammers and chainsaws expose themselves to hand-arm vibration (HAV). Exposure to HAV may cause injuries to both the neurological and the vascular system. The occupational health services (OHS) in Sweden use a formal guideline for secondary prevention focusing on early detection of vibration-related injuries. **Methods:** The guide includes several screening tools, such as a screening questionnaire, clinical examinations, and laboratory tests. There are no studies, to our knowledge, on the diagnostic value of the separate items on symptoms in the screening questionnaire in relation to the laboratory tests or the clinical examinations performed during a medical examination among patients exposed to HAV. **Results:** Furthermore, the recently presented ISO standard for HAV measurements (ISO/TR 18,750) has only been tested for vascular injuries and not neurological injuries. This research roadmap aims to evaluate separate items in a screening questionnaire on neurological symptoms in relation to laboratory and clinical tests among HAV exposed workers in the Arctic region of Northern Sweden. It also covers a comparison of the dose-response of the current ISO 5349-1 measurement standard and the new suggested standard ISO/TR 18,750 with the neurosensory outcomes. **Conclusions:** This manuscript describes the study rationale, design, methods, and significance.
**Pettersson et al. 2024.**
**International Journal of Circumpolar Health, vol. 83, no. 1.**

**Keywords:** Health surveillance; Sweden; hand-arm vibration syndrome; measurements; neurological symptoms; occupational health; screening.
**Evidence Level:** 4B
**Link:** https://www.tandfonline.com/doi/full/10.1080/22423982.2024.2403793

**Occupational benzene exposure and colorectal cancer: A systematic review and meta-analysis**
**Background:** Recent reports suggest that benzene exposure may be associated with solid cancers, such as lung and bladder cancers. Instead, evidence on the association between benzene and colorectal cancer (CRC) is sparse. **Methods:** Thus, we aimed to summarize current literature on the association between occupational benzene exposure and CRC. We searched Pubmed, Embase (through Ovid), and Scopus to retrieve cohort and nested case-control studies on the association between occupational benzene exposure and solid cancers. The search was initially completed in December 2022 and later updated in April 2024. We assessed quality of included studies using a modified version of Newcastle-Ottawa Scale. We computed pooled relative risks (RRs) and corresponding 95% confidence intervals (CIs) of CRC according to occupational benzene exposure, using the Paule-Mandel method. **Results:** Twenty-eight studies were included in the meta-analysis. Most of them were conducted in Europe or North America (82.1%) and were industry-based (89.3%). Pooled RRs comparing workers exposed to benzene with those who were unexposed for incidence and mortality were 1.10 (95% CI: 1.06, 1.15) and 1.04 (95% CI: 0.97, 1.11) for CRC, 1.12 (95% CI: 1.01, 1.24) and 1.08 (95% CI: 0.99, 1.19) for colon cancer, and 1.04 (95% CI: 0.94, 1.14) and 1.05 (95% CI: 0.92, 1.19) for rectal cancer, respectively. Only one study supported the occurrence of a dose-response relationship between occupational benzene exposure and CRC, while others found no increase in risk according to dose of exposure or duration of employment. **Conclusions:** Our findings suggest that occupational benzene exposure may be associated with CRC. Further research with detailed assessment of individual-level exposure is warranted to confirm our results.
**Sassano et al. 2024.**
**Environmental Research, vol. 257.**

**Keywords:** Benzene; colorectal cancer; meta-analysis; occupation; systematic review; workers.
**Evidence Level:** 1A
**Link:** https://www.sciencedirect.com/science/article/pii/S0013935124011186?via%3Dihub

**Occupational exposure limits for reproductive toxicants: A comparative analysis**
**Background:** We investigated the level of protection of reproductive and developmental toxicity offered through occupational exposure limits (OELs) and Derived No-Effect Levels for workers' inhalation exposure (wDNELs). **Methods:** We compared coverage of substances that have a harmonised classification as reproductive toxicant 1 A or 1B (Repr.1 A/B), numerical values and scientific basis of 12 lists of OELs and wDNELs from REACH Registrants' and the Committee for Risk Assessment. **Results:** Across the 14 sources of OELs and wDNELs, 53 % of the Repr1A/B-substances had at least one exposure limit (counting groups of metals as one entry). Registrants' wDNELs covered the largest share, 40 %. The numerical values could be highly variable for the same substance across the lists. How often reproductive toxicity is identified as the critical effect varies between the examined lists, both due to different assessments of the same substance and different substance coverage. Reviewing the margin of safety to reproductive toxicity cited in the documents, we found that 15 % of safety margins were lower to reproductive toxicity than the critical effect. **Conclusions:** To conclude, neither the REACH nor work environment legislation supply wDNELs or OELs for a substantial share of known reproductive toxicants. EU OELs cover among the fewest substances in the range, and in many cases national OELs or wDNELs are set at more conservative levels.
**Schenk et al. 2024.**
**Reproductive Toxicology, vol. 128.**

**Keywords:** DNEL; health risk assessment; industrial hygiene; maximum allowable concentration; reproductive toxicology; route-to-route extrapolation; TLV; uncertainty factors.
**Evidence Level:** 5B1
**Link:** https://www.sciencedirect.com/science/article/pii/S0890623824001163?via%3Dihub

**Revealing the dual impact of VOCs on recycled rubber workers: Health risk and odor perception**
**Background:** Volatile organic compounds (VOCs) pose potential hazards to human health and contribute significantly to odor pollution. **Methods:** This study examined VOC emissions from a representative

recycled rubber industry, evaluating the occupational health risks for frontline workers in various workshops. Variables such as gender and workshop-specific concentration variations were considered using Monte Carlo simulation methods. **Results:** Employees in the five production workshops and office areas face noncarcinogenic health risks with hazard indices (HIs) greater than 1, with the rubber compounding phase presenting the highest risk. Acetaldehyde is identified as the primary noncarcinogenic health risk substance, with hazard quotient (HQ) values exceeding 1 in all workshops. Carcinogenic health risks vary by area, with the highest risks found in compounding and refining workshops. Formaldehyde poses the greatest risk in rubber grinding workshops and offices, with cumulative weights exceeding unacceptable levels of M80.58 % and W77.56 % in grinding and M94.98 % and W92.24 % in the office. Male workers face 4-7 % greater noncarcinogenic VOC health risks than females and 5-14 % greater carcinogenic risks from individual VOCs, increasing their susceptibility to health risks caused by VOCs. Additionally, our analysis of odor identification and intensity classification revealed that 53 VOCs are capable of causing odor pollution, with several substances reaching odor levels of 2 or higher. The predominant perceived odors, as reflected in the odor wheel, include categories such as "solvent/aromatic" and "sweet/fruit," with aldehydes being the primary odor-causing substances. **Conclusions:** In summary, emissions of VOCs from rubber industrial processes not only pose substantial health risks to workers but also contribute significantly to odor pollution. Consequently, enterprises must prioritize optimizing workplace conditions to ensure the occupational health and well-being of their employees.

**Zhang et al. 2024.**

**Ecotoxicology and Environmental Safety, vol. 283.**



**Keywords:** Health risks; odor intensity; odor wheel; recycle rubber; VOCs.

**Evidence Level:** 5B

**Link:** https://linkinghub.elsevier.com/retrieve/pii/S0147-6513(24)00900-X

**Occupational exposure and new-onset asthma in the population-based Telemark study: A 5-year follow-up**

**Background:** This study aimed to estimate the incidence of asthma and assess the association between job exposure matrix (N-JEM) assigned occupational exposure, self-reported occupational exposure to vapour, gas, dust and fumes (VGDF), mould, damages from moisture and cold, and new-onset asthma. We also aimed to assess the corresponding population attributable fraction (PAF) for ever exposure to VGDF. **Design:** Longitudinal population-based respiratory health study. **Setting:** Responders from the baseline Telemark Study in south-eastern Norway were followed up from 2013 to 2018. **Participants:** 7120 participants, aged 16-55, were followed during a 5-year period. **Main outcome measures:** New-onset asthma and its association with self-reported occupational exposure to VGDF, data from the N-JEM and self-reported workplace conditions were assessed using logistic regression adjusted for gender, age, smoking and body mass index. The PAF was calculated using the PUNAF command in STATA. **Results:** There were 266 (3.7%) cases of new-onset asthma and an incidence density of 7.5 cases per 1000 person-years. A statistically significant association was found for ever exposed to VGDF with an OR of 1.49 (95% CI 1.15 to 1.94), weekly OR 2.00 (95% CI 1.29 to 3.11) and daily OR 2.46 (95% CI 1.39 to 4.35) exposure to VGDF. The corresponding PAF for ever exposed to VGDF was 17% (95% CI 5.4% to 27.8%) and the risk of asthma onset increased with frequent VGDF exposure, indicating a possible exposure-response relationship (p=0.002 for trend). The N-JEM exposure group, accidental peak exposure to irritants had an increased risk of new-onset asthma, OR 2.43 (95% CI 1.21 to 4.90). A significant association was also found for self-reported exposure to visible damages due to moisture 1.51 (95% CI 1.08 to 2.11), visible and smell of mould 1.88 (95% CI 1.32 to 2.68), 1.55 (95% CI 1.12 to 2.16) and cold environment 1.41 (95% CI 1.07 to 1.86). **Conclusion:** Participants had elevated ORs for asthma associated with self-reported and N-JEM-assigned exposures. A PAF of 17% indicates that work-related asthma is still common. The possible exposure-response relationship suggests that reducing occupational VGDF exposure frequency could prevent the onset of asthma.

