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Workplace Research Monthly

Formerly Emerging Evidence Alert

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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 November and December 2023 only.

Contents

Description of Evidence Levels Definitions Used in this Review

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

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

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

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

Enabling Healthy and Safe Workplaces

Health and Wellbeing

This month we explore workplace health and wellbeing issues associated with eating habits at the office, interpersonal touch in the workplace, workplace choice architecture modification, and sleeping duration on risk of diabetes. Other studies explore health inequalities among young workers, occupational risk factors for multiple sclerosis, the impact of menopause in the workplace, the influence of sociodemographic variables and healthy habits on insulin resistance indicators, and the impact of health risk factors on healthcare resource utilization, work-related outcomes and health-related quality of life of Australians. In Covid-19 related research we explore the effect of Covid-19 on the scope of occupational medicine, the effect of meditation and occupational well-being, the effects of Covid-19 infection on the cardiorespiratory fitness of firefighters, rural health workers wellness during the pandemic and the effect of living with covid on different work sectors.

Improving eating habits at the office: An umbrella review of nutritional interventions
Background:(1) Workplace nutrition interventions have garnered attention as a pivotal component of employee well-being and organisational productivity. However, the effectiveness of various intervention types remains inconclusive. This review aims to systematically evaluate the efficacy of cognitive, behavioural, and mixed nutrition interventions in the workplace, considering the nuances of intervention design, setting, and target demographics. **Methods:** (2) A comprehensive umbrella review was conducted, categorising the existing literature into person-oriented and environmental strategies. This review was prepared in line with the Joanna Briggs Institute methodology for umbrella reviews and the preferred reporting items for systematic reviews and meta-analyses reporting standard. **Results:** (3) The analysis revealed a lack of definitive evidence supporting the universal effectiveness of any single intervention type. Nonetheless, behavioural and mixed interventions demonstrated more favourable outcomes as compared to purely cognitive strategies. Factors such as intervention design, workplace setting, and target group characteristics were identified as significant determinants of the intervention success. (4) The review emphasises the imperative for additional investigations that utilise evidence-based approaches to formulate sound guidelines for efficacious nutrition interventions in occupational settings. **Conclusions:** This review functions as a foundational framework for guiding both scholarly research and the pragmatic execution of nutrition programs in the workplace.
Hyży et al. 2023.
Nutrients, vol. 15, no. 24.

Keywords: Behavioural interventions; cognitive interventions; employee well-being; organisational productivity; workplace nutrition.
Evidence Level: 1A
Link: https://www.mdpi.com/2072-6643/15/24/5072

Attitudes to interpersonal touch in the workplace in autistic and non-autistic groups.
Background: Unemployment and underemployment have consistently been shown to be higher in autistic adults relative to non-autistic adults. This may be due, in part, to a lack of workplace accommodations being made for autistic people. One factor that may contribute to employment inequalities in autistic people is differences in attitudes towards interpersonal touch. **Methods:**This study acts as a preliminary investigation into whether employed autistic and non-autistic participants differ in their attitudes towards touch in the workplace, and in their loneliness and wellbeing. The current dataset was drawn from a larger online survey (the Touch Test) designed to explore attitudes and experiences towards touch. **Results:**We found that employed autistic participants had more negative attitudes to general, social and workplace touch relative to non-autistic participants. Autistic participants also experienced greater loneliness and reduced wellbeing. Attachment-related anxiety was the only significant predictor of wellbeing in employed autistic adults. However, attachment-related anxiety, general attitudes to touch and the role of touch in the workplace predicted wellbeing in employed non-autistic adults. With regards

to loneliness, general attitudes to touch and the role of touch in the workplace predicted loneliness in autistic participants. We also replicated the finding that a greater proportion of autistic participants were unemployed relative to non-autistic participants. **Conclusions:**Collectively, this research highlights the importance of considering touch in research investigating employment, and its impact on loneliness and wellbeing, in autistic participants.
Penton et al. 2023.
Journal of Autism and Developmental Disorders, vol. 53, no. 12.

Keywords: Autism; employment; interpersonal touch; loneliness; wellbeing.
Evidence Level: 5A
Link: https://link.springer.com/article/10.1007/s10803-022-05710-z

Acceptability of workplace choice architecture modification for healthy behaviours.
Background: Altering the choice architecture of decision contexts can assist behaviour change, but the acceptability of this approach has sparked debate. Considering hypothetical interventions, people generally welcome the approach for promoting health, but little evidence exists on acceptance in the real world. Furthermore, research has yet to explore the implementers' perspective, acknowledging the multidimensionality of the acceptability construct. Addressing these knowledge gaps, this study evaluated the acceptability of a quasi-experimental implementation-effectiveness trial that modified the worksite choice architecture for healthy eating and daily physical activity. **Methods**: Fifty-three worksites participated in the 12-month intervention and implemented altogether 23 choice architecture strategies (Mdn 3/site), including point-of-choice prompts and changes to choice availability or accessibility. Retrospective acceptability evaluation built on deductive qualitative content analysis of implementer interviews (n = 65) and quantitative analysis of an employee questionnaire (n = 1124). Qualitative analysis examined implementers' thoughts and observations of the intervention and its implementation, considering six domains of the Theoretical Framework of Acceptability: ethicality, affective attitude, burden, intervention coherence, opportunity costs, and perceived effectiveness. Quantitative analysis examined employees' acceptance (7-point Likert scale) of eight specific intervention strategies using Friedman test and mixed-effects logistic regression. **Results**: Implementers considered the choice architecture approach ethical for workplace health promotion, reported mostly positive affective attitudes to and little burden because of the intervention. Intervention coherence supported acceptance through increased interest in implementation, whereas low perceived utility and high intensity of implementation reduced cost acceptance. Perceived effectiveness was mixed and varied along factors related to the implementer, social/physical work environment, employer, and employee. Employees showed overall high acceptance of evaluated strategies (Mdn 7, IQR 6.4-7), though strategies replacing unhealthy foods with healthier alternatives appeared less supported than providing information or enhancing healthy option availability or accessibility (p-values < 0.02). Greater proportion of male employees per site predicted lower overall acceptance (OR 4.4, 95% CI 1.2-16.5). **Conclusions**: Work communities appear to approve workplace choice architecture interventions for healthy eating and physical activity, but numerous factors influence acceptance and warrant consideration in future interventions. The study contributes with a theory-based, multidimensional evaluation that considered the perspectives of implementers and influenced individuals across heterogeneous real-world settings.
Rantala et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Acceptability; choice architecture; health promotion; nudge; prevention; type 2 diabetes; workplace.
Evidence Level: 5A
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17331-x

Health inequalities among young workers: The mediating role of working conditions and company characteristics.

Background: Few studies have investigated health inequalities among young workers. The objectives of this study are to assess the extent of health inequalities in a sample of job starters and to explore the contribution of job demands and organisational factors. **Methods:** We analyze data from the BIBB/BAuA Youth Employment Survey 2012. The cross-sectional survey includes a representative sample of 3214 German employees, apprentices, and trainees aged 15-24 years. Individuals were grouped by their years of schooling into low (< 12 years) and high levels of education (≥ 12 years). Regression analysis estimated the link between education and four health outcomes: self-rated health, number of health events, musculoskeletal symptoms, and mental health problems over the last 12 months. Counterfactual mediation analysis tested for indirect effects of education via working conditions (i.e., physical and psychosocial job demands) and company characteristics (i.e., company size, health prevention measures, financial situation, downsizing). All analyses were adjusted for age, sex, nationality, region, working hours, job tenure, employment relationship, and economic sector. **Results:** Highly educated workers reported better self-rated health (b = 0.24, 95% CI 0.18-0.31) and lower numbers of health events (Rate Ratio (RR) = 0.74, 95% CI 0.67-0.82), musculoskeletal symptoms (RR = 0.73, 95% CI 0.66-0.80) and mental health problems (RR = 0.84, 95% CI 0.76-0.93). Total job demands explained between 21.6% and 87.2% of the educational differences (depending on health outcome). Unfavourable company characteristics were associated with worse health, but showed no or only small mediation effects. **Conclusions:** Health inequalities are already present at the early working career due to socio-economically stratified working hazards. To enhance prevention measures that aim at reducing inequalities in workplace health, we propose shifting attention towards earlier stages of life.

Reuter et al. 2023.
International Archives of Occupational and Environmental HealthJ, vol. 96, no. 10.

Keywords: Company level; health inequalities; job demands; mediation; socio-economic position; young workers.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00420-023-02010-6

Occupational risk factors for multiple sclerosis: A systematic review with meta-analysis.

Background: We decided to conduct the first systematic review with meta-analysis to provide the highest level of up-to-date evidence on the occupational risk factors for Multiple Sclerosis. **Methods:** A systematic, comprehensive literature search was performed in four electronic academic databases. We included any case-control study that enrolled working-age subjects and compared the proportion of MS cases with controls who were not exposed to an occupational risk factor. The primary outcome was the occurrence of MS. The quality assessment was performed with the Critical Appraisal Checklist for Case Control Studies, developed, and validated by the Joanna Briggs Institute. All the selection process was also carried out by two independent and previously trained researchers. **Results:** Overall, the total sample included 19,004 people with MS and 4,164,162 controls. Agricultural workers (OR = 1.44, 95% CI 1.13-1.83), offshore workers (OR = 3.56, 95% CI 2.74-4.61), and hairdressers (OR = 8.25, 95% CI 1.02-66.52) were associated with a higher probability of being diagnosed with MS. In parallel, workers exposed to toxic fumes from oil wells (OR = 16.80, 95% CI 8.33-33.90), low-frequency magnetic fields (OR = 1.71, 95% CI 1.03-2.72), and pesticides (OR = 3.17, 95% CI = 2.53-3.99) also had an increased likelihood of having MS. **Conclusion:** Our study has the potential to influence more assertive public policies. Nevertheless, future studies on how the occupational setting may contribute to the incidence of MS are highly recommended.

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

Keywords: Demyelinating; environmental; epidemiology; etiology; multiple sclerosis; occupational; risk factors.
Evidence Level: 1A
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1285103/full

Sleeping more hours per day than working can prevent new-onset diabetes.
Background: We expressed the combined effect by the ratio of daily sleep time to daily work time. The aim of this study was to discuss the predictive ability of daily sleep hours/work hours (SH/WH) ratio for diabetes risk. **Methods**: Cox proportional hazards regression was used to calculate the hazard ratios (HRs) of new-onset diabetes. Restricted cubic spline analyses were performed to visualize the influence trend of SH/WH ratio and diabetes risk. **Results**: The RCS model revealed a non-linear and L-shaped correlation between SH/WH ratio and diabetes risk. Compared with the participates with SH/WH ratio <1, those with a ratio ≥1 had a lower risk of developing diabetes. The multivariable adjusted hazard ratios (HRs) with 95% confidence intervals (CIs) of new-onset diabetes in Q2, Q3, Q4 and Q5 groups compared with Q1 group were 0.82 (0.57, 1.19), 1.05 (0.69, 1.59), 0.57 (0.36, 0.91), 0.66 (0.42, 1.06). The Kaplan-Meier curve showed that Q4 group had lower cumulative incidence. **Conclusion**: Sleeping longer than working (SH/WH ratio ≥1) can reduce risk for developing diabetes. A minimal risk observed at 1.10-<1.37 (the fourth quintile) of SH/WH ratio.
Yu et al. 2023.
International Journal of Public Health, vol. 68.

Keywords: New-onset diabetes; prevention; sleep duration; sleep hours/work hours ratio; work hours.
Evidence Level: 4B
Link: https://www.ssph-journal.org/articles/10.3389/ijph.2023.1606634/full

Working well: Mitigating the impact of menopause in the workplace: A narrative evidence review.
Background: In recent years there has been a much greater recognition by some employers of the need to support female employees experiencing the menopause. However, despite an increased awareness of the need to reduce the impact of menopause on the workforce, employers rarely have the opportunity to implement evidence-based interventions. **Aims**: This evidence review aims to provide an insight into the effectiveness of workplace programmes supporting women experiencing menopause symptoms, and to identify knowledge gaps as drivers for future research. **Methods**: A search for papers published in English between 2012 and 2023 was carried out on the PsycINFO, Medline, and Embase databases. Abstract review was used to screen initial returns before a subsequent full-text review determined the final studies included. **Results**: Twelve studies were selected for in-depth review: four conducted in the UK, seven in continental Europe and one in South America. The findings of the papers fell into five categories: work ability, improved symptom management, mental wellbeing and empowerment, increased openness about menopause in the workplace, and the impact of management/leadership. None of the included interventions were reported to give a significant improvement in measures of work ability. However, there were improvements in women's wellbeing, and their ability to manage symptoms. Interventions to improve workplace openness and managers' skills were well received by participants. **Conclusions**: The evidence for effective workplace interventions for women experiencing menopause symptoms is currently lacking. There is considerable need for further high-quality evaluations of interventions designed to support women in the workplace.
Dennis et al. 2023.
Maturitas, vol. 177.

Keywords: Female; menopause; wellbeing; work ability; workforce; workplace.
Evidence Level: 6A
Link: https://www.maturitas.org/article/S0378-5122(23)00430-9/fulltext

Impact of health risk factors on healthcare resource utilization, work-related outcomes and health-related quality of life of Australians: A population-based longitudinal data analysis.
Background: Health risk factors, including smoking, excessive alcohol consumption, overweight, obesity, and insufficient physical activity, are major contributors to many poor health conditions. This study aimed to assess the impact of health risk factors on healthcare resource utilization, work-related outcomes and health-related quality of life (HRQoL) in Australia. **Methods:** We used two waves of the nationally representative Household, Income, and Labor Dynamics in Australia (HILDA) Survey from 2013 and 2017

for the analysis. Healthcare resource utilization included outpatient visits, hospitalisations, and prescribed medication use. Work-related outcomes were assessed through employment status and sick leave. HRQoL was assessed using the SF-6D scores. Generalized estimating equation (GEE) with logit or log link function and random-effects regression models were used to analyse the longitudinal data on the relationship between health risk factors and the outcomes. The models were adjusted for age, sex, marital status, education background, employment status, equilibrium household income, residential area, country of birth, indigenous status, and socio-economic status. **Results:** After adjusting for all other health risk factors covariates, physical inactivity had the greatest impact on healthcare resource utilization, work-related outcomes, and HRQoL. Physical inactivity increased the likelihood of outpatient visits (AOR = 1.60, 95% CI = 1.45, 1.76 $p < 0.001$), hospitalization (AOR = 1.83, 95% CI = 1.66-2.01, $p < 0.001$), and the probability of taking sick leave (AOR = 1.31, 95% CI = 1.21-1.41, $p < 0.001$), and decreased the odds of having an above population median HRQoL (AOR = 0.48, 95% CI = 0.45-0.51, $p < 0.001$) after adjusting for all other health risk factors and covariates. Obesity had the greatest impact on medication use (AOR = 2.02, 95% CI = 1.97-2.29, $p < 0.001$) after adjusting for all other health risk factors and covariates. **Conclusion:** Our study contributed to the growing body of literature on the relative impact of health risk factors for healthcare resource utilization, work-related outcomes and HRQoL. Our results suggested that public health interventions aim at improving these risk factors, particularly physical inactivity and obesity, can offer substantial benefits, not only for healthcare resource utilization but also for productivity.

Mi et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: BMI; alcohol consumption; health-related quality-of-life; healthcare resource utilization; physical inactivity; smoking; work-related outcomes.

Evidence Level: 4A

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1077793/full

Influence of sociodemographic variables and healthy habits on the values of insulin resistance indicators in 386,924 Spanish workers.

Background: Insulin resistance (IR) is an alteration of the action of insulin in cells, which do not respond adequately to this action, leading to an increase in blood glucose levels. IR produces a very diverse clinical picture and increases the cardiometabolic risk of the population that suffers from it. Among the factors that influence IR are genetics, unhealthy lifestyle habits, overweight, and obesity. The objective of this work was to determine how different sociodemographic variables and healthy habits influence the values of different scales that assess the risk of presenting IR in a group of Spanish workers. **Methods:** An observational, cross-sectional, descriptive study was carried out in 386,924 workers from different Spanish regions. Different sociodemographic variables and lifestyle habits were studied (age, social class, educational level, smoking, Mediterranean diet, physical exercise) along with their association with four scales to evaluate the risk of insulin resistance (TyG index, TyG-BMI, METS-IR, TG/HDL-c). To analyse the quantitative variables, Student's *t* test was used, while the Chi-squared test was used for the qualitative variables. A multinomial logistic regression analysis was performed, calculating the odds ratio with its 95% confidence intervals. The accepted level of statistical significance was set at $p < 0.05$. **Results:** In the multivariate analysis, all variables, except educational level, increased the risk of presenting high values on the IR risk scales, especially a sedentary lifestyle and low adherence to the Mediterranean diet. **Conclusions:** Our results demonstrate an association between the practice of regular physical exercise and a reduction in the risk of IR; a strong role of the Mediterranean diet as a protective factor for IR; an association between aging and increased IR, which has also been suggested in other studies; and, finally, a relationship between a low socioeconomic level and an increase in IR.

Mestre Font et al. 2023.

Nutrients, vol. 15, no. 24.

Keywords: Mediterranean diet; insulin resistance; physical exercise; smoking; social class.

Evidence Level: 4B

Link: https://www.mdpi.com/2072-6643/15/24/5122

COVID-19 marked a change in the scope of occupational medicine from occupational to work-related diseases and total worker health®.
Background: The COVID-19 pandemic challenged occupational medicine, while its focus had already shifted from occupational diseases to work-related illnesses. Such a broader scope allowed the inclusion of transmissible diseases among the causes for concern in working settings. COVID-19 has had a profound impact globally, resulting in millions of infections, often lethal. From its appearance, COVID-19 was found to affect specific groups of workers at higher risk of contracting the virus due to their occupation or workplace conditions, which accounts for its consideration as a potential work-related disease. **Methods:**This overview examines various aspects of COVID-19 based on articles published in our journal. Specifically, the epidemiology of COVID-19 is discussed, including mortality rates and groups at higher risk. The diagnosis, measures to prevent contagion, vaccination efforts, long-term effects, and psychosocial factors are also summarized. **Results:**The emerging picture is that COVID-19 has been a trigger accelerating the change of paradigm of occupational medicine, which is more and more concerned with prevention. **Conclusions:** Occupational Health contributes to health promotion and Total Worker Health®.
Corradi et al. 2023.
La Medicina del Lavoro, vol. 114, no. 6.

Keywords: COVID-19; occupational medicine; work-related diseases; worker health.
Evidence Level: 6A
Link: https://mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/15429

Doing what matters in times of stress: No-nonsense meditation and occupational well-being in COVID-19.
Background: While the COVID-19 pandemic challenged the general public's health and well-being, it exacerbated the pre-existing well-being issues in the educational sector in many countries. Mindfulness-based interventions are often applied to protect and promote occupational well-being. **Methods:**To investigate how the well-being benefits of these interventions arise, we selected one accessible technique that is used in most of them: focused attention meditation. In the middle of the COVID-19 pandemic, 199 teachers voluntarily practiced five to ten minutes of meditation together with their pupils, every morning for six months. We employed a three-wave longitudinal design to follow any changes in the meditating teachers' well-being and compared these changes to a waitlist control condition of 42 teachers. Three dimensions of well-being were measured at baseline, half-time, and post-intervention: emotional, cognitive, and physical well-being. **Results:**Latent growth curve models revealed that the meditation technique not only improves well-being but also prevents the development of well-being problems. The practice of focused attention meditation resulted in improvements in emotional and physical well-being and prevented the development of cognitive well-being problems that were observed within the control condition. The effects were strongest for emotional and cognitive well-being and followed a linear trend. This paper shows that the well-being effects of mindfulness-based interventions are at least in part due to the focused attention meditation that is practiced in them. **Conclusions:**Occupational groups that experience emotional, cognitive, or physical well-being issues can benefit from a few minutes of focused attention meditation per day.
Van de Velde et al. 2023.
PLoS One, vol. 18, no. 11.

Keywords: Stress; meditation; occupational well-being; COVID-19.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0292406

The effect of mild to moderate COVID-19 infection on the cardiorespiratory fitness of firefighters.
Background: An adequate level of cardiorespiratory fitness (CRF) is critical for firefighters to perform the strenuous and physiologically demanding work of firefighting safely and effectively. The coronavirus

disease 2019 (COVID-19) has been shown to negatively impact CRF in both the acute phase and longer-term following infection. This study aimed to determine changes to the CRF of firefighters pre- to post-mild to moderate COVID-19 infection and to investigate the impact of days past COVID-19 infection on change in CRF. **Methods:** CRF measures from cardiopulmonary exercise testing (CPET) at annual occupational health exams that occurred pre-COVID-19 infection in 2019 were obtained for firefighters from seven Arizona fire departments. Measures were compared to CPET evaluations from annual health exams the following year in a cohort of firefighters who self-reported mild to moderate illness following COVID-19 infection between exams. **Results:** Among a cohort of 103 firefighters, mean age 40 ± 9 years, CRF [as measured by peak oxygen consumption (VO_2)] declined by an average of 2.55 $ml \cdot kg^{-1} \cdot min^{-1}$ or 7.3% (d = -0.38, $p < 0.001$) following COVID-19 infection (mean time from COVID-19 infection to CPET was 110 ± 78 days). The number of days past COVID-19 infection showed a small, yet significant, relationship to peak VO_2 (r = 0.250, p = 0.011). Estimated marginal effects indicated that when biological sex, age, and BMI are controlled for, predicted peak VO_2 returned to pre-COVID-19 values ~300 days after COVID-19 infection. **Conclusion:** Peak VO_2 ($ml \cdot kg^{-1} \cdot min^{-1}$) declined 7.3% among firefighters an average of 110 days past reporting mild to moderate COVID-19 infection. This decrease has implications for the operational readiness and safety of firefighters.

D'Isabel et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: COVID-19; cardiopulmonary exercise testing (CPET); cardiorespiratory fitness (CRF); firefighters; firefighting.

Evidence Level: 4B

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1308605/full

Rural health care worker wellness during COVID-19: Compassion fatigue, compassion satisfaction & utilization of wellness resources.

Background: The goal of this study was to identify factors associated with compassion fatigue (CF) and compassion satisfaction (CS) among rural health care workers (HCWs) during the COVID-19 pandemic. The secondary purpose was to assess utilization of wellness resources and preferences for new resources. **Methods:** A survey was distributed (October-December 2020) and completed by faculty, clinicians and staff (n = 406) at a rural university. Measures included a modified version of the Professional Quality of Life Scale (PROQOL-21), the Patient Health Questionnaire-4 and the Brief Resilience Coping Scale. Respondents reported their use of wellness resources and their preferences for new resources. **Results:** The mean CF score was 21.1, the mean CS score was 26.8 and 42.0% screened positive for depression or anxiety. Few of the existing wellness resources were utilized and respondents' preferences for new wellness resources included time off (70.7%), onsite food trucks (43.0%) and support animals (36.5%). Younger age, depression and anxiety were associated with higher CF. Older age, better mental health and resilience were associated with higher CS. **Conclusions:** Rural HCWs have high CF, yet few utilize wellness resources. Rural health care organizations may foster wellness by providing time off for self-care, expanding mental health services and building resilience.

Bailey et al. 2023.

PLoS One, vol. 18, no. 12.

Keywords: COVID-19; compassion fatigue; compassion satisfaction; rural healthcare worker; wellness.

Evidence Level: 5B

Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295020

A deep dive into selected work sectors during the COVID-19 pandemic and the "living with COVID" phase: Understanding similarities and differences in practice, perceptions, and preparedness.

Background: When it comes to controlling workplace transmission of SARS-CoV-2, the virus that causes COVID-19, different workplaces and industrial sectors face different challenges, both in terms of likely transmission routes and which control measures can be practically, economically, and effectively implemented. This article considers a large body of research in the United Kingdom across different work

sectors and time points during the COVID-19 pandemic to better understand mitigation measures, challenges to mitigating the risk of SARS-COV-2 transmission, knowledge gaps, and barriers and enablers to control viral transmission. **Methods:** Data is drawn from 2 phases of research. Phase 1 gathered data from an interactive workshop (April 2022) where PROTECT researchers working across 8 work sectors shared knowledge and expertise from research conducted between 2020 and 2022. Phase 2 revisited 6 of these sectors to explore participants' views on the "living with COVID" phase of the pandemic (February-October 2022) through qualitative interviews. **Results:** Our findings emphasise the importance of considering the characteristics of each work sector (and their sub-sectors), relative to the physical workplace and workforce, the ways organisations operate, and how they interact with the public. Study findings show that participant's views and organisational practices changed quickly and significantly over the course of the pandemic. Most participants initially perceived that the majority of risk mitigations would remain in place for the foreseeable future. However, following the change in Government Guidance towards "living with COVID", most mitigation measures were quickly removed and it had become necessary for sectors/organisations to restore normal operations, thereby treating the COVID-19 virus like any other illness, while remaining prepared for future health emergencies that may arise. **Conclusion:** We suggest that national policy makers and organisational leaders remain mindful of the lessons learned and knowledge gained at all levels (national, regional, local, organisational, and individual) during the COVID-19 pandemic. We make recommendations in support of recovery as sectors/organisations continue "living with COVID" and other respiratory diseases; balanced with longer term planning for the next public health crisis.

Coleman et al. 2023.

Annals of Work Exposures and Health, vol. 67, no. 9.

Keywords: COVID-19; SARS-CoV-2; industry response; prevention and control; protective practices; worker behaviours; workplace transmission; workplace transmission risk.

Evidence Level: 5A

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10683848/

Work Health and Safety

This month we explore workplace health and safety issues associated with occupation-induced fatigue, workplace risks for amyotrophic lateral sclerosis, the effect of mandatory breath testing on alcohol-related crashes, the injury experience in commercial fishing, the epidemiology of work-related burn injuries and the use of cannabis and the risk of workplace injury. In construction industry-based research studies explored the factors associated with occupational injuries among building construction workers and factors affecting the non-use of safety harness at height among construction workers. In healthcare worker related research studies explored the effect of the implementation of healthcare workers support interventions after patient safety incidents, educational intervention based on health action model to promote safe behavior and the epidemiology of needlestick and sharp injuries among healthcare workers.

Occupation-induced fatigue and impacts on emergency first responders: A systematic review.

Background: Fatigue in emergency first responders (EFRs) is known to affect performance abilities and safety outcomes for both patients and EFRs. The primary aim of this review was to determine the main contributors to occupation-induced fatigue in EFRs and its subsequent impacts. **Methods:** Following the PRISMA checklist, academic databases (Medline, Embase, CINAHL, and SPORTDiscus) were searched using key terms with results subjected to inclusion and exclusion criteria. Populations of interest were firefighters, paramedics, or emergency call centre personnel. **Results:**Of the 5633 records identified, 43 studies, which reported on 186 unique measures from a total population of 6373 participants, informed the review. Synthesis revealed fatigue was caused by lack of sleep during the shift and consistent poor sleep quality which negatively impacted cognitive function, alertness, and physical and mental health while increasing safety-compromising behaviours and injuries. Both subjective and objective assessments of fatigue are necessary for effective risk management in EFRs. **Conclusions:**EFRs that are consistently

fatigued are at a greater risk of poor physical and mental health, reduced cognitive function, and increased injuries. No studies reported on fatigue in emergency call centre personnel, highlighting a literature gap. Funding was provided by the Australian Capital Territory Emergency Services Agency. Preregistration was filed in OSF: osf.io/26f3s.
Marvin et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 22.

Keywords: Fatigue; firefighters; function; injury; paramedics; safety.
Evidence Level: 1A
Link: https://www.mdpi.com/1660-4601/20/22/7055

Work-related factors and risk of amyotrophic lateral sclerosis: A multivariable Mendelian randomization study.
Background: The causal relationship between work-related factors and amyotrophic lateral sclerosis (ALS) is unclear. We used a Mendelian randomization (MR) analysis to investigate the unconfounded association between work-related factors and ALS. **Methods**: Univariable MR analyses were conducted to evaluate the causal effects of work-related factors on ALS. Instrumental variables from the UK Biobank on work-related factors (n = 263,615) were used as proxies. The outcome dataset used ALS (n case = 20,806, n control = 59,804) summary-level data from a large-scale genome-wide association study based on European ancestry. MR analysis used inverse variance weighted (IVW), MR-Egger, and weighted median (WM) to assess causal effects and other methods of MR for sensitivity analysis. Further multivariable MR analyses were performed to explore potential mediating effects. **Results**: In univariable MR, IVW methods support evidence that genetically determined job involves heavy manual or physical work (OR = 2.04, 95% CI: 1.26-3.31; p = .004) was associated with an increased risk of ALS, and the WM methods also confirm this result (OR = 2.36, 95% CI: 1.30-4.28; p = .005). No evidence of heterogeneity or horizontal pleiotropy was found in the results. In multivariable MR, the association was absent after adjusting for smoking and blood pressure. **Conclusions**: Our MR analysis results demonstrate the potential causal relationship between jobs that involve heavy manual or physical work and ALS, which might be mediated by smoking and high systolic blood pressure.
Li et al. 2023.
Brain and Behavior, vol. 13, no. 12.

Keywords: Mendelian randomization; amyotrophic lateral sclerosis; job involves heavy manual or physical work; single-nucleotide polymorphisms.
Evidence Level: 3B
Link: https://onlinelibrary.wiley.com/doi/10.1002/brb3.3317

Trend in alcohol-related crashes before and after the introduction of mandatory breath testing among commercial truck drivers.
Background: Since 2011, commercial truck drivers have been required to take alcohol breath tests at the beginning and end of their working hours due to their employers' legal obligations. However, non-commercial truck drivers are not required to do so. We examined whether alcohol-related crashes had decreased after 2011 among commercial truck drivers. **Methods:** Using police data, we conducted a joinpoint regression analysis to examine the trend in the proportion of alcohol-related crashes from 1995 through 2020 caused by commercial truck drivers (who were subjected to alcohol breath testing) and non-commercial truck drivers (who were not subjected to testing). The annual percentage change in this trend was also estimated. **Results:** During the 26-year study period, truck drivers caused 1,846,321 at-fault crashes, and 0.4% of the crashes involved intoxicated driving. A significant decreasing trend in the proportion of alcohol-related crashes was identified among both commercial and non-commercial truck drivers in the 2000s, during which several legal amendments were made against drunk driving. The annual percentage change was -13.5% from 2001 to 2012 among commercial truck drivers, and -14.9% from 2001 to 2011 among non-commercial truck drivers. No decreasing trend was observed afterwards, despite the introduction of mandatory alcohol breath testing in 2011. **Conclusion:** The effect of

mandatory alcohol breath testing on reducing alcohol-related crashes among commercial truck drivers was not evident.
Ichikawa et al. 2023.
Journal of Epidemiology, vol. 33, no. 11.

Keywords: Commercial driver; drunk driving; motor vehicle collision; prevention.
Evidence Level: 4A
Link: https://pubmed.ncbi.nlm.nih.gov/35965065/

Relationship of personal, situational, and environmental factors to injury experience in commercial fishing.
Introduction: Commercial fishing work involves a variety of activities and is hazardous. While much is understood to mitigate fatalities in this industry, research must further explore nonfatal injury characteristics, factors related to injury, and potential injury prevention strategies. This paper determines if fishing experience is associated with injury risk and explores common work activities associated with injury. **Method:** Key informant interviews and a survey of fishermen were conducted to refine work activity codes and collect injury experiences. Independent sample t-tests compared the means of the years fishing by injury incident for all crab fishermen then stratified by position. Descriptive statistics explored the nature of injury in relation to work activity. **Results:** The level of experience was significantly lower for injured fishermen compared to fishermen who reported no injuries, but when stratified by position at the time of the injury, the association of injury to experience was only significant for owners. This stratified result demonstrates that the work activity, rather than experience, drives the apparent relationship of experience to injury. Being tired (24%) and weather (26%) were indicated as contributing factors at the time of injury. **Conclusion:** Modifying the work environment to better control hazards would benefit all fishermen, regardless of their experience, age, or position. Further work into effective interventions that fishermen would adopt is needed to reduce injury risk. Any formal or informal training of new fishermen should focus on the most hazardous activities, but more experienced fishermen would also benefit. Additionally, effective training or interventions for fatigue management, and decision support tools for weather- and navigation-related decisions would further reduce risk of at sea injuries. Practical applications: Injury prevention training, for all fishermen, regardless of their position and years of experience, should cover the most hazardous tasks, fatigue risk management strategies, and weather decisions.
Kincl et al. 2023.
Journal of Safety Research, vol. 87.

Keywords: Crew experience; crew position; fishermen; injury prevention; work processes.
Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S0022437523001111?via%3Dihub

Prevalence and factors associated with occupational injuries among building construction workers in the Gambia.
Background: Although occupational injuries among building construction workers are a major public health concern, limited studies have focused on the prevalence and factors associated with injuries among building construction workers in sub-Saharan Africa. Accordingly, this study investigates the prevalence and factors associated with occupational injuries among building construction workers in the Gambia. **Method:** Using a cross-sectional design, 504 building construction workers with more than 12 months of work experience in the construction industry and aged ≥18 years were recruited from 22 registered companies in the Kanifing Municipality of the Gambia. Data were collected using a structured questionnaire and an observational checklist. **Results:** More than 56% of the building construction workers reported sustaining work-related injuries in the past 12 months. Majority of injuries reported were abrasions/lacerations (28.2%), followed by cuts (26.6%), backaches (23.8%) and piercing/punctured wounds (22.8%). Results of the multivariate logistic regression analysis showed that being male worker (adjusted OR (aOR), 3.06; 95% CI 1.31 to 7.19), had <8 hours of work daily (aOR 3.46, 95% CI 1.44 to 7.78),

smoke tobacco (aOR 1.97; 95% CI 1.36 to 2.85) and consume alcohol (aOR 0.27; 95% CI 0.08 to 0.95) were significantly associated with injuries from building construction work. **Conclusion:** Our findings show that injuries among building construction workers are prevalent in the Gambia. Male gender, work hours, tobacco use and alcohol consumption were associated with occupational injuries in building construction. Introducing and enforcing workplace safety policies in the building construction industry may help reduce occupational injury among construction workers in the Gambia.
Kinteh et al. 2023.
Injury Prevention, vol. 29, no. 6.

Keywords: Multiple injury; occupational injury; public health.
Evidence Level: 4B
Link: https://injuryprevention.bmj.com/content/29/6/500.long

Key factors for effective implementation of healthcare workers support interventions after patient safety incidents in health organisations: A scoping review.
Background: This study aims to map and frame the main factors present in support interventions successfully implemented in health organisations in order to provide timely and adequate response to healthcare workers (HCWs) after patient safety incidents (PSIs). **Methods:** Design: Scoping review guided by the six-stage approach proposed by Arksey and O'Malley and by PRISMA-ScR. Data sources: CINAHL, Cochrane Library, Embase, Epistemonikos, PsycINFO, PubMed, SciELO Citation Index, Scopus, Web of Science Core Collection, reference lists of the eligible articles, websites and a consultation group. Eligibility criteria for selecting studies: Empirical studies (original articles) were prioritised. We used the Mixed Methods Appraisal Tool Version 2018 to conduct a quality assessment of the eligible studies. Data extraction and synthesis: A total of 9766 records were retrieved (last update in November 2022). We assessed 156 articles for eligibility in the full-text screening. Of these, 29 articles met the eligibility criteria. The articles were independently screened by two authors. In the case of disagreement, a third author was involved. The collected data were organised according to the Organisational factors, People, Environment, Recommendations from other Audies, Attributes of the support interventions. We used EndNote to import articles from the databases and Rayyan to support the screening of titles and abstracts. **Results:** The existence of an organisational culture based on principles of trust and non-judgement, multidisciplinary action, leadership engagement and strong dissemination of the support programmes' were crucial factors for their effective implementation. Training should be provided for peer supporters and leaders to facilitate the response to HCWs' needs. Regular communication among the implementation team, allocation of protected time, funding and continuous monitoring are useful elements to the sustainability of the programmes. **Conclusion:** HCWs' well-being depends on an adequate implementation of a complex group of interrelated factors to support them after PSIs.
Guerra-Paiva et al. 2023.
BMJ Open, vol. 13, no. 12.

Keywords: Health services administration and management; health and safety; public health; quality in health care.
Evidence Level: 6A
Link: https://bmjopen.bmj.com/content/13/12/e078118.long

Educational intervention based on health action model to promote safe behavior of hospital service workers.
Background: Hospitals are considered to be one of the most hazardous environments to work in, and their service workers are exposed to many serious risks. So The purpose of this study was to investigate the effect of educational intervention based on the Health Action Model to promote the safe behavior of hospital service workers. **Methods:** In this quasi-experimental study, 45 workers in each of the control and experimental groups participated. Demographic information and data related to Health Action Model constructs were collected through a questionnaire and a checklist, immediately and three months after

the intervention. Cronbach's alpha coefficients were used to confirm the properties of the tools. Educational intervention accompanied was applied in the form of four training classes. The data were analyzed using SPSS 20 software. **Results:** Before the intervention, there was no significant difference between the two groups in terms of demographics and the study's main variables. results showed significant changes in mean scores of safe behavior, Attitude, norms, belief, intention, knowledge in the experimental group three months after the intervention ($P < 0.001$). **Conclusions:** The research results show that Health Action Model educational intervention can change workers' awareness, attitudes, norms, beliefs, and intentions toward unsafe behavior and improve their safety performance.
Mohammadi et al. 2023.
BMC Health Services Research, vol. 23, no. 1.

Keywords: Health action model; health education; health promotion; healthy behavior; hospital personnel.
Evidence Level: 3B
Link: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-023-10267-3

A large-scale survey on epidemiology and underreporting of needlestick and sharp injuries among healthcare workers in China.
Background: Needlestick and sharp injuries (NSI) carry the risk of transmitting numerous bloodborne pathogens, leading to both health and economic burdens. The underreporting of NSIs among healthcare workers (HCWs) is a global issue of concern, as timely treatment and prevention of complications rely on proper reporting. Underreporting further impedes accurate surveillance and appropriate resource allocation, with developed and developing nations facing disparities due to differences in healthcare policy. Purpose: The purpose of this research is to examine the epidemiology of NSIs and NSI underreporting, as well as to identify the determinants associated with the occurrence of NSIs and the underreporting of such injuries. **Method:** A retrospective online survey was conducted from January 15 to January 31, 2022 among healthcare workers (HCWs) across Gansu Province, China. **Results:** A total of 7,283 healthcare workers (HCWs) from various institutions participated in this study. After quality assurance checks, 6,464 (88.77%) responses were included in the final analysis. Results revealed a 32.86% self-reported needlestick and sharp injury (NSI) incidence among respondents, with 28.53% of NSIs going unreported. Contrary to common belief, more experienced HCWs exhibited higher rates of both NSIs and underreporting compared to their less experienced peers. The primary reasons cited for NSIs and underreporting were lapses in concentration and not perceiving patients as infectious. Multivariate regression analysis exposes the significant influence of training frequency, occupation, department and years of services on the occurrence of NSIs. Conversely, the reporting of NSIs is primarily influenced by training, reimbursement, occupation, department and hospital grade. Compared to HCWs with no training, those who received ≥3 training sessions per year showed a 12.16% lower NSI incidence (27.12% vs. 39.28%, $p < 0.001$) and a 55.68% lower underreporting rate (14.61% vs. 70.29%, $p < 0.001$).
Conclusion: There is a pressing need for enhanced surveillance, tailored training programs, and more efficient reporting mechanisms to combat this significant occupational health challenge.
Tonghui et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: China; health care workers (HCWs); needlestick and sharp injuries; training; underreporting.
Evidence Level: 4B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1292906/full

Identification and classification of factors affecting the non-use of safety harness at height among construction workers in Tehran.
Background: The accident of falling from a height is high among construction workers. Construction workers do not use harnesses. Thus, the present study was conducted to identify the factors affecting the non-use of harnesses among construction workers in Tehran, Iran. **Methods:** In this study was conducted by interviewing professors and construction workers in order to identify factors affecting the non-use of

harness. Factors influencing the non-use of safety harnesses were identified from the workers' point of view. The obtained data were classified and coded using MAXQDA 10 software. After that, the most essential, effective and powerful factors were identified using the degree and intersectionality of social network analysis. **Results:** According to the interview results, 27 factors were determined as factors affecting the non-use of harnesses by construction workers and divided into four main groups. The four groups were harness design, management factors, harness comfort, and attitudinal factors. Based on the results of the degree centrality, the non-ergonomic design and attitude of the harness inefficiency were identified as the most influential and powerful factors. The betweenness indicator also showed that the non-ergonomic design could mediate other factors in the non-use of the harness.
Conclusion: The findings showed that by considering various factors such as considering more comfort in the design of the ergonomic harness, it produced a better product. Also, the use of safety harnesses by workers increases.
Sepehr et al. 2023.
PLoS One, vol. 18, no. 11.
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Keywords: Safety harness; construction; Tehran.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0287906

Epidemiology of work-related burn injuries: A ten-year retrospective study of 429 patients at a referral burn centre in the north of Iran.
Background: Work-related burns can have a destructive impact; however, knowledge of the epidemiology of work-related burn injuries in Iran is limited. This study aimed to describe epidemiological characteristics of work-related burn injuries in a burn centre in the north of Iran. **Methods:** This study was a retrospective single-centre study of the medical records of work-related burns between 2011 and 2020. Data collection was done using the hospital information system (HIS). The data were analysed by using descriptive statistical methods and SPSS 24.0 software. Of the 9220 cases treated in the burn centre, 429 (4.65%) had work-related burns. **Results:** There was an increasing trend of work-related burns during the ten years. The mean age of patients was 37.53 (SD = 13.72). Most patients were male (n = 377, 87.9%), with a male-to-female ratio of 7.25/1. The mean total body surface area burn was 23.39% (SD = 20.03). Most work-related burns occurred in the summer season (46.9%, n = 201), and the upper limb was the most common anatomical site of burns (n = 123, 28.7%). The most common mechanism of injury was fire & flames (266, 62.0%). Inhalation injury was observed in 52 (12.1%) patients, and mechanical ventilation was undertaken in 71 (16.6%) patients. The mean length of stay in the hospital was 10.38 (SD = 10.37) days, and the overall mortality rate was 11.2%. The most common activities associated with burns at the time of the incidents were food preparation and serving related (108, 25.2%), followed by welders (n = 71, 16.6%) and electricians (n = 61, 14.2%). **Conclusions:** This research is the basis for evaluating work-related burns and identifying the causes of these injuries to develop education and prevention programmes, especially for young male workers.
Bagheri Toolaroud et al. 2023.
International Wound Journal, vol. 20, no. 9.
User License: *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) (https://creativecommons.org/licenses/by-nc-nd/4.0/)*
Keywords: Burns; epidemiology; occupational injuries; retrospective studies.
Evidence Level: 4B
Link: https://onlinelibrary.wiley.com/doi/10.1111/iwj.14238

Workplace and non-workplace cannabis use and the risk of workplace injury: Findings from a longitudinal study of Canadian workers.
Background: Findings of previous studies examining the relationship between cannabis use and workplace injury have been conflicting, likely due to methodological shortcomings, including cross-sectional designs and exposure measures that lack consideration for timing of use. The objective was to estimate the association between workplace cannabis use (before and/or at work) and non-workplace use

and the risk of workplace injury. **Methods**: Canadian workers participating in a yearly longitudinal study (from 2018 to 2020) with at least two adjacent years of survey data comprised the analytic sample (n = 2745). The exposure was past-year workplace cannabis use (no past-year use, non-workplace use, workplace use). The outcome was past-year workplace injury (yes/no). Absolute risks and relative risks (RR) with 95% confidence intervals (CIs) were estimated between workplace and non-workplace cannabis use at one time point and workplace injury at the following time point. Models were adjusted for personal and work variables and were also stratified by whether respondents' jobs were safety-sensitive. **Results**: Compared to no past-year cannabis use, there was no difference in workplace injury risk for non-workplace cannabis use (RR 1.09, 95%CI 0.83-1.44). However, workplace use was associated with an almost two-fold increased risk of experiencing a workplace injury (RR 1.97, 95%CI 1.32-2.93). Findings were similar for workers in safety-sensitive and non-safety-sensitive work. **Conclusion**: It is important to distinguish between non-workplace and workplace use when considering workplace safety impacts of cannabis use. Findings have implications for workplace cannabis use policies and substantiate the need for worker education on the risks of workplace cannabis use.
Carnide et al. 2023.
Canadian Journal of Public Health, vol. 114, no. 6.

Keywords: Accidents, occupational; cannabis; humans; longitudinal studies; occupational groups; occupational injuries; workplace.
Evidence Level: 4B
Link: https://link.springer.com/article/10.17269/s41997-023-00795-0

Risk Assessment

Key factors in crane-related occupational accidents in the Spanish construction industry (2012-2021)
Background: The construction industry is one of the riskiest sectors worldwide, with crane operations being one of the most dangerous activities. The aim of this study was to gain insight into the key factors involved in crane-related occupational accidents in the construction industry in Spain. **Methods:** To this end, 1314 accidents involving cranes were analyzed from a total of 241,937 accidents that occurred in the construction of buildings. The data were collected from the Spanish government's occupational accident statistics corresponding to the years 2012-2021. **Results:**The results evidenced a statistically significant relationship between cranes as the material agent and the size of the company, with 95% of cases corresponding to small- or medium-sized companies (less than 250 employees). Additionally, it shows how the crane operator is identified as a material contributor to crane accidents in the construction industry, and may be considered a key component to these accidents. **Conclusions:**In conclusion, improving the knowledge gained about the key factors in crane-related accidents at work in the construction industry provides essential information that helps to design and implement appropriate preventive measures to avoid the recurrence of unwanted events with these machines.
Herrera-Pérez et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 22.

Keywords: Accident statistics; construction of buildings; crane; material agent; occupational accident; safety.
Evidence Level: 4B
Link: https://www.mdpi.com/1660-4601/20/22/7080

Ergonomics

This month we explore ergonomic issues associated with movement phenotypes from occupational gesture kinematics and the predictive factors of ergonomic behaviors based on social cognitive theory.

Identification of movement phenotypes from occupational gesture kinematics: Advancing individual ergonomic exposure classification and personalized training.

Background: The identification of personalized preventive strategies plays a major role in contrasting the occurrence of work-related musculoskeletal disorders. This requires the identification of distinct movement patterns within large samples and the attribution of a proper risk level to each identified movement phenotype. **Methods:**We assessed the feasibility of this approach by exploiting wearable inertial measurement units to estimate the whole-body kinematics of 43 healthy participants performing 18 reach-to-manipulate movements, which differed based on the object's position in the space and the type of manipulation required. **Results:** Through unsupervised clustering, we identified multiple movement phenotypes graded by ergonomic performance. Furthermore, we determined which joints mostly contributed to instantiating the ergonomic differences across clusters, emphasizing the importance of monitoring this aspect during occupational gestures. **Conclusions:** Overall, our analysis suggests that movement phenotypes can be identified within occupational motor repertoires. Assigning individual performance to specific phenotypes has the potential to inform the development of more effective and tailored interventions.

Scalona et al. 2023.
Applied Ergonomics, vol. 115.

Keywords: Ergonomics assessment; movement phenotypes; wearable technologies.
Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S000368702300220X?via%3Dihub

Predictive factors of ergonomic behaviors based on social cognitive theory among women workers on assembly lines: Application of Bayesian networks.

Background: This study focuses on identifying the key factors associated with ergonomic behaviors (ERBE) among women workers on assembly lines (WwAL) to prevent musculoskeletal disorders (MSDs) caused by repetitive motions and unfavorable body postures. To achieve this objective, this study employed Bayesian networks (BN) analysis based on social cognitive theory (SCT). **Methods:** A cross-sectional study was conducted to examine the predictive factors of ERBE among 250 WwAL from six different industries located in Neyshabur, a city in northeastern Iran. The study used a two-stage cluster sampling method for participant selection and self-report questionnaires to collect data on demographic characteristics, variables associated with SCT, ERBE, and the standard Nordic questionnaire. The collected data were analyzed using Netica and SPSS version 21, which involved statistical analyses such as independent t-tests, Pearson correlation, and ANOVA tests at a significance level of $p < 0.05$. BN analysis was conducted to identify the important factors that impact ERBE. **Results:** The majority of individuals reported experiencing chronic pain in their back, neck, and shoulder areas. Engaging in physical activity, consuming dairy products, and attaining a higher level of education were found to be significantly associated with the adoption of ERBE $p < 0.05$. Among the various SCT constructs, observational learning, intention, and social support demonstrated the highest levels of sensitivity towards ERBE, with scores of 4.08, 3.82, and 3.57, respectively. However, it is worth noting that all SCT constructs exhibited a certain degree of sensitivity towards ERBE. **Conclusions:** The research findings demonstrate that all constructs within SCT are effective in identifying factors associated with ERBE among WwAL. The study also highlights the importance of considering education levels and variables related to healthy lifestyles when promoting ERBE in this specific population.

Hosseini et al. 2023.
BMC Musculoskeletal Disorders, vol. 24, no. 1.

Keywords: Assembly line workers; bayesian networks; ergonomic behaviors; social cognitive theory.
Evidence Level: 4B
Link: https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-023-07021-5

Chronic Health Issues

This month we explore chronic health issues associated with working sustainably with ADHD or autism, work-related asthma, metabolic syndrome and risk of premature employment exit, occupational outcomes of people with multiple sclerosis, dissatisfaction with performing work-related knee-straining activities after total knee arthroplasty, prevention of cognitive function decline in patients with hypertension and prevalence of coronary heart disease and workplace risk factors. In other research we explore the impact of malnutrition on returning to work after treatment for head and neck cancer, impairment of vocational activities and financial problems among blood cancer survivors and the effect of Brugada syndrome on job fitness.

'It's like it is designed to keep me stressed': Working sustainably with ADHD or autism.
Background: Adults with attention deficit/hyperactivity disorder (ADHD) or autism spectrum disorder (ASD) face multiple challenges in obtaining and maintaining employment. **Aims:** To identify and describe how adults with ADHD or ASD experienced their ability to work and what factors affected their ability to find a sustainable work situation over time. **Methods:** Individual in-depth interviews were performed with 20 purposively sampled participants with ADHD/ASD. Data were analysed inductively using reflexive thematic analysis. **Results:** Three themes were identified, describing (1) one's own cognitive abilities and challenges, (2) enablement by flexibility and acceptance in the work environment, and (3) accumulated stress that makes the work situation unsustainable over time. **Conclusions:** Over time, a lack of continuity and predictability of support measures caused great stress and exhaustion, with severe consequences for working life and in life in general. Adaptations needed to be individually tailored and include nonoccupational factors. Significance: The study shows that adults with ADHD/ASD need long-term interventions that flexibly adapt to individual needs, as they vary over time. The findings suggest that occupational therapists and other health care providers, employers, employment services and other involved agencies should pay a greater deal of attention to stability and predictability over time.
Högstedt et al. 2023.
Scandinavian Journal of Occupational Therapy, vol. 30, no. 8.

Keywords: Attention deficit/hyperactivity disorder; autism spectrum disorder; employment; qualitative research; thematic analysis; vocational rehabilitation.
Evidence Level: 5B
Link: https://www.tandfonline.com/doi/full/10.1080/11038128.2022.2143420

Disposition of work-related asthma in a Spanish asthma cohort: Comparison of asthma severity between employed and retired workers.
Background: Exposure to certain agents in the workplace can trigger occupational asthma or work-exacerbated asthma, both of which come under the heading of work-related asthma (WRA). Understanding the burden that WRA represents can help in the management of these patients. **Aim:** To assess the influence of occupation on asthma in real life and analyze the characteristics of patients with WRA included in an asthma cohort. **Methods:** This was a prospective multicenter study of a cohort of consecutive patients with asthma. A standardized clinical history was completed. Patients were classified as having WRA or non-WRA. All patients underwent respiratory function tests, FeNO test, and methacholine challenge (methacholine concentration that causes a 20% drop in FEV_1) at the beginning of the study. They were classified into two groups, depending on their employment status: employed (group 1) or unemployed (group 2). **Results:** Of the 480 patients included in the cohort, 82 (17%) received the diagnosis of WRA. Fifty-seven patients (70%) were still working. Mean age (SD) was 46 (10.69) years in group 1 and 57 (9.91) years in group 2 ($P < .0001$). Significant differences were observed in adherence to treatment (64.9% in group 1 vs 88% in group 2; $P = .0354$) and in severe asthma exacerbations (35.7% in

group 1 vs 0% in group 2; P = .0172). No significant differences were observed in the rest of the variables analyzed. **Conclusions:** The burden of WRA in specialized asthma units is not negligible. The absence of differences in the severity of asthma, the treatment administered, alterations in lung function, and the number of exacerbations in those working versus not working may support the idea that advice regarding changing jobs should be customized for individual patients.
Romero-Mesones et al. 2023.
The Journal of Allergy and Clinical Immunology, vol. 11, no. 11.

Keywords: Exacerbation; occupational asthma; work-exacerbated asthma.
Evidence Level: 4B
Link: https://linkinghub.elsevier.com/retrieve/pii/S2213-2198(23)00706-7

Metabolic syndrome increases the risk for premature employment exit: A longitudinal study among 60 427 middle-aged and older workers from the Lifelines Cohort Study and Biobank.
Background: This study aimed to examine whether (i) metabolic syndrome (MetS) increases the risk for premature employment exit and (ii) a dose-response relationship exists between an increasing number of MetS components and premature employment exit among middle-aged and older workers. **Methods:** A sample of N=60 427 Dutch workers (40-64 years old) from the Lifelines Cohort Study and Biobank were examined using data from five measurement waves during a total median follow-up time of 4.2 years. MetS components were based on physical measures, blood markers, and medication use. Premature employment exit types (ie, unemployment, work disability, and early retirement) were determined using questionnaires. MetS and number of MetS components were examined as risk factors for premature employment exit using competing risk regression analysis. **Results:** MetS significantly increased the risk for work disability [adjusted sub distribution hazard ratio (SHR) 1.78, 95% confidence interval (CI) 1.54-2.05] and unemployment (adjusted SHR 1.16, 95% CI 1.06-1.26). A clear dose-response relationship was found for an increasing number of MetS components and work disability. No associations were found between MetS (components) and early retirement after adjusting for sociodemographic factors. **Conclusions:** MetS was identified as a modifiable early-stage cardio-metabolic risk factor especially for work disability and, to a lesser extent, for unemployment. Further, a clear dose-response relationship was found between an increasing number of MetS components and work disability. MetS interventions and prevention might help to prolong working lives. More awareness is needed among employers and occupational health professionals about the premature employment exit risk faced by middle-aged and older workers with MetS.
Runge et al. 2023.
Scandinavian Journal of Work, Environment and Health, vol. 49, no. 8.

Keywords: Metabolic syndrome; premature employment; middle-aged.
Evidence Level: 4B
Link: https://www.sjweh.fi/article/4113

Occupational outcomes of people with multiple sclerosis during the COVID-19 pandemic: A systematic review with meta-analysis.
Background: People with Multiple Sclerosis (PwMS) are vulnerable to unfavorable occupational outcomes and the COVID-19 pandemic brought major consequences on people's professional lives. In this view, we decided to investigate the occupational outcomes of PwMS during the COVID-19 pandemic. **Methods:** We performed a systematic review with meta-analysis searching key terms in four databases. We initially included any peer-reviewed original article that enrolled adult patients with the diagnosis of MS and assessed any occupational variable during the COVID-19 pandemic. There were no time limits and no language restrictions. The primary outcomes were the prevalence of unemployment, retirement and employment status change among people with MS during the COVID-19 pandemic. Other outcomes included the modality and characteristics of work: type of work, full-time work, part-time work and remote work. We also searched for data from studies that addressed any change in the work status due

to the COVID-19 outbreak. **Results:** We identified 49 eligible articles comprising a total sample size of 17,364 individuals with MS. The pooled prevalence of unemployment and retirement was 0.47 (95% CI = 0.42-0.53). The pooled prevalence of PwMS who were unemployed or retired was positively associated with the progressive phenotype of the disease (p = 0.017) and the use of glatiramer acetate (p = 0.004), but negatively associated with hospitalization due to COVID-19 (p = 0.008) and the use of immunosuppressants (p = 0.032), siponimod (p < 0.001), and cladribine (p = 0.021). The pooled proportion of PwMS that reported any change of the employment status during the COVID-19 pandemic was 0.43 (95% CI = 0.36-0.50) while the pooled prevalence of PwMS who worked remotely during this period was 0.37 (95% CI = 0.15-0.58). The change in employment status was negatively associated with the duration of MS (p = 0.03) but positively associated with the progressive phenotype of the disease (p < 0.001). **Conclusion:** Our seminal review may serve as an example of how patients with neurological diseases or disabilities in general may have their jobs impacted in a pandemic and foster the context of global socio-economic crisis.

Vitturi et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: COVID-19; demyelinating diseases; immunomodulators; multiple sclerosis; occupational health; public health; unemployment; work.

Evidence Level: 1A

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1217843/full

Only low patients' expectations are prognostic for dissatisfaction with performing work-related knee-straining activities after total knee arthroplasty: A prospective multicenter cohort study.

Background: To investigate whether preoperative expectations regarding performing work-related knee-straining activities were associated with being dissatisfied 6 months after total knee arthroplasty (TKA) among working patients, and, to identify prognostic factors for being dissatisfied with performing these work-related knee-straining activities. Methods: Design: Multicenter prospective cohort study. Setting: Orthopedic surgery departments of 7 hospitals in the Netherlands. Participants: A consecutive sample of 175 working patients who were on the waiting list for TKA (median age 59 years, 53% women) and intended to return to work (N=175). Interventions: Not applicable. Main outcome measure(s): Dissatisfaction with performing work-related knee-straining activities 6 months postoperative was measured using the Work Osteoarthritis or joint-Replacement Questionnaire (score range 0-100). The clinically relevant cut-off points for being satisfied and dissatisfied were ≥71 and ≤50, respectively. **Results:** Thirty-three patients (19%) were dissatisfied with performing work-related knee-straining activities 6 months after TKA. Patients who expected to be dissatisfied preoperative had a 5.1 times higher odds (95% CI 1.7-15.5) of being dissatisfied 6 months postoperatively compared with patients who expected to be satisfied preoperative. Regression analyses revealed that only patients' expectations were prognostic for being dissatisfied 6 months postoperatively rather than age, pain level, or having a knee-straining job. **Conclusions:** Two in 10 working patients are dissatisfied with performing work-related knee-straining activities 6 months after TKA. Only preoperative patients' expectations appeared prognostic. Therefore, we should better prepare working patients with low expectations by managing their preoperative expectations and improving their performance of work-related knee-straining activities in rehabilitation.

van Zaanen et al. 2023.

Archives of Physical Medicine and Rehabilitation, vol. 104, no. 12.

Keywords: Arthroplasty; knee; motivation; patient reported outcome measure; patient satisfaction; rehabilitation; replacement.

Evidence Level: 4B

Link: https://www.archives-pmr.org/article/S0003-9993(23)00337-4/fulltext

Physical activity, sleep disorders, and type of work in the prevention of cognitive function decline in patients with hypertension.