**Zivadinovic et al. 2024.**

**BMJ Open, vol. 14, no. 9.**

**Keywords:** Asthma; epidemiology; occupational and industrial medicine.
**Evidence Level:** 4B
**Link:** https://bmjopen.bmj.com/content/14/9/e090131.long

## Physical Activity

*This month we explore physical activity issues including barriers and enablers for being physically active at work and occupational and sex differences in active commuting among workers from 2006 to 2016*

**"Balancing work and movement": Barriers and enablers for being physically active at Indian workplaces - Findings from SMART STEP trial**
**Background:** Non-communicable diseases are rising rapidly in low- and middle-income countries, leading to increased morbidity and mortality. Reducing sedentary behavior (SB) and increasing physical activity (PA) offer numerous health benefits. Workplaces provide an ideal setting for promoting SB/PA interventions; however, understanding the barriers and enablers is crucial for optimizing these interventions in workplace environments. **Methods:** Nested within a cluster randomised controlled trial (the SMART-STEP trial), the present study employed in-depth interviews with 16 office workers who have completed 24 weeks of two distinct (technology assisted and traditional) workplace SB/PA interventions. Using a deductive analysis, semi-structured interviews were administered to explore the barriers and enablers to the SB/PA interventions at individual, interpersonal and organisational level using the socio-ecological model. **Results:** Several individual (poor goal setting, perceived health benefits & workload, attitude, intervention engagement), interpersonal (lack of peer support) and organisational (task prioritisation, lack of organisational norm and material or social reward) barriers were identified. Indian women engaged in desk-based office jobs often find themselves burdened with intense home and childcare responsibilities, often without sufficient support from their spouses. A primary concern among Indian office workers is the poor awareness and absence of cultural norms regarding the health risks associated with SB.
**Conclusions:** Raising awareness among workplace stakeholders-including office workers, peers, and the organization-is crucial before designing and implementing SB/PA interventions in Indian workspaces. Personalized interventions for Indian female office workers engaged in desk-bound work are warranted.
**Chandrasekaran et al. 2024.**
**International Journal of Behavioral Nutrition and Physical Activity, vol. 21, no. 1.**

**Keywords:** Barriers; compliance; office workers; physical activity; sedentary behaviour; sustainable cities; urban community; workplace.
**Evidence Level:** 2B
**Link:** https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-024-01661-z

**Occupational and sex differences in active commuting among Canadian workers from 2006 to 2016**
**Background:** Active commuting (AC) to and from work is associated with numerous health benefits, through increased physical activity. This study examined whether occupation types and part-time work, by sex, were associated with AC in a population-based sample of Canadian workers. **Data and methods:** Cross-sectional public use microdata files from the 2006 (n=363,048), 2011 (n=370,672), and 2016 (n=362,310) Census of Population were examined. Multinomial logistic regression models were used to estimate the odds of cycling, walking, and using public transit, relative to using a private motorized vehicle, by occupation and sex. Time trends in mode share were also analyzed. **Results:** In 2016, commuting by private motorized vehicle and cycling were more common among males, while public transit and walking were more common among females. Occupations in art, culture, recreation, and sport were associated with the greatest odds of cycling (odds ratio [OR]=3.02, 99% confidence interval [CI]: 2.65 to 3.39), while those in trades, transportation, natural resources, and manufacturing had the lowest odds of cycling (OR=0.47, 99% CI: 0.44 to 0.51) and walking (OR=0.36, 99% CI: 0.33 to 0.38). Since 2006, relative declines of 1% and 8% in

the proportion of workers commuting by driving and walking, respectively, were observed (absolute change of -1% each). Relative increases of 14% and 12% were observed for cycling and public transit, respectively (absolute changes of less than 1% and 1.5%, respectively). **Interpretation:** This study found that sex and occupation are important correlates of AC among Canadian workers. Further research aimed at understanding occupational barriers and facilitators may inform future AC interventions.
**Christopher et al. 2024.**
**Health Reports, vol. 35, no. 9.**

**Keywords:** Active transportation; epidemiology; occupational health; physical activity; workplace.
**Evidence Level:** 4B
**Link:** https://www150.statcan.gc.ca/n1/pub/82-003-x/2024009/article/00001-eng.htm

## Musculoskeletal Health

**Prevalence of and risk factors for low back pain among professional drivers: A1 systematic review and meta-analysis**
**Purpose:** A growing body of research indicates a correlation between occupational exposure, particularly among individuals in driving-related occupations, and the incidence of low back pain (LBP). **Methods:** Databases were systematically searched, including PubMed, Embase, Web of Science, Cochrane Library, and SinoMed, from their inception through December 2023 for relevant studies of the prevalence and risk factors of LBP among professional drivers. Subsequent meta-analyses were performed utilizing Stata 17.0 and RevMan 5.4 software, while risk factor indicators were assessed using the Grading of Recommendations, Assessment, Development and Evaluation evidence quality grading system. **Results:** A systematic review and meta-analysis comprising 19 studies involving 7,723 patients indicated that the incidence of LBP among drivers was 39% (95% confidence interval [CI] 0.20-0.57) in the past 7 days and 53% (95% CI 0.43-0.63) in the past 12 months. A subgroup analysis revealed a prevalence of 48% (95% CI 0.33-0.64) in 2005-2015 and 56% (95% CI 0.42-0.70) in 2016-2023. Among the identified factors, robust evidence highlighted age ≥ 41 years (odds ratio [OR] = 2.10; 95% CI 1.36-3.24; P = 0.0008), alcohol consumption (OR = 1.75; 95% CI 1.31-2.34; P = 0.0001), sleeping < 6 h/night (OR = 1.60; 95% CI 1.13-2.24; P = 0.007), uncomfortable seating (OR = 1.71; 95% CI 1.23-2.36; P = 0.001), improper driving posture (OR = 2.37; 95% CI 1.91-2.94; P < 0.00001), and manual handling (OR = 2.23; 95% CI 1.72-2.88; P < 0.00001) as significant risk factors for LBP. There was moderate evidence of a lack of exercise (OR = 1.78; 95% CI 1.37-2.31; P < 0.0001), working > 10 h/day (OR = 2.49; 95% CI 1.89-3.28; P < 0.00001), > 5 years' driving experience (OR = 2.12; 95% CI 1.66-2.69; P < 0.00001), a lack of back support (OR = 1.81; 95% CI 1.25-2.62; P = 0.002), high work-related pressure (OR = 2.04; 95% CI 1.59-2.61; P < 0.00001), and job dissatisfaction (OR = 1.57; 95% CI 1.23-2.01; P = 0.0003) as moderate risk factors. There was no evidence of body mass index or smoking as risk factors for LBP among professional drivers. **Conclusion:** The current evidence indicates an increasing annual trend in the prevalence of LBP among professional drivers. Factors including age ≥ 41 years, alcohol consumption, and sleeping < 6 h/night were among the 12 influential factors contributing to LBP in professional drivers. Enhancing awareness of these factors and formulating targeted preventive strategies may be beneficial.
**Jia et al. 2024.**
**Journal of Orthopaedic Surgery and Research, vol. 19, no. 1.**

**Keywords:** Incidence; low back pain; meta-analysis; professional drivers; risk factors.
**Evidence Level:** 1A
**Link:** https://josr-online.biomedcentral.com/articles/10.1186/s13018-024-04999-z

# Guiding and Supporting Mental Health and Wellbeing

## Mental Health

*This month we explore occupational mental health issues including the relationship between occupational stress, burn-out and sleep quality, factors associated with burnout among educators, precarious employment and mental health and how the double-track human resource management model contribute to job burnout and mental health. In other studies we explore trajectories of work disability among individuals with anxiety-, mood/affective-, or stress-related disorders, effect of organizational change on workplace psychosocial risks and employee mental health, association of social isolation and depressive symptoms with workplace productivity loss, mental health literacy and importance of prefabrication to easing construction workers' experience of mental health stressors.*

**Current situation and relationship between occupational stress, burn-out and sleep quality among ambulance drivers: A cross-sectional study**

**Background:** To understand the current status of occupational stress, occupational burn-out and sleep quality among ambulance drivers in Hengyang, China and to analyse the relationship between occupational stress, occupational burn-out and sleep quality of ambulance drivers. **Design:** A cross-sectional study. **Setting:** Prehospital emergency centre of third-class hospital in Hengyang, China. **Participants:** From October 2023 to December 2023, a cross-sectional survey was conducted, with 213 ambulance drivers from Hengyang, China, selected as participants. **Methods:** General demographic questionnaires, the Chinese Occupational Stress Inventory, the Maslach Burnout Inventory and the Pittsburgh Sleep Quality Index were used for data collection and analysis. **Results:** Occupational stress among ambulance drivers was positively correlated with occupational burn-out and sleep quality (r=0.528, 0.447, both p<0.01) while occupational burn-out was positively correlated with sleep quality (r=0.394, p<0.01). Occupational burn-out partially mediated the relationship between occupational stress and sleep quality among ambulance drivers, with a mediation effect value of 0.168, accounting for 26.09% of the total effect. **Conclusion:** The sleep quality of ambulance drivers in Hengyang, China is suboptimal, with occupational stress directly predicting sleep quality. Occupational burn-out plays a partial positive mediating role between occupational stress and sleep quality among ambulance drivers. Reducing occupational stress and burn-out is beneficial for improving the sleep quality of ambulance drivers.

**Zhang et al. 2024.**

**BMJ Open, vol. 14, no. 9.**



**Keywords:** Burnout, professional; occupational stress; quality of life; sleep medicine.

**Evidence Level:** 4B

**Link:** https://bmjopen.bmj.com/content/14/9/e089252.long

**Factors associated with burnout in military police officers in a city in Paraná**

**Background:** To analyze the association between burnout and sociodemographic, work factors, lifestyle habits and health conditions of military police officers in a municipality in the state of Paraná, Brazil. **Method:** Cross-sectional research with 131 military police officers. Data were analyzed using the Statistical Package for the Social Sciences software and the R program. Chi-square, Fisher's exact and Poisson Generalized Linear Model tests were used. **Results:** Most participants (65.6%) had a high level of burnout. In relation to protective factors, those who carried out leisure activities had a 33.6% chance of not developing burnout. Conjugality was also a protective factor. Not practicing physical activity and leisure activities are factors that can contribute to the occurrence of burnout. **Conclusions:** Important factors and high rates of burnout were observed in the police officers investigated. It is necessary to implement public health policies to reduce burnout with attention focused on this professional category.