Background: Hypertensive patients are likelier to have cognitive function decline (CFD). This study aimed to explore physical activity level, sleep disorders, and type of work that influenced intervention effects on cognitive function decline in hypertensive patients and to establish a decision tree model to analyze their predictive significance on the incidence of CFD in hypertensive patients. **Methods:** This cross-sectional study recruited patients with essential hypertension from several hospitals in Shandong Province from May 2022 to December 2022. Subject exclusion criteria included individuals diagnosed with congestive heart failure, valvular heart disease, cardiac surgery, hepatic and renal dysfunction, and malignancy. Recruitment is through multiple channels such as hospital medical and surgical outpatient clinics, wards, and health examination centers. Cognitive function was assessed using the Mini-Mental State Examination (MMSE), and sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Moreover, we obtained information on the patients' type of work through a questionnaire and their level of physical activity through the International Physical Activity Questionnaire (IPAQ). **Results:** The logistic regression analysis results indicate that sleep disorder is a significant risk factor for CFD in hypertension patients(OR:1.85, 95%CI:[1.16,2.94]), mental workers(OR:0.12, 95%CI: [0.04,0.37]) and those who perform both manual and mental workers(OR: 0.5, 95%CI: [0.29,0.86]) exhibit protective effects against CFD. Compared to low-intensity, moderate physical activity(OR: 0.53, 95%CI: [0.32,0.87]) and high-intensity physical activity(OR: 0.26, 95%CI: [0.12,0.58]) protects against CFD in hypertension patients. The importance of predictors in the decision tree model was ranked as follows: physical activity level (54%), type of work (27%), and sleep disorders (19%). The area under the ROC curves the decision tree model predicted was 0.72 [95% CI: 0.68 to 0.76]. **Conclusion:** Moderate and high-intensity physical activity may reduce the risk of developing CFD in hypertensive patients. Sleep disorders is a risk factor for CFD in hypertensive patients. Hypertensive patients who engage in mental work and high-intensity physical activity effectively mitigate the onset of CFD in hypertensive patients.

Zhang et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Cognitive function decline; hypertension; physical activity; sleep disorders; type of work.
Evidence Level: 4B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17343-7

Prevalence of coronary heart disease and its risk factors by working environment among Japanese male workers.

Background: Work is a major social determinant of health. We conducted a cross-sectional study to explore the association between coronary heart disease (CHD), its risk factors, and the working environment among Japanese male workers. **Methods:** We collected data from 10,572 workers (mean age 49.9 yr) who underwent annual medical check-ups in Toyama, Japan, in 2016. This study included data from health check-ups and questionnaires on medical history of CHD, hypertension, and diabetes, and the use of medication. The working environment included company size and industry categories. Company size was classified into 4 categories according to the number of full-time workers (1-20, 21-100, 101-300, 301-). The industry category was classified into 10 categories. Logistic regression analysis was performed to explore the association. In total, 1.5% of patients had a history of CHD and 31.5% and 11.0% of participants were suffering from hypertension and diabetes, respectively. **Results:**Compared to workers in a large company, those in a smaller company were more likely to have CHD. Moreover, there was a significant association between CHD's risk factors and working in the transportation industry. **Conclusions:**Health providers, including medical doctors, should consider employee working environment as a potential risk factor for CHD.

Yamada et al. 2023.
Industrial Health, vol. 61, no. 6.

Keywords: Cardiovascular; company size; coronary heart disease; diabetes; hypertension; industry category.
Evidence Level: 4B
Link: https://www.jstage.jst.go.jp/article/indhealth/61/6/61_2022-0149/_article

Mapping the impact of malnutrition as defined by the Global Leadership Initiative on Malnutrition and nutrition impact symptoms on the possibility of returning to work after treatment for head and neck cancer.
Background: This study aimed to investigate whether malnutrition or nutrition impact symptoms (NIS) affect the possibility of returning to work after treatment for head and neck cancer. **Methods:** Patients of working age with head and neck cancer were followed up from treatment initiation to 3 months (n = 238), 1 year (n = 182), and 2 years (n = 130) after treatment completion. The observed decrease in the number of patients over time was due to retirement, lack of follow-up, or death. Returning to work was dichotomised as yes or no. Malnutrition was diagnosed 7 weeks after treatment initiation using the Global Leadership Initiative on Malnutrition (GLIM) criteria. This time-point corresponds to the end of chemoradiotherapy or radiotherapy (with or without prior surgery), except for patients who underwent exclusive surgery. NIS were scored on a Likert scale (1-5) at each follow-up using the Head and Neck Patient Symptom Checklist© (HNSC©). Nonparametric tests were used to analyse the ability of patients with/without malnutrition and high/low NIS scores to return to work. **Results:** At 3 months, 1 year, and 2 years after treatment completion, 135/238 (56.7%), 49/182 (26.9%), and 23/130 (17.7%) patients had not returned to work. Patients with malnutrition at 7 weeks after treatment initiation were more likely to not return to work at 3 months than those without malnutrition, 70.5% compared to 47.1% ($p < 0.001$). At all three follow-up time-points, patients reporting high scores for a number of NIS had more often not returned to work, with this pattern being most distinct at 2 years. **Conclusion:** Malnutrition according to the GLIM criteria at 7 weeks after treatment initiation and NIS assessed by the HNSC© at subsequent follow-ups were predictors of the return-to-work process after treatment for up to 2 years.
Einarsson et al. 2023.
Supportive Care in Cancer, vol. 32, no. 1.

Keywords: GLIM; Head neck cancer; nutrition impact symptoms; return to work.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00520-023-08252-x

Impairment of vocational activities and financial problems are frequent among German blood cancer survivors.
Background: Little is known about changes in the personal living conditions of long-term blood cancer survivors in Germany. **Methods:** To gather information about social relationships, work life, overall well-being, and religion, we performed a questionnaire-based retrospective study on 1551 survivors who had been on follow-up for ≥ 3 years (median, 9 years). **Results:** Most survivors reported that marital status and relationships with relatives and friends remained constant before and after blood cancer. Vocational activities were temporarily impaired for 47.5%, with a median time of 11 months to return to work. More than a third of the patients (35.6%) discontinued work permanently, with disability and retirement pension rates of 7.9% and 38.1%, respectively, at the time of the survey. Financial problems due to reduced income were reported by 26.2%, in particular after relapse or allogeneic transplantation. Patient reports addressing their quality of life showed large variations. It was best in acute leukemia survivors without a history of allogeneic transplantation and worst in patients with myeloproliferative disorders. Religion tended to become more important after blood cancer. **Conclusions:** In conclusion, vocational impairment and financial problems are frequent among German blood cancer survivors. Efforts should be made at an early stage to reestablish the patients' ability to work.
Baum et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Vocational activities; impairment; blood cancer.

Evidence Level: 4B
Link: https://www.nature.com/articles/s41598-023-50289-9

Brugada syndrome and job fitness: Report of three cases.
Background: Brugada syndrome (BrS) is an inherited arrhythmogenic disorder predisposing patients to a high risk of sudden cardiac death. Specific guidelines on the health surveillance of BrS workers are lacking. **Methods:** We report here three cases requiring assessment of specific job capacity, investigated with an interdisciplinary protocol including 24-h Holter electrocardiography with modified precordial leads, pharmacological test with ajmaline, molecular genetic analysis, electrophysiological study with ventricular stimulation, risk stratification, and occupational medicine evaluation: (1) a female 42-yr-old company manager with positive ajmaline test and CACNA1C gene mutation (judged fit for the job with limitations regarding work-related stress); (2) a male 44-yr-old welder with positive ajmaline test, SCN5A gene mutation, and associated OSAS (obstructive sleep apnea syndrome), who was advised to refrain from night shifts and driving company vehicles; (3) a male 45-yr-old electrical technician with inducible ventricular tachyarrhythmia, who was implanted with a biventricular cardioverter defibrillator, and therefore recommended to avoid exposure to electromagnetic fields and working at heights. **Results and Conclusions:** We conclude that the collaboration between the cardiologist and the occupational physician allows defining the functional capabilities and the arrhythmogenic risk of BrS workers, to optimize job fitness assessment.
Candura et al. 2023.
Industrial Health, vol. 61, no. 6.

Keywords: Arrhythmia; electrocardiography; genetic analysis; sudden cardiac death; syncope; work fitness.
Evidence Level: 5B
Link: https://www.jstage.jst.go.jp/article/indhealth/61/6/61_2022-0205/_article

Occupational Exposure

This month we explore occupational exposure issues associated with airborne microplastics, occupational exposure and health surveys and the relevance of oral exposure in the workplace. In Radon exposure related research we explore the risk models for lung cancer due to radon exposure and the workplace factors influencing radon exposure. In air-related exposure issues we explore personal exposure to fine particulate matter and asthma-related health, associations of exposure to air pollution and physical activity with the risk of systemic inflammation-induced multimorbidity and the use of facepiece respirators in workers exposed to agricultural odours. In Silica dust related research, we explore the application of risk assessment models for crystalline silica dust among stone carvers and occupational exposure to respirable crystalline silica and lung cancer. In noise related research we explore worker perceptions of noise exposure and occupational hearing loss, the use of mobile apps for noise management in occupational health and safety and reinvigorating engineered noise controls. In waste management research we explore organophosphate ester (OPE) exposure in waste recycling workers, brominated flame-retardant exposure in E-waste recycling facilities, and effect of hydrogen sulphide exposure on sensory-motor neuropsychological function among sewage plant workers. In firefighter related research we explore the risk of urinary tract cancer, changes in urinary metabolomes after structural fires, the biomonitoring of polycyclic aromatic hydrocarbons at fire training facilities and the exposure to gaseous PAHs during controlled forest fires. In other research we explore the occupational risk factors for laryngeal cancer, oropharyngeal cancer, pesticides and endometrial cancer, low-dose radiation and ischaemic heart disease and parental occupational exposure and the risk of asthma in offspring. In lead exposure related research, we explore the use of hematological parameters for diagnosing occupational lead poisoning and the effect of lead exposure on blood pressure and renal function.

Evaluating changes in firefighter urinary metabolomes after structural fires: An untargeted, high resolution approach.

Background: Firefighters have elevated rates of urinary tract cancers and other adverse health outcomes, which may be attributable to environmental occupational exposures. Untargeted metabolomics was applied to characterize this suite of environmental exposures and biological changes in response to occupational firefighting. **Methods:** 200 urine samples from 100 firefighters collected at baseline and two to four hours post-fire were analyzed using untargeted liquid-chromatography and high-resolution mass spectrometry. Changes in metabolite abundance after a fire were estimated with fixed effects linear regression, with false discovery rate (FDR) adjustment. Partial least squares discriminant analysis (PLS-DA) was also used, and variable important projection (VIP) scores were extracted. Systemic changes were evaluated using pathway enrichment for highly discriminating metabolites. **Results:** Metabolome-wide-association-study (MWAS) identified 268 metabolites associated with firefighting activity at FDR $q < 0.05$. Of these, 20 were annotated with high confidence, including the amino acids taurine, proline, and betaine; the indoles kynurenic acid and indole-3-acetic acid; the known uremic toxins trimethylamine n-oxide and hippuric acid; and the hormone 7a-hydroxytestosterone. Partial least squares discriminant analysis (PLS-DA) additionally implicated choline, cortisol, and other hormones. Significant pathways included metabolism of urea cycle/amino group, alanine and aspartate, aspartate and asparagine, vitamin b3 (nicotinate and nicotinamide), and arginine and proline. **Conclusions:**Firefighters show a broad metabolic response to fires, including altered excretion of indole compounds and uremic toxins. Implicated pathways and features, particularly uremic toxins, may be important regulators of firefighter's increased risk for urinary tract cancers.

Furlong et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Firefighters; urinary metabolomes; urinary tract cancers.
Evidence Level: 3B
Link: https://www.nature.com/articles/s41598-023-47799-x

Exploring personal exposure to airborne microplastics across various work environments in Pathum Thani Province, Thailand.

Background: This study used personal air samplers to assess the concentration of airborne microplastics exposed by different occupational groups during their working hours. **Methods:** The personal air sampler was placed in the "breathing zone" of the worker during working hours to collect microplastic exposure data. Occupations examined included housekeepers, laundromat staff, office workers, van drivers, street vendors, maintenance technicians in wastewater treatment plants, and waste segregation officers in the university and market. **Results:** The level of airborne microplastic exposure was found to be influenced by the daily activities and environmental conditions of the workplace. Waste segregation officers in the university and market exhibited the highest levels of exposure to airborne microplastics, at 3964 ± 2575 microplastics per cubic meter (n/m3) and 3474 ± 678 n/m3, respectively. Further analysis focused on airborne microplastics less than 10 µm in size which can be taken in through inhalation. During the 8 h working period, the waste segregation officer in the university recorded the highest 10 µm airborne microplastic intake, at 5460 pieces, followed by the waste segregation officer in the market at 3301 pieces, housekeepers at 899 pieces, van drivers at 721 pieces, maintenance technicians in WWTPs at 668 pieces, laundromat staff at 454 pieces, street vendors at 249 pieces, and office workers at 131 pieces.

Limsiriwong et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 24.

Keywords: Airborne microplastics; personal air sampler; personal exposure.
Evidence Level: 5B
Link: https://www.mdpi.com/1660-4601/20/24/7162

Organophosphate ester (OPE) exposure among waste recycling and administrative workers in Denmark using silicone wristbands.

Background: In a recent estimate, 96 million tons of hazardous waste were produced in the European Union, most of which were handled among the member states. Organophosphate esters (OPEs) are applied as flame retardants and plasticizers and are present in many products, e.g., electronics, which end up in the hazardous waste stream upon disposal. **Methods:** Given the growing body of information suggesting potential adverse health effects of OPEs, waste recycling workers who handle hazardous waste could potentially be at risk of elevated exposure to these chemicals. Using silicone wristbands, we evaluated OPE exposure among waste recycling workers who handled hazardous waste and compared their exposure to that of administrative workers from the same waste companies. Wristbands were extracted and analyzed for six OPEs, which were all detected in >75% of wristbands. **Results:** Overall, the sum of tris(2-chloroisopropyl) phosphate (ΣTCIPP) isomers was the most abundant OPE across all wristbands collected within the study. In general, the sum of tri(methyl phenyl) phosphate isomers (Σ TMPP) was elevated for all waste workers (10 β = 7.9), whereas tri-n-butyl phosphate (TnBP), tris(1,3-dichloroisopropyl) phosphate (TDCIPP), and ΣTMPP were 3-12 times higher among those specifically handling electronic and hazardous waste compared to the administrative workers ($p < 0.05$). Repeated wristband measurements from the same worker had fair to good consistency in OPE concentrations (intraclass correlation coefficients = 0.54-0.77), except for the two most volatile chlorinated OPEs. **Conclusions:** Taken together, our results suggest that waste recycling workers who handle electronic and hazardous waste have significantly elevated exposure to OPEs, and efforts to reduce these exposures should be considered.

Hammel et al. 2023.

Chemosphere, vol. 345.

Keywords: Flame retardants; hazardous waste; occupational exposure; personal passive sampling; plasticizers; e-waste.

Evidence Level: 5B

Link: https://www.sciencedirect.com/science/article/pii/S0045653523027194?via%3Dihub

Updated risk models for lung cancer due to radon exposure in the German Wismut cohort of uranium miners, 1946-2018.

Background: UNSCEAR recently recommended that future research on the lung cancer risk at low radon exposures or exposure rates should focus on more contemporary uranium miners. **Methods:** For this purpose, risk models in the German Wismut cohort of uranium miners were updated extending the follow-up period by 5 years to 1946-2018. The full cohort (n = 58,972) and specifically the 1960 + sub-cohort of miners first hired in 1960 or later (n = 26,764) were analyzed. The 1960 + sub-cohort is characterized by low protracted radon exposure of high quality of measurements. Internal Poisson regression was used to estimate the excess relative risk (ERR) for lung cancer per cumulative radon exposure in Working Level Months (WLM). **Results:** Applying the BEIR VI exposure-age-concentration model, the ERR/100 WLM was 2.50 (95% confidence interval (CI) 0.81; 4.18) and 6.92 (95% CI < 0; 16.59) among miners with attained age < 55 years, time since exposure 5-14 years, and annual exposure rates < 0.5 WL in the full (n = 4329 lung cancer deaths) and in the 1960 + sub-cohort (n = 663 lung cancer deaths), respectively. Both ERR/WLM decreased with older attained ages, increasing time since exposure, and higher exposure rates. Findings of the 1960 + sub-cohort are in line with those from large pooled studies, and ERR/WLM are about two times higher than in the full Wismut cohort. Notably, 20-30 years after closure of the Wismut mines in 1990, the estimated fraction of lung cancer deaths attributable to occupational radon exposure is still 26% in the full Wismut cohort and 19% in the 1960 + sub-cohort, respectively. **Conclusions:**This demonstrates the need for radiation protection against radon.

Kreuzer et al. 2023.

Radiation and Environmental Biophysics, vol. 62, no. 4.

Keywords: Cohort; epidemiology; lung cancer; radon; risk.

Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00411-023-01043-2

Are UK E-waste recycling facilities a source of environmental contamination and occupational exposure to brominated flame retardants?
Background: Investigations into the impacts of regulated electrical and electronic waste (e-waste) recycling activities on urban environments in Europe remain rather scarce. **Methods:** In this study, dust samples taken both inside and outside of five UK e-waste recycling facilities were analysed for concentrations of polybrominated diphenyl ethers (PBDEs), novel brominated flame retardants (NBFRs), and hexabromocyclododecane (HBCDD). **Results:**Average concentrations of ΣBFRs in dust inside and outside UK e-waste recycling facilities were 12,000 ng/g and 180 ng/g, with median concentrations of 7500 ng/g and 85 ng/g, respectively. BDE-209 and decabromodiphenyl ethane (DBDPE) were the most abundant BFRs in both indoor and kerb dust, making a combined contribution to ΣBFRs of ~90 % on average. While four out of the five studied e-waste facilities showed a lack of significant impact on BFR contamination in surrounding environment, one of the studied e-waste recycling facilities was identified as a likely source of BFR contamination to UK urban environments, with industrial activities as another potential source of NBFRs. Occupational exposure of UK e-waste recycling workers to BFRs via dust ingestion was generally lower than that estimated for e-waste recyclers from other countries, but was comparable to BFR exposure via dust ingestion of UK office workers. **Conclusions:**Our estimates suggested that health burdens posed by dust ingestion of BFRs were minimal for UK e-waste recycling workers.
Ma et al. 2023.
Science of The Total Environment, vol. 898.

Keywords: BFRs; dust; e-waste recycling; occupational exposure; WEEE.
Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S0048969723040263?via%3Dihub

Radon exposure and its influencing factors across 3,140 workplaces in Spain.
Background: Indoor radon exposure increases the risk of lung cancer. Radon concentration in workplaces is regulated in EU countries, including Spain, based on a reference level of 300 Bq/m3. The objective of this study is to describe workplace radon exposure in Spain and its influencing factors. **Methods:** To do this, we collected long-term radon measurements with alpha track detectors in 3140 workplaces mainly located in radon prone areas. Radon concentration exceeded 300 Bq/m3 in 1 out of 5 workplaces. Median radon concentration was 107 Bq/m3 in radon prone areas, 28 Bq/m3 off radon prone areas, and 101 Bq/m3 globally for the complete sample. **Results:** Our results indicate that excessive radon concentrations can be expected in radon prone areas at all floor levels, especially below ground. Floor level, working sector, and location significantly influence radon concentration. The highest radon concentrations were found in the Education & Culture sector, comprising schools, universities, libraries, or cultural centers. These results indicate that radon should no longer be considered a risk for marginal occupations, but a risk everyone has if located in a radon prone area. Immediate action, including radon testing and mitigation, is needed to protect workers in Spain against radon exposure. This is already mandatory since EU regulation for radon has been recently transposed in Spain. **Conclusions:** Competent authorities should enforce this regulation without further delay, and employers must address their responsibility and communicate with workers about this risk.
Martin-Gisbert et al. 2023.
Environmental Research, vol. 239.

Keywords: Environmental health; ionising radiation; lung cancer; radon; workers.
Evidence Level: 4B https://journals.sagepub.com/doi/full/10.1177/00048674231174809

Link: https://www.sciencedirect.com/science/article/pii/S0013935123021096?via%3Dihub

Personal exposure to fine particulate matter (PM(2.5)) and self-reported asthma-related health.
Background: PM2.5 (fine particulate matter ≤2.5 μm in diameter) is a key pollutant that can produce acute asthma exacerbations and longer-term deterioration of respiratory health. Individual exposure to PM2.5 is unique and varies across microenvironments. Low-cost sensors (LCS) can collect data at a spatiotemporal resolution previously unattainable, allowing the study of exposures across microenvironments. **Methods:** The aim of this study is to investigate the acute effects of personal exposure to PM2.5 on self-reported asthma-related health. Twenty-eight non-smoking adults with asthma living in Scotland collected PM2.5 personal exposure data using LCS. Measurements were made at a 2-min time resolution for a period of 7 days as participants conducted their typical daily routines. Concurrently, participants were asked to keep a detailed time-activity diary, logging their activities and microenvironments, along with hourly information on their respiratory health and medication use. Health outcomes were modelled as a function of hourly PM2.5 concentration (plus 1- and 2-h lag) using generalized mixed-effects models adjusted for temperature and relative humidity. **Results:** Personal exposures to PM2.5 varied across microenvironments, with the largest average microenvironmental exposure observed in private residences (11.5 ± 48.6 μg/m3) and lowest in the work microenvironment (2.9 ± 11.3 μg/m3). The most frequently reported asthma symptoms, wheezing, chest tightness and cough, were reported on 3.4%, 1.6% and 1.6% of participant-hours, respectively. The odds of reporting asthma symptoms increased per interquartile range (IQR) in PM2.5 exposure (odds ratio (OR) 1.29, 95% CI 1.07-1.54) for same-hour exposure. Despite this, no association was observed between reliever inhaler use (non-routine, non-exercise related) and PM2.5 exposure (OR 1.02, 95% CI 0.71-1.48). Current air quality monitoring practices are inadequate to detect acute asthma symptom prevalence resulting from PM2.5 exposure; to detect these requires high-resolution air quality data and health information collected in situ. **Conclusions:** Personal exposure monitoring could have significant implications for asthma self-management and clinical practice.
McCarron et al. 2023.
Social Science and Medicine, vol. 337.

Keywords: Air pollution; asthma; fine particulate matter; personal exposure; Scotland.
Evidence Level: 5A
Link: https://www.sciencedirect.com/science/article/pii/S0277953623006500?via%3Dihub

Occupational exposures of firefighting and urinary tract cancer risk among men in the Norwegian Fire Departments Cohort.
Background: Increased risks of bladder cancer and mesothelioma were the strongest evidence for the recent reclassification of firefighting as carcinogenic (Group 1) by the International Agency for Research on Cancer. Our study aim was to develop indicators for specific firefighting exposures and examine associations with urinary tract cancer (UTC), including bladder cancer. **Methods:** We developed indicators for exposure from employment at a fire department or in firefighting jobs, to fire and smoke, and to diesel exhaust for men in the Norwegian Fire Departments Cohort (n=4250). Incident UTC cases were obtained from the Cancer Registry of Norway (1960-2021). Poisson regression was used to estimate incidence rate ratios (IRR) with cumulative exposures grouped into tertiles (reference: lowest exposed tertile) with 0-year, 10-year and 15-year lagging of exposures. **Results:** During 125 090 person-years of follow-up, there were 76 cases of UTC. IRRs were mostly non-significantly increased in the middle tertile and at or below 1 in the highest tertile for total duration of employment, number of fires attended and fire exposure score with and without lags. In the middle tertile for diesel exhaust exposure, UTC risk was elevated over twofold with 10-year (IRR 2.27, 95% CI 1.22 to 4.20) and 15- year (2.21, 1.18 to 4.16) lags, and near 1 in the highest tertile. Findings for bladder cancer were similar to those for UTC. **Conclusions:** Dose-response associations between the exposure indicators and UTC were not observed. Future studies using the indicators with more cases are needed.
Marjerrison et al. 2023.

Occupational and Environmental Medicine, vol. 80, no. 12.

Keywords: Firefighters; polycyclic aromatic hydrocarbons; vehicle emissions.
Evidence Level: 4B
Link: https://oem.bmj.com/content/80/12/659.long

Associations of long-term exposure to air pollution and physical activity with the risk of systemic inflammation-induced multimorbidity in Chinese adults: Results from the China multi-ethnic cohort study (CMEC).

Background: Previous studies proved the effect of long-term exposure to air pollution or physical activity (PA) on the risk of systemic inflammation-induced multimorbidity (SIIM), while the evidence regarding their joint effects was rare, especially in low- and middle-income countries. Therefore, we aimed to examine the extent of interaction or joint relations of PA and air pollution with SIIM. **Methods:** This study included 72,172 participants from China Multi-Ethnic Cohort. The average concentrations of ambient particulate matter pollutants (PM_1, $PM_{2.5}$, and PM_{10}) were estimated using satellite-based random forest models. Self-reported information on a range of physical activities related to occupation, housework, commuting, and leisure activities was collected by an interviewer-administered questionnaire. A total of 11 chronic inflammatory systemic diseases were assessed based on self-reported lifetime diagnosis or medical examinations. SIIM was defined as having ≥ 2 chronic diseases related to systemic inflammation. Logistic regression models were used to assess the complex associations of air pollution particulate matter and PA with SIIM. **Results:** We found positive associations between long-term air pollution particulates exposure and SIIM, with odds ratios (95%CI) of 1.07 (1.03 to 1.11), 1.18 (1.13 to 1.24), and 1.08 (1.05 to 1.12) per 10 $\mu g/m^3$ increase in PM_1, $PM_{2.5}$, and PM_{10}. No significant multiplicative interaction was found between ambient air pollutant exposure and PA on SIIM, whereas negative additive interaction was observed between long-term exposure to $PM_{2.5}$ and PA on SIIM. The positive associations between low volume PA and SIIM were stronger among those exposed to high-level air pollution particulates. Compared with individuals engaged in high volume PA and exposed to low-level ambient air pollutants, those engaged in low volume PA and exposed to high-level ambient air pollutants had a higher risk of SIIM (OR = 1.49 in PM_1 exposure, OR = 1.84 in $PM_{2.5}$ exposure, OR = 1.19 in PM_{10} exposure). **Conclusions:** Long-term (3 years average) exposure to PM_1, $PM_{2.5}$, and PM_{10} was associated with an increased risk of SIIM. The associations were modified by PA, highlighting PA's importance in reducing SIIM for all people, especially those living in high-level air pollution regions.
Li et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Air pollution; multimorbidity; particulate matter; physical activity; systemic inflammation.
Evidence Level: 4B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17518-2

A current affair: Worker perceptions of noise exposure and occupational hearing loss in Australian coal mines.

Background: The objective of the online survey was to determine worker attitudes towards, perceptions on hearing loss, and management of workplace noise; and to identify barriers within current strategies that prevent effective management of hearing health in Australian mines. Methods: This cross-sectional study utilized a modified survey design, initially designed for use by Safe Work Australia for a broader study published in 2010. The survey questionnaire was made available online to volunteer participants, recruited with the assistance of State and National Health and Safety, and mining organizations. Volunteer participants were required to be proficient in English, be employed by an Australian underground or open cut mine, including coal processing plants; or work as a contractor on one of the specified mine sites. All mining employees, regardless of occupation, job title, and occupational hearing loss classification or status, were invited to complete the questionnaire. **Results**: Almost 60% of respondents indicated that they had high noise exposure for than 10 yr or more, and have some trouble

hearing, mostly associated with infrequent tinnitus. Nearly 71% of these workers believe that the noise control strategies in their workplaces are effective, but this mostly refers to the use of hearing protection devices. **Conclusion**: The results indicate that general knowledge on the cause and effect of noise exposure in the workplace is well understood. However, due to the long latency associated with the development of noise-induced hearing loss (NIHL), there is an issue urgency in terms of risk management. It is surprising that most of the respondents recommended more inspections and administrative controls, especially since most respondents were health, safety, and environment (HSE) professionals. HSE professionals should be advocating for higher order, more permanent solutions, and not purely administrative controls and personal protective equipment. These findings raise the question of whether there is a multifaceted working-culture issue that needs to be addressed, in combination with higher order control implementation.

Liebenberg et al. 2023.

Annals of Work Exposures and Health, vol. 67, no. 9.

Keywords: Mining; noise; noise control; occupational hearing loss; worker beliefs; worker perceptions.

Evidence Level: 4A

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10683847/

Biomonitoring of polycyclic aromatic hydrocarbons in firefighters at fire training facilities and in employees at respiratory protection and hose workshops.

Background: Polycyclic aromatic hydrocarbons (PAHs) are carcinogenic to humans and are formed by incomplete combustion. PAHs are always present during firefighting operations, and fire department members can be exposed to them in the workplace. **Methods**: In this study, we analyzed 1-hydroxypyrene (1-OHP) in 36 urine samples from nine firefighters, collected before and after fire training sessions, and 32 urine samples from eight employees at respiratory protection and hose workshops. To assess breakthrough PAH exposure through personal protective equipment and potential dermal uptake, some of the workshop employees wore cotton garments under their regular workwear. Cotton samples were then examined for the presence of 17 semi-volatile and low-volatility PAHs. **Results**: After firefighting exercises, we observed approximately a fivefold increase in mean 1-OHP concentrations in samples from firefighters, from 0.24 µg/L to 1.17 µg/L (maximum: 5.31 µg/L). In contrast, 1-OHP levels in workshop employees were found to be low, with the majority of urine samples yielding concentrations below the limit of quantification (LOQ: 0.05 µg/L, maximum: 0.11 µg/L). Similarly, low PAH levels were found on the workshop employees' cotton undergarments, with maximum concentrations of 250 and 205 ng/g for pyrene and benzo[a]pyrene, respectively. **Conclusion**: In conclusion, significant increases in 1-OHP in urine were observed in firefighters after training sessions, whereas work-related exposure remained low among workshop employees.