**Ribeiro et al. 2024.**

**Revista Brasileira de Enfermagem, vol. 77, no. 4.**

**Keywords:** Burnout; military police officers.
**Evidence Level:** 4B
**Link:** https://www.scielo.br/j/reben/a/fB3ZZPhz9ZsLhVhvvNGXHzr/?lang=en

**A systematic review on mental health and its associated factors among educators in Malaysia**
**Background:** Mental health is a vital aspect of health and wellbeing that supports our capacity as individuals and as a society to make choices, form bonds with one another, and influence the world we live in. This review aims to identify and synthesize research on mental health and its associated factors among educators in Malaysia. Given the rise in mental health issues among educators, it is crucial to understand the risk factors and develop supportive environments to promote mental well-being. By investigating the causes of poor mental health among educators, this review seeks to provide recommendations based on evidence for future research priorities, policy, and practice, particularly in Malaysia. **Methods:** This systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria. A total of 488 studies were identified from five databases namely Scopus, PubMed, Web of Science, Science Direct, and PsycINFO with 30 articles meeting the inclusion criteria. Covidence tool is used for screening and data extraction. **Results:** The findings highlighted six major themes as significant predictors of poor mental health among educators in Malaysia were work-family conflict and demands, pandemic impact, work environment, physical health, personality traits, and workload. **Conclusions:** The outcomes of this review support future policy research on academic well-being, aiming to improve work-life balance for educators. Stakeholders can work towards creating a more supportive, productive, and sustainable academic environment in Malaysia.
**Munusamy et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Educators; factors; Malaysia; mental health; systematic review.
**Evidence Level:** 1A
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19855-2

**Precarious employment and mental health in the United States: Results from the Medical Expenditure Panel Survey (MEPS), 2008-2021**
**Background:** To measure associations between employment precarity and mental health among United States (US) workers. **Methods:** This study used data from the US Medical Expenditure Panel Survey for 2008-2021. Multivariable generalized estimating equations were used to measure associations between employment precarity (operationalized as a multi-dimensional exposure) and self-rated mental health after adjusting for relevant confounders. Marginal effects analysis was used to assess potential dose-response relationships between precarity and mental health. **Results:** Our sample (n = 57,529) was representative of >106 million US workers employed throughout 2008-2021. Compared to those with low levels of employment precarity, those with medium and high levels of precarity had an increased odds of reporting poor/fair mental health (aOR = 1.21; 95% CI = 1.11, 1.32 and 1.51; 95% CI = 1.36, 1.68, respectively). Marginal effects analysis indicated that increasing levels of precarity were associated with an increased probability of reporting poor/fair mental health. **Conclusions:** Increasing levels of employment precarity were associated with poor/fair self-rated mental health, findings potentially indicative of a dose-response relationship between the two. These nationally representative findings suggest employment precarity is an important social determinant of mental health. Future research could investigate how best to mitigate the negative effects of precarity on workers' lives and well-being, particularly regarding mental health.
**Lundstrom et al. 2024.**
**Preventative Medicine, vol. 186.**

**Keywords:** Employment quality; mental health; occupational health; precarious employment; social determinants of health.
**Evidence Level:** 4B
**Link:** https://www.sciencedirect.com/science/article/abs/pii/S0091743524002457?via%3Dihub

**How does the double-track human resource management model contribute to job burnout and mental health among Chinese government departments? A Chinese police study**

**Background:** This study aims to investigate the contribution of the double-track human resource management model to the job performance and mental health of frontline police within China's public security organs. **Methodology:** An individual-centered approach, latent profile analysis (LPA), was utilized in this study, which used cluster sampling to survey all police of all 118 frontline police stations in an economically underdeveloped area of China and 839 personnel were selected for the analysis. This method allowed for a detailed examination of the contribution of the double-track system to job performance and mental health. **Findings and conclusion:** The study identified three subtypes of job burnout among Chinese police: low job burnout, medium job burnout, and emotional exhaustion type. The double-track human resource management model in China's public security organs has contributed to significant disparities between civilian and auxiliary police, such as more severe job burnout among civilian police, lower job performance, and mental health among auxiliary police. **Implications:** To mitigate the potential risks associated with the double-track human resource management model, adjustments are necessary for both the management system and the treatment distribution system, which would also help address the disparities and improve the overall wellbeing and performance of all police officers.

**Liang et al. 2024.**
**Frontiers in Public Health, vol. 12.**

**Keywords:** Auxiliary police; double-track human resource management; job burnout; job performance; mental health.
**Evidence Level:** 5B
**Link:** https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1423103/full

**Trajectories of work disability among individuals with anxiety-, mood/affective-, or stress-related disorders in a primary healthcare setting**

**Background:** Anxiety-, mood/affective-, or stress-related disorders affect up to one-third of individuals during their lives and often impact their ability to work. This study aimed to delineate trajectories of work disability (WD) among individuals diagnosed with anxiety-, mood/affective-, or stress-related disorder in primary healthcare and to examine associations between trajectory group membership and sociodemographic, clinical, and clinical-related factors. **Methods:** The study population included working-age individuals, aged 22-62 years, living in Stockholm County, Sweden, who experienced a new episode of any anxiety-, mood/affective, or stress-related disorder in primary healthcare in 2017 (N = 11,304). Data were obtained from Swedish national and regional registers and were linked using pseudonymised unique personal identification numbers. The primary outcome was days with WD (sum of sickness absence and disability pension days) during the three years before and three years after a diagnosis of anxiety-, mood/affective-, or stress-related disorders in primary healthcare. A zero-inflated Poisson group-based trajectory model was used to identify groups of individuals with similar patterns of WD over the study period, with a multinomial logistic regression used to examine associations of sociodemographic, clinical, and clinical-related factors with trajectory group membership. **Results:** Four distinct trajectory groups were found, high increasing (5.1%), with high levels, from 16 to 80 days of WD in six-monthly intervals during follow-up, peak (11.1%), with a peak in WD, up to 32 days of WD, around the time of the diagnosis, low increasing (12.8%), with an increase in days of WD from 4 to 22 during the study period, and constant low (71.1%), with almost no WD over the study period. In multinomial regression models, diagnostic category, psychotropic medication use, a diagnosis of a psychiatric disorder within secondary healthcare, age at diagnosis, and occupation were associated with WD trajectory groups. **Conclusions:** Around two-thirds of individuals treated for a new episode of any anxiety-, mood/affective-, or stress-related disorder in primary healthcare have an excellent prognosis regarding WD. Several sociodemographic and clinical characteristics were associated with group membership; these factors could identify individuals at risk of long-term welfare dependency and who might benefit from interventions to promote a return to work.

**Helgesson et al. 2024.**
**BMC Psychiatry, vol. 24, no. 1.**

**Keywords:** Anxiety disorder; depression; psychiatric disorders; sick leave; stress disorder primary care; work capacity.
**Evidence Level:** 4B
**Link:** https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-024-06068-5

**Organizational change: Challenges for workplace psychosocial risks and employee mental health**
**Background:** Constant organizational change is the norm in many companies today. At present, evidence on the impact of organizational change on psychosocial risks at work and employee mental health is limited. We investigate organizational change and its association with psychosocial risks and mental health in three consecutive surveys covering 12 years. **Methods:** The study was based on data from three cross-sectional waves (2006, 2012, 2018) of the German BIBB/BAuA Employment Survey, comprising 53,295 employees. Four change indicators (i.e., introduction of new software, changes in goods and services produced/provided, downsizing and restructuring), five indicators of psychosocial risks (i.e., time pressure, interruptions, multitasking, working to the limits of capability, and working very quickly) and four mental health indicators (i.e., sleep disturbances, nervousness, tiredness and depressive symptoms) were investigated. We applied Poisson regression analysis to examine associations between organizational change, psychosocial risks, and mental health. **Results:** According to the pooled analysis of all three waves, the majority of employees reported having experienced at least one organizational change, such as downsizing or restructuring, between 2006 and 2018. Organizational change was negatively associated with psychosocial risks (e.g., working to the limits of one's capability, PR: 1.66; 95% CI: 1.48-1.86) and with employee mental health (PR: 1.82; 95% CI: 1.61-2.04). **Conclusions:** Organizational change is omnipresent in the modern economy. Our research suggests that transformation processes in organizations can bear risks to employees' health as psychosocial risks increase. Therefore, companies planning organizational change should accompany such processes with occupational health and safety measures.
**Backhaus et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Changes at the workplace; mental health; organizational change; psychosocial risks.
**Evidence Level:** 4B
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19815-w

**Association of social isolation and depressive symptoms with workplace productivity loss in a multi-ethnic Asian study**
**Background:** The association of health-related productivity loss (HRPL) with social isolation and depressive symptoms is not well studied. We aimed to examine the association of social isolation and depressive symptoms with productivity loss. **Methods:** Data on employed adults aged 21 years and above were derived from the Population Health Index (PHI) study conducted by the National Healthcare Group (NHG) on community-dwelling adults, residing in the Central and Northern residential areas of Singapore. The severity of depressive symptoms and social isolation were assessed using the 9-item Patient Health Questionnaire (PHQ-9) and Lubben Social Network Scale-6 (LSNS-6) respectively. Productivity loss was assessed using the Work Productivity and Activity Impairment Questionnaire (WPAI). We used Generalised Linear Models, with family gamma, log link for the analysis. Models were adjusted for socio-demographic variables (including age, gender, ethnicity, employment status, housing type) and self-reported chronic conditions (including the presence of diabetes, hypertension, and dyslipidemia). **Results:** There were 2,605 working (2,143 full-time) adults in this study. The median reported percentage of unadjusted productivity loss was 0.0%, 10.0% and 20.0% for participants with social isolation, depressive symptoms, and both, respectively. In the regression analysis, mean productivity loss scores were 2.81 times (95% Confidence Interval: 2.12, 3.72) higher in participants with depressive symptoms than those without. On the other hand, social isolation was not found to be associated with productivity loss scores (1.17, 95% Confidence Interval: 0.96, 1.42). The interaction term of depressive symptoms with social isolation was statistically significant, with an effect size of 1.89 (95% Confidence Interval: 1.04, 3.44). It appeared that productivity loss was amplified when social isolation and depressive symptoms were concomitant. Our results suggested significant associations of social isolation and depressive symptoms with productivity loss.