Koslitz et al. 2023.

Frontiers of Public Health, vol. 13.

Keywords: PAH; exposure; firefighting; occupational hygiene; urine; workplace.

Evidence Level: 5B

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1277812/full

Assessing the usefulness of mobile apps for noise management in occupational health and safety: Quantitative measurement and expert elicitation study.

Background: Overexposure to occupational noise can lead to hearing loss. Occupational noise mapping is conventionally performed with a calibrated sound level meter (SLM). With the rise of mobile apps, there is a growing number of SLM apps available on mobile phones. However, few studies have evaluated such apps for accuracy and usefulness to guide those with occupational noise detection needs in selecting a quality app. **Objective:** The purpose of this study was to evaluate the accuracy and usefulness of SLM mobile apps to guide workplace health and safety professionals in determining these apps' suitability for assessing occupational noise exposure. **Methods:** The following three iOS apps were assessed: the NIOSH

(National Institute for Occupational Safety and Health) Sound Level Meter, Decibel X, and SoundMeter X apps. The selected apps were evaluated for their accuracy in measuring sound levels in low-, moderate-, and high-noise settings within both simulated environments and real-world environments by comparing them to a conventional SLM. The usefulness of the apps was then assessed by occupational health specialists using the Mobile App Rating Scale (MARS). **Results:** The NIOSH Sound Level Meter app accurately measured noise across a range of sound levels in both simulated settings and real-world settings. However, considerable variation was observed between readings. In comparison, the Decibel X and SoundMeter X apps showed more consistent readings but consistently underestimated noise levels, suggesting that they may pose a risk for workers. Nevertheless, none of the differences in sound measurements between the three apps and the conventional SLM were statistically significant (NIOSH Sound Level Meter: P=.78; Decibel X: P=.38; SoundMeter X: P=.40). The MARS scores for the three apps were all above 3.0, indicating the usefulness of these apps. **Conclusions:** Under the conditions of this study, the NIOSH Sound Level Meter app had equivalent accuracy to the calibrated SLM and a degree of usefulness according to the MARS. This suggests that the NIOSH Sound Level Meter app may be suitable for mapping noise levels as part of a monitoring strategy in workplaces. However, it is important to understand its limitations. Mobile apps should complement but not replace conventional SLMs when trying to assess occupational noise exposure risk. Our outcomes also suggest that the MARS tool may have limited applicability to measurement-based apps and may be more suited to information-based apps that collect, record, and store information.

Huyan et al. 2023.
JMIR mHealth and uHealth, vol. 11.

Keywords: MARS; Mobile App Rating Scale; hearing; hearing loss; mHealth; management; mobile applications; mobile apps; mobile phone; noise detection; noise management; occupational health; tool; usefulness.
Evidence Level: 4B
Link: https://mhealth.jmir.org/2023/1/e46846

A cross-sectional study of sensory-motor neuropsychological function among sewage plant and sewage net workers exposed to hydrogen sulphide when handling wastewater.

Background: Workers at sewage treatment plants are exposed to a complex mixture of toxins, including hydrogen sulphide (H2S). An issue of concern among sewage workers, is possible negative nervous system effects from low-level H2S exposure. Empirical neuropsychological evidence indicates both that low-dose exposure to H2S exposure affects the nervous system, and the contrary, that such exposure may facilitate nervous system function, since H2S is an endogenously produced central nervous system (CNS) gasotransmitter. The aim of this study is to describe a possible association between the H2S component of the total exposure and long-term effects on neuropsychological motor function among wastewater workers. **Methods:** Workers (N = 138) treating wastewater in 6 sewage-treatment plants, or in the sewer net system participated in a cross-sectional study. H2S exposure was expressed in a dichotomous exposure variable defining currently H2S-exposed (N = 112) and unexposed referent workers (N = 26), and a variable defining a job-exposure matrix for long-term total typical workplace H2S exposure. The participants went through neuropsychological tests for hand coordination, reaction time (SRT), and balance, and completed questionnaires. Pearson chi-square test or independent samples t-test was used when comparing the currently H2S-exposed workers with the unexposed control group. Multiple linear regression was used to assess associations between the independent variables age, smoking and exposure variables, and the neuropsychological tests. **Results:** The analyses indicate increased SRT in the currently H2S-exposed group compared to controls (mean [SD] = 225.8 [29.9] versus 210.7 [26.3] ms, P = 0.019), and an association between increased SRT and current H2S-exposure in the total study sample (β = 14.7, P = 0.026, R2 = 0.06, P = 0.050). Blindfolded balance testing indicates a nonsignificant trend in the total study sample, of reduced balance in the highest versus lowest H2S total long-term exposure-index group (Sway area [mean {SD}, mm2: 702 [410] versus 581 [278]), and a significant association between total long-term H2S exposure and reduced balance among smokers (Sway area, mm2 [β = 38.7, P = 0.039], mean sway, mm [β = 0.3, P = 0.015]). **Conclusion:** The observed trends and associations may be due to

exposure peaks in certain work operations and pinpoint the importance of minimizing and avoiding exposure peaks, also when H2S time-weighted average measurements do not exceed an occupational exposure limit of 5 ppm.
Goffeng et al. 2023.
Annals of Work Exposures and Health, vol. 67, no. 9.

Keywords: H2S; exposure index; job-exposure matrix; nervous system; neuropsychological tests; sewage; wastewater workers.
Evidence Level: 4A
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10683850/

Occupational risk factors for laryngeal cancer in Tunisia: A case control study.
Background: Tobacco use and alcohol consumption are the primary risk factors for laryngeal cancer (LC). In most populations, occupational exposures are likely to play a minor role in laryngeal carcinogenesis. We aimed to investigate the association between occupational exposure and laryngeal cancer. **Methods:** It is a case-control study that included 140 cases diagnosed between January 2013 and December 2016 and 140 controls matched by sex, age, alcohol consumption, and tobacco consumption. **Results:** Significantly increased risks were found amongst workers of the building sector (OR=4.621; 95% CI [1.826-11.693]) and the mechanical industry sector (OR=5.074; 95% CI [1.425-18.072]). Significant association of laryngeal cancer with various carcinogens was observed such as asbestos (p=0.009; OR=3.68; 95% CI [1.29-10.46]), paint vapors (p=0.005; OR=3.35; 95% CI [1.37-8.16]), solvents (p=0.001; OR=3.29: 95% CI [1.61-6.68]) and cement dust (p=0.003; OR=3.19: 95% CI [1.43-7.12]). After binary logistic regression, cement dust was independently correlated with LC (p=0.042; OR=3.93; 95% CI [1.04-14.78]. The administration sector was associated with decreased risk (p=0.001; OR=0.07; 95% CI [0.03-0.15]) as well as the health sector (p=0.001; OR=0.098; 95% CI [0.02-0.43]). **Conclusions:** Our results supported the role of occupational factors in developing LC. Further studies enabling an in-depth analysis of occupational exposures are necessary to provide a clearer definition of the etiological associations between single agents and circumstances of exposure and the genesis of LC.
Gaddour et al. 2023.
La Medicina del Lavoro, vol. 114, no. 6.

Keywords: Occupational risk; laryngeal cancer; Tunisia.
Evidence Level: 4B
Link: https://mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14588

Occupational etiology of oropharyngeal cancer: A literature review.
Background: While abundant evidence exists linking alcohol, tobacco, and HPV infection to a carcinogenic impact on the oropharynx, the contribution of inhalational workplace hazards remains ill-defined. **Methods:** We aim to determine whether the literature reveals occupational environments at a higher-than-average risk of developing oropharyngeal cancer (OPC) and summarize the available data. To identify studies assessing the relationship between occupational exposure and risk of OPC, a search of the literature through the PubMed-NCBI database was carried out and, ultimately, 15 original articles meeting eligibility criteria were selected. Only original articles in English focusing on the association between occupational exposure and risk or death of specifically OPC were included. **Results:** The available data are supportive of a potentially increased risk of OPC in waiters, cooks and stewards, artistic workers, poultry and meat workers, mechanics, and World Trade Center responders exposed to dust. However, the available literature on occupation-related OPC is limited. **Conclusions:** To identify occupational categories at risk, large cohorts with long follow-ups are needed. Identification of causal associations with occupation-related factors would require dose-response analyses adequately adjusted for confounders.
Nikkilä et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 21.

Keywords: OPC; exposure; head and neck cancer; occupation; occupational; oropharynx.
Evidence Level: 6A
Link: https://www.mdpi.com/1660-4601/20/21/7020

The efficiency of nuisance relief by filtering facepiece respirators used by workers exposed to agricultural odours.
Background: The study aimed to evaluate the effectiveness of filtering facepiece respirators (FFRs) in reducing odour nuisances in agricultural work environment. Additionally, an assessment was conducted on the microbiological contamination of FFRs and the functionality of Time4Mask application in enhancing workplace safety. **Methods:** Two types of FFRs were used for the study: with absorbing properties and reference ones. The research was carried out in 6 livestock rooms during a 1-week period in early spring (February-March 2021) on a farm in central Poland. The microclimate conditions (thermoanemometer), and particulate matter concentrations (laser photometer) were assessed. Additionally, the odour content in the studied rooms and the breathing zone of FFR users (gas chromatography with mass spectrometry) were evaluated. The number of microorganisms on the respirators was determined (cultivation method), followed by their identification (biochemical tests, taxonomic keys). Breakthrough curves were determined for both FFR types to assess absorption capabilities. **Results:** The average temperature in the livestock rooms was about 13°C, relative humidity - 53%, air flow velocity - 0.21 m/s, and particulate matter concentration - 0.216 mg/m^3. A significant variety of odorants was found in the environment and the breathing zone under the FFRs. Bacterial counts ranged between 2.4 × 10^1 and 2.6 × 10^2 CFU/cm^2, fungi between 3.2 × 10^0 and 5.4 × 10^1 CFU/cm^2, xerophilic fungi from 4.4 × 10^0 to 4.0 × 10^1 CFU/cm^2, mannitol-positive staphylococci between 1.6 × 10^1 and 1.0 × 10^2 CFU/cm^2, and haemolytic staphylococci from 2.2 × 10^1 to 4.5 × 10^1 CFU/cm^2, depending on the respirator type. Respirators were colonized by bacteria from the genera: *Bacillus*, *Staphylococcus*, actinobacteria *Streptomyces* sp., and fungi: *Candida*, *Absidia*, *Aspergillus*, *Mucor*, and *Penicillium*. Respirators with absorbing properties had over 8-times longer breakthrough time than reference ones. **Conclusions:** Respirators with activated carbon effectively improved work comfort when exposed to odours. Due to growth of microorganisms in the respirator materials, periodic replacement is necessary. It is crucial to provide workers with information about the safe-use time of respirators, considering environmental conditions. This is achievable using modern IT tools like Time4Mask application. Med Pr Work Health Saf. 2023;76(5):363-75.
Okrasa et al. 2023.
Medycyna Pracy, vol. 74, no. 5.

Keywords: Time4Mask; agriculture; filtering facepiece respirators; microbiological contamination; odour nuisance; worker safety and well-being.
Evidence Level: 5B
Link: http://medpr.imp.lodz.pl/The-efficiency-of-nuisance-relief-by-filtering-facepiece-respirators-used-by-workers,174012,0,2.html

Occupational exposure to pesticides and endometrial cancer in the Screenwide case-control study.
Background: Endometrial cancer is the most common gynaecological tumour in developed countries and disease burden is expected to increase over the years. Identifying modifiable risk factors may help developing strategies to reduce the expected increasing incidence of these neoplasms. **Objective:** This study evaluates the association between occupational exposure to pesticides and endometrial cancer using data from a recent case-control study in Spain. **Methods:** The analyses included data from 174 consecutive incident endometrial cancer cases and 216 hospital controls frequency-matched by age. Data were collected through structured epidemiological questionnaires and exposure to pesticides was assessed using a Spanish job-exposure matrix (MatEmESp). **Results:** Overall, 12% of controls and 18% of cases were occupationally exposed to pesticides. We observed a positive association between occupational exposure to pesticides and endometrial cancer (OR = 2.08; 95% CI = 1.13-3.88 compared to non-exposed). In general, exposures that occurred farther in the past were significantly associated with

endometrial cancer. Exposure to insecticides, fungicides and herbicides were positively associated with endometrial cancer (OR = 2.08; 95% CI = 1.13-3.88, OR = 4.40; 95% CI = 1.65-13.33, and OR = 5.25; 95% CI = 1.84-17.67, respectively). The agricultural, poultry and livestock activities scenario was associated with endometrial cancer (OR = 4.16; 95% CI = 1.59-12.32), while the cleaning exposure scenario was not (OR = 1.22; 95% CI = 0.55-2.67).
Conclusions: Assessment of occupational exposure to pesticides assessed using a Spanish job-exposure matrix revealed a positive association with endometrial cancer. The elucidation of the role of pesticide compounds on endometrial cancer should shed a light on the aetiology of this tumour.
Peñalver-Piñol et al. 2023.
Environmental Health, vol. 22, no. 1.

Keywords: Endometrial cancer; job-exposure matrix; occupational exposure; pesticides.
Evidence Level: 4B
Link: https://ehjournal.biomedcentral.com/articles/10.1186/s12940-023-01028-0

Exposure to low-dose radiation in occupational settings and ischaemic heart disease: A systematic review and meta-analysis.
Background: Ionising radiation is a human carcinogen, but the evidence is less clear that exposure to low-dose ionising radiation (LDIR) increases the risk of adverse cardiovascular outcomes. **Methods:** We synthesised the literature of chronic occupational exposure to LDIR and cardiovascular disease, particularly for ischaemic heart disease (IHD).The literature search was conducted using three databases including studies published between 1990 and 2022. A quality assessment of the studies was completed using the Office of Health and Assessment and Translation Risk of Bias Rating Tool. We conducted meta-analyses for IHD mortality using random effects models using measures of excess relative risk per sievert (ERR/Sv) obtained from internal cohort comparisons, as well as with standardised mortality ratios (SMRs) from external cohort comparisons. **Results:** We identified 2189 articles, and of these, 26 provided data on IHD and were retained. Most studies were classified as having a 'moderate' level of risk of bias. Fourteen and 10 studies reporting external radiation doses were included in meta-analyses using SMR and ERR/Sv, respectively. The meta-summary SMR was 0.81 (95% CI 0.74 to 0.89) with evidence of reduced risk but high heterogeneity across studies. For internal cohort measures, the summary ERR/Sv for a lagged exposure of 10 years was 0.10 (95% CI 0.01 to 0.20) with low heterogeneity. The subgroup analysis by lagged exposure time showed the strongest association were for the 15 and 20 years lag. **Conclusions:**Our findings suggest that occupational exposure to LDIR increases the risk IHD mortality and highlight the relevance of internal cohort comparisons.
Peters et al. 2023.
Occupational and Environmental Medicine, vol. 80, no. 12.

Keywords: Cardiology; occupational health; radiation, ionizing.
Evidence Level: 1A
Link: https://oem.bmj.com/content/80/12/706.long

Application of multiple occupational health risk assessment models for crystalline silica dust among stone carvers.
Background: Silica is the most abundant substance on the Earth's crust and is a proven carcinogen. The aim of this study was to measure the occupational exposure of stone carvers to crystalline silica and to evaluate the health risks. **Methods:** This descriptive and analytical cross-sectional study was performed on 79 stone carvers. Inhalation air sampling was performed by the NIOSH7500 method and the amount of silica was determined by X-ray diffraction (XRD). Semi-quantitative and quantitative risk assessments were performed using the methods of the Singapore Department and the US Environmental Protection Agency (EPA), respectively. Mortality due to silicosis and lung cancer were estimated using the Manettej and Rice models. Data were analyzed using SPSS23 software. **Results:** The mean exposure to total inhalable dust and crystalline silica among the stone carvers was 1.44 and 0.5 mg/m3, respectively. Exposure to total dust and silica was significantly higher than the occupational standard (P <0.0001).

Stone carvers' exposure to silica was at very high-risk level, and the carcinogenicity of silica considering two cancer slopes was 7.40 × 10-6 and 3.12 × 10-7 and the risk of non-carcinogenicity was unacceptable. **Conclusion:** The mortality rate due to silicosis was between 3 and 12 people per thousand, and due to lung cancer was 150.24 people per thousand. Based on the results of risk assessment, serious control measures should be implemented in order to reduce workers' exposure to silica.
Rahimimoghadam et al. 2023.
Asian Pacific Journal of Cancer Prevention, vol. 24, no. 11.

Keywords: Lung cancer; Risk Assessment; Silica exposure; X-ray diffraction; silicosis mortality.
Evidence Level: 5B
Link: https://journal.waocp.org/?sid=Entrez:PubMed&id=pmid:38019261&key=2023.24.11.3999

Association between parental occupational exposure and the risk of asthma in offspring: A meta-analysis and systematic review.
Background: Previous epidemiological studies have shown inconsistent results regarding the relation between the risk of asthma in offspring and parental occupational exposure. Therefore, we conducted a comprehensive and systematic collection of currently available epidemiological data to quantify the correlation between the 2. **Methods:** Related studies published before March 2023 were identified through searches of the Cochrane Library, Embase, PubMed, and Web of Science databases. The quality of included studies was assessed using the Newcastle-Ottawa Scale, while pooled odds ratios (ORs) with 95% confidence intervals (CIs) were computed using fixed-effect or random-effects models. **Results:** This systematic review included 10 cohort studies, with a total of 89,571 parent-child pairs included in the quantitative analysis. The results exhibited a substantial association between parental occupational exposure to allergens (OR = 1.11; 95% CI: 1.00, 1.23; P = .051) and irritants (OR = 1.19; 95% CI: 1.07, 1.32; P = .001) and an increased risk of asthma in offspring. This association was also observed in the analysis of wheezing (OR = 1.22; 95% CI: 1.11, 1.35; P < .001 and OR = 1.19; 95% CI: 1.08, 1.32; P = .001). Subgroup analysis demonstrated that maternal occupational exposure to allergens (OR = 1.07; 95% CI: 1.02, 1.12; P = .008) and irritants (OR = 1.13; 95% CI: 1.05, 1.21; P = .001) significantly increased the risk of childhood asthma. Furthermore, parental postnatal occupational exposure to allergens (OR = 1.26; 95% CI: 1.10, 1.46; P = .001) and irritants (OR = 1.26; 95% CI: 1.06, 1.49; P = .009) had a more pronounced impact on childhood asthma. Higher levels of exposure (OR = 1.26; 95% CI: 1.10, 1.46; P = .001 and OR = 1.30; 95% CI: 1.16, 1.47; P < .001) were recognized as significant risk factors for childhood asthma. **Conclusion:** Parental occupational exposure to allergens and irritants increases the risk of asthma and wheezing in offspring, with maternal exposure, postnatal exposure, and high-dose exposure being the primary risk factors for childhood asthma.
Ren et al. 2023
Medicine, vol. 102, no. 48.

Keywords: Occupational exposure; asthma; offspring; parental occupational exposure.
Evidence Level: 1A
Link: https://journals.lww.com/md-journal/fulltext/2023/12010/association_between_parental_occupational_exposure.76.aspx

Occupational exposure to respirable crystalline silica and lung cancer: A systematic review of cut-off points.
Background: Respirable crystalline silica (RCS) is associated with the development of lung cancer. However, there is uncertainty around the exposure threshold at which exposure to RCS may pose a clear risk for the development of lung cancer. The objective of this study was to review the cut-off points at which the risk of mortality or incidence of lung cancer due to occupational exposure to RCS becomes evident through a systematic review. **Methods:** We conducted a search in PubMed, including cohort and case-control studies which assessed various categories of RCS exposure. A search was also conducted on

the webpages of institutional organizations. A qualitative data synthesis was performed. **Results:** Twenty studies were included. Studies that assessed lung cancer mortality and incidence displayed wide variability both in RCS exposure categories and related risks. Although most studies found no significant association for RCS exposure categories, it appears to be a low risk of lung cancer for mean concentrations of less than 0.07mg/m^3. Regulatory agencies set annual RCS exposure limits ranging from 0.025mg/m^3 through 0.1mg/m^3. **Conclusions:** There is a wide degree of heterogeneity in RCS exposure categories, with most studies observing no significant risk of lung cancer for the lowest exposure categories. Cut-off points differ between agencies but are nonetheless very similar and do not exceed 0.1mg/m^3.

Rey-Brandariz et al. 2023.

Environmental Health, vol. 22, no. 1.

Keywords: International agencies; lung cancer; occupational exposure; respirable crystalline silica; systematic review.

Evidence Level: 1A

Link: https://ehjournal.biomedcentral.com/articles/10.1186/s12940-023-01036-0

Diagnostic value of a logistic model of occupational lead poisoning using hematological parameters.

Background: We investigated the predictive value of a logistic model utilizing hematological parameters in diagnosing occupational lead poisoning. **Methods:** This retrospective study (September 2020-December 2022) included patients with occupational lead poisoning. Differences in hematological parameters were compared between individuals with occupational blood lead poisoning and healthy individuals. We used logistic regression analysis to develop a diagnostic prediction model for occupational blood lead poisoning. Receiver operating characteristic (ROC) curves and corresponding area under the ROC curve values were used to assess the diagnostic value of hematological parameters and logistic models. **Results:** Compared with controls, several indicators were significantly higher in the group with blood lead poisoning, but others were significantly lower. Logistic regression analysis showed that the red blood cell distribution width coefficient of variation (RDW-CV), neutrophil/lymphocyte ratio (NLR), and percentage of small red blood cells (Micro%) were independent factors in diagnosing occupational blood lead poisoning. The logistic regression model constructed based on these three parameters had sensitivity 78.7% and specificity 83.8% for diagnosing occupational lead poisoning. **Conclusion:** We identified RDW-CV, NLR, and Micro% as independent predictors in the diagnosis of occupational lead poisoning. A logistic regression model that includes these may contribute to better detection of occupational lead poisoning.

Sun et al. 2023.

Journal of International Medical Research, vol. 51, no. 11.

Keywords: Hematological parameter; blood lead poisoning; diagnosis; logistic model; occupational hazard; prediction; retrospective study.

Evidence Level: 4B

Link: https://journals.sagepub.com/doi/full/10.1177/03000605231213221

Firefighters' personal exposure to gaseous PAHs during controlled forest fires: A case study with estimation of respiratory health risks and in vitro toxicity.

Background: Firefighters are daily exposed to adverse health-hazardous pollutants. Polycyclic aromatic hydrocarbons (PAHs), well known endocrine disruptors with carcinogenic, mutagenic, and teratogenic properties, are among the most relevant pollutants. The characterization of firefighters' occupational exposure to airborne PAHs remains limited; information is scarce for European firefighters. Also, the in vitro assessment of firefighters' respiratory health risks is inexistent. **Methods:** To reply to these scientific gaps, this work characterizes the levels of gaseous PAH in firefighters' personal air during regular working activities at controlled forest fires and at fire stations (control group). **Results:** Breathable levels were 2.2-26.7 times higher during fire events than in the control group (2.63-32.63 µg/m3versus 1.22 µg/m3, $p < 0.001$); the available occupational guidelines (100 and 200 µg/m3 defined by the US National Institute for

Occupational Safety and Health and the North American Occupational Safety and Health Administration, respectively) were not exceeded. Concentrations of (possible/probable) carcinogenic PAHs were 1.9-15.3 times superior during firefighting ($p < 0.001$). Increased values of total benzo(a)pyrene equivalents ($p = 0.101$), dose rates ($p < 0.001$), and carcinogenic risks ($p = 0.063$) were estimated in firefighters during controlled fires comparatively with the control group. Firefighters' breathable gaseous phase collected during fire events contributed to induce a significant viability decrease (<70 %; $p < 0.05$) in A549 and Calu-3 cell lines. The principal component analysis (PCA) allowed the differentiation between firefighters participating in controlled fire events from the control group. PCA analysis demonstrated the potential of PAHs to distinguish different sources of firefighters´ occupational exposure and of combining estimated health risk parameters with in vitro toxicities determined with human-breathable air collected during real-life scenarios. **Conclusions:**Overall, the participation in controlled fire events contributes to the respiratory health burden of firefighting forces. However, more studies are needed to corroborate these preliminary findings, explore the respiratory toxicological mechanisms, and support the implementation of preventive actions and mitigation strategies to pursue firefighters' health.
Teixeira et al. 2023.
Science of The Total Environment, vol. 908.

Keywords: Airborne PAHs; controlled fires; firefighting forces; health risk assessment; occupational exposure; pulmonary cell viability assays.
Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S0048969723069929?via%3Dihub

Blood pressure and renal function responses in workers exposed to lead for up to six years.
Background and Methods: The Study for Promotion of Health in Recycling Lead (SPHERL) assessed the blood pressure (BP) and renal function (RF) responses for up to 6 years in the workers without previous occupational lead exposure. BP was the average of five consecutive readings and the estimated glomerular filtration rate was derived from serum creatinine (eGFRcrt) and cystatin C (eGFRcys). Blood lead (BL) was measured by inductively coupled plasma mass spectrometry (detection limit 0.5 µg/dL). The statistical methods included multivariable-adjusted mixed models and interval-censored Cox regression analysis. **Results:** The 234 workers analyzed were on average 28.5 years old and included 91.9% men. The baseline BL concentration was 4.35 µg/dL and increased 3.17-fold over follow-up (median: 2.03 years; range: 0.92-6.45 years). The changes in BP and RF were not significantly correlated with the follow-up-to-baseline BL ratio ($p \geq .51$ and $p \geq .18$, respectively). The fully-adjusted changes in systolic/diastolic BP associated with a doubling of BL were -0.25/-0.12 mm Hg (CI: -0.94 to 0.44/-0.66 to 0.42 mm Hg). Accordingly, the incidence of stage-1 or -2 hypertension was not associated with the BL change ($p \geq .063$). Similarly, the changes in eGFRcrt and eGFRcys associated with a 3-fold BL increment were not significant, amounting to -0.70 mL/min/1.73 m2 (CI: -1.70 to 0.30 mL/min/1.73 m2) and -1.06 mL/min/1.73 m2 (-2.16 to 0.03 mL/min/1.73 m2). **Conclusions:** In conclusion, the BP and RF responses to an over 3-fold BL increment were small and not significant confirming the safety of modern lead-handing facilities operating under current safety rules.
Yu et al. 2023.
Journal of Clinical Hypertension, vol. 25, no. 12.

Keywords: Blood pressure; hypertension; lead; occupational exposure; renal function.
Evidence Level: 5A
Link: https://onlinelibrary.wiley.com/doi/10.1111/jch.14748

Occupational exposure and health surveys at metal additive manufacturing facilities.
Background: Additive manufacturing is a novel state-of-the art technology with significant economic and practical advantages, including the ability to produce complex structures on demand while reducing the need of stocking materials and products. Additive manufacturing is a technology that is here to stay; however, new technologies bring new challenges, not only technical but also from an occupational health

and safety perspective. Herein, leading Swedish companies using metal additive manufacturing were studied with the aim of investigating occupational exposure and the utility of chosen exposure- and clinical markers as predictors of potential exposure-related health risks. **Methods**: Exposure levels were investigated by analysis of airborne dust and metals, alongside particle counting instruments measuring airborne particles in the range of 10 nm-10 µm to identify dusty work tasks. Health examinations were performed on a total of 48 additive manufacturing workers and 39 controls. All participants completed a questionnaire, underwent spirometry, and blood and urine sampling. A subset underwent further lung function tests. **Results**: Exposure to inhalable dust and metals were low, but particle counting instruments identified specific work tasks with high particle emissions. Examined health parameters were well within reference values on a group level. However, statistical analysis implied an impact on workers kidney function and possible airway inflammation. **Conclusion**: The methodology was successful for investigating exposure-related health risks in additive manufacturing. However, most participants have been working <5 years. Therefore, long-term studies are needed before we can conclusively accept or reject the observed effects on health.

Assenhöj et al. 2023.

Frontiers in Public Health, vol 20.

Keywords: 3D-printing; additive manufacturing; binder jetting; metals; occupational exposure; occupational health; particle exposure; powder bed fusion.

Evidence Level: 5B

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1292420/full

Reinvigorating engineered noise controls: A systems approach.

Background: Hearing loss is a major worldwide health issue affecting an estimated 1.5 billion people. Causes of hearing loss include genetics, chemicals, medications, lifestyle habits such as smoking, and noise. Noise is probably the largest contributing factor for hearing loss. Noise arises from the workplace, ambient environment, and leisure activities. The easiest noise sources to control are workplace and environmental. Workplace noise is unique in that the employer is responsible for the noise and the worker. Also, workers may be exposed to much higher levels of noise than they would accept elsewhere. Employers follow the traditional hierarchy of controls (substitution/engineering, administrative, personal protective equipment [PPE]). Substituting or engineering a lower noise level actually reduces the hazard present to the worker but demand more capital investment. Administrative and PPE controls can be effective, but enforcement and motivation are essential to reducing risk and there is still some hearing loss for a portion of the workers. The challenge is to estimate the costs more clearly for managers. A systems engineering approach can help visualize factors affecting hearing health. **Methods:** In this study, a systems engineering causal loop diagram (CLD) was developed to aid in understanding factors and their interrelationships. The CLD was then modeled in VenSim. The model was informed from the authors' expertise in hearing health and exposure science. Also, a case study was used to test the model. The model can be used to inform decision-makers of holistic costs for noise control options, with potentially better hearing health outcomes for workers. **Results:** The CLD and cost model demonstrated a 4.3 year payback period for the engineered noise control in the case study. **Conclusions:** Systems thinking using a CLD and cost model for occupational hearing health controls can aid organizational managers in applying resources to control risk. Int J Occup Med Environ Health. 2023;36(5):672-84.

Slagley et al. 2023.

International Journal of Occupational Medicine and Environmental Health, vol. 36, no. 5.

Keywords: Hearing loss; noise; noise-induced; occupational health; personal protective equipment; systems analysis.

Evidence Level: 6B

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10702872/

The relevance of oral exposure in the workplace: A systematic review and meta-analysis.
Background: The inclusion of all relevant exposure routes in the exposure assessment is essential for the protection of workers. However, under European chemical regulations but also for workplace risk assessments according to occupational safety and health (OSH) requirements, the quantitative assessment of oral exposure is usually neglected assuming good occupational hygiene. In contrast, several studies point to the importance of unintentional ingestion in the workplace. To our knowledge, there is no systematic analysis of the extent of this exposure route. **Methods:** Therefore, the aim of this study was to assess systematically the current knowledge on the relevance of occupational oral exposure using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method. Five electronic databases and nine institutional websites were searched for all publications on the relevance. The data were extracted into a concept matrix. In the subsequent meta-analysis, the identified conclusions on the relevance were analyzed. In addition, the measurement methods or modeling approaches that were described for occupational oral exposure were determined as well as the potentially relevant workplaces and substances. **Results:** In total, 147 studies were included in this analysis that contain a general or several, differentiated assessments of the relevance of occupational oral exposure. Nine of these studies assessed this exposure route as irrelevant. However, 123 studies considered oral exposure as potentially contributing and 80 studies explicitly identified it as relevant. 78 and 94 of the publications described modeling and measurement approaches, respectively. The workplaces frequently identified as potentially or explicitly relevant were other indoor, other industrial or recycling workplaces. Analogously, metals, dust and powders or pesticides were the most frequently investigated substance groups. **Discussion:** As several studies assessed occupational oral exposure as relevant in the context of different workplaces and substances, further investigation of this exposure route is needed. This systematic review and meta-analysis serve as a basis for further development of feasible assessment methods for this route of exposure.
Dietz et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: PRISMA; inadvertent ingestion; occupation; oral exposure; overall exposure; workplace.
Evidence Level: 1A
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1298744/full

Sedentary Practices

This month we explore issues associated with work-related sedentary behavior and mental health and work engagement and the effect of a sitting reduction intervention.

Association of work-related sedentary behavior with mental health and work engagement among Japanese white- and blue-collar workers
Background: This study investigated the association of work-related sedentary behavior with mental health and work engagement among white- and blue-collar workers. **Methods:** An Internet survey was conducted among 1600 workers aged 20 to 59 years. A total of 1213 valid responses were analyzed to examine the association of work-related sedentary behavior with mental health and work engagement. **Results:** Higher level of occupational sedentary behavior significantly associated with poorer mental health and lower work engagement among white-collar workers. Considering the effect of occupation, association of sedentary behavior with mental health disappeared, whereas association with work engagement remained for white-collar workers. **Conclusions:** Our result suggested the importance of decreasing work-related sedentary behavior for enhancing work engagement regardless of the occupation for white-collar workers. Further study is needed to confirm the association between these variables for blue-collar workers.
Sakakibara et al. 2023.
Journal of Occupational and Environmental Medicine, vol. 65, no. 11.

Keywords: Sedentary behavior; mental health; work engagement.
Evidence Level: 4B
Link:
https://journals.lww.com/joem/fulltext/2023/11000/association_of_work_related_sedentary_behavior.14.aspx

Implementation and engagement of the SMART Work & Life sitting reduction intervention: An exploratory analysis on intervention effectiveness
Background: To enhance the impact of interventions, it is important to understand how intervention engagement relates to study outcomes. We report on the level of implementation and engagement with the SMART Work & Life (SWAL) programme (delivered with (SWAL plus desk) and without a height-adjustable desk (SWAL)) and explore the effects of different levels of this on change in daily sitting time in comparison to the control group. **Methods:** The extent of intervention delivery by workplace champions and the extent of engagement by champions and participants (staff) with each intervention activity was assessed by training attendance logs, workplace champion withdrawal dates, intervention activities logs and questionnaires. These data were used to assess whether a cluster met defined criteria for low, medium, or high implementation and engagement or none of these. Mixed effects linear regression analyses tested whether change in sitting time varied by: (i) the number of intervention activities implemented and engaged with, and (ii) the percentage of implementation and engagement with all intervention strategies. **Results:** Workplace champions were recruited for all clusters, with 51/52 (98%) attending training. Overall, 12/27 (44.4%) SWAL and 9/25 (36.0%) SWAL plus desk clusters implemented all main intervention strategies. Across remaining clusters, the level of intervention implementation varied. Those in the SWAL (n = 8 (29.6%) clusters, 80 (32.1%) participants) and SWAL plus desk (n = 5 (20.0%) clusters, 41 (17.1%) participants) intervention groups who implemented and engaged with the most intervention strategies and had the highest percentage of cluster implementation and engagement with all intervention strategies sat for 30.9 (95% CI -53.9 to -7.9, p = 0.01) and 75.6 (95% CI -103.6 to -47.7, p < 0.001) fewer minutes/day respectively compared to the control group at 12 month follow up. These differences were larger than the complete case analysis. The differences in sitting time observed for the medium and low levels were similar to the complete case analysis. **Conclusions:** Most intervention strategies were delivered to some extent across the clusters although there was large variation. Superior effects for sitting reduction were seen for those intervention groups who implemented and engaged with the most intervention components and had the highest level of cluster implementation and engagement.
Edwardson et al. 2023.
International Journal of Behavioral Nutrition and Physical Activity, vol. 20, no. 1.

Keywords: Engagement; fidelity; intervention; sitting; workplace.
Evidence Level: 4B
Link: https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-023-01548-5

Participant and workplace champion experiences of an intervention designed to reduce sitting time in desk-based workers: SMART work & life.
Background: A cluster randomised controlled trial demonstrated the effectiveness of the SMART Work & Life (SWAL) behaviour change intervention, with and without a height-adjustable desk, for reducing sitting time in desk-based workers. Staff within organisations volunteered to be trained to facilitate delivery of the SWAL intervention and act as workplace champions. This paper presents the experiences of these champions on the training and intervention delivery, and from participants on their intervention participation. **Methods:** Quantitative and qualitative feedback from workplace champions on their training session was collected. Participants provided quantitative feedback via questionnaires at 3 and 12 month follow-up on the intervention strategies (education, group catch ups, sitting less challenges, self-monitoring and prompts, and the height-adjustable desk [SWAL plus desk group only]). Interviews and focus groups were also conducted at 12 month follow-up with workplace champions and participants respectively to gather more detailed feedback. Transcripts were uploaded to NVivo and the constant comparative approach informed the analysis of the interviews and focus groups. **Results:** Workplace

champions rated the training highly with mean scores ranging from 5.3/6 to 5.7/6 for the eight parts. Most participants felt the education increased their awareness of the health consequences of high levels of sitting (SWAL: 90.7%; SWAL plus desk: 88.2%) and motivated them to change their sitting time (SWAL: 77.5%; SWAL plus desk: 85.77%). A high percentage of participants (70%) reported finding the group catch up session helpful and worthwhile. However, focus groups highlighted mixed responses to the group catch-up sessions, sitting less challenges and self-monitoring intervention components. Participants in the SWAL plus desk group felt that having a height-adjustable desk was key in changing their behaviour, with intrinsic as well as time based factors reported as key influences on the height-adjustable desk usage. In both intervention groups, participants reported a range of benefits from the intervention including more energy, less fatigue, an increase in focus, alertness, productivity and concentration as well as less musculoskeletal problems (SWAL plus desk group only). Work-related, interpersonal, personal attributes, physical office environment and physical barriers were identified as barriers when trying to sit less and move more. **Conclusions:** Workplace champion and participant feedback on the intervention was largely positive but it is clear that different behaviour change strategies worked for different people indicating that a 'one size fits all' approach may not be appropriate for this type of intervention. The SWAL intervention could be tested in a broader range of organisations following a few minor adaptations based on the champion and participant feedback.

Edwardson et al. 2023.

International Journal of Behavioral Nutrition and Physical Activity, vol. 20, no. 1.

Keywords: Barriers; benefits; occupational; sedentary behaviour; workplace.

Evidence Level: 2A

Link: https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-023-01539-6

Physical Activity

This month we explore physical activity issues associated with lifetime occupational and recreational physical activity and risk of lymphoma, sickness absence, micronutrient and health status, ambulatory blood pressure, and the difference in physical activity behaviors between working from home and working at the office.

Lifetime occupational and recreational physical activity and risk of lymphoma subtypes: Results from the European Epilymph case-control study.

Background: Physical activity is known to convey protection against several cancers. However, results on the risk of lymphoma overall and its subtypes have been inconsistent. The aim of this study was to investigate occupational and recreational physical activity in relation to risk of lymphoma subtypes adjusting for established occupational risk factors. **Methods:** We applied standardized tools to assess energy expenditure at work and in recreational physical activities to the questionnaire information on lifetime work and exercise history in 1117 lymphoma cases, including Hodgkin lymphoma, and B-cell (including chronic lymphocytic leukemia, and multiple myeloma) and T-cell non-Hodgkin's lymphoma (NHL) subtypes, and 1207 controls who took part in the multicentre European EpiLymph case-control study. We calculated the risk of lymphoma (all subtypes), B-cell NHL and its most represented subtypes, and Hodgkin's lymphoma (all subtypes) associated with weekly average Metabolic Equivalent of Task (MET-hours/week) and cumulative MET-hours of lifetime recreational, occupational, and total physical activity, with unconditional logistic regression and polytomous regression analysis adjusting by age, centre, sex, education, body mass index, history of farm work and solvent use. **Results:** We observed an inverse association of occupational, and total physical activity with risk of lymphoma (all subtypes), and B-cell non-Hodgkin's lymphoma among women, and an upward trend in risk of Hodgkin's lymphoma with recreational and total physical activity among men, for which we cannot exclude chance or bias. **Conclusions:** Our results suggest no effect of overall physical activity on risk of lymphoma and its subtypes.

Meloni et al. 2023.

Cancer Epidemiology, vol. 87.

Keywords: B-cell lymphoma; chronic lymphocytic leukemia; diffuse large b-cell lymphoma; energy expenditure; exercise; follicular lymphoma; lymphoma; multiple myeloma; non-hodgkin's lymphoma; obesity; occupation.
Evidence Level: 4B
Link: https://www.sciencedirect.com/science/article/pii/S1877782123001753?via%3Dihub

The impact of leisure-time physical activity and occupational physical activity on sickness absence. A prospective study among people with physically demanding jobs.

Background: This prospective study aimed to investigate the relation between occupational physical activity (OPA), leisure-time physical activity (LTPA) and sickness absence (SA). A second aim was to explore the possible interaction effects between OPA and LTPA in determining SA. **Methods:** The study is based on data from 304 workers in the service and manufacturing sector. Moderate-to-vigorous physical activity (MVPA) was measured by two Axivity AX3 accelerometers for 2-4 consecutive working days. Participants reported on the level of their physically demanding tasks by using a 5-item scale from the Job Content Questionnaire. Data on SA was provided by the administration departments of the participating companies during a 1 year follow-up period. We used negative binomial regression models for our statistical analysis. **Results:** After adjusting for potential confounders, physically demanding tasks were significantly associated with a higher number of SA episodes and days. Accelerometer-assessed MVPA during leisure time but not during work was correlated with lower SA. Our results show a significant interaction effect between MVPA during work and leisure time in the sense that more MVPA during work increased the risk for SA days only among workers with low LTPA, but not among workers with moderate-to-high LTPA. **Conclusions:** Our results indicate that LTPA and OPA are related to opposite SA outcomes. MVPA during leisure time and work interact in their effect on SA, whereas we found no interaction effect between LTPA and self-reported physically demanding tasks in determining SA.

Ketels et al. 2023.
Scandinavian Journal of Work, Environment and Health, vol. 49, no. 8.

Keywords: Physical activity; sickness; absence; physically demanding jobs.
Evidence Level: 4A
Link: https://www.sjweh.fi/article/4120

The association between number of steps and the ambulatory blood pressure during leisure vs. work hours among cleaners.

Background: The physical activity paradox states occupational physical activity (OPA) to be hazardous and leisure time physical activity (LTPA) to be beneficial for health. Yet, the acute effects of OPA and LTPA on cardiovascular risk factors are sparsely investigated. The aim of this study was to investigate the acute effects on ambulatory blood pressure (ABP) from steps/hour during work and leisure time among cleaners. **Methods:** Data were obtained from a cluster randomized worksite intervention among 91 cleaners in Denmark and included a questionnaire, objective physical measurements, ABP (measured across 24 h), and steps/hour (measured during work and leisure time). A preliminary linear regression analysis was conducted as a mixed model including random intercept and slope, allowing for both within- and between-participant variability. We adjusted for sex, age, job seniority, medication use, smoking, self-reported fitness and BMI. Changes in ABP (mmHg) were estimated per 100 steps/hour. **Results:** The number of steps taken was not associated with ABP during either work or leisure. Moreover, the ABP did not seem to differ between exposure to steps taken during work (systolic - 0.42 mmHg, 95% Confidence Interval (CI): - 1.10-0.25, diastolic - 0.03 mmHg, 95% CI, - 0.45-0.39) and leisure time (systolic -0.47 mmHg, 95% CI, - 1.66-0.72, diastolic 0.25 mmHg, 95% CI, - 0.46-0.97). **Conclusion:** Our findings show no significant association between steps/hour and ABP and no contrasting effects between work and leisure time. These mechanisms fostering the divergent results need to be further investigated to improve the understanding of the physical activity paradox.

Poulsen et al. 2023.
International Archives of Occupational and Environmental Health, vol. 96, no. 10.

Keywords: Ambulatory blood pressure; cardiovascular disease; cleaners; physical activity paradox; walking.
Evidence Level: 2B
Link: https://link.springer.com/article/10.1007/s00420-023-02015-1

The association of physical activity level with micronutrient and health status of Austrian bank employees.

Background: Favorable health benefits of an active lifestyle have been clearly documented within the context of occupational health. However, a knowledge gap exists regarding the monitoring and comparison of micronutrient status across varying levels of physical activity (PA). This study aimed to investigate the association of PA level with micronutrient status and the associated health biomarkers among a cohort of Austrian bank employees. **Methods:** Using a cross-sectional design, this study involved the participation of bank employees (n = 123; average age: 43 years; 49% males) from the federal state of Tyrol, located in the western part of Austria. To assess PA levels and sedentary behavior, the Global Physical Activity Questionnaire (GPAQ; developed by the WHO) was administered. Accordingly, participants were categorized into three groups: low PA, moderate PA, and high PA. Participants' blood samples were obtained to measure blood levels of micronutrients, homocysteine, and CoQ10. The values of vitamins and minerals in whole-blood were compared to sex-specific reference ranges and grouped into three categories: below, within, or exceeding the reference range. **Results:** The prevalence of a high PA level was 61%, while 18% of participants had a low PA level. Overweight/obesity was significantly less prevalent among participants with high PA levels (22%) compared to those with moderate (50%) and low (50%) PA levels (p = 0.045). No significant differences between PA levels were found for sex, age, diet type, homocysteine, or CoQ10 markers (p > 0.05). There was no significant PA-based difference in blood concentrations of most vitamins and minerals (p > 0.05), except for vitamin D (p = 0.001) among females, as well as selenium (p = 0.040) and vitamin B12 (p = 0.048) among males. **Conclusion:** The present findings offer initial insights into the link between PA behaviors, micronutrient status, and health, highlighting potential implications in occupational health and lifestyle, specifically in developing tailored approaches based on PA levels.
Schauer et al. 2023.
Nutrients, vol. 15, no. 23.

Keywords: Coenzyme Q10; homocysteine; mineral; nutrition; occupation; physical exercise; sedentary lifestyle; sport; vitamin.
Evidence Level: 4A
Link: https://www.mdpi.com/2072-6643/15/23/4884

Hybrid office work in women and men: Do directly measured physical behaviors differ between days working from home and days working at the office?

Background: We investigated and compared temporal sitting patterns among male and female hybrid office workers when working at the office (WAO), working from home (WFH), and for non-working days (NWD). **Methods:** We analyzed data collected in 2020 among 165 hybrid office workers, carrying thigh-worn accelerometers for 938 days in total. Day type (WAO, WFH, or NWD) and time in bed were identified using diaries. Time awake was exhaustively classified as non-sitting time and time sitting in short, moderate, and long bouts. Effects of day type and gender on the 24-h compositions of physical behaviors were analyzed using multilevel linear mixed models. **Results:** During workdays (both WAO and WFH), workers spent less time in bed and more time sitting, particularly in moderate and long bouts, than during NWD. Time in bed was longer when working from home than when working at the office, and more of the awake time was spent sitting. Differences between WAO and WFH in ratios between short, moderate, and long bouts of sitting were small and inconsistent. Men spent more time sitting than women, and more time in moderate and long sitting bouts relative to short bouts. **Conclusions:** When working from home, hybrid office workers sat more during their hours awake compared to when working

at the office. Sitting time was larger during working days than during non-working days and was higher in men than in women. These results may contribute to support organizational policies for hybrid work.
Wahlström et al. 2023.
Annals of Work Exposures and Health, vol. 67, no. 9.

Keywords: Compositional data analysis; covid-19 pandemic; remote work; sedentary; temporal patterns; time in bed.
Evidence Level: 5B
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10683849/

Musculoskeletal Health

This month we explore sex differences in wrist strength the association between shoulder pain and occupational, physical activity, and mental health factors, upper limb fatigue estimation based on wearable sensors, the effect of work-rest schedules on muscle fatigue in material handling jobs and how employees with chronic musculoskeletal disorders experience the management of their condition in the workplace. In office-worker based research we explore the impact of daily yoga exercises on physical and mental discomfort, risk factors for carpal tunnel syndrome and related work disability, the association of neck and shoulder pain with Scapular Dyskinesis, the effect of height-adjustable sit-to-stand workstations and the impacts of posture changes on productivity.

Sex differences in wrist strength: A systematic review.
Background: Sex differences in strength have been attributed to differences in body anthropometrics and composition; these factors are often ignored when generating workplace guidelines. These differences directly impact the upper extremity, leaving female workers exposed to injury risk. The wide range of tools and techniques for measuring upper extremity strength presents a challenge to ergonomists and work task designers; collating outcomes to provide a clear outlook of differences between males and females is essential and the purpose of this work. **Methods:** Four online databases were searched (PROSPERO ID: CRD42022339023) with a focus on articles assessing sex differences in wrist strength. A total of 2,378 articles were screened for relevancy; 25 full-text articles were included in this systematic review. Articles examined movement pairs (ulnar/radial deviation, pronation/supination, and flexion/extension), as well as contraction types (isometric and isokinetic) to observe sex differences in wrist strength. **Results:** Across all articles, females produced ~60-65% of male flexion/extension strength, ~55-60% pronation/supination strength, and ~60-70% ulnar/radial deviation strength. Overall, females presented lower strength-producing abilities than males, but when considering strength relative to body mass, male-female differences were less pronounced and occasionally females surpassed male strength metrics; typically, this occurred during flexion/extension, particularly in isokinetic contractions
Conclusions: This review has identified a scarcity of articles examining ulnar/radial deviation, pronation/supination, as well as isokinetic contractions; these are needed to supplement workplace exposure guidelines.
Napper et al. 2023.
PeerJ, vol. 11.

Keywords: Sex differences; strength; wrist.
Evidence Level: 1A
Link: https://peerj.com/articles/16557/

Testing the association between shoulder pain prevalence and occupational, physical activity, and mental health factors in two generations of Australian adults.
Background: Shoulder pain is common among the adult population, but it appears to reduce in prevalence around retirement age. Associations between shoulder pain and work-place exposures, physical activity, or mental health status are unclear and may change with age. This study aimed to

determine the prevalence of self-reported shoulder pain in Australian adults across two generations and test the association with occupational factors, physical activity, and mental health. **Methods:** In this cross-sectional study we used data from a longitudinal Australian pregnancy cohort (the Raine Study). We analysed data from the children (Gen2) at the 22-year follow-up (N = 1128) and parents (Gen1) at the 26-year follow-up (N = 1098). Data were collected on self-reported shoulder pain, occupational factors (employment status and work description), physical activity, and mental health at the respective follow-ups. Prevalence rates were provided as percentages with 95% confidence intervals. Univariate analysis for group comparisons included chi squared for categorical comparisons. The association of predictor variables and shoulder pain was assessed using logistical regression. **Results:** In Gen1 31.4% of adults aged 40-80 reported the presence of shoulder pain in the last month, with no significant difference between females and males. Gen1 participants younger than 65 reported more shoulder pain (OR[95%CI] = 1.80 [1.04-3.09]). Gen2 females (14.7%) reported shoulder pain in either shoulder more frequently than males (7.7%) and bilateral shoulder pain (8.0%) more frequently than males (1.9%). Gen1 had increased odds of reporting shoulder pain if their work was "physical or heavy manual" compared to "sedentary" (OR [95% CI] = 1.659 [1.185-2.323]) and when categorised with depression (OR [95% CI] = 1.940 [1.386-2.715]) or anxiety (OR [95% CI] = 1.977 [1.368-2.857]). Gen2 participants with depression (OR [95% CI] = 2.356 [1.620-3.427]) or anxiety (OR [95% CI] = 2.003 [1.359-2.952]) reported more shoulder pain. **Conclusion:** Overall, shoulder pain was more prevalent in young females than males and was more prevalent in those under the age of 65. Cross-sectional associations were established between some occupational factors in older adults and depression in all adults, and shoulder pain.

Hodgetts et al. 2023.

Chiropractic & Manual Therapies, vol. 31, no. 1.

Keywords: Anxiety; depression; epidemiology; occupation; occupational factors; physical activity; prevalence; shoulder pain.

Evidence Level: 4A

Link: https://chiromt.biomedcentral.com/articles/10.1186/s12998-023-00520-1

Impact of 10-min daily yoga exercises on physical and mental discomfort of home-office workers during COVID-19.

Background: Evaluate the effects of 10 min/day of yoga for 1 month on musculoskeletal discomfort and mood disturbance of home-office workers. The COVID-19 pandemic forced many people to switch to teleworking. The abrupt change from an office setting to an improvised home-office may negatively affect the musculoskeletal and emotional health of workers. By providing mental and physical exercises, yoga may be effective in reducing adverse effects. **Method:** Fifty-four participants (42 women, 12 men) followed a 1-month yoga program, while 40 participants (26 women, 14 men) continued with their common work routine. The Cornell Musculoskeletal Discomfort Questionnaire was used to evaluate severity, interference with work and frequency of pain, and to obtain a total discomfort score for 25 body areas. Mood disturbance was evaluated with the Profile of Mood States questionnaire. Both groups completed both questionnaires, before and after the experimentation period. **Results:** After 1 month, for the yoga group only, significant reductions were observed in the discomfort of eyes, head, neck, upper and lower back, right wrist, and hips/buttocks, as well as reductions in discomfort severity, frequency and interference for the neck, upper and lower back. Total mood disturbance was also significantly reduced for the yoga group only. No favorable changes occurred for the control group. **Conclusion:** The yoga intervention program appears to reduce musculoskeletal discomfort and mood disturbance of home-office workers. **Application:** Sedentary workers may benefit from 10 min/day of yoga during the workday to attenuate potential physical and emotional discomfort during the current pandemic and beyond.

Gabriela-Garcia et al. 2023.

Human Factors, vol. 65, no. 7.

Keywords: Emotional state; musculoskeletal discomfort; office workers; teleworking; yoga.

Evidence Level: 3A

Link: https://journals.sagepub.com/doi/full/10.1177/00187208211045766

Occupational and non-occupational risk factors correlating with the severity of clinical manifestations of carpal tunnel syndrome and related work disability among workers who work with a computer.
Background: The contribution of certain occupational and personal factors to the development of carpal tunnel syndrome (CTS) is still uncertain. We investigated which specific occupational and non-occupational factors correlate with the level of clinical manifestations and work disability related to CTS. **Methods:** The study included 190 workers who work with a computer and have diagnosed CTS (100 men, 90 women, aged 20-65 years). Subjective experience of CTS-related impairments was assessed with the Symptom Severity Scale (SSS) and the Functional Status Scale (FSS) of the Boston Carpal Tunnel Syndrome Questionnaire (BCTQ). The objective, neural impairments were tested with electrodiagnostics (EDX), whereas CTS-related work disability data were collected from medical records. **Results:** We found a high inter-correlation between BCTQ, EDX, and work disability data. These also showed high correlations with certain occupational factors (duration of computer-working in months and hours spent daily in computer-working, certain ergonomic, microclimatic, and other occupational conditions) and non-occupational factors (demographic and lifestyle factors: nutritional status, diet, smoking, alcohol consumption, and physical activity). Despite its limitations, our study has identified occupational and non-occupational risk factors that can aggravate CTS and work disability, but which can also be improved with workplace and lifestyle preventive and corrective measures. **Conclusions:** More research is needed, though, to establish the possible causal relationships and the independent influence of each of those risk factors.
Çupi et al. 2023.
Archives of Industrial Hygiene and Toxicology, vol. 74, no. 4.

Keywords: Boston Carpal Tunnel Syndrome questionnaire; nerve compression; nerve conduction; occupational exposure; sick leave.
Evidence Level: 4B
Link: https://sciendo.com/article/10.2478/aiht-2023-74-3754?content-tab=article

Neck and shoulder pain with Scapular Dyskinesis in computer office workers.
Background and Objectives*:* Computer office workers spend long periods in front of a computer, and neck and shoulder pain are common. Scapular dyskinesis (SD) is associated with neck and shoulder pain. However, SD in computer office workers has not been elucidated. We aimed to investigate the prevalence of SD, neck and shoulder pain, disability, and working hours in computer office workers. **Materials and Methods:** In total, 109 computer office workers participated in this study. The results of a scapular dyskinesis test (SDT), lateral scapular slide test (LSST), neck disability index (NDI), shoulder pain and disability index (SPADI), visual analog scale (VAS) scores of the neck and shoulder, and working hours were recorded. **Results***:* Ninety-eight computer office workers (89.9%) had SD. Computer office workers with SD had significantly higher NDI (p = 0.019), neck VAS (p = 0.041), and dominant shoulder VAS scores (p = 0.043). The LSST results showed a significantly greater distance (p = 0.016) in participants with SD. **Conclusions***:* The prevalence of SD was very high in computer office workers, and neck and shoulder pain were more prevalent in workers with obvious SD.
Moon et al. 2023.
Medicina, vol. 59, no. 12.

Keywords: Computer office workers; neck pain; scapular dyskinesis; shoulder pain.
Evidence Level: 5A
Link: https://www.mdpi.com/1648-9144/59/12/2159

Data-driven approach for upper limb fatigue estimation based on wearable sensors.
Background: Muscle fatigue is defined as a reduced ability to maintain maximal strength during voluntary contraction. It is associated with musculoskeletal disorders that affect workers performing repetitive activities, affecting their performance and well-being. Although electromyography remains the gold

standard for measuring muscle fatigue, its limitations in long-term work motivate the use of wearable devices. **Methods:** This article proposes a computational model for estimating muscle fatigue using wearable and non-invasive devices, such as Optical Fiber Sensors (OFSs) and Inertial Measurement Units (IMUs) along the subjective Borg scale. Electromyography (EMG) sensors are used to observe their importance in estimating muscle fatigue and comparing performance in different sensor combinations. This study involves 30 subjects performing a repetitive lifting activity with their dominant arm until reaching muscle fatigue. Muscle activity, elbow angles, and angular and linear velocities, among others, are measured to extract multiple features. Different machine learning algorithms obtain a model that estimates three fatigue states (low, moderate and high). **Results:** Results showed that between the machine learning classifiers, the LightGBM presented an accuracy of 96.2% in the classification task using all of the sensors with 33 features and 95.4% using only OFS and IMU sensors with 13 features. This demonstrates that elbow angles, wrist velocities, acceleration variations, and compensatory neck movements are essential for estimating muscle fatigue **Conclusions:** In conclusion, the resulting model can be used to estimate fatigue during heavy lifting in work environments, having the potential to monitor and prevent muscle fatigue during long working shifts.
Otálora et al. 2023.
Sensors, vol. 23, no. 22.

Keywords: Optical Fiber Sensors; electromyography; inertial sensors; machine learning; muscle fatigue.
Evidence Level: 5B
Link: https://www.mdpi.com/1424-8220/23/22/9291

Ukumela impilo randomised trial: Preliminary findings of height-adjustable sit-to-stand workstations on health outcomes of South African office workers.
Background: The prevalence of sedentary behaviour has concurrently risen with multiple cardiometabolic risk markers independent of physical activity levels. Office-based workers accumulate the highest levels of sitting time during occupational times. This study aims to investigate the short-term effects of using height-adjustable sit-to-stand workstations on cardiometabolic risk markers of office-based workers in South Africa. **Results:** Sixty-two office-based workers were randomized into intervention (n = 44), and the control group (n = 18). Small improvements were observed in BMI, blood pressure, and cholesterol levels in this cohort. **Conclusion:** This preliminary investigation confirms that short-term height-adjustable sit-stand interventions are effective in reducing workplace sitting time and selected health outcomes. South Africa has been attributed with the highest burden of obesity in Sub-Saharan Africa, as a result, there is a need to implement long-term workplace intervention to reverse these implications. **Trial registration:** Pan African Clinical Trial Registry, PACTR201911656014962 on the 12th of November 2019.
Phaswana et al. 2023.
BMC Research Notes, vol. 16, no. 1.