**Conclusions:** These findings highlighted the potential impact of social isolation and depressive symptoms on work performance and drew attention to the importance of having a holistic work support system that promotes social connectedness, mental wellbeing and work productivity.
**Ha et al. 2024.**
**Scientific Reports, vol. 14, no. 1.**

**Keywords:** Depression; economic impact; mental health; productivity; social isolation.
**Evidence Level:** 4B
**Link:** https://www.nature.com/articles/s41598-024-73272-4

**Mental health literacy for public employees**
**Background:** Although mental disorders are common in the workplace, they often go unnoticed. There is frequently a gap in the recognition and effective management of these disorders, leading to delayed recovery and worsening conditions. This study evaluates the level of Mental Health Literacy (MHL) among employees of the Finance and Planning Departments in the Federal District, Brazil, and proposes preventive measures and de-stigmatization strategies for mental health in the workplace. **Methods:** MHL among active employees was assessed using the Mental Health Literacy Scale (MHLS), developed by O'Connor and Casey (2015) and validated for Brazilian Portuguese by Buta et al. (2024). The data analysis included descriptive and inferential statistics, with nonparametric tests used to compare MHL across different groups. **Results:** The results showed that 27.6% of participants had adequate literacy, 67.9% had problematic levels, and 4.5% had inadequate levels. Women were observed to have higher literacy levels than men. Additionally, significant variations in literacy levels were noted among individuals with different health conditions; those diagnosed with cancer, depression, or other illnesses had higher literacy than those without diagnosed conditions. **Conclusion:** To address MHL challenges, educational actions such as awareness campaigns, training, and consultancy programs are essential.
**Buta et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Mental health; mental health literacy; public administration; public policy; survey.
**Evidence Level:** 4B
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19937-1

**Importance of prefabrication to easing construction workers' experience of mental health stressors**
**Background:** Construction is widely acknowledged for its socioeconomic contributions, although it is also always considered as a dangerous and incident-prone industry. As a new method of working, prefabrication presents better work environments and other benefits that can potentially improve the safety and mental health of construction workers. **Methods:** This study compares the extent of stressors in traditional and prefabricated construction. Eighty-four construction site and factory-based workers in Australia were surveyed. **Results:** Prefabricated construction respondents reported less experience of industry-related, management/organisational, and personal stressors. Specifically, the stressors found to be weakened by prefabrication were mental fatigue, work injuries, poor working conditions, unfavourable shift rosters, work overload, and poor work-life balance. Furthermore, the degree of the experience of potential mental health improvement factors such as labour effort efficiency, reduced on-site trade overlap, increased mechanised construction, and less dependence on weather conditions, among others, was significantly higher in prefabrication than in traditional construction. **Conclusions:** The influence of prefabrication on measures of poor and positive mental health is recommended for further studies, particularly by finding its links with the different groups of construction workers.
**Fagbenro et al. 2024.**
**International Journal of Environmental Research and Public Health, vol. 21, no. 9.**

**Keywords:** Construction workers; mental health stressors; poor mental health; prefabricated construction; traditional construction.
**Evidence Level:** 4A

**Link:** https://www.mdpi.com/1660-4601/21/9/1218

## Bullying, Harassment and Occupational Violence

*This month we explore bullying, harassment and occupational violence issues in higher education institutions, the relationship between workplace bullying and family functioning and one year cumulative incidence and risk factors associated with workplace violence within the ambulance service*

**Workplace bullying and harassment in higher education institutions: A scoping review**
**Background:** Workplace bullying is broadly defined as a detrimental form of negative micro-political interaction(s) incorporating a range of aggressive interpersonal behaviours. While targeted toxic behaviour based upon legally protected grounds such as ethnicity, gender, or sexual orientation is conceptualised as harassment, this paper positions harassment as a constituent subset of workplace bullying-distinct, but inextricably linked to the broader landscape of workplace predation and incivility. Meta-analyses of cross-sectional and longitudinal studies demonstrate a robust relationship between being bullied and compromised health, and some sectors, e.g., education, display higher than average levels of exposure, suggesting that contexts matter. **Methods:** The higher education sector is the focus of this scoping review. High rates of bullying have been reported in Higher Education Institutions (HEIs), where many of the organisational factors that drive bullying are present. One systematic literature review has been carried out on bullying in HEIs, reviewing papers prior to 2013. Since the sector has seen considerable contextual change since that time, another review is timely. This systematic scoping review aims to identify the volume, range, nature, and characteristics of studies of workplace bullying in HEIs between 2003 and 2023, with a specific focus on how the *context* of HEIs contributes to the enactment and/or the response to workplace bullying. **Results:** To this end, 3179 records were identified, with 140 papers charted to identify methods, institution, population, and country. Forty-seven papers were subjected to full-text review for the exploration of contextual factors. **Conclusions:** Priorities for future research lie in addressing the pernicious effects of neoliberal governance models as well as the complex and intersecting power relations that are unique to higher education.
**Hodgins et al. 2024.**
**International Journal of Environmental Research and Public Health, vol. 21, no. 9.**

**Keywords:** Gendered power dynamics; harassment; higher education institution; neoliberalism; precarity; workplace bullying.
**Evidence Level:** 6A
**Link:** https://www.mdpi.com/1660-4601/21/9/1173

**The relationship between workplace bullying and family functioning: A systematic review**
**Background:** While the occupational and health-related consequences of workplace bullying have received extensive research attention, the effects of workplace bullying on the family domain have been largely ignored. **Methods:** Based on the PRISMA framework, the Scopus, Web of Science, PsycINFO, and PubMed databases were searched up to May 12, 2024, for articles on associations between workplace bullying and family functioning. **Results:** A total of 1347 articles were identified, of which 37 were found after review to meet the criteria for inclusion. All the included studies found a direct or indirect association between workplace bullying and family functioning. Most studies are grounded in the conservation of resources (COR) theory, spillover theory, crossover theory, and work-family interface model. Negative affect (emotions), work-family conflict (WFC), and burnout were considered essential mechanisms explaining the links between workplace bullying and family functioning, with personal resources (demands) as the main moderators. Most studies focus on the one-way impact of workplace bullying on family functioning, mainly using cross-sectional, non-randomized self-report designs. **Conclusions:** Future research will benefit from using a longitudinal design, continued characterization of the workplace bullying-family functioning

relationship, including its nature, direction, processes, and boundary conditions in various industrial and cultural contexts, together with the use of models for the integration of research findings.
**Jie et al. 2024.**
**PLoS One, vol. 19, no. 9.**

**Keywords:** Workplace bullying; bullying; family functioning.
**Evidence Level:** 1A
**Link:** https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0310300

**One year cumulative incidence and risk factors associated with workplace violence within the ambulance service in a Swedish region: A prospective cohort study**
**Background:** To measure the 1 year cumulative incidence of and analyse the risk factors associated with workplace violence directed towards the ambulance service in a Swedish region. **Design:** Prospective cohort study. **Setting:** The ambulance services in Örebro County Council (Sweden) contain approximately 300 000 inhabitants. **Participants:** All ambulance missions during the period of 12 months (n=28 640) were assessed. **Primary and secondary outcome measures:** The primary outcome measure was workplace violence together with the associated risk factors. **Results:** The 1 year cumulative incidence of workplace violence within the ambulance service was 0.7%. Non-physical violence was most common. There was an increased odds for violence when the patient was under the influence of alcohol or drugs or suffering from mental illness. There was an association between the dispatch categories intoxication, unconsciousness or mental health problems and workplace violence against ambulance personnel. The offenders were mostly men aged 18-29 and workplace violence was more likely to occur in public places. **Conclusions:** The 1 year cumulative incidence of workplace violence within the regional ambulance service was low in comparison to that of previous research. The overall regression model had low explanatory power, indicating that the phenomenon is complex and that additional variables need to be taken into account when trying to predict when workplace violence will occur. Additional research is needed to fully understand why workplace violence within the ambulance service occurs and how to mitigate such situations.
**Viking et al. 2024.**
**BMJ Open, vol. 14, no. 9.**

**Keywords:** Accident and emergency medicine; health and safety; risk management.
**Evidence Level:** 4B
**Link:** https://bmjopen.bmj.com/content/14/9/e074939.long

## Psychosocial Issues

*This month we explore psychosocial issues including regulatory foci as moderators in the job demands-resources model, the moderating role of family-to-work conflict and fifty years of research on psychosocial working conditions and health.*

**Promotion or prevention: Regulatory foci as moderators in the job demands-resources model**
**Background:** Building on the job demands-resources (JD-R) model and regulatory focus theory, this study examined how regulatory foci shaped the effects of different job demands and resources on both negative and positive workplace outcomes among medical staff. **Methods:** Two independent studies ($N_{Study\ 1}$ = 267; $N_{Study\ 2}$ = 350) were designed for cross-validation. Participants completed a battery of measures evaluating job demands (workload, emotional demands, interpersonal stress), job resources (psychological safety, perceived organizational support, servant leadership), and well-being (job burnout, affective commitment, job satisfaction). **Results:** Multiple linear regression analyses showed employees' well-being was affected by job demands and resources through energetic and motivational processes, respectively. The deleterious effect of emotional demands on job burnout was pronounced in individuals with weak prevention focus (B = 0.392, standard error [SE] = 0.069, $p < .001$). Psychological safety (Study 1) and servant leadership (Study 2) had stronger positive associations with motivational outcomes among individuals with weak promotion

focus than those with strong promotion focus (B = 0.394, SE = 0.069, p < .001; B = 0.679, SE = 0.121, p < .001; and B = 0.476, SE = 0.072, p < .001, respectively). **Conclusion:** We used two samples to examine and cross-validate the joint effects of job characteristics and personal traits on workplace well-being among Chinese medical staff. Although heterogenous, the results showed regulatory foci were especially important in determining the effects of job demands and resources on well-being when there was (autonomous) self-regulation in the workplace.
**Jing et al. 2024.**
**Human Resources for Health, vol. 22, no. 1.**

**Keywords:** Job demands–resources model; prevention focus; promotion focus; regulatory focus theory; well-being; workplace self-regulation.
**Evidence Level:** 4B
**Link:** https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-024-00950-9