Keywords: Cardiometabolic outcomes; height adjustable sit-to-stand workstation; office-based workers; sedentary behaviour; South Africa.
Evidence Level: 3B
Link: https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-023-06642-2

Quantifying the impacts of posture changes on office worker productivity: An exploratory study using effective computer interactions as a real-time indicator.
Background: Working in a standing posture is considered to improve musculoskeletal comfort and can help enhance office workers' performance in the long term. However, there is a lack of a quantitative, real-time measure that reflects on whether office workers can immediately become more concentrated and work more efficiently when they switch to a standing posture. **Methods:** To tackle this problem, this study proposed that the number of effective computer interactions could be used as a real-time indicator to measure the productivity of office workers whose work is primarily computer-based. Using this metric, we conducted an exploratory study to investigate the correlation between posture and productivity changes at a 10-minute resolution for eight participants. **Results:** The study found that when allowed to

use sit-stand desks to adjust postures, participants chose to switch to standing posture for about 47 min on average once a day; standing work was most frequent between 2:30 - 4:00 pm, followed by 10:30 - 11:30 am, during which time the number of computer interactions also became higher, showing a significant positive correlation. In addition, participants were approximately 6.5% more productive than when they could only work in a sitting posture. **Conclusion:** This study revealed that posture changes could have an immediate improvement in productivity.
Wang et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Computer interaction; office workers; postures; quantitative approach; sit-stand desk; work productivity.
Evidence Level: 3B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17100-w

Breaking the fatigue cycle: Investigating the effect of work-rest schedules on muscle fatigue in material handling jobs.
Background: Muscle fatigue has proven to be a main factor in developing work-related musculoskeletal disorders. Taking small breaks or performing stretching routines during a work shift might reduce workers' fatigue. Therefore, our objective was to explore how breaks and/or a stretching routine during a work shift could impact muscle fatigue and body kinematics that might subsequently impact the risk of work-related musculoskeletal disorder (WMSD) risk during material handling jobs. **Methods:** We investigated muscle fatigue during a repetitive task performed without breaks, with breaks, and with a stretching routine during breaks. Muscle fatigue was detected using muscle activity (electromyography) and a validated kinematic score measured by wearable sensors. **Results:** We observed a significant reduction in muscle fatigue between the different work-rest schedules ($p < 0.01$). Also, no significant difference was observed between the productivity of the three schedules. **Conclusions:** Based on these objective kinematic assessments, we concluded that taking small breaks during a work shift can significantly reduce muscle fatigue and potentially reduce its consequent risk of work-related musculoskeletal disorders without negatively affecting productivity.
Beltran Martinez et al. 2023.
Sensors, vol. 23, no. 24.

Keywords: Electromyography; muscle fatigue; musculoskeletal disorders; wearable inertial measurement units; work–rest schedule.
Evidence Level: 5B
Link: https://www.mdpi.com/1424-8220/23/24/9670

How do employees with chronic musculoskeletal disorders experience the management of their condition in the workplace? A metasynthesis.
Background and Methods: This metasynthesis contributes to an understanding of the experiences, perceptions, and attitudes of employees on managing chronic musculoskeletal disorders (CMSDs) at work. Many studies in this field are concerned with prevention or return-to-work (RTW) programmes. However, the purpose of this review was to synthesise evidence that only focuses on the employees' management of their CMSDs at work. The SPIDER framework was used to structure the question "How do employees with CMSDs experience the management of their condition in the workplace"? The literature search focused on articles published between 2011 and 2021, and the search was conducted using the following databases: MEDLINE, SCOPUS, CINAHL, AMED, PsycINFO. **Results:** The review identified nine articles that explored employees' experiences of managing CMSDs at work. Thematic synthesis was used to create analytic themes which provided a more in-depth discussion of these experiences. The identified themes were: 'employees actively seek ways to manage their conditions', 'influence of work environment on employees with CMSDs' and 'optimising the relationship between employees and managers. **Conclusions:** This metasynthesis suggests that the ability to negotiate workplace support and manage CMSDs at work is influenced by the cultural and social environment of the organisation. Effective communication, care and

trust between the employee is needed. The review also illustrated the need for healthcare professionals to provide support to employees at work.
Skamagki et al. 2023.
Journal of Occupational Rehabilitation, vol. 33, no. 4.

Keywords: Chronic musculoskeletal diseases; management; qualitative research; workplace.
Evidence Level: 1A
Link: https://link.springer.com/article/10.1007/s10926-023-10099-2

Guiding and Supporting Mental Health and Wellbeing

Mental Health

This month we explore mental health issues related to borderline personality disorder, work addiction, upper airway-related symptoms, job satisfaction and job tenure, male suicide risk, precarious employment, the relationship between employment and the outcome of brief therapy and mental healthcare use. In Covid-19 related research we explore changes in anxiety and depression among public health workers, the prevalence of obsessive-compulsive disorders (OCD) symptoms among health care workers , the impact on worker stress in human service organizations, job burnout among primary healthcare workers, the influence of meaningful work on the mental health of SME employees and the psychosocial work environment and mental health among seafarers.

Employment interventions to assist people who experience borderline personality disorder: A scoping review.
Background: Employment is an important social determinant of health and is associated with positive health outcomes. However, individuals who have been diagnosed with borderline personality disorder (BPD) are significantly underrepresented in the workforce. Whilst there is an array of evidence based therapeutic interventions, there remains a gap in knowledge regarding the most effective ways to enhance employment outcomes for people with a diagnosis of BPD. **Aim:** To explore employment interventions for people with BPD, map the available evidence and identify key concepts and knowledge gaps. **Methods:** A scoping review was conducted to identify and map the relevant literature. Findings were summarised using a narrative approach. Consultation was provided by a reference group including peer support workers with lived experience of BPD and mental health clinicians. **Results:** Seven articles met the inclusion criteria, including non-randomised and case study/series designs and a randomised controlled trial protocol, with participant numbers generally low. All programmes combined a psychotherapeutic component with work related goals; however, there were notable differences in relation to the conceptual/theoretical approach of the psychotherapeutic component and delivery of the work-related components. Barriers and enablers to programme participation and success are explored. **Conclusions:** This review provides important insights into the characteristics of vocational rehabilitation interventions for people diagnosed with BPD. The findings will inform the co-production of approaches to support people with BPD to engage in employment.
Kernot et al. 2023.
International Journal of Social Psychiatry, vol. 69, no. 8.

Keywords: Borderline personality disorder; employment interventions; health.
Evidence Level:
Link: https://journals.sagepub.com/doi/full/10.1177/00207640231189424

The neuropsychological profile of work addiction.
Background: The objective of this study was to examine, for the first time, the neuropsychological aspects of work addiction, with a specific emphasis on the cognitive factors identified by theoretical models.
Methods: While previous research has highlighted self-reported obsessiveness and impulsiveness in work

addiction, this study sought to go beyond self-report measures by employing also neuropsychological reaction time tasks to assess executive functions. A total of 101 participants were categorized into two groups based on their Work Addiction Risk Test scores: a high-risk group (HWA; n = 39) and a low-risk group (LWA; n = 62) for work addiction. Executive functions were assessed using Go/No-Go, Digit Span, Counting Span, N-back, and Card Sorting Tasks. **Results:** The findings revealed that the HWA group had poorer inhibitory control and achieved lower scores on the more complex working memory task involving updating (2-back). However, they exhibited unaltered cognitive flexibility and outperformed the LWA group on the 1-back task associated with maintenance and storage of information and sustained attention. Higher levels of impulsiveness and compulsiveness were observed in the HWA group, consistent with previous studies. These findings highlight the role of inhibition and working memory in work addiction, potentially contributing to challenges such as inefficient working strategies and impaired social functioning. **Conclusions:** This study offers valuable insights into the neurocognitive aspects of work addiction, deepening our understanding of this phenomenon.
Berta et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Work addition; neuropsychological; cognitive.
Evidence Level: 3B
Link: https://www.nature.com/articles/s41598-023-47515-9

Upper airway-related symptoms according to mental illness and sleep disorders among workers employed by a large non-profit organization in the mountain west region of the United States.
Background: The relationships between selected upper airway-related symptoms (speech disturbances, voice disorders, cough, and breathing abnormalities) and mental illness and sleep disorders have been previously demonstrated. However, these relationships have not been compared in a single study with consideration of potential confounding variables. **Methods:** The current research incorporates a descriptive study design of medical claims data for employees (~21,362 per year 2017-2021) with corporate insurance to evaluate the strength of these relationships, adjusting for demographic variables and other important confounders. **Results:** The upper airway-related symptoms are each significantly and positively associated with several mental illnesses and sleep disorders, after adjusting for demographic and other potential confounders. The rate of any mental illness is 138% (95% CI 93-195%) higher for speech disturbances, 55% (95% CI 28-88%) higher for voice disorders, 28% (95% CI 22-34%) higher for cough, and 58% (95% CI 50-66%) higher for breathing abnormalities, after adjustment for the confounding variables. Confounding had significant effects on the rate ratios involving cough and breathing abnormalities. The rate of any sleep disorder is 78% (95% CI 34-136%) higher for speech disturbances, 52% (95% CI 21-89%) higher for voice disorders, 34% (95% CI 27-41%) higher for cough, and 172% (95% CI 161-184%) higher for breathing abnormalities, after adjustment for the confounding variables. Confounding had significant effects on each of the upper airway-related symptoms. Rates of mental illness and sleep disorders are positively associated with the number of claims filed for each of the upper airway-related symptoms. **Conclusions:** The comorbid nature of these conditions should guide clinicians in providing more effective treatment plans that ultimately yield the best outcome for patients.
Merrill et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 24.

Keywords: Confounder; medical claim; mental illness; rates; sleep disorder.
Evidence Level: 4B
Link: https://www.mdpi.com/1660-4601/20/24/7173

Job satisfaction and job tenure of people with mental health disorders: A UK Biobank cohort study.
Background: Job satisfaction plays an important role for the life quality and health of working individuals. While studies have shown that self-reported mental health conditions such as stress, anxiety and depression are associated with job satisfaction, a large population-based study exploring and comparing self-reported physician posed diagnosed conditions and their association with job satisfaction and job

tenure is missing. This study addresses the gap along with exploring the impact of the neurotic personality trait and other possible contributing factors. **Methods:** Sixteen mental health disorders diagnosed by physicians, categorised into four major groups were investigated in relation to employment status (108,711 participants) and in relation to job satisfaction and job tenure (34,808 participants). Analyses were performed using linear regression adjusted for age, sex, townsend deprivation index, body mass index, education, physical activity, work hours and neuroticism. **Results:** Neurotic and stress disorders, eating disorders and other mental health disorders were strongly associated with lower job satisfaction and shorter job tenure in both unadjusted and adjusted analyses. Neuroticism was strongly linked to job satisfaction but was not associated with job tenure. **Conclusions:** Study findings clarify the complex relationship of mental health with job satisfaction and job tenure, which is very important to understand in designing measures to improve working life participation of individuals with mental health issues.
Mohammad et al. 2023.
Scandinavian Journal of Public Health, vol. 51, no. 8.

Keywords: Anxiety; depression; eating disorder; employment; job satisfaction; job tenure; mental illness; mood disorder; neuroticism; occupation; schizophrenia; stress disorder.
Evidence Level: 4B
Link: https://journals.sagepub.com/doi/full/10.1177/14034948221119639

Occupational class differences in male suicide risk in Finland from 1970 to 2019.
Background: In the last few decades, suicide rates have decreased in most European countries. However, periodic changes in risk by occupational class have not been studied as much in detail. **Methods:** Representative cohorts of Finnish working-age men were followed for nine years on suicide mortality starting from five different census years (1970, 1980, 1990, 2000, 2010). Each cohort included between 300 970 and 332 318 men. Cox regression modelling was used to estimate hazard ratios by census year, occupational class and their interactions. Further models adjusted for age and its interactions with census year and occupational class. **Results:** The risk of male suicide has more than halved between 1991 and 2019. The relative hazard ratio of suicide in manual workers compared to managers and professionals was around 1.6 to 1.8 times higher. The period when the suicide risk started to decline differed by occupational class: a significant decrease compared to 1970s' levels was seen for managers and professionals already in the 1990s and for lower non-manual employees around 10 years later (in the 2000s). Manual workers only reached the 1970s suicide risk of managers and professionals in the 2000s and 2010s. **Conclusion:** A delayed reduction of suicide rates among lower occupational classes suggests that the impact of social changes can occur at different speed in different population groups.
Raittila et al. 2023.
European Journal of Public Health, vol. 33, no. 6.

Keywords: Suicide risk; male; Europe; occupational class.
Evidence Level: 4B
Link: https://academic.oup.com/eurpub/article/33/6/1014/7295465?login=true

Precarious employment in early adulthood and later mental health problems: A register-linked cohort study.
Background: Precarious employment is a determinant of self-reported mental health problems among young adults. Less is known about more severe and objectively measured health outcomes, such as mental health problems requiring inpatient care. The current study aims to investigate the effect of precarious employment in early adulthood on later mental health problems requiring inpatient care. **Method:** A register-based cohort study, based on the Swedish Work, Illness and Labor-market Participation cohort, was conducted, following a cohort of young adults aged 27 years between 2000 and 2003 (born between 1973 and 1976) (n=339 403). Information on labour market position in early adulthood (precarious employment, substandard employment, unemployment and standard

employment) was collected from registers 3 years after graduating from school. Information on the outcome of mental health problems (depression, anxiety and stress-related disorders) was collected from the National Patient Register. HRs with 95% CIs were obtained by Cox regression analyses. **Results:** After adjusting for important covariates, such as prior mental health problems, compared with individuals in standard employment, individuals who were precariously employed in early adulthood had an increased risk of later mental health problems ($HR_{adjusted}$: 1.51 95% CI 1.42 to 1.60). The association between precarious employment and mental health was slightly stronger for males. **Conclusions:** In Sweden, entry into the labour market with precarious employment is associated with an increased risk of mental health problems, which is important given that precarious employment is becoming more prevalent among young adults.

Thern et al. 2023.

Journal of Epidemiology and Community Health, vol. 77, no. 12.

Keywords: Depression; employment; epidemiology; stress.

Evidence Level: 4B

Link: https://jech.bmj.com/content/77/12/755.long

Changes in anxiety and depression among public health workers during the COVID-19 pandemic response.

Background: The COVID-19 pandemic has negatively impacted mental health indicators, leading to an increase in symptoms of anxiety and depression in both the general population of adults and children and many occupational groups. This study aims to examine changes in anxiety and depression among a cohort of public health workers in the U.S. during the first year of the COVID-19 pandemic and identify potential risk factors. **Methods:** Longitudinal data were collected from a sub-sample (N = 85) of public health workers in 23 U.S. states who completed two surveys in 2020 and 2021. Information on background characteristics, personal well-being, and work environment as well as validated scales to assess generalized anxiety disorder (GAD), depressive disorder, and burnout was collected. Data were analyzed using Stata Version 17, and significant differences were determined using Pearson's Chi^2 and Fisher's Exact tests. **Results:** The proportion of those reporting GAD (46.3% to 23.2%) or depression (37.8% to 26.8%) improved from Survey 1 to Survey 2 overall; symptoms of anxiety saw the largest improvement. Persistent depression was associated with sustained burnout, changes in social support, and days worked per week. **Conclusion:** Public health workers experienced elevated levels of anxiety and depression during the initial pandemic response, but a reduction in these symptoms was observed in the subsequent year after vaccines had become widely available. However, unmet needs remain for ongoing workplace mental health supports to address burnout, as well as for additional emotional supports outside of work for public health professionals.

Stone et al. 2023.

International Archives of Occupational and Environmental Health, vol. 96, no. 9.

Keywords: Anxiety; COVID-19; depression; longitudinal; public health; workforce.

Evidence Level: 4B

Link: https://link.springer.com/article/10.1007/s00420-023-02002-6

The relationship between having a job and the outcome of brief therapy in patients with common mental disorders.

Background: Previous studies have shown that being employed is associated not only with patients' health but also with the outcome of their treatment for severe mental illness. This study examined what influence employment had on improvements in mental health and functioning among patients with common mental disorders who received brief treatment and how patients' diagnosis, environmental and individual factors moderated the association between being employed and treatment outcome. **Methods:** The study used naturalistic data from a cohort of patients in a large mental health franchise in the Netherlands. The data were obtained from electronic registration systems, intake questionnaires and

Routine Outcome Monitoring (ROM). The International Classification of Functioning, Disability and Health (ICF) framework was used to identify potential subgroups of patients. Logistic regression models were used to analyze the relationship between employment status and treatment outcome and to determine how the relationship differed among ICF subgroups of patients. **Results:** A strong relationship was found between employment status and the outcome of brief therapy for patients with common mental disorders. After potential confounding variables had been controlled, patients who were employed were 54% more likely to recover compared to unemployed patients. Two significant interactions were identified. Among patients who were 60 years of age or younger, being employed was positively related to recovery, but this relationship disappeared in patients older than 60 years. Second, among patients in all living situations there was a positive effect of being employed on recovery, but this effect did not occur among children (18+) who were living with a single parent. **Conclusions:** Being employed was positively associated with treatment outcome among both people with a severe mental illness and those with a common mental disorder (CMD). The main strength of this study was its use of a large dataset from a nationwide franchised company. Attention to work is important not only for people with a severe mental illness, but also for people with a CMD. This means that in addition to re-integration methods that focus on people with a severe mental illness, more interventions are needed for people with a CMD.
van Oosten et al. 2023.
BMC Psychiatry, vol. 23, no. 1.

Keywords: Brief therapy; common mental disorders; employment status; recovery.
Evidence Level: 4B
Link: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-023-05418-z

The impact of employment on mental healthcare use among people with disability: Distinguishing between part- and full-time employment.
Background: Employment can improve mental health among people with disability (PWD), however, little is known about how different levels of workforce participation influence mental healthcare use. The aim of this study was to estimate the extent to which different levels of working hours are associated with changes in mental healthcare use among PWD. **Methods:** Data on working hours and healthcare use among working age PWD who were receiving government benefits (N=260 825) was obtained from Australian Census-linked administrative records between 2011 and 2019. Individual fixed effects panel models were used to estimate the impact of increased working hours on mental healthcare (services and prescriptions). Heterogeneity analyses by job security and key sociodemographic characteristics were conducted. **Results:** Compared to not working, we found that working 1-14, 15-29, and ≥30 hours per week was respectively associated with a 3.3%, 18.0%, and 9.9% reduction in the use of mental healthcare prescriptions as well as a 6.8%, 18.4%, and 22.3% reduction in the use of mental healthcare services by PWD. The effects were larger for PWD in more secure work and those living in rural and disadvantaged areas. **Conclusions:** Working more hours was associated with reduced mental healthcare use among PWD. Policy interventions should consider the broader benefits of enabling part-time and secure work placements for PWD, particularly for those living in rural and disadvantaged regions.
Saxby et al. 2023.
Scandinavian Journal of Work, Environment and Health, vol. 49, no. 8.

Keywords: Mental healthcare; disability; employment.
Evidence Level: 4A
Link: https://www.sjweh.fi/article/4123

Bridging the mental health gap: Unveiling and mitigating the hidden toll of workplace behaviors on diverse populations.
Background: This study investigates the critical issue of mental health disparities within diverse populations in modern workplaces, a concern that significantly affects both individuals and organizational structures. **Methods:** By focusing on how prevailing workplace behaviors, including implicit biases, microaggressions, and the scarcity of diversity in leadership, exacerbate these disparities, the research

highlights the urgent need for attention and action in this area. The mental health gap-disparities in conditions and access to care among different workplace groups emerges from systemic inequalities and stigmatization, deeply influencing employee productivity, creativity, collaboration, and retention. **Results:** Our research underscores the disproportionate impact of this gap on diverse populations, characterized by varying ethnicity, gender, age, socio-economic status, and other unique identity attributes. The paper articulates the substantial economic repercussions for organizations, manifesting as reduced productivity, increased absenteeism, and higher turnover rates. Recommendations include the implementation of cultural competency training, promotion of inclusive leadership, investment in tailored mental health resources and fostering open dialog about mental health. These strategies are pivotal in creating an inclusive, resilient, and harmonious work environment. **Conclusions:** Our findings aim to catalyze a shift in organizational practices toward mental well-being, advocating for comprehensive strategies to bridge the mental health divide in workplaces, thereby enhancing overall organizational health and cohesion.
Zou 2023.
Frontiers in Public Health, vol. 11.

Keywords: Implicit biases; inclusive leadership; mental health disparities; organizational behavior; workplace diversity.
Evidence Level: 6B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1308099/full

The gendered associations between precarious employment and mental health in working-age Australians: A longitudinal analysis using 16 waves of the HILDA survey.
Background: Unemployment and precarious employment (PE) are routinely found to be associated with poorer mental health. Importantly, women are over-represented in PE (due to disproportionate unpaid care demands), yet a gender lens has been lacking in much of the extant literature. **Methods:** This study addresses several gaps by reconsidering how PE can be conceptualised from a gender perspective and examining the impact of differing levels of multidimensional PE on the mental health of working-age Australians. Utilising sixteen annual waves (2005-2020) of the HILDA survey, this longitudinal study employed mixed-effects analysis and Mundlak modelling to examine the association between PE and mental health in working-age (25-64yrs) adults. Mental health was assessed using the MHI-5 scale. A multidimensional PE scale (based on objective and subjective indicators) was developed and three levels of precarity were modelled. **Results:**19,442 participants were included in the analyses and all models were stratified by gender. We found women experience greater exposure to PE in Australia, and our results showed a ubiquitously strong and negative association between PE and mental health in both women and men, across all levels of PE, with a dose dependent association observed with increasing PE. Additional adjustment for prior mental health slightly attenuated effect sizes, but the strength and direction of all associations were unchanged. This study provides longitudinal evidence of the detrimental impact of PE on the mental health of working age Australians, highlighting the importance of labour regulations and employment policies to minimize PE for all adults. **Conclusions:**However, given women's differential exposure to PE, this study also reinforces the urgent need for gender-sensitive social policies to address continued inequity in the division of unpaid household labour to promote a more equitable paid labour market into the future.
Ervin et al. 2023.
Social Science & Medicine, vol. 339.

Keywords: Australia; gender; longitudinal; mental health; mixed effects; precarious employment.
Evidence Level: 4A
Link: https://www.sciencedirect.com/science/article/pii/S0277953623007396?via%3Dihub

Prevalence of obsessive-compulsive disorders (OCD) symptoms among health care workers in COVID-19 pandemic: A systematic review and meta-analysis.

Background: Obsessive Compulsive Disorder (OCD) symptoms are among the serious mental health challenges that Health Care Workers (HCWs) faced during the COVID-19 pandemic. As these symptoms reduce the mental well-being and effectiveness of HCWs which are followed by poor health outcomes for patients, the aim of this systematic review and meta-analysis was to determine the prevalence of OCD symptoms among HCWs worldwide. **Methods:** PubMed, Google Scholar, Cochrane, Scopus, Web of Science, ProQuest, Emerald, and ERIC databases were searched using related keywords till the end of October 2021. Observational studies about the prevalence of OCD symptoms among healthcare workers during the COVID-19 pandemic were screened and evaluated. In order to assess the quality of studies, the Newcastle-Ottawa scale (NOS) checklist was used. The effect measure was the prevalence rate with a 95% confidence interval (CI). **Results:** A total of 7864 individuals from 11 studies were included. The range of OCD symptoms prevalence across these studies was from 0.07 to 0.47. Due to the high heterogeneity between the studies (I^2 = 98.6%, P < 0.01), the random effects model was used. The pooled prevalence was 0.29 (95% CI: 0.22-0.38) based on logit transformed CI. **Conclusions:** The pooled prevalence of OCD symptoms was 29% among the HCWs during the COVID-19 pandemic. This prevalence was higher than the general population according to the pre-pandemic literature, but lower than the recent reports amid the pandemic. Psychosocial interventions are suggested to be designed and implemented in such conditions.

Soleimanvandi Azar et al. 2023.
BMC Psychiatry, vol. 23, no. 1.

Keywords: COVID-19; health care workers; Meta-analysis; OCD; Obsessive compulsive disorder symptoms**;** Systematic reviews.
Evidence Level: 1A
Link: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-023-05353-z

COVID-19's impact on worker stress in human service organizations: The mediating role of inclusion.

Background: Human service organizations faced extraordinary challenges due to COVID-19. Despite the increasing interest and research in this new scenario, there has been limited discussion about the impact of COVID-19 on workers, the challenges they faced, and the resulting stress. **Methods:** This study aimed to analyze the impact of COVID-19 on work-related stress and the mediating role of inclusion among workers in human service organizations in Chile during the pandemic. The research design was quantitative and involved a sample of 173 workers from civil society organizations who were contacted during the pandemic. **Results:**The study confirmed that individuals most affected by the pandemic experienced higher levels of work-related stress, and that inclusion played a negative mediating role in this relationship. **Conclusions:** This article highlights the importance of relationships, decision-making processes, and access to information in reducing stress in post-COVID scenarios for organizations that traditionally handle crises.

Calderón-Orellana et al. 2023.
PLoS One, vol. 18, no. 12.

Keywords: COVID-19; stress; human service organizations; inclusion.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295743

Job burnout among primary healthcare workers during COVID-19 pandemic: Cross-sectional study in China.

Background: This study evaluated job burnout among primary healthcare workers (PHCWs) in China during the COVID-19 pandemic, explored its influencing factors, and examined PHCWs' preferences for reducing job burnout. **Method**: We conducted a multicenter cross-sectional study in Heilongjiang, Sichuan, Anhui, Gansu, and Shandong Provinces. An electronic questionnaire survey was conducted through convenience sampling in communities from May to July 2022. We collected sociodemographic

characteristics, job burnout level, job satisfaction, and preferred ways to reduce job burnout among PHCWs. **Results**: The job burnout rate among PHCWs in China was 59.87% (937/1565). Scores for each dimension of job burnout were lower among PHCWs who had a better work environment (emotional exhaustion OR: 0.60; depersonalization OR: 0.73; personal accomplishment OR: 0.76) and higher professional pride (emotional exhaustion OR: 0.63; depersonalization OR: 0.70; personal accomplishment OR: 0.44). PHCWs with higher work intensity (emotional exhaustion OR: 2.37; depersonalization OR: 1.34; personal accomplishment OR: 1.19) had higher scores in all job burnout dimensions. Improving work environments and raising salaries were the preferred ways for PHCWs to reduce job burnout. **Conclusion**: Strategies should be developed to improve job satisfaction among PHCWs, enhance their professional identity, and alleviate burnout to ensure the effective operation of the healthcare system, especially during periods of overwork.

Cai et al. 2023.

Frontiers in Public Health, vol. 11.

Keywords: COVID-19; MBI scale; job burnout; occupational health; primary healthcare workers.

Evidence Level: 4B

Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1266864/full

The influence of meaningful work on the mental health of SME employees in the COVID-19 era: Can coping strategies mediate the relationship?

Background: Stress, depression, and anxiety are prevalent issues among SME employees during the COVID-19 pandemic. Even while having meaningful work that expressively contributes to individual growth has been related to improving mental health, employees' work may also need to adopt coping strategies to increase outcomes. The purpose of this study was to examine the relationship between meaningful work (positive meaning, meaning-making, and greater good motivations) and mental health, as well as coping strategies (problem-focused and emotion-focused) as a mediator of this relationship. **Methods:** Meaningful work, coping strategies, and mental health were evaluated in empirical research based on a sample of 462 SME employees working in Malaysia. Structured questionnaires were used to collect the data and analyze it through Structural Equation Modelling (SEM) using AMOS 21.0. **Results:** The findings of the study show the importance of meaningful work in influencing the mental health of SME employees, particularly during a crisis like the COVID-19 pandemic. This suggests that the more they value and see their work as meaningful, the more capable they are of dealing with limitations and mental health problems associated with crises. The study also discovered a partial mediating role for coping strategies between employees' mental health and meaningful work. **Conclusion:** This study encourages employees to constantly feel connected and discover continued possibilities to work and learn even during crisis situations. In order to improve human resource efficiency in emerging markets, managers and owners of SMEs must implement the model developed by the researchers.

Jalil et al. 2023.

BMC Public Health, vol. 23, no. 1.

Keywords: COVID-19; coping strategies; meaningful work; mental health; smes; structure equation modelling.

Evidence Level: 4B

Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17347-3

Psychosocial work environment and mental health among the global workforce of seafarers in the wake of the COVID-19 pandemic.

Background: The aim of this study was to investigate the impact of the COVID-19 pandemic on the mental health outcomes of international seafarers, who played a crucial role in maintaining global trade during the pandemic. The study examined how changes in psychosocial work environment and policies affected mental health outcomes among seafarers. **Methods:** We analyzed a survey including answers from 17,861 seafarers, serving on 44 different international commercial vessels with 154 different nationalities. Stress, anxiety, and depression were applied as outcome measures in this study. Three sets of independent

variables were included: work-related consequences of the COVID-19 pandemic, general psychosocial work environment onboard, and socioeconomic variables. First, we applied binary linear regression, followed by a multivariate linear regression analysis. **Results:** The study found that changes in safety consciousness and clear communication from employers were associated with better mental health outcomes among seafarers. Eroded policies related to crew changes had a significant negative effect on mental wellbeing due to delays caused by national quarantine guidelines and travel restrictions. The results also showed a discrepancy in mental health outcomes between those onboard and those onshore, with stress being present in both groups. **Conclusions:** The findings suggest that crisis management within shipping companies played an important role in mitigating adverse mental health outcomes during the pandemic. Clear communication from employers and emphasizing safety issues onboard were effective strategies for promoting better mental wellbeing among seafarers. However, delays in crew changes had a significant negative impact on mental health outcomes, highlighting the need for global cooperation and overarching agreements to protect international seafarers during times of crises.
Hayes-Mejia et al. 2023.
BMJ Public Health, vol. 23, no. 1.

Keywords: Anxiety; COVID-19; depression; international labor policy; mental health; seafarers; stress.
Evidence Level: 5B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17035-2

Bullying, Harassment and Occupational Violence

This month we explore workplace bullying in Ital and the effectiveness of a workshop-based intervention to reduce bullying and violence at work.