**Parents' work demands on next day's cortisol awakening response - The moderating role of family-to-work conflict**
**Background:** Constant availability, overtime and feeling overwhelmed by work can impact employees' wellbeing and their biological stress responses. Especially working parents often struggle to balance the demands of their work and family life and were found to be distracted from their work due to family responsibilities. The Family-to-Work Conflict (FWC) indicates the extent to which participating in work is made difficult by family demands. Recent studies have found associations between FWC and biological outcomes such as the Cortisol Awakening Response (CAR), a measure of an individual's Hypothalamic-Pituitary-Adrenal (HPA)-axis activity. This diary study investigates the effect of parental work demands on next day's cortisol response as well as the moderating role of FWC and the mediating role of fatigue.
**Methods:** Over the course of five consecutive days (from Monday to Friday), 168 observations were made on a total of 42 parents. Participants had at least one child and worked a minimum of 20 hours per week. Salivary cortisol samples were obtained immediately, 15 and 30 minutes after awakening each day. Work demands, FWC and fatigue were assessed using standardized questionnaires. Within-person effects were examined using multilevel modeling and mediation analyses. **Results:** Our results indicate that there are no main effects of work demands on next day's cortisol response. The multilevel analysis revealed that FWC predicts lower wakening cortisol levels and confirmed FWC as an increasing moderator between work demands and next day's HPA-axis activity. Further, work overload was found to increase fatigue, which in turn leads to higher CAR on the following day. This indicates that fatigue mediates the relationship between work demands and CAR. Our findings add to a growing body of research demonstrating further predictors for HPA-axis activity and emphasise the importance of considering family related demands when investigating biological outcomes for working parents.
**Akko et al. 2024.**
**Psychoneuroendocrinology, vol. 167.**

**Keywords:** Cortisol awakening response; family-to-work conflict; fatigue; parenthood; work demands.
**Evidence Level:** 5B
**Link:** https://www.sciencedirect.com/science/article/pii/S0306453024001513?via%3Dihub

**Fifty years of research on psychosocial working conditions and health: From promise to practice**
**Background:** This paper presents an overview of 50 years of research on psychosocial working conditions and health with regards to conceptualization, interventions and policy. We reflect on the promise of past and current research on psychosocial working conditions and, in addition, discuss current progress in translating this research into workplace practice and improvements in people's working lives.
**Methods:** We conducted a narrative review of meta-reviews and key publications on psychosocial working conditions and health. The review covers a historical overview of theories of the past 50 years, measurement of psychosocial working conditions, health effects, intervention research, and policy development on psychosocial working conditions. **Results:** Psychosocial working conditions are conceptualized in different ways, with increasing complexity in the understanding developing over time.

Exposures related to psychosocial working conditions are associated with a wide range of health outcomes, in particular cardiovascular disease and mental health conditions. In response to growing evidence on associations between psychosocial working conditions and health outcomes, intervention research has expanded rapidly, but for various reasons the evidence base is stronger and more extensive for individual- than organizational-level interventions. This individual/organizational imbalance is reflected in practice, and may partly explain why policy interventions have yet to show reductions in exposures to psychosocial work factors and associated adverse outcomes. **Conclusions:** Pressing needs for advancing the field include improvements in capturing exposure dynamics, developing objective measures of exposure, methodologic advancements to optimize causal inference in etiologic studies, and alternatives to randomized controlled trials for intervention evaluation.
**Boot et al. 2024.**
**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 6.**

**Keywords:** Psychosocial working; health.
**Evidence Level:** 6A
**Link:** https://www.sjweh.fi/article/4180

# Fostering Work Participation

## Return to Work

*This month we explore return to work issues including social class of orthopaedic rehabilitation patients and differences in subjective health, return to work motivation, and participation in aftercare interventions, and the relationship between coronary artery angiographic characteristics, occupational factors, and return to work.*

**The social class of orthopedic rehabilitation patients: Are there differences in subjective health, return to work motivation, and participation in aftercare interventions?**
**Background:** This longitudinal quasi-experimental study examines the relationship between social class, subjective health, motivation to return to work (RTW) following medical rehabilitation, and participation in aftercare interventions, utilizing the Social Cognitive Theory of Social Class. **Methods:** To do so, a prospective multicentric study was conducted. The analysis was based on data from N = 1044 orthopedic rehabilitation patients in three clinics in Germany. Latent growth curve models, fixed-effect linear regression models, and multilevel binomial logistic regression were employed for data analysis. **Results:** As hypothesized, the findings demonstrate that lower social class is associated with poorer subjective health, while higher social class is linked to increased solipsistic motives, characterized by pursuing personal goals in the context of RTW. Conversely, individuals from lower social classes exhibit contextualist motives, which indicate a focus on social and environmental threats influencing their motivation to RTW. Surprisingly, social class does not significantly impact participation in aftercare interventions, probably due to low variance and potentially the successful inclusion within the German healthcare system. These findings emphasize the importance of considering diverse motivation profiles derived from the Social Cognitive Theory of Social Class. **Conclusions:** The study contributes to our understanding of the social determinants of health and has implications for reducing health disparities by highlighting the motivational aspects, including solipsistic and contextualist motives, associated with social class.
**Rinn et al. 2024.**
**Social Science & Medicine, vol. 356.**

**Keywords:** Aftercare interventions; cognitive tendencies; health disparities; medical rehabilitation; work-related outcomes.
**Evidence Level:** 4B
**Link:** https://www.sciencedirect.com/science/article/pii/S0277953624006051?via%3Dihub

**The relationship between coronary artery angiographic characteristics, occupational factors, and return to work**

**Background:** Coronary artery disease is one of the most common causes of disability and work loss among working-age individuals. Since the ability to return to work after cardiovascular events depends on several factors, identifying these factors can be helpful in treatment planning and effective rehabilitation. In this study, we aimed to assess the employment status and related factors one year after angiography in patients with stable angina and acute coronary syndrome and to investigate the impact of occupational factors on angiographic characteristics. **Methods:** This retrospective study included 447 patients with coronary artery disease who underwent angiography between February 2020 and March 2021 at a teaching hospital. Data regarding employment status and other related variables, including the Job Content Questionnaire, were collected through medical record reviews and telephone interviews one year after hospital discharge. The participants' occupational factors and return-to-work status were then compared. **Results:** One year after angiography, the rate of returning to work was 70%. Of these, 86.3% had resumed their previous job. Factors associated with a reduced return to work included major coronary artery involvement, a history of hypertension, lower ejection fraction, and increased hospitalization days. Occupational risk factors such as low income, longer working hours, and high job demand also decreased the likelihood of returning to employment. **Conclusion:** Various clinical and socioeconomic factors can predict the probability of returning to work after angiography in patients with coronary artery disease. Considering these factors could be useful in formulating clinical guidelines to improve employment outcomes for these patients.

**Rezaei et al. 2024.**

**Turkish Society of Cardiology, vol. 52, no. 6.**



**Keywords:** Coronary artery angiographic; occupation; return to work.

**Evidence Level:** 4B

**Link:** https://archivestsc.com/jvi.aspx?un=TKDA-86918&volume=52&issue=6

## Presenteeism and Absenteeism

*This month we explore presenteeism and absenteeism issues including gender differences in mental health-related sickness absence, the effect of job control on physician-certified sickness absence , sickness absence after work accidents and post-traumatic stress among white-collar workers and respiratory-related workers' compensation claims from private employers.*

**Gender differences in mental health-related sickness absence in the education sector**

**Background:** The education sector experiences high rates of sickness absence, primarily due to mental health disorders. This issue poses significant challenges, not only for the affected employees but also for their colleagues, pupils, the organization, and the society as a whole. Several factors are likely to contribute to this issue, including work-related factors and gender dynamics, as the education sector has a high proportion of female employees. **Methods:** In this study, we use statistical methods to compare the average duration of sickness absence due to mental disorders in the education sector with other sectors. Additionally, we explore the influence of gender, age, and working hours on the duration of sickness absence. For our study we use a large dataset consisting of approximately 200,000 cases of sickness absence due to mental disorders, with more than 32,000 cases from the education sector. **Results:** Our analysis shows that average sickness absence duration is consistently longer in the education sector than in other sectors, even after accounting for gender and age. Specifically, the average duration of sickness due to mental disorders in the education sector is 235 days, compared to 188 days in other sectors. We also observe gender differences in absence duration in all sectors, with an interaction effect indicating that working in education affects recovery rates more for men than for women. Consequently, the gender difference in absence duration is smaller in the education sector than in other sectors. **Conclusion:** Using a large dataset, we find significant differences in absence duration between employees in the education

sector and those in other sectors. Other factors, such as gender, also influence sickness absence duration, but to a lesser extent. Notably, the gender effect on absence duration is smaller in the education sector compared to other sectors.
**Timp et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Education; gender; long term sickness absence; mental disorders; sickness absence duration.
**Evidence Level:** 4B
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-20155-y

**Does job control contribute to differences in physician-certified sickness absence across office concepts? A mediation analysis in a nationally representative sample**
**Background:** Several studies have found higher sickness absence in shared and open workspaces than in private offices, but little is known about why these differences occur. We propose and test job control as a potential mechanism underlying observed differences in the risk of physician-certified sickness absence between private offices and shared and open workspaces. **Methods:** We conducted a counterfactual mediation analysis using observational survey data from a nationally representative sample of Norwegian employees merged with prospective data from national registries (N=5512). The registry data included information about whether participants had any physician-certified sickness absence the year following the survey. Models were adjusted for age, sex, education level, occupation group, executive/leadership responsibility, and time spent on office work. **Results:** We found significantly higher sickness absence risk in conventional [risk ratio (RR) 1.12, 95% confidence interval (CI) 1.01–1.25] and non-territorial (RR 1.20, 95% 1.04–1.37) open-plan and non-territorial shared-room offices (RR 1.29, 95% CI 1.13–1.48) compared to private offices. Natural indirect effects due to job control were statistically significant in all contrasts and accounted for 19-34% of total effects depending on contrast. **Conclusions:** Findings were in line with hypothesized relationships and suggest that job control may be a mechanism underlying observed differences in sickness absence across office concepts. Future studies should continue to explore potential mechanisms linking shared and open workspaces to higher sickness absence and other unfavorable outcomes in the workplace, particularly with study designs that provide stronger basis for causal inference.
**Borge et al. 2024.**
**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 6.**

**Keywords:** Job control; sickness; physicians; office work.
**Evidence Level:** 4B
**Link:** https://www.sjweh.fi/article/4167