Workplace bullying in Italy: A systematic review and meta-analysis.
Background: Within any work environment, employees may be affected by "workplace bullying", a form of violent and repeated social behavior towards subordinates and colleagues. This review aimed to investigate the prevalence of bullied workers in Italy, the causes of the phenomenon, and the consequences at physical, psychological, and organizational levels. **Methods:** We included observational studies and systematic reviews examining the prevalence of bullied workers and the causes and consequences in Italian workplaces. Data extraction and analysis were performed on all included studies. The research strategy included three electronic databases (PubMed, Scopus, and Web of Science). A comprehensive search was done to retrieve articles based on a PRISMA-compliant protocol registered in PROSPERO: CRD 42023394635. **Results:** One hundred eighty-four articles were retrieved, and once duplicates and irrelevant articles were removed, 42 useful articles were reviewed. The mean pooled prevalence, calculated based on workers complaining of mistreatment, was 6.7% (SD: 4,09) and increased significantly to 17.0% (SD: 12.88) when considering only healthcare workplaces. Causes include how impaired mental health and high workload reinforce the possibility of being bullied in the workplace, resulting in a worsening of the worker's quality of life (physical and psychological) and the work organization with increased absenteeism and job changes. **Conclusions:** Workplace bullying is a very present phenomenon within workplaces in Italy. In light of this, it is necessary to put prevention plans in place and find solutions to maintain optimal organizational well-being in the work environment.
Colaprico et al. 2023.
La Medicina del Lavoro, vol. 114, no. 6.

Keywords: Workplace bullying; social behaviour; colleagues; Italy.
Evidence Level: 1B
Link: https://mattioli1885journals.com/index.php/lamedicinadellavoro/article/view/14673

Effectiveness of a workshop-based intervention to reduce bullying and violence at work: A 2-year quasi-experimental intervention study.

Background: Bullying and violence at work are associated with reduced wellbeing of the victims, but few evidence-based interventions are available to prevent these offensive behaviours. We developed and examined the effectiveness of an intervention aimed at prevention of bullying and violence at work through modifications in psychosocial work environment. **Methods:** In accordance with pre-published protocol, employees and supervisors of 12 work units in 3 cities (intervention group A: n = 315; intervention group B: n = 271) received a workshop-based intervention on organizational practices to prevent bullying and violence, including supervisor support, supervisor justice, workplace social capital, and psychological safety and were compared to a reference group (n = 2310) which did not receive the intervention. Latent change score modelling (LCSM) was used to estimate between- and within-individual differences in changes of organizational practices and prevalence of bullying and violence from baseline (2020) to follow-up (2022). **Results:** No direct or indirect effects of intervention were observed. Of the potential mediator variables, supervisor support (B = 0.04; 95% confidence interval 0.006, 0.07) and supervisor justice (0.04; 0.01, 0.08) improved in the intervention group B between the measurements and compared to control group, but the result was not replicated in intervention group A. No changes were observed between the measurement points in bullying or violence at work. **Conclusions:** No intervention effects on bullying and violence at work were observed. It may be worthwhile to develop the intervention further to focus more on supervisor and co-worker relationships and on psychosocial resources of work team.

Seppälä et al. 2023.
Social Science and Medicine, vol. 338.

Keywords: Latent chance score modelling; offensive behaviours; psychosocial work environment; public sector work.
Evidence Level: 3B
Link: https://www.sciencedirect.com/science/article/pii/S0277953623006755?via%3Dihub

Psychosocial Issues

This month we explore psychosocial issues associated emotional intelligence and occupational health safety environment, the online language of work-personal conflict, the effect of environmental and genetic interactions and personal resources interventions on job burnout and self-efficacy beliefs at work. In occupational stress related research we explore human and machine-induced social stress in complex work environments, the effect of stress on sleep, emotional exhaustion and traumatic stress among healthcare workers during the Covid-19 pandemic and the influence of enterprise social media visibility on work stress.

Emotional intelligence as a conduit for improved occupational health safety environment in the oil and gas sector.

Background: To address the issue of promoting occupational health and safety at the workplace, this study aimed to evaluate the mediating effect of four different dimensional constructs of Emotional Intelligence (EI) on the influence Occupational Health and Safety Management Practices (OHSMP) hold on safety performance and workplace accidents among oil and gas workers. **Methods:** The study is explanatory research that adopted a cross-sectional survey design. Convenience and stratified sampling techniques were used to select 699 respondents from the three major government-owned oil and gas organizations. The multiple standard regression and bootstrapping mediation methods were used for data analysis after subjecting the data to exploratory and confirmatory factor assessments. **Results:** Results indicated that OHSMP significantly predicts EI, safety performance, and workplace accidents. Again, EI was found to predict safety performance and workplace accidents significantly. Results also indicated that all the construct dimensions for measuring EI significantly explain the relationship between OHSMP and

safety performance, as well as the influence of OHSMP on workplace accidents. The theoretical basis for these findings is that workers with high-level EI are likely to cope with occupational health and safety lapses or safety-related challenges at the workplace by participating and complying with the organization's safety management practices or procedures. **Conclusions:** Such employees are likely to exhibit safe working behaviors and contribute to improving safety performance in the organization.
Edmund et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Occupational health and safety; workplace; oil; gas.
Evidence Level: 4B
Link: https://www.nature.com/articles/s41598-023-46886-3

The online language of work-personal conflict.
Background: With the blurring of boundaries in this digital age, there is increasing concern around work-personal conflict. Assessing and tracking work-personal conflict is critical as it not only affects individual workers but is also a vital measure among broader well-being and economic indices. **Methods:** This inductive study examines the extent to which work-personal conflict corresponds to individuals' language use on social media. We apply an open-vocabulary analysis to the posts of 2810 Facebook users who also completed a survey for an established work-personal conflict scale. **Results:** It was found that the language-based model can predict personal-to-work conflict (r = 0.23) and work-to-personal conflict (r = 0.15) and provide important insights into such conflicts. Specifically, we found that high personal-to-work conflict was associated with netspeak and swearing, while low personal-to-work conflict was associated with language about work and positivity. **Conclusions:** We found that high work-to-personal conflict was associated with negative emotion and negative tone, while low work-to-personal conflict was associated with positive emotion and language about birthdays.
Liou et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Work-personal conflict; boundaries; social media; online.
Evidence Level: 5A
Link: https://www.nature.com/articles/s41598-023-48193-3

Effects of environmental and genetic interactions on job burnout in coal miners: Interactions between occupational stress, coping styles, and NR3C2 gene polymorphisms.
Background: To investigate the current situation regarding occupational burnout among coal miners, explore the relationship between NR3C2 gene polymorphism and occupational burnout, and analyze the influence of the interaction between environment and gene on occupational burnout. This study provides a scientific basis for formulating health strategies to combat job burnout. **Methods**: A total of 1,500 first-line coal mine workers were selected by cluster random sampling, and the job burnout scale, job content questionnaire (JCQ), and simplified coping style questionnaire (SCSQ) were used for the questionnaire survey. A total of 150 workers were randomly selected from the high burnout group and the low burnout group, and a total of 300 workers were selected as the research objects to examine the relationship between gene polymorphism, environment-gene interactions and burnout. This study employed iMLDRTM genotyping technology for NR3C2 gene (rs5522, rs2070950) polymorphism analysis. The relationship between the occurrence of job burnout, occupational stress, coping styles and the NR3C2 gene was analyzed. **Results**: Finally, a total of 1,282 valid questionnaires were retrieved, with an effective recovery rate of 85.5%. The study included 128 participants (10%) with zero burnout, 400 (31.2%) with mild burnout, 649 (50.6%) with moderate burnout and 105 (8.2%) with severe burnout. There were significant differences in the rate of burnout among miners with respect to sex, age, working years, educational level, shifts, and marital status ($P < 0.05$). The difference in occupational stress between the different job burnout groups was statistically significant ($P < 0.05$). Compared with the GG genotype of rs2070950 of the NR3C2 gene, the CC genotype was identified as a susceptibility gene for occupational burnout ($P < 0.05$). In respect to rs5522, rs2070950, occupational stress, positive coping, and negative

coping, the low-risk group was unlikely to suffer from job burnout compared with the high-risk group (OR = 0.103, 95%CI: 0.058-0.182). **Conclusion**: In addition to demographic characteristics, occupational stress and negative coping styles were also identified as risk factors for job burnout. The interaction between locus rs5522, locus rs2070950, occupational stress, positive response, and negative response were found to affect the incidence of occupational burnout.
Lin et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: GMDR; NR3C2 gene; coping styles; job burnout; occupational stress.
Evidence Level: 4B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1237843/full

Human and machine-induced social stress in complex work environments: Effects on performance and subjective state.
Background: Social stress at work can lead to severe consequences. As a result of technological developments, social stress will increasingly be induced by machines. It is therefore crucial to understand how machine-induced social stress affects operators. **Methods:** The present study aimed to compare human and machine-induced social stress with regard to its effect on primary and secondary task performance, and on subjective state (e.g., self-esteem, mood and justice). 90 participants worked on a high-fidelity simulation of a complex work environment, on which they had received extensive training (2h15). Social stress was induced by a human or a machine using a combination of negative performance feedback and ostracism. **Results:** Results indicate that social stress did not affect performance, affect or state self-esteem. Machine-induced and human-induced social stress overall had similar effects, except for the latter impairing perceived justice. **Conclusions:** We discuss implications of these results for automation at the workplace and outline future research directions.
Thuillard et al. 2023.
Applied Ergonomics, vol. 115.

Keywords: Human-machine interaction; negative feedback; ostracism; performance; social stress.
Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S000368702300217X?via%3Dihub

Effects of three personal resources interventions on employees' burnout.
Background: Personal resources are related to positive psychological states that can translate into lower burnout among employees. However, although these personal resources can be promoted through ad hoc interventions, there are few studies that analyze this type of interventions in workers. **Methods:** The aim of this study was to assess the effectiveness of three interventions on personal resources on reducing employees' burnout. To this end, it was hypothesized that a positive psychological capital intervention (PsyCap), a job crafting intervention and a combined intervention would have a positive impact on burnout levels. This research used a quasi-experimental, longitudinal, pretest-post test design, with repeated measures and a waiting list control group. Study participants (N = 144) were all workers divided into three interventions and a control group. A noteworthy aspect of the study design is that the intervention was implemented as a voluntary online training activity. **Results:**This study showed that personal resources interventions were effective in reducing burnout among employees. The PsyCap intervention and the combined intervention showed the greatest efficacy. Contrary to expectations, the combined intervention did not show significantly greater efficacy than the other two experimental groups. **Conclusions:** The study concludes with a discussion of its limitations and practical implications for future personal resources intervention studies.
Pérez-Marqués et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Burnout; employees; interventions.

Evidence Level: 3B
Link: https://www.nature.com/articles/s41598-023-49000-9

Daily cortisol variations are predicted proximally by self-efficacy beliefs at work and indirectly by perceived self-regulatory abilities in managing negative emotions.
Background and Methods: In the present ecological study, we analyzed the relations of a set of self-efficacy beliefs at work to parameters of diurnal cortisol variation. Specifically, using data collected during two consecutive working days from 166 workers, we tested a mediation model positing social and work-related self-efficacy beliefs as mediators of the relations between self-regulatory emotional self-efficacy beliefs in managing negative emotions and cortisol indicators. **Results:** Results from the multilevel mediation analyses supported the proposed model for work-related self-efficacy, which resulted as a significant mediator of the relation between self-regulatory emotional self-efficacy beliefs in managing negative emotions and the overall cortisol daily production indexed by computing the area under the curve with respect to the ground. **Conclusions:** Findings suggest the importance of self-efficacy beliefs for workers' physiological adjustment. Theoretical and practical contributions of the findings are discussed.
Sommovigo et al. 2023.
International Journal of Psychophysiology, vol. 193.

Keywords: Area under the curve; cortisol; ecological momentary assessment; self-efficacy at work; self-regulation.
Evidence Level: 5B
Link: https://linkinghub.elsevier.com/retrieve/pii/S0167-8760(23)00515-9

Too stressed to sleep? Downsizing, job insecurity and sleep behavior.
Background: While workforce downsizing can benefit firms by increasing efficiency, it also leads to a deterioration of worker job security. **Methods:** This study uses German survey data to investigate the impact of downsizing on quality and quantity of sleep. While the topic is largely unexplored, it is of central importance, as sleep is not only the most time-consuming activity in the life of individuals, but also highly essential for productivity, health, and life itself. To address potential endogeneity, the study employs three measures of downsizing: **Results:** Workforce reduction at the firm level, dismissal rate at the industry level, and nationwide news of downsizing. The results show that all three measures of downsizing lead to poor sleep. **Conclusions:** The study further investigates the role of job insecurity as a potential mechanism. Instrumental variable estimates indicate that perceived job insecurity strongly increases the probability of insufficient sleep.
Chadi 2023.
Economics & Human Biology, vol. 51.

Keywords: Downsizing; job insecurity; media coverage; sleep behavior; work stress.
Evidence Level: 4B
Link: https://www.sciencedirect.com/science/article/pii/S1570677X23000874?via%3Dihub

A moderated mediation investigation of the influence of enterprise social media visibility on work stress.
Background: Drawing upon the communication visibility theory, this study delves into the intricate dynamics of message transference and network translucence within the context of enterprise social media (ESM), unraveling their profound impact on information overload and social overload experienced by employees. **Methods:** Consequently, we examine the consequential relationship between these overwhelming cognitive burdens and the levels of work stress experienced by individuals in the organizational setting. Moreover, our study explores the moderating role of resilience, shedding light on how this intrinsic psychological trait can shape the connection among information overload, social overload, and work stress. **Results:** Based on empirical analysis of the data collected from 351 ESM users,

the findings demonstrate a significant positive association between message transference, network translucence, and the occurrence of information overload and social overload among employees. Furthermore, the results reveal a strong positive association among information overload and social overload over work stress. However, the salient contribution of this study lies in uncovering the pivotal moderating effect of resilience, revealing that high levels of resilience act as a buffer against the adverse impacts of information overload and social overload, leading to lower levels of work stress among individuals. By advancing our comprehension of communication visibility theory, this study adds to the theoretical underpinnings of communication visibility, resilience, and their interplay in the context of ESM while providing practical insights for employees and organizations to navigate the challenges posed by information overload, social overload, and work stress. **Conclusions:** Through its meticulous examination of these multifaceted phenomena, this study opens avenues for further research and invites scholars to probe deeper into the complex dynamics of communication visibility and resilience in the evolving landscape of contemporary organizations.

Yang et al. 2023.

Acta Psychologica, vol. 241.

Keywords: Information overload; message transparency; network translucence; resilience; social overload; work stress.

Evidence Level: 5B

Link: https://www.sciencedirect.com/science/article/pii/S0001691823002603?via%3Dihub

Emotional exhaustion and traumatic stress among healthcare workers during the COVID-19 pandemic: Longitudinal changes and protective factors.

Background: Healthcare workers (HCWs) are at high risk of experiencing work-related stress, burnout syndrome, and depression, especially during infectious disease outbreaks like COVID-19. Contributing factors include increased workload, lack of personal protective equipment, and inadequate support from the healthcare administration. Longitudinal studies have shown that the mental health status of HCWs has deteriorated over time. Social support and compassion satisfaction (CS) are protective factors that can mitigate adverse mental health effects. The present longitudinal study examined the mental health status of HCWs during the COVID-19 outbreak and aimed to identify potential predictors and protective factors. **Methods:** The study comprised 386 healthcare workers in Hungary and was conducted in two waves (T1 and T2) from January 2021 to January 2022. Participants completed an online survey including the Professional Quality of Life Scale, Maslach Burnout Inventory, demographic and work-related background factors. Statistical analyses included descriptive statistics, and a cross-lagged panel model (CLPM). **Results:** Frontline HCWs had higher levels of secondary traumatic stress (STS) and emotional exhaustion (EE) than non-frontline healthcare workers. Both groups experienced significant increases in these measures between T1 and T2. The CLPM indicated that EE had a significant lagged effect on STS among frontline workers, while STS had a significant lagged effect on EE among non-frontline workers. CS had a significant protective effect on both STS and EE in both groups. **Conclusions:** The findings suggest that CS protects EE and STS, particularly among frontline HCWs. The study also showed that different causative relationships exist between these factors among frontline and non-frontline HCWs, which underlines the possible cyclical relationship between the two depending on the circumstances. The results provide insights into the protective role of positive work experiences and the importance of considering the needs of both frontline and non-frontline HCWs in preventive intervention programs.

Spányik et al. 2023.

PLoS One, vol. 18, no. 2.

Keywords: Exhaustion; traumatic stress; healthcare workers; COVID-19.

Evidence Level: 4B

Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291650

Fostering Work Participation

Return to Work

This month we explore return to work issues associated with traumatic spinal fractures and spinal cord injuries, work-related psychological injuries, post-Covid and or employees with chronic pain.

Return to work after traumatic spinal fractures and spinal cord injuries: A retrospective cohort study.
Background: This study aimed to determine the factors associated with return to work (RTW) after traumatic spinal fracture and spinal cord injury. It provided a predictive model for RTW among patients with spinal fractures and spinal cord injury and determined important factors influencing the time to RTW after injury. **Methods:** A retrospective cohort study was conducted in Poursina Tertiary Hospital, Guilan, Iran between May 2017 and May 2020. Patients aged 18 to 65 who were hospitalized with traumatic spinal fractures and spinal cord injuries were included. Demographic and clinical data were collected from the National Spinal Column/Cord Injury Registry of Iran (NSCIR-IR). A researcher-administered questionnaire was used through a telephone interview to obtain complementary data on social and occupational variables. Kaplan-Meier survival analysis was used to estimate the average time to RTW and the predictors of RTW were determined by multivariate Cox regression model. **Results:**Of the 300 patients included, 78.6% returned to work and the average time to RTW was about 7 months. The mean age of the participants was 45.63 ± 14.76 years old. Among the study variables, having a Bachelor's degree (HR 2.59; 95% CI 1.16-5.77; P = 0.019), complications after injury (HR 0.47; 95% CI 0.35-0.62; P = 0.0001), full coverage health insurance (HR 1.73; 95% CI 1.10-2.72; P = 0.016), opium use (HR 0.48; 95% CI 0.26-0.90; P = 0.023), number of vertebral fractures (HR 0.82; 95% CI 0.67-0.99; P = 0.046), and length of hospital stay (HR 0.95; 95% CI 0.93-0.98; P = 0.001) were found to be significant in predicting RTW in Cox regression analysis. **Conclusions:** Our analysis showed that wealthier people and those with high job mobility returned to work later.
Keihanian et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Return to work; traumatic spinal fractures; spinal cord injuries.
Evidence Level: 4B
Link: https://www.nature.com/articles/s41598-023-50033-3

Return to work experiences of Ontario public safety personnel with work-related psychological injuries.
Background: Public safety personnel (PSP) perform work that puts them at greater risk of psychological injury than the general public. PSP who subsequently develop posttraumatic stress disorder (PTSD) or other mental health conditions may need to take time off of work and use the workers compensation system. Very little is known about the experiences of PSP making this type of claim in Ontario to the Workplace Safety and Insurance Board (WSIB), or which healthcare professionals (HCP) PSP access as part of the treatment and return to work (RTW) process. This study captures the experiences of Ontario PSP in their RTW journeys, including with employers, WSIB, and HCPs. **Methods:** A survey-based study was conducted, using email and social media platforms to distribute the survey to PSP across Ontario. Quantitative data were summarized using means and frequencies, and open text results were analyzed using qualitative framework analysis. **Results:** 145 survey respondents met the inclusion criteria for the study. On a scale out of 5, PSP rated their experience with WSIB and employer support as poor on their first RTW attempt with an average rating of 2.93 and 2.46 respectively. The top three HCPs accessed by PSP were psychologists (61%), occupational therapists (OT; 60%) and general practitioners (GP; 44%). Respondents identified the cultural competence of HCPs in understanding their work demands and work culture as very important. **Conclusions:** To improve RTW experiences for PSP who make a workers compensation claim for a psychological injury, an increase in HCP cultural competence related to PSP work is indicated, as well as improved RTW processes and workplace support.
Edgelow et al. 2023.
Journal of Occupational Rehabilitation, vol. 33, no. 4.

Keywords: Emergency responders; occupational health; post-traumatic; public safety personnel; return to work; stress disorders.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s10926-023-10114-6

Return to work after Post-COVID: Describing affected employees' perceptions of personal resources, organizational offerings and care pathways.
Background: Most individuals recover from the acute phase of infection with the SARS-CoV-2 virus, however, some encounter prolonged effects, referred to as the Post-COVID syndrome. Evidence exists that such persistent symptoms can significantly impact patients' ability to return to work. This paper gives a comprehensive overview of different care pathways and resources, both personal and external, that aim to support Post-COVID patients during their work-life reintegration process. By describing the current situation of Post-COVID patients pertaining their transition back to the workplace, this paper provides valuable insights into their needs. **Methods:** A quantitative research design was applied using an online questionnaire as an instrument. Participants were recruited via Post-COVID outpatients, rehab facilities, general practitioners, support groups, and other healthcare facilities. **Results:** The analyses of 184 data sets of Post-COVID affected produced three key findings: (1) The evaluation of different types of personal resources that may lead to a successful return to work found that particularly the individuals' ability to cope with their situation (measured with the FERUS questionnaire), produced significant differences between participants that had returned to work and those that had not been able to return so far ($F = 4.913$, $p = 0.001$). (2) In terms of organizational provisions to facilitate successful reintegration into work-life, predominantly structural changes (i.e., modification of the workplace, working hours, and task) were rated as helpful or very helpful on average ($mean_{workplace}$ 2.55/SD = 0.83, $mean_{working\ hours}$ 2.44/SD = 0.80; $mean_{tasks}$ 2.55/SD = 0.83), while the remaining offerings (i.e., job coaching or health courses) were rated as less helpful or not helpful at all. (3) No significant correlation was found between different care pathways and a successful return to work. **Conclusion:** The results of the in-depth descriptive analysis allows to suggests that the level of ability to cope with the Post-COVID syndrome and its associated complaints, as well as the structural adaptation of the workplace to meet the needs and demands of patients better, might be important determinants of a successful return. While the latter might be addressed by employers directly, it might be helpful to integrate training on coping behavior early in care pathways and treatment plans for Post-COVID patients to strengthen their coping abilities aiming to support their successful return to work at an early stage.
Straßburger et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: Long COVID; occupational health; post-COVID syndrome; return to work; work ability.
Evidence Level: 5B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1282507/full

Evaluating the clinical use and utility of a digital support app for employees with chronic pain returning to work (SWEPPE): Observational study.
Background: The digital app SWEPPE (sustainable worker, a digital support for persons with chronic pain and their employers) was developed to improve the support of people with chronic pain in their return-to-work process after sick leave and includes functions such as the action plan, daily self-rating, self-monitoring graphs, the coach, the library, and shared information with the employer. **Objective:** This study aims to describe the use of the smartphone app SWEPPE among people with chronic pain who have participated in an interdisciplinary pain rehabilitation program. **Methods:** This is a case study including 16 people participating in a feasibility study. The analyses were based on user data collected for 3 months. Quantitative data regarding used functions were analyzed with descriptive statistics, and qualitative data of identified needs of support from the employer were grouped into 8 categories. **Results:** Self-monitoring was used by all participants (median 26, IQR 8-87 daily registrations). A total of 11 (N=16, 69%) participants set a work-related goal and performed weekly evaluations of goal fulfillment and ratings of their work ability. In total, 9 (56%) participants shared information with their employer and 2

contacted the coach. A total of 15 (94%) participants identified a total of 51 support interventions from their employer. Support to adapt to work assignments and support to adapt to work posture were the 2 biggest categories. The most common type of support identified by 53% (8/15) of the participants was the opportunity to take breaks and short rests. **Conclusions:** Participants used multiple SWEPPE functions, such as daily self-registration, goal setting, self-monitoring, and employer support identification. This shows the flexible nature of SWEPPE, enabling individuals to select functions that align with their needs. Additional research is required to investigate the extended use of SWEPPE and how employers use shared employee information.

Turesson et al. 2023.

JMIR Human Factors, vol. 10.

Keywords: Chronic pain; digital support; eHealth; mobile phone; return-to-work; user data.

Evidence Level: 5B

Link: https://humanfactors.jmir.org/2023/1/e52088

Presenteeism and Absenteeism

This month we explore absenteeism issues associated with patients with chronic pain, in workers after Covid-19 and acute respiratory illness, the impact of Finnish reforms adding new sickness absence checkpoints on rehabilitation, predicting long-term sickness absence with employee questionnaires and administrative records and the moderating effect of cardiorespiratory fitness on sickness absence. In presenteeism related research we explore period pain presenteeism.

Sickness absence and disability pension among patients with chronic pain in interdisciplinary treatment or unspecified interventions.

Background: Interdisciplinary treatment is a widely implemented strategy for the rehabilitation of patients with chronic pain. A primary treatment objective is to decrease the load on the social insurance system; however, it is questionable whether interdisciplinary treatment reduces sickness absence and disability pension (SA/DP). **Methods:** This register-based observational study compared SA and DP between patients in interdisciplinary treatment and unspecified interventions. With data from 7,752 Swedish specialist health care patients in their prime working age, we analyzed total net SA/DP days over 3 years from the first visit to a pain rehabilitation center. A zero-one-inflated beta model, adjusted for theoretically substantiated confounders, was used to estimate the mean differences in total days and the proportions of patients with both zero and maximum days. **Results:** Compared with unspecified interventions, interdisciplinary treatment resulted in a mean (95% confidence interval) absolute increase of 50 (37, 62) total days, a 13.0% (11.3%, 14.6%) decrease in patients with zero days, and a 1.5% (.2%, 2.8%) decrease in patients with the maximum days. These findings support that interdisciplinary treatment increases SA/DP compared to less intensive interventions but reduces the risk of maximum days, implying that it is advantageous for patients with the highest absence. This highlights the need for improved patient selection procedures and the adaptation of interdisciplinary treatment programs to more adequately target SA/DP reduction.: **Conclusions:** This study provides an accessible overview of SA/DP among working-age patients with chronic pain in Swedish specialist health care. It also shows that interdisciplinary treatment does not decrease SA/DP more than alternative treatments in most patients but is advantageous for the patients with the longest absence.

LoMartire et al. 2023.

The Journal of Pain, vol. 24, no. 11.

Keywords: Chronic pain; interdisciplinary treatment; multimodal rehabilitation; productivity loss; return-to-work.

Evidence Level: 4B

Link: https://www.jpain.org/article/S1526-5900(23)00444-3/fulltext

Impact of a Finnish reform adding new sickness absence checkpoints on rehabilitation and labor market outcomes: An interrupted time series analysis.

Background: In 2012, new checkpoints were introduced in the Finnish sickness absence system to improve early detection of long-term work disability and hasten return to work after illness. We examined whether the reform affected participation in rehabilitation and labor market outcomes over a one-year period. **Methods**: We used interrupted time series analysis among persons who started receiving sickness allowance up to three years before and up to two years after the reform. Separate analyses were conducted among those who passed 30, 60, and 90 sickness allowance days. Poisson regression analysis was used, controlling for seasonal variation, gender, age, and educational level. **Results**: After the reform, participation in rehabilitation within one year of passing 30 sickness allowance days increased by 5.1% [incidence rate ratio (IRR) 1.051, 95% confidence interval (CI) 1.015-1.086]. The increase after 60 and 90 sickness allowance days was slightly larger. Looking at the type of rehabilitation, vocational rehabilitation from the earnings-related pension scheme increased most. Regarding the rehabilitation provided by the Social Insurance Institution of Finland (Kela), vocational rehabilitation, medical rehabilitation, and discretionary rehabilitation increased, but the increase was statistically significant only in the last case. Post-reform changes in employment, unemployment, sickness absence and disability retirement were negligible. **Conclusions**: The introduction of new sickness absence checkpoints was associated with an increase in participation in rehabilitation but did not affect labor market outcomes one year later. The reform thus was only partially successful in achieving its objectives. Future research should focus on identifying the most effective approaches for utilizing rehabilitation to enhance labor market participation after sickness absence.

Laaksonen et al. 2023.
Scandinavian Journal of Work, Environment and Health, vol. 49, no. 8.

Keywords: Sickness absence; rehabilitation; work disability; illness; return to work.
Evidence Level: 4B
Link: https://www.sjweh.fi/article/4122

Predicting long-term sickness absence with employee questionnaires and administrative records: A prospective cohort study of hospital employees.

Background: This study aimed to compare the utility of risk estimation derived from questionnaires and administrative records in predicting long-term sickness absence among shift workers. **Methods:** This prospective cohort study comprised 3197 shift-working hospital employees (mean age 44.5 years, 88.0% women) who responded to a brief 8-item questionnaire on work disability risk factors and were linked to 28 variables on their working hour and workplace characteristics obtained from administrative registries at study baseline. The primary outcome was the first sickness absence lasting ≥90 days during a 4-year follow-up. **Results:** The C-index of 0.73 [95% confidence interval (CI) 0.70-0.77] for a questionnaire-only based prediction model, 0.71 (95% CI 0.67-0.75) for an administrative records-only model, and 0.79 (95% CI 0.76-0.82) for a model combining variables from both data sources indicated good discriminatory ability. For a 5%-estimated risk as a threshold for positive test results, the detection rates were 76%, 74%, and 75% and the false positive rates were 40%, 45% and 34% for the three models. For a 20%-risk threshold, the corresponding detection rates were 14%, 8%, and 27% and the false positive rates were 2%, 2%, and 4%. To detect one true positive case with these models, the number of false positive cases accompanied varied between 7 and 10 using the 5%-estimated risk, and between 2 and 3 using the 20%-estimated risk cut-off. The pattern of results was similar using 30-day sickness absence as the outcome. **Conclusions:** The best predictive performance was reached with a model including both questionnaire responses and administrative records. Prediction was almost as accurate with models using only variables from one of these data sources. Further research is needed to examine the generalizability of these findings.