**Sickness absence after work accidents and post-traumatic stress among white-collar workers in the retail and wholesale industry: A longitudinal Swedish cohort study**
**Background:** Most studies about accidents and about PTSD, respectively, have been conducted either on blue-collar workers, or on the entire working population. There are very few such studies on white-collar workers. **Aim:** To examine diagnosis-specific sickness absence (SA) and disability pension (DP) after a work accident or PTSD, respectively, among white-collar workers in the private retail and wholesale industry.
**Methods:** A prospective population-based cohort study of all 192,077 such workers aged 18-67 (44% women) in Sweden in 2012, using linked microdata from nationwide registers. We identified individuals who had secondary healthcare due to work-related accidents (n = 1114; 31% women) or to PTSD (n = 216; 79% women) in 2012-2016. Their average number of net days of diagnosis-specific SA (in SA spells > 14 days) and DP were calculated for 365 days before and 365 days after the healthcare visit.
**Results:** 35% of the women and 24% of the men had at least one new SA spell during the 365 days after healthcare due to work accidents. Among women, the average number of SA/DP days increased from 14 in the year before the visit to 31 days the year after; among men from 9 to 21 days. SA days due to fractures and other injuries increased most, while SA days due to mental diagnoses increased somewhat. 73% of women and 64% of men who had healthcare due to PTSD had at least one new SA spell in the next year. Women increased from 121 to 157 SA/DP days and men from 112 to 174. SA due to stress-related

disorders and other mental diagnoses increased the most, while DP due to stress-related diagnoses and SA due to musculoskeletal diagnoses increased slightly. **Conclusions:** About a quarter of those who had secondary healthcare due to work accidents, and the majority of those with such healthcare due PTSD, had new SA in the following year. SA due to injury and mental diagnoses, respectively, increased most, however, SA/DP due to other diagnoses also increased slightly. More knowledge is needed on factors associated with having or not having SA/DP in different diagnoses after work accidents and among people with PTSD.
**Farrants et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Disability pension; population-based; post-traumatic stress disorder; retail and wholesale industry; sick leave; white-collar workers; work accidents.
**Evidence Level:** 4B
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19865-0

**Respiratory-related workers' compensation claims from private employers - Ohio, 2001-2018**
**Background:** Diseases and conditions related to the respiratory system contribute to work-related morbidity, mortality, and disability. Details on the causes and nature of work-related respiratory disease and the specific industries in which they occur are limited. This study identifies respiratory-related claims in the Ohio Bureau of Workers' Compensation (OHBWC) system and describes claim and worker characteristics to inform public health surveillance. **Methods:** We developed a list of respiratory-related International Classification of Diseases Clinical Modification (ICD-CM) diagnosis codes and searched over 2 million claims filed between 2001 and 2018 in the OHBWC system for at least one of these codes. The claim characteristics, rates of claims by employer industry classification, and causes of claims from narrative text were determined for these respiratory-related claims. **Results:** Among the 23,015 respiratory-related claims (5.8 per 10,000 full-time equivalents [FTE]), 54.6% had at least one ICD-CM code for Allergic Reactions and 30.6% had at least one code for Toxic Effects of Substances Chiefly Non-medicinal as to Source. Claim causes from narrative text included Chemical Exposure (30.3%), Activity Suggesting Exposure (24.4%), and Vapors, Gases, Dusts, or Fumes (VGDF) Exposure (19.3%). The highest overall rates of respiratory-related claims among private employers were for the agriculture, forestry & fishing (11.4 per 10,000), public safety (ambulance services) (11.3), and manufacturing (10.7) industry sectors. **Conclusions:** Respiratory-related claims in the OHBWC system were often acute in nature and included allergic reactions. Narratives from these claims provide insight into the work-related exposures and events causing claims or the disease and symptom factors surrounding claims.
**Kurth et al. 2024.**
**Journal of Safety Research, vol. 90.**

**Keywords:** Respiratory; workers' compensation claims; private employer.
**Evidence Level:** 5B
**Link:** https://www.sciencedirect.com/science/article/abs/pii/S0022437524000823?via%3Dihub

## Working hours

*This month we explore working hours issues including work hours and the risk of hypertension, and the diversity of flexible working time arrangements and workers' health.*

**Work hours and the risk of hypertension: The case of Indonesia**
**Background:** Individuals working excessive hours is a worldwide phenomenon. In Indonesia, over 32 million people work more than 40 h per week, contributing to around 26% of the workforce. Excessive working may affect health, increasing the risk of cardiovascular diseases such as hypertension. Hypertension affected around 34% of Indonesian adults, approximately 63.3 million people and led to about 427,000

deaths in 2018, and the prevalence remains high at 29.2% in 2023. This study aims to analyze the relationship between work hours and the risk of hypertension among working individuals in Indonesia. **Methods:** This study used a pooled cross-sectional data from the Indonesian Family Life Survey (IFLS) wave 4 (2007) and wave 5 (2014) and performed a logit regression analysis to examine the likelihood of a working individual having hypertension based on the individual's work hours. A dummy variable of hypertension is created based on the result of blood pressure measurement. The sample consists of 22,500 working individuals in Indonesia. This study controlled for job characteristics, sociodemographic status and health-behavioral risk factors such as BMI and smoking behavior, and performed additional regression analyses for alternative models to check for robustness. **Results:** Our findings showed that there is a higher probability of having hypertension for workers who work longer hours by 0.06% points for each additional hour of work ($p < 0.01$). Other factors such as physical activity and smoking behavior have also been demonstrated to be significantly correlated to the risk of hypertension. **Conclusions:** This study revealed a positive relationship between work hours and hypertension. Although this study cannot suggest causality, the strongly significant correlation may provide an idea and an overview regarding the risk of hypertension among working individuals in Indonesia. The Indonesian government could consider conducting further studies to implement and promote flexible working arrangements initiatives and incentive programs to improve workers' health outcomes.
**Andini et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Hypertension; IFLS; Indonesia; work hours.
**Evidence Level:** 4B
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-20003-z

**Diversity of flexible working time arrangements and workers' health: An analysis of a workers' panel and linked employer-employee data for France**
**Background:** Flexible working time arrangements (FWTA) have increased over the last decades, favored by labor market deregulation, the decentralization of collective bargaining and the development of new technologies. The negative impact of some non-standard working hours on health (like night work, shift work) is quite well-known but other forms of FWTA have been studied less so far. **Methods:** This article aims to investigate the relationship between FWTA and workers' health. It focuses on employer-oriented FWTA and uses a job demands-control framework to identify different types of working time demands and control. The study uses individual data from the French working conditions survey, including panel data from 2013 to 2019 (64,981 observations) and cross-sectional employer-employee linked data from 2019 (5687 employees from 4672 workplaces). **Results:** We identify empirically two main dimensions of employer-oriented FWTA, based on 14 working time variables. The first type involves "atypical working hours", such as working weekends, nights, early mornings, evenings, or doing shift work. The second type - "work overflow" - is characterized by long working hours, overtime, taking work home, and having variable working hours. Using a fixed-effects model based on panel data, we show that both types of FWTA have a negative impact on workers' self-rated general health and mental health, as measured by the WHO-5 index. The study also finds that workers who have more control - both individual and collective - to face these demands demonstrate better health. Workers with control over their working hours report better health and are less negatively affected by FWTA. Moreover, workplace-level practices have ambiguous relationships with workers' health. However, those involving social dialogue and workers' participation have more favorable effects: the positive effect of health and safety committees is especially clear. **Conclusions:** To improve workers' health in the context of increased flexible working time arrangements, public policies should promote the development of control over working time and participation of workers to social dialogue on working time related issues.
**Erhel et al. 2024.**
**Social Science & Medicine, vol. 356.**

**Keywords:** Flexible working; workers' health; employer; employee.
**Evidence Level:** 4B

**Link:** https://www.sciencedirect.com/science/article/pii/S0277953624005823?via%3Dihub

## Wellness Programs

*This month we explore wellness program issues including promoting mental health in the workplace using web software, improving sleep health in paramedics through an app-based intervention, effect of health behaviour interventions on truck drivers' health and the effectiveness of a Goldilocks work intervention to promote musculoskeletal health among industrial workers.*

**Promoting mental health in the workplace: Web software development and validation**
**Objective:** To develop and validate the content and technical aspects of a web software program for promoting mental health in the workplace. **Method:** Applied methodological study and technological development, carried out in three stages: 1) Umbrella review development; 2) Web software development; 3) Content and technical validation carried out by 14 judges. The data was submitted to descriptive statistical analysis and calculation of the content validity index. **Results:** Based on the guidelines' recommendations, information was defined and extracted in order to develop the web software consisting of the following dimensions: mental health education, support among coworkers, promotion strategies and mental health self-assessment. For the technical development, the objectives, general functions and technological infrastructure were defined. After development and functional testing, the version was made available for content and technical validation by judges. The overall content validity index was 0.98 and for the technical aspects it was 0.97. **Conclusion:** The agreement between the judges in relation to the content and technical aspects, as well as the suggestions incorporated, demonstrated the potential for using web software to promote mental health in the workplace.
**Pinhatti et al. 2024.**
**Revista Latino-Americana de Enfermagem, vol. 32.**

**Keywords:** Mental health; workplace; web software development.
**Evidence Level:** 6B
**Link:** https://www.scielo.br/j/rlae/a/GB7Ts3rRhSVVRSNWqYpfbMr/?lang=en

**Improving sleep health in paramedics through an app-based intervention: A randomised waitlist control pilot trial**
**Background:** Due to work commitments, shiftworkers often obtain inadequate sleep, consequently experiencing negative health, wellbeing, and safety outcomes. Given shiftworkers may have limited control over their work commitments, lifestyle and environmental factors within their control may present an intervention opportunity. However, such interventions require tailoring to ensure applicability for this sleep-vulnerable population. **Methods:** A randomised waitlist control pilot trial investigated the effectiveness of mobile health application Sleepfit, which delivered a tailored sleep health intervention aimed at improving sleep health and sleep hygiene outcomes amongst paramedic shiftworkers. Outcome measures of self-reported sleep health (sleep need, duration, and quality, fatigue, Insomnia Severity Index, Fatigue Severity Scale, and Epworth Sleepiness Scale scores) and sleep hygiene (Sleep Hygiene Index score) were collected at baseline, post-intervention, and 3-month follow-up. **Results:** Fifty-eight paramedics (aged 33.4 ± 8.0 years; 50% male) were recruited, and trialed Sleepfit for a 14-day intervention period between August 2021-January 2022. For all participants, there was a significant reduction in Insomnia Severity Index and Sleep Hygiene index scores after intervention engagement. Regression models demonstrated no significant intervention effect on sleep health or sleep hygiene outcomes (intervention versus waitlist control group). A high study drop-out rate (91.4%) prevented assessment of outcomes at 3-month follow-up. **Conclusions:** Pilot trial findings demonstrate that Sleepfit may elicit improvements in sleep health and sleep hygiene outcomes amongst paramedic shiftworkers. However, low enrolment and retention means that findings should be interpreted with caution, further highlighting potential engagement challenges, especially among paramedics who are particularly in need of support for improved sleep. **Trial registration:**

Prospectively registered with the Australian New Zealand Clinical Trial Registry 24/01/2020 (reference no. ACTRN12620000059965).
**Shriane et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Shiftwork; sleep hygiene; mHealth.
**Evidence Level:** 2A
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19823-w

**Keep on truckin': How effective are health behaviour interventions on truck drivers' health? A systematic review and meta-analysis**
**Background:** Truck drivers are a vital workforce, but have higher rates of obesity and other chronic diseases than the general population. The occupation's sedentary nature, limited physical activity opportunities and access to healthy food, and irregular sleeping patterns contribute to poor health. This systematic review and meta-analysis aimed to evaluate the effectiveness of interventions on health behaviours and cardiometabolic biomarkers of health in truck drivers. **Methods:** A systematic search was conducted in February 2024, and reported according to PRISMA 2020 guidelines. Experimental studies targeting physical activity, sedentary behaviour, sleep, diet, weight loss, drug/alcohol use, and/or smoking were eligible. Two reviewers independently screened and completed data extraction and risk of bias assessment. Data were combined at the study level. Pooled statistics were calculated using mean differences (MD) or standardised mean differences (SMD) for outcomes that were reported in ≥2 studies. Pre- and post-intervention means and standard deviations (SD) for the intervention and control groups were used to compute effect sizes. **Results:** Nineteen studies (n=2137 participants) were included. Meta-analyses found a small-to-moderate increase in fruit and vegetable consumption (SMD 0.32, p=0.03) with no other significant effects on other outcome variables. **Conclusions:** Interventions are moderately effective in increasing truck drivers' fruit and vegetable consumption, but not other outcomes. There is a dearth of research in the driver population compared to other occupational groups. Future interventions should consider workplace and environmental factors to promote the health and wellbeing of truck drivers. **Trial registration:** The study protocol was registered on PROSPERO (CRD42021283423).
**Virgara et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Cardiometabolic health biomarkers; diet; freight worker; physical activity.
**Evidence Level:** 1A
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-19929-1

**Effectiveness of a Goldilocks work intervention to promote musculoskeletal health among industrial workers - A cluster randomized controlled trial**
**Background:** Industrial workers with physically demanding work have increased risk of musculoskeletal pain. The present 12-week Goldilocks Work intervention aimed to organize work among industrial workers to comprise a 'just right' ergonomic balance of physical behaviors (i.e., sit, stand and active) intended to promote musculoskeletal health. The paper investigates the effectiveness of the intervention in reducing low back pain after work. **Methods:** 83 workers across 28 workteams in a biotech organization were recruited. Workteams were randomly allocated to receive the intervention or work as usual (control). Intervention workteams implemented the Goldilocks Work planning tool to organize their work tasks towards a predefined 'just right' ergonomic balance (i.e., composition of 60% sitting, 30% standing, 10% active work and hourly task alternation). The primary outcome was low back pain intensity. Secondary outcomes were bodily pain, fatigue, physical exertion, productivity and energy after work measured in the survey, and composition and alternations of physical behaviors measured using wearable sensors. **Results:** The intervention was delivered almost as planned, with good quality and high adherence among most workteams. However, the intervention did not change physical behaviors towards the intended 'just right' ergonomic balance. No significant reduction in low back pain (0.07, CI 95%: -0.68; 0.82), bodily pain (0.10, CI 95%: -0.57; 0.76), tiredness (-0.53, CI 95%: -1.24; 0.19), physical exertion (-0.18, CI 95%: -0.83;

0.48), or improvement in energy (0.39, CI 95%: -1.02; 0.23) or productivity (-0.03, CI 95%: -0.77; 0.72) were found. **Conclusion:** This Goldilocks Work intervention did not promote musculoskeletal health among industrial workers and did not change physical behaviors as intended. Thus, more research is needed into implementation strategies to change physical behaviors during productive work towards an evidence-based 'just right' ergonomic balance.

**Fritz Lerche et al. 2024.**

**Journal of Safety Research, vol. 90.**



**Keywords:** Musculoskeletal health; industrial workers.

**Evidence Level:** 3B

**Link:** https://linkinghub.elsevier.com/retrieve/pii/S0022-4375(24)00059-8

## Organisational Issues

**Understanding the interplay between organisational injustice and the health and wellbeing of female police officers: A meta-ethnography**

**Background:** Female police officers are reported to encounter more bias, discriminatory practices, and inadequate support than their male counterparts and experience poorer health outcomes. This meta-ethnographic review looks beyond individual responsibilities to consider which aspects of policing impact the health and well-being of female police officers. **Methods:** Primary qualitative and mixed method studies published between 2000 and 2024 were included. ProQuest (all databases) and Ovid (Medline and Embase) were searched using terms related to health, wellbeing, females, police, and qualitative research. This was a cross-jurisdictional review, with no limit on country of study. In total, twenty-one papers met the inclusion criteria. A seven-phase inductive and interpretative meta-ethnographic technique was employed to synthesise, analyse, and interpret the data. **Results:** The data analysis revealed a distinct outcome that demonstrated a strong relationship and substantial impacts of organisational injustice on the health and well-being of female police officers. Our findings showed that organisational injustice, encompassing procedural, relational, distributive, and gendered injustice, significantly influences the health and well-being of female officers. Impacts on mental health were commonly discussed, followed by aspects influencing social health, workplace wellbeing, and physical health. Moreover, the effects of these four forms of organisational injustice and the associated cultural, systemic, and structural risk factors extend beyond the immediate health and wellbeing impacts on the individual female officer through impeding other aspects of their work life, such as career progression and work-life balance, that can further impact long-term health and well-being. **Conclusion:** This review highlights the importance of addressing organisational injustice and the cultural, systemic, and structural risk factors within policing to promote healthier and more inclusive workforces for female officers. Policymakers and practitioners should critically examine policies and practices that may appear gender neutral but disproportionately impact women, affecting the health and well-being of female police officers. By addressing these issues, transformative action can be taken to create safer, more supportive, and healthier working environments for female police officers.

**Illias et al. 2024.**

**BMC Public Health, vol. 24, no. 1.**



**Keywords:** Female police officer; gender; health and wellbeing; injustice; meta-ethnography; occupational health; police; qualitative; sexism; stress.

**Evidence Level:** 1A

**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-20152-1

## Shift Work

**Personalized sleep and nutritional strategies to combat adverse effects of night shift work: A controlled intervention protocol**
**Background:** Working during the night interferes with the timing of normal daily activities and is associated with an increased risk of chronic diseases. Under controlled experimental conditions, interventions focusing on sleep and nutrition can mitigate the short-term adverse effects of shift work. However, it is unclear how these results translate to real-life, how they can be targeted to individual conditions, and how they relate to long-term health. Therefore, the current study aims to implement a personalized sleep and nutritional intervention among night shift workers in the field. **Methods:** A non-blinded controlled intervention study is used, consisting of a run-in period, an intervention of 3 months, post-intervention measurements, and a follow-up after 12 months. Three study arms are included: sleep intervention, nutritional intervention, and control group (n = 25 each). Participants are healthy 18-60-year male night shift workers, with at least one year of experience in night shift work. Information from the run-in period will be used to personalize the interventions. The main outcomes are sleep measurements and continuous interstitial glucose levels. Furthermore, general health biomarkers and parameters will be determined to further evaluate effects on long-term health. **Discussion:** This study aims to mitigate negative health consequences associated with night shift work by introducing two personalized preventive interventions. If proven effective, the personalized interventions may serve as practical solutions that can have a meaningful impact on the sustainable health and employability of night shift workers. This study will thereby contribute to the current need for high-quality data on preventative strategies for night shift work in a real-life context.
**van der Rhee et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Circadian disruption; glucose homeostasis; metabolic health; night shift; occupational health; precision nutrition; real-life intervention; shift work; sleep.
**Evidence Level:** 6A
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-20022-w

## Management and Leadership

**Exploring line managers' perspectives on using data in managing sickness absence: A qualitative study**
**Background:** The purpose of this study is to explore line managers' perspectives on data as tool in the management of sickness absence in public sector workplaces in Denmark. **Methods:** The study is a qualitative study based on 19 semi-structured interviews with line managers from four public sector workplaces characterized by high levels of sickness absence or poor work environment. The interviews were analysed inductively using thematic analysis. **Results:** The findings show that line managers primarily use data to identify employees at risk of sickness absence. The experiences highlighted related to how and when data are perceived as a valuable tool by the line managers, and that nuances in the data, accessibility of the data and how data are presented are important factors to ensure appropriate follow-up on sickness absence. **Conclusions:** The findings suggest that for line managers to use data to manage sickness absence appropriately, the data must be easily accessible, simple for line managers to understand and provide line managers with a sufficient overview of sickness absence in their work units. It is also important to consider other factors affecting sickness absence, such as the work environment, when aiming to reduce sickness absence.
**Rasmussen et al. 2024.**
**Health Research Policy and Systems, vol. 22, no. 1.**

**Keywords:** Absenteeism; data; line manager; sickness absence; workplace.
**Evidence Level:** 5B
**Link:** https://health-policy-systems.biomedcentral.com/articles/10.1186/s12961-024-01224-5

**Line manager training and organizational approaches to supporting well-being**
**Background:** Employee mental health and well-being (MH&WB) is critical to the productivity and success of organizations. Training line managers (LMs) in mental health plays an important role in protecting and enhancing employee well-being, but its relationship with other MH&WB practices is under-researched. **Aims:** To determine whether organizations offering LM training in mental health differ in the adoption of workplace- (i.e. primary/prevention-focused) and worker-directed (including both secondary/resiliency-focused and tertiary/remedial-focused) interventions to those organizations not offering LM training and to explore changes in the proportions of activities offered over time. **Methods:** Secondary analysis of enterprise data from computer-assisted telephone interview surveys. The analysis included data from organizations in England across 4 years (2020: n = 1900; 2021: n = 1551; 2022: n = 1904; 2023: n = 1902). **Results:** Offering LM training in mental health was associated with organizations' uptake of primary-, secondary-, and tertiary-level MH&WB activities across all 4 years. The proportion of organizations offering primary-, secondary- and tertiary-level interventions increased over time. On average, tertiary-level activities were most adopted (2020: 80%; 2021: 81%; 2022: 84%; 2023: 84%), followed by primary-level activities (2020: 66%; 2021: 72%; 2022: 72%; 2023: 73%) and secondary-level activities (2020: 62%; 2021: 60%; 2022: 61%; 2023: 67%). **Conclusions:** Offering LM training in mental health is associated with the adoption of other MH&WB practices by organizations. Suggesting that organizations that are committed to the mental health agenda are more likely to take a holistic approach (including both worker and workplace strategies) to promoting workforce mental health, rather than providing LM training in isolation.
**Dulal-Arthur et al. 2024.**
**Occupational Medicine, vol. 74, no. 6.**

**Keywords:** Line manager; well-being; approach; support.
**Evidence Level:** 5B
**Link:** https://academic.oup.com/occmed/article/74/6/416/7712333?login=false

## Work Ability

**Gender and educational differences in work participation and working years lost in Norway**
**Background:** This study aimed to quantify the duration of work participation and reasons for working years lost, according to gender and educational attainment, among a Norwegian population. **Methods:** Register data on labor market attachment between 2000-2015 were obtained from Statistics Norway. We included five cohorts: individuals turning 20 (N=323 333), 30 (N=386 006), 40 (N=388 962), 50 (N=358 745), and 60 years (N=284 425) between 1 January 2000 and 31 December 2005. Individuals were followed for ten years. Data completeness allowed calculation of the average time spent in work and years lost to health-related absences and non-employment states per cohort. Changes in state probabilities over time were also depicted. Mean differences between genders and educational levels, and corresponding 95% confidence intervals were based on 1000 bootstrap samples. **Results:** Both genders spent most time in work; however, per cohort, women worked approximately one year less than men. As cohorts aged, main reasons for working years lost changed from education and economic inactivity to sickness absence and disability pensioning; this trend was stronger for women than men. Individuals with a low education spent fewer years in work and more years in sickness absence and disability pensioning than highly educated peers. This difference tended to be larger for women and older cohorts. **Conclusions:** Per cohort, women participated one year less in work than men and, depending on age, spent more time in education, economic inactivity, sickness absence, and disability pensioning. Stronger educational gradients were seen for work and health-related absences for older cohorts and women.
**Merkus et al. 2024.**
**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 6.**

**Keywords:** Gender; work participation; working years; Norway.

**Evidence Level:** 4B
**Link:** https://www.sjweh.fi/article/4166

# Adapting to the Future of Work

## Aging Workforce

*This month we explore the occupational issues associated with the aging workforce including a resource-oriented perspective on the aging workforce, and the relationship between cancer and intention to leave work among older workers*

**A resource-oriented perspective on the aging workforce - Exploring job resource profiles and their associations with various health indicators**
**Background:** Promoting older workers' health in the context of increasing labor force participation and skill shortages is crucial. Examining job resource profiles offers a promising approach to understanding how to promote and maintain the health of older workers within the workplace. However, it is unclear how different job resources interact within distinct worker subgroups. Thus, this study explores the association between the job resource profiles of distinct subgroups and various health indicators among older workers in Europe. **Methods:** Data from 4,079 older workers (age range: 50-60 years, 57% female) from waves 6 and 8 of the Survey of Health, Ageing and Retirement in Europe (SHARE) were analyzed. Latent profile analysis was employed to identify distinct job resource profiles using social support, recognition, job promotion, autonomy, and development opportunities. Associations between these profiles and various health indicators were examined, alongside the sociodemographic and socioeconomic characteristics associated with each profile. **Results:** Four distinct job resource profiles emerged: (I) average job resource workers (n = 2170, 53%), (II) high social job resource workers (n = 983, 24%), (III) low job resource workers (n = 538, 13%), and (IV) autonomous decision-making workers (n = 388, 10%). Workers in the (II) high social job resource profile had the highest socioeconomic status and reported the best self-perceived health, lowest depressive symptoms, and fewest limitations and chronic diseases. Conversely, workers in the (III) low job resource profile had the second-lowest socioeconomic status and reported the poorest health outcomes. Surprisingly, older workers with high autonomy (profile IV) had the lowest socioeconomic status and the second worst self-perceived health. This may be because they perceive themselves as autonomous while lacking support and recognition. **Conclusion:** There is wide variation in the level and composition of resources available to older workers in the workplace. The most vulnerable subgroups, such as low job resource workers (profile III) and autonomous decision-making workers (profile IV), could benefit from tailored workplace health promotion interventions, such as support from supervisors or peers. Strengthening older workers' job resources, including social support and recognition, can improve their health and contribute to them remaining in the workforce.
**Gut et al. 2024.**
**BMC Public Health, vol. 24, no. 1.**

**Keywords:** Health indicators; job resources; latent profile analysis; older workers; workplace health promotion.
**Evidence Level:** 4B
**Link:** https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-20098-4

**Relationship between cancer and intention to leave work among older workers: A cross-sectional internet-based study**
**Background:** Limited research has focused on the relationship between cancer, job loss, and factors associated with job loss among older workers. Therefore, in this study, we aimed to examine the relationship between cancer and intention to leave and between physical-health-related issues, mental-health-related issues, and cancer-related symptoms and intention to leave among older workers with cancer. **Materials and Methods:** This cross-sectional internet-based study included 4498 workers aged 60-75 years. Intention to leave was assessed based on whether individuals considered quitting their current

jobs in the near future. **Results**: A multivariate logistic regression analysis showed a significant association between cancer and intention to leave (adjusted odds ratio [aOR]: 1.42, 95% confidence interval [CI]: 1.01-2.00, *p* = 0.045). In addition, physical-health-related issues (aOR: 2.33, 95% CI: 1.10-4.92, *p* = 0.026) and mental-health-related issues (aOR: 4.44, 95% CI: 1.80-10.98, *p* = 0.001) were significantly associated with the intention to leave. **Conclusions***:* Healthcare providers and employers must address the physical- and mental-health-related issues facing older workers with cancer to help them secure their employment.
**Matsugaki et al. 2024.**
**Medicina, vol. 60, no. 9.**

**Keywords:** Cancer; intention to leave; older worker; unemployment.
**Evidence Level:** 4B
**Link:** https://www.mdpi.com/1648-9144/60/9/1506

## Work Environment

*This month we explore work environment issues including the daily use of self-leadership strategies and employee work engagement while working from home and the office, and colour and brightness at work*

**Daily use of self-leadership strategies and employee work engagement while working from home and the office**
**Background:** Employees' work engagement may vary by work location (office vs. home office), assuming that working at home requires greater self-regulation. Hence, self-leadership may play an important role when employees work at home. **Methods:** The present study investigates whether employees use self-leadership strategies (self-goal setting, self-reward, self-punishment, self-cueing, and visualization of successful performance) more often on home days than on office days. We also examine how these strategies are related to daily work engagement, and whether they are more effective for promoting work engagement depending on the work location. **Results:** One hundred and one employees completed daily questionnaires on office and home days, resulting in 514 observations. Multilevel analyses revealed that employees reported higher use of self-goal setting, self-reward, and visualization on home days than on office days. Furthermore, we found that applying these strategies was positively related to day-specific work engagement. Nevertheless, self-cueing had no effect and self-punishment was detrimental to work engagement. Moreover, we found no support for the idea that the effectiveness of self-leadership strategies for promoting work engagement depends on the work location. **Conclusions:** These findings contribute to our understanding of self-leadership strategies promoting work engagement on home and office days.
**Patterer et al. 2024.**
**Scientific Reports, vol. 14, no. 4.**

**Keywords:** Self-leadership strategies; employee work engagement; working from home; office.
**Evidence Level:** 5B
**Link:** https://www.nature.com/articles/s41598-024-71432-0

**Color and brightness at work: Shedding some light on mind wandering**
**Introduction:** Occupational hazards are partly caused by the physical factors of the work environment, among which are ambient color and brightness, which can interfere with cognitive performance. Especially in modern work environments, performance relies heavily on cognitive functions such as attention, and an important factor in disrupting sustained attention is mind wandering (MW). This study aimed to investigate the effects of white and blue colors with two brightness levels on sustained attention and brain electrophysiology. **Methods:** A total of 20 participants were exposed to 4 different conditions (white and blue as color and 300 and 800 lx as the brightness level) in separate blocks in a virtual reality environment in which a continuous performance test (CPT) was performed. **Results:** The high brightness blue condition induced significant changes in sustained attention. MW network analysis showed a significant decrease in

delta frequency band in the blue color condition with high brightness and beta decrease in the blue color condition with low brightness, whereas the activity of MW network increased when exposed to the white color condition. **Conclusion:** High-brightness blue light resulted in better sustained attention and decreased activity of MW-related neural regions. It is thus recommended that these results be taken into consideration in the interior design of educational settings and cars among other environments that require a high level and maintenance of cognitive functions, especially sustained attention.

**Soltanzadeh et al. 2024.**
**Brain and Behavior, vol. 14, no. 9.**

**Keywords:** Attention; mind wandering; virtual reality; work environment.
**Evidence Level:** 5B
**Link:** https://onlinelibrary.wiley.com/doi/10.1002/brb3.70020