Nyberg et al. 2023.
Scandinavian Journal of Work, Environment and Health, vol. 49, no. 8.

Keywords: Sickness absence; employee; hospital.

Evidence Level: 4B
Link: https://www.sjweh.fi/article/4124

Determinants of sickness absence duration after mild COVID-19 in a prospective cohort of Canadian healthcare workers.
Background: The aim of the study is to identify modifiable factors associated with sickness absence duration after a COVID-19 infection. **Methods:** Participants in a prospective cohort of 4964 Canadian healthcare workers were asked how many working days they had missed after a positive COVID-19 test. Only completed episodes with absence ≤31 working day and no hospital admission were included. Cox regression estimated the contribution of administrative guidelines, vaccinations, work factors, personal characteristics, and symptom severity. **Results:** A total of 1520 episodes of COVID-19 were reported by 1454 participants. Days off work reduced as the pandemic progressed and were fewer with increasing numbers of vaccines received. Time-off was longer with greater symptom severity and shorter where there was a provision for callback with clinical necessity. **Conclusions:** Vaccination, an important modifiable factor, related to shorter sickness absence. Provision to recall workers at time of clinical need reduced absence duration.
Adish et al. 2023.
Journal of Occupational and Environmental Medicine, vol. 65, no. 11.

Keywords: Sickness; absence; COVID-19; Canadian; healthcare workers.
Evidence Level: 4B
Link:
https://journals.lww.com/joem/fulltext/2023/11000/determinants_of_sickness_absence_duration_after.9.aspx

Work attendance with acute respiratory illness before and during COVID-19 pandemic, United States, 2018-2022.
Background: Covid-19 and influenza virus can be transmitted by asymptomatic, presymptomatic, or symptomatic infected people. **Methods**: this study assessed attendance at work while ill before and during the COVID-19 pandemic in the United States. **Results:** Persons with influenza or COVID-19 were significantly less likely to work onsite than persons with other acute respiratory illnesses. **Conclusions:** This study found that few workers with positive COVID-19 test results a worked onsite. Hybrid and remote work may reduce workplace exposures and help reduce spread of respiratory viruses.
Ahmed et al. 2023.
Emerging Infectious Diseases, vol. 29, no. 12.
Keywords: COVID-19; SARS-COV-2; United States; acute respiratory illness; coronavirus disease; disease transmission; influenza; pandemics; presenteeism; respiratory infections; severe acute respiratory syndrome coronavirus 2; teleworking; viruses; workplaces.
Evidence Level: 4B
Link: https://wwwnc.cdc.gov/eid/article/29/12/23-1070_article

Period pain presenteeism: Investigating associations of working while experiencing dysmenorrhea.
Background: Although menstrual pain (dysmenorrhea) is common and can have detrimental effects on work and social functioning, little is known about how people manage it in their professional life. Existing evidence indicates that people with dysmenorrhea often engage in presenteeism, meaning they work despite experiencing symptoms and report perceptions of social stigma around menstruation. **Methods:** In this study, we investigated individual health-related factors, psychosocial factors, and work factors associated with period pain presenteeism in a cross-sectional survey study including *N* = 668 employed people with experiences of dysmenorrhea. **Results:** Our results show that symptom severity, disclosure of menstrual pain to the leader, and remote work are directly associated with period pain presenteeism. We further found that the presence of medical diagnosis moderates the association between symptom severity and presenteeism. Disclosure to the leader was associated with leader gender, leader-member

exchange (LMX), and the absence of a medical diagnosis, indicating a potential mediating effect. We did not, however, find the perceptions of public beliefs regarding the concealment of menstruation to be related to presenteeism or disclosure. **Conclusions:** Our findings have important implications for research on menstrual health and occupational health management practice.
Cook et al. 2023.
Journal of Psychosomatic Obstetrics & Gynecology, vol. 44, no. 1.

Keywords: Menstruation; gender diversity; illness disclosure; pain; presenteeism.
Evidence Level: 4A
Link: https://www.tandfonline.com/doi/full/10.1080/0167482X.2023.2236294

Moderating effect of cardiorespiratory fitness on sickness absence in occupational groups with different physical workloads.
Background: Sickness absence from work has a large adverse impact on both individuals and societies in Sweden and the costs for sickness absence were calculated to 64.6 billion Swedish kronor (approx. 5.6 billion in Euros) in 2020. Although high cardiorespiratory fitness may protect against potential adverse effects of high physical workload, research on the moderating effect of respiratory fitness in the relation between having an occupation with high physical workload and sickness absence is scarce. **Methods:** To study the moderating effect of cardiorespiratory fitness in the association between occupation and psychiatric, musculoskeletal, and cardiorespiratory diagnoses. Data was retrieved from the HPI Health Profile Institute database (1988-2020) and Included 77,366 participants (mean age 41.8 years, 52.5% women) from the Swedish workforce. The sample was chosen based on occupational groups with a generally low education level and differences in physical workload. Hurdle models were used to account for incident sickness absence and the rate of sickness absence days **Results:** There were differences in sickness absence between occupational groups for musculoskeletal and cardiorespiratory diagnoses, but not for psychiatric diagnoses. In general, the association between occupation and musculoskeletal and cardiorespiratory diagnoses was moderated by cardiorespiratory fitness in most occupational groups with higher physical workload, whereas no moderating effect was observed for psychiatric diagnoses. **Conclusions:** The study results encourage community and workplace interventions to both consider variation in physical workload and to maintain and/or improve cardiorespiratory fitness for a lower risk of sickness absence, especially in occupations with high physical workload.
Väisänen et al. 2023.
Scientific Reports, vol. 13, no. 1.

Keywords: Cardiorespiratory fitness; sickness absence; physical workload.
Evidence Level: 4B
Link: https://www.nature.com/articles/s41598-023-50154-9

Workers Compensation

The relative burden of occupational injuries and illnesses in firefighters: An analysis of Washington Workers' Compensation Claims, 2006-2020.
Background: Firefighters face many hazards on the job and have a high rate of work-related injuries and illnesses (WRII). **Methods:** We analyzed Washington workers' compensation claims from 2006-2020 to characterize WRII in firefighters compared to law enforcement officers and "all other" workers. **Results:** There were 9187 compensable claims for firefighters, 7801 for law enforcement officers, and 586,939 for "all other" workers. Nearly 40% of claims for firefighters were work-related musculoskeletal disorders (WMSDs). The claim rate per 10,000 full-time equivalent (FTE) firefighters was 716.4, which is significantly higher than that of law enforcement officers (510.0) and "all other" workers (163.2). The rate per 10,000 FTE of WMSD claims was also higher in firefighters (277.0) than in law enforcement officers (76.2) and "all other" workers (57.6). Additional WRII among firefighters commonly included being struck or caught in objects, slipping or tripping, and exposure to caustic or noxious substances; and amongst law

enforcement, transportation accidents and violence. Medical costs and time-loss days per claim were lower for firefighters and law enforcement than for "all other" workers. **Conclusions:** Common tasks associated with WMSDs in firefighters included lifting and transporting patients, using specific tools and equipment, and physical training. WMSDs stand out as an area for prevention and intervention activities.
Anderson et al. 2023.
International Journal of Environmental Research and Public Health, vol. 20, no. 22.

Keywords: Firefighters; first responder; law enforcement officers; occupational injuries; workers' compensation claims.
Evidence Level: 4B
Link: https://www.mdpi.com/1660-4601/20/22/7077

Working hours

This month we explore issues associated with working hours and subjective well-being, work-life balance and all-cause mortality.

Association between hours of work and subjective well-being: How do physicians compare to lawyers and accountants?
Background: Analyses of physician well-being typically rely on small and unrepresentative samples. **Methods:** In April 2011, the UK Office for National Statistics incorporated subjective well-being metrics (SWB) into the Annual Population Survey (APS), a well-established survey. This survey includes variables from the labor market, making APS an ideal source for measuring the association between work hours and SWB metrics and comparing among different professionals. Using APS data from 2011/12 to 2014/15, this study examined the association between SWB levels and work hours using multiple linear models for physicians (primary care physicians and hospital doctors), lawyers, and accountants. **Results:** Of the 11,810 observations, physicians were more satisfied, happier, and less anxious; females were more stressed (10.7%); and age was negatively associated with happiness and satisfaction. **Conclusions:** Incorporating information on preferences to work more hours (underemployment) did not affect physicians' but worsened the well-being of other professionals (lawyers and accountants). Surveyed physicians were less anxious, happier, and more satisfied than lawyers or accountants before Covid. Although the total work hours did not alter the SWB metrics, overtime hours for other professionals did. Increasing the working hours of underemployed physicians (with appropriate compensation) could be a relatively inexpensive solution to tackle the shortage of health workers in the short run.
Núñez-Elvira 2023.
PLoS One, vol. 18, no. 12.

Keywords: Hours of work; subjective well-being; lawyers; accountants.
Evidence Level: 5B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295797

Differential impacts of reduced worktime on work-life balance in Korea.
Background and Methods: This study analyzes the heterogenous effects of reducing weekly work hour on workers' quality of life in Korea. Using longitudinal household data from the Korean Labor and Income Panel Study (KLIPS) from 2001 to 2017, this study aims to shed light on how the work hour reduction policy may differently affect workers with different levels of resources and support by demographic and socioeconomic status. **Results:** Our estimates from the difference-in-differences approach exploiting the staggered implementation of the work hour reduction policy indicate that the policy increased leisure satisfaction of female workers with low educational level and female workers in regular or inflexible work setting. Given Korea's exceedingly long working hours and inequities in the labor market, a better understanding of the complex factors that affect work-life balance can be helpful in developing policies supportive of healthy work-life balance for workers. **Conclusions:** This study, to our knowledge, is the first

to investigate the composition of workers in the Korean labor market and examine differential impacts of the workhour reduction policy by demographic and socioeconomic status.
Kim et al. 2023.
PLoS One, vol. 18, no. 11.

Keywords: Work-life balance; reduced worktime; quality of life; Korea.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0294247

Long working hours and all-cause mortality in China: A 26-year follow-up study.
Background: The relationship between long working hours and the risk of mortality has been debated in various countries. This study aimed to investigate the association between long working hours and all-cause mortality in a large population-based cohort in China. **Methods:** This retrospective cohort study (N=10 269) used a large, nationally representative data set [the China Health and Nutrition Surveys (CHNS)] from 1989 to 2015. Long working hours (≥55 hours per week) were compared to standard working hours (35-40 hours per week). The outcome measure was all-cause mortality. Hazard ratio (HR) for all-cause mortality was calculated from Cox proportional hazards regression models, with stratified analyses to assess differences in mortality risk among subgroups. **Results:** Among the participants, 411 deaths (3.52 per 1000 person-years) occurred during a median follow-up of 11.0 (range 4.0-18.0) years. After adjusting for covariates, long working hours were associated with a significantly increased risk of all-cause mortality [HR 1.49, 95% confidence intervals (CI) 1.02-2.18]. Stratified analyses revealed that this association was present only among men (HR 1.78, 95% CI 1.15-2.75) and smoking participants (HR 1.57, 95% CI 1.05-2.57). **Conclusion:** This study provides evidence of an association between long working hours and all-cause mortality, which is specifically observed among men and smokers. Targeted interventions should be implemented to reduce excessive working hours and identify individuals at elevated risk, with support from labor organizations, policymakers, and employers.
Huang et al. 2023.
Scandinavian Journal of Work, Environment and Health, vol. 49, no. 8.

Keywords: Working hours; mortality; China.
Evidence Level: 4B
Link: https://www.sjweh.fi/article/4115

Wellness Programs

This month we explore the impact of a comprehensive mental health program on frontline health service workers and the factors influencing the degree of employee involvement in preventive nutrition and physical activity web-based programs.

Assessing the impact of a comprehensive mental health program on frontline health service workers.
Background: Mental health issues are a growing concern in the workplace, linked to negative outcomes including reduced productivity, increased absenteeism, and increased turnover. Employer-sponsored mental health benefits that are accessible and proactive may help address these concerns. **Methods:** The aim of this retrospective cohort study was to evaluate the impact of a digital mental health benefit (Spring Health) on frontline healthcare service workers' clinical and workplace outcomes. The benefit was sponsored by a national health services company from 2021-2022 and included mental health screening, care navigation, psychotherapy and/or medication management. We hypothesized program use would be associated with improvements in depression and anxiety symptoms, and increased productivity and retention. Participants were employees enrolled in the benefit program, had at least moderate anxiety or depression, at least 1 treatment appointment, and at least 2 outcome assessments. Clinical improvement measures were PHQ-9 scale (range, 0-27) for depression and GAD-7 scale (range, 0-21) for anxiety; workplace measures were employee retention and the Sheehan Disability Scale (SDS) for functional impairment. **Results:** A total of 686 participants were included. Participants using the mental health

benefit had a 5.60 point (95% CI, 4.40-6.79, d = 1.28) reduction in depression and a 5.48 point (95% CI, 3.88-7.08, d = 1.64) reduction in anxiety across 6 months. 69.9% (95% CI, 61.8%-78.1%) of participants reliably improved (≥5 point change) and 84.1% (95% CI, 78.2%-90.1%) achieved reliable improvement or recovery (<10 points). Participants reported 0.70 (95% CI, 0.26-1.14) fewer workdays per week impacted by mental health issues, corresponding to $3,491 (95% CI, $1305-$5677) salary savings at approximately federal median wage ($50,000). Furthermore, employees using the benefit were retained at 1.58 (95% CI, 1.4-1.76) times the rate of those who did not. **Conclusions:**Overall, this evaluation suggests that accessible, proactive, and comprehensive mental health benefits for frontline health services workers can lead to positive clinical and workplace outcomes.
Ward et al. 2023.
PLoS One, vol. 18, no. 11.

Keywords: Mental health program; frontline health service workers.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0294414

Factors influencing the degree of employee involvement in preventive nutrition and physical activity web-based programs in medium and small enterprises.
Background and Methods: This cross-sectional study was part of a comprehensive workplace health promotion program (WHPP) implemented in the work environment of small- and medium-sized enterprises (SMEs) in Western Slovenia, which included web-based educational campaigns aimed at promoting positive lifestyle changes among workers, including healthy eating habits and physical activity. As part of this program, which included campaigns in the areas of stress management, ergonomics, sleep hygiene, communication, work climate, and absenteeism, we developed and examined the engagement frequency in web-based content on healthy eating and physical activity for the companies included in the WHPP. This part of the project lasted from 2020 to 2022. Prior to the educational campaign, participants voluntarily completed a screening questionnaire. We analyzed the patterns of 370 workers in terms of their job classification (predominantly sedentary, predominantly standing, or predominantly physical), body mass index (BMI), gender, age, and selected indicators of diet and physical activity. **Results:** Of the 88 companies participating in the WHPP, 26 took part in our web-based educational campaigns on nutrition and physical activity. Through an empirical analysis using descriptive and inferential statistics and a linear regression, we found that, on average, the engagement frequency (i.e., proportion of educational personal e-mails read) was highest among men with sedentary work, with older employees participating more actively than expected. Moreover, workers with good dietary habits and a favorable BMI proved to be the most avid readers of the web-based campaigns. Despite the overall low participant engagement frequency, it is clear that web-based educational campaigns are more appealing to workers with sedentary jobs and good dietary habits. **Conclusions:** This study provides valuable information on the potential effectiveness of appropriate workplace health promotion campaigns for SMEs and public health practices.
Stubelj et al. 2023.
Nutrients, vol. 15, no. 24.

Keywords: Diet; food; health promotion; nutrition; nutrition campaign; obesity; overweight; physical activity; workplace.
Evidence Level: 4B
Link: https://www.mdpi.com/2072-6643/15/24/5129

Job Design

This month we explore the impact of web-based and blended training for coping with challenges of flexible work designs and chronic pain and associated factors in remote work.

Comparing web-based and blended training for coping with challenges of flexible work designs: Randomized controlled trial.

Background: Workers with flexible work designs (FWDs) face specific challenges, such as difficulties in detaching from work, setting boundaries between work and private life, and recovering from work. **Objective:** This study evaluated the effectiveness of an intervention in improving the recovery, work-life balance, and well-being of workers with FWDs compared with a waitlist control group. It also compares the effectiveness of a web-based training format and blended training format. **Methods:** In the web-based training format, participants individually completed 6 web-based modules and daily tasks over 6 weeks, learning self-regulation strategies to meet the particular challenges of FWDs. In the blended training format, participants attended 3 group sessions in addition to completing the 6 web-based modules. In a randomized controlled trial, participants were assigned to a web-based intervention group (196/575, 34.1%), blended intervention group (198/575, 34.4%), or waitlist control group (181/575, 31.5%). Study participants self-assessed their levels of primary outcomes (psychological detachment, satisfaction with work-life balance, and well-being) before the intervention, after the intervention, at a 4-week follow-up, and at a 6-month follow-up. The final sample included 373 participants (web-based intervention group: n=107, 28.7%; blended intervention group: n=129, 34.6%; and control group: n=137, 36.7%). Compliance was assessed as a secondary outcome. **Results:** The results of multilevel analyses were in line with our hypothesis that both training formats would improve psychological detachment, satisfaction with work-life balance, and well-being. We expected blended training to reinforce these effects, but blended training participants did not profit more from the intervention than web-based training participants. However, they reported to have had more social exchange, and blended training participants were more likely to adhere to the training. **Conclusions:** Both web-based and blended training are effective tools for improving the recovery, work-life balance, and well-being of workers with FWDs. Group sessions can increase the likelihood of participants actively participating in web-based modules and exercises.

Althammer et al. 2023.
Journal of Medical Internet Research, vol. 25.

Keywords: Blended training; psychological detachment; web-based training; well-being; work-life balance.
Evidence Level: 2A
Link: https://www.jmir.org/2023/1/e42510

Chronic pain and associated factors in remote work during the COVID-19 pandemic in Brazil.

Background: Estimate the prevalence of chronic pain and its association with symptoms of anxiety, sleep disorders, and aspects of remote work in the context of the COVID-19 pandemic. **Method:** A cross-sectional and descriptive study conducted with 328 adults engaged in remote work. Data was collected online from February 2021 to January 2022. For pain investigation and evaluations of sleep and anxiety, a structured questionnaire, the Pittsburgh Sleep Quality Index, and the Generalized Anxiety Disorder-7 were used, respectively. **Results:** The prevalence of chronic pain was 47.9% (CI 95% = 42.5-53.3). Associations were identified between pain and anxiety, sleep disorders, and sitting time ($p<0.01$). **Conclusion:** The prevalence of chronic pain in remote work was found to be high, with pain being of moderate intensity and associated with anxiety, sleep disorders, and prolonged sitting time.

Silvestre et al. 2023.
Revista Brasileira de Enfermagem, vol. 76,

Keywords: Chronic pain; remote work; COVID-19.
Evidence Level: 4B

Link: https://www.scielo.br/j/reben/a/ZQpfF5ckWkvpYGMLfKVHdFS/?lang=en

Shift Work

This month we explore shift work related issues associated with poor sleep and blood pressure and inflammation, food experiences within and outside of the workplace, BMI and breast cancer risk in postmenopausal women, depression and anxiety symptoms and genome-wide DNA methylation profiles.

Poor sleep and shift work associate with increased blood pressure and inflammation in UK Biobank participants.

Background: Disrupted circadian rhythms have been linked to an increased risk of hypertension and cardiovascular disease. However, many studies show inconsistent findings and are not sufficiently powered for targeted subgroup analyses. **Methods:** Using the UK Biobank cohort, we evaluate the association between circadian rhythm-disrupting behaviours, blood pressure (SBP, DBP) and inflammatory markers in >350,000 adults with European white British ancestry. **Results:** The independent U-shaped relationship between sleep length and SBP/DBP is most prominent with a low inflammatory status. Poor sleep quality and permanent night shift work are also positively associated with SBP/DBP. Although fully adjusting for BMI in the linear regression model attenuated effect sizes, these associations remain significant. Two-sample Mendelian Randomisation (MR) analyses support a potential causal effect of long sleep, short sleep, chronotype, daytime napping and sleep duration on SBP/DBP. **Conclusions:** Thus, in the current study, we present a positive association between circadian rhythm-disrupting behaviours and SBP/DBP regulation in males and females that is largely independent of age.

Kanki et al. 2023.

Nature Communications, vol. 14, no. 1.

Keywords: Poor sleep; shift work; blood pressure; inflammation.

Evidence Level: 4B

Link: https://www.nature.com/articles/s41467-023-42758-6

Exploring Australian night shift workers' food experiences within and outside of the workplace: A qualitative photovoice study.

Background: Night shift workers are at a 20 to 40 % increased risk of metabolic diseases, which may be associated with their disrupted eating patterns. This qualitative study explores factors that influence night shift workers' eating habits, within and outside of the workplace, to identify target areas for health promotion strategies. **Participants and setting:** Eligible participants resided in Australia, working at least three overnight shifts per month. **Design:** The photovoice method was used, whereby participants were asked to take photos that represent their typical eating habits. These photos were incorporated as prompts in a semi-structured interview, which explored factors influencing eating habits on night shifts and days-off and perceptions and enablers to healthy eating. **Results:** Ten participants completed the study. Thematic analysis generated four main themes, which were mapped onto the Social Ecological Model (SE Model). Aligned with the SE Model, our results show night shift workers' eating habits are influenced by intrapersonal, interpersonal and (work) organisational levels. Participants reported that at work, appropriate food preparation facilities are required to enable healthy food choices. Poor shift work rostering leads to prolonged fatigue on days-off, limiting their ability and motivation to engage in healthy eating. Consequently, night shift workers seem to require additional supports from their social networks and enhanced food literacy skills, in order to adopt/ maintain healthy eating behaviours.
Conclusions: Night shift work creates individual and environmental barriers to healthy eating, which are present during and outside of work. Health promotion strategies for this population should include multiple approaches to address these barriers.

Leung et al. 2023.

Public Health Nutrition, vol. 26, no. 11.

Keywords: Dietary intake; dietary pattern; night work; qualitative; shift work; workplace.
Evidence Level: 5A
Link: https://www.cambridge.org/core/journals/public-health-nutrition/article/exploring-australian-night-shift-workers-food-experiences-within-and-outside-of-the-workplace-a-qualitative-photovoice-study/D3DDAFDCB4CD675DFE95CBBD58D1E55E

Shift work, body mass index and associated breast cancer risks in postmenopausal women.
Background: Shift work increases the risk of breast cancer, but the mechanisms is still under discussion. This study evaluates the relationship between breast cancer and shift work on the basis of overweight and obesity among postmenopausal women. **Methods:** We examined this association using data from a case-control study carried between 2015 and 2019. The study involved 111 postmenopausal women with breast cancer and the same number of control participants. A self-reporting questionnaire was used for data collection. Multivariate logistic regression was conducted to find correlations between variables and determine the strength of relationships. **Results:** A 2.65-fold risk of breast cancer (OR=2.65; 95% CI: 1.34-5.22) was found among shift work women, compared with postmenopausal women not performing shift work. The association was modified by body mass index, showing a risk rate 9.84 times higher (OR=9.84; 95% CI: 2.14-45.19) among shift work and overweight women, compared to non-overweight women who had never been shift workers. **Conclusions:** About 49% of controls and 72% of cases had ever worked in a job that required shift work. The risk of breast cancer in postmenopausal women is associated with shift work, especially among overweight women. Some preventive measures to reduce the risk of breast cancer, in particular regarding a healthy lifestyle and weight control in this group of working women, should be implemented.
Świątkowska et al. 2023.
Annals of Agricultural and Environmental Medicine, vol. 30, no. 4.

Keywords: BMI; breast cancer; case-control study; obesity; overweight; postmenopausal women; shift work.
Evidence Level: 4B
Link: https://www.aaem.pl/Shift-work-body-mass-index-and-associated-breast-cancer-risks-in-postmenopausal-women,168414,0,2.html

Independent and joint trajectories of depression and anxiety symptoms among Chinese male sailors throughout a prolonged non-24-h rotating shift schedule at sea: A parallel-process growth mixture modeling approach.
Background: The predictive and protective effect of hardiness on mental health remains unclear among shift workers on non-24-h working schedules. The present study aimed to investigate the independent and joint trajectories of depression and anxiety symptoms and the role of hardiness during a prolonged period of non-24-h shift working schedule. **Methods:** Four hundred nine Chinese male sailors (working on 18-h watchstanding schedule) were recruited and completed all 5-wave tests through online questionnaires (at Day 1, 14, 28, 42, 55, respectively) during a 55-day sailing. The questionnaires included sociodemographic variables, hardiness, depression and anxiety symptoms. Independent and joint trajectories of depression and anxiety symptoms were estimated by latent growth mixture models. The effect of hardiness on trajectories was examined by logistic regression models. **Results:** 2 and 3 latent trajectories were identified for depression and anxiety symptoms, respectively. Based on initial levels and development trends, 3 distinct joint trajectories of depression and anxiety were identified and named as: "Low-Inverted U" group (73.6%), "Moderate-Deterioration" group (6.9%), and "High-Stable" group (9.5%). Sailors with higher levels of hardiness were more likely to follow the "Low-Inverted U" trajectory of depression and anxiety symptoms (all $p < 0.001$). **Conclusions:** There existed individual differences in the trajectories of depression and anxiety. Hardiness may have a protective effect that can prevent and alleviate depression and anxiety symptoms. Therefore, hardiness-based intervention programs are encouraged among the shift workers on non-24-h working and rest schedules.

Tu et al. 2023.
BMC Psychiatry, vol. 23, no. 1.

Keywords: Anxiety; depression; hardiness; longitudinal study; rotating shift work; shift work tolerance**.**
Evidence Level: 4B
Link: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-023-05389-1

Exploration of genome-wide DNA methylation profiles in night shift workers.
Background: The past decades, studies indicated that night shift work is associated with adverse health effects, however, molecular mechanisms underlying these effects are poorly understood. A few previous studies have hypothesized a role for DNA-methylation (DNAm) in this relationship. **Methods:** We performed a cross-sectional epigenome-wide association study, to investigate if night shift work is associated with genome-wide DNAm changes and DNAm-based biological age acceleration, based on previously developed so-called 'epigenetic clocks.' Short term (2-6 years) and intermediate term (10-16 years) night shift workers, along with age and sex matched dayworkers (non-shift workers) were selected from the Lifelines Cohort Study. For genome-wide methylation analysis the Infinium Methylation EPIC array (Ilumina) was used. Linear regression analyses were used to detect differences in methylation at individual CpG-sites associated with night shift work. Pathway analysis was performed based on KEGG pathways and predictions of age acceleration in night shift workers were performed based on four previously developed epigenetic age calculators. **Results:** Only in women, differences in methylation at individual CpG-sites were observed between night shift workers and non-shift workers. Most of these differentially methylated positions (DMPs) were observed in intermediate term night shift workers. Pathway analysis shows involvement of pathways related to circadian rhythm and cellular senescence. Increased age acceleration was observed only in short-term night shift workers (men and women). This might be indicative of adaptation to night shift work or a so-called healthy worker effect. **Conclusions:** In conclusion, these results show that DNA methylation changes are associated with night shift work, specifically in women.
Wackers et al. 2023.
Epigenetics, vol. 18, no. 1.

Keywords: DNA-methylation; Night shift work; circadian rhythm; epigenetic clock.
Evidence Level: 4B
Link: https://www.tandfonline.com/doi/full/10.1080/15592294.2022.2152637

Management and Leadership

This month we explore the effect of management on HR practices, job demands and employee well-being, the efficacy of interventions aiming at office workers' movement behaviour and mental health and the effect of individualized behavior-based safety-leadership training.

High-performance HR practices, job demands and employee well-being: The moderating role of managerial support.
Background: Drawing on the labour process theory and the job-demands resources model, this study challenges the assumption of beneficial effects of high-performance HR practices (HPHRP). The study argues that such practices lead to heightened work demands, which in turn compromise employees' well-being. The study also argues that the negative consequences associated with HPHRP can be ameliorated when employees receive support from their managers. **Methods:** To test the study's moderated mediation model, multisource matched employer-employee data from the Workplace Employment Relations Survey 2011 is used. **Results:** Results of generalised multilevel structural equation modelling in STATA revealed that the relationship between HPHRP and well-being (anxiety and depression) is mediated by Job demands (JD). Furthermore, the relationship between JD and both anxiety and depression is moderated by Managerial support (MS), such that when the level of MS is high, the positive relationship between HPHRP and both anxiety and depression via JD is weaker. **Conclusions:** Taken together, the

findings of the study advance our understanding of why and when HPHRP may impair employees' well-being.
Yunus et al. 2023.
Stress and Health, vol. 39, no. 5.

Keywords: Employee well-being; high-performance HR practices; job demands; managerial support.
Evidence Level: 5B
Link: https://onlinelibrary.wiley.com/doi/10.1002/smi.3252

"It depends on the boss" - A qualitative study of multi-level interventions aiming at office workers' movement behaviour and mental health.
Background: This embedded qualitative study explored the acceptability, feasibility, and fidelity of two multi-level RCT interventions among office workers, aiming at improving movement behaviour to enhance mental health and cognition. The interventions addressed the organizational, environmental, and individual level. **Methods:** Semi-structured interviews and focus group discussions were conducted with 38 stakeholders after completion of the interventions. Data were analysed using reflexive thematic analysis.
Results: The interventions were well appreciated, and office workers attributed improvements in movement behaviour and wellbeing to the interventions. Especially the cognitive behavioural therapy (CBT) based counselling and free gym access were appreciated, feasible and delivered as planned. Participants described existing workplace norms as barriers to more activity, particularly for reducing sitting. Support from managers and team support were considered crucial components. However, delivering these components was difficult. **Conclusions:** The findings support the design of the multi-level interventions for changing movement behaviour. Results highlight the potential of CBT for this target group and the importance of manager and team support. Desired effects of similar multi-level interventions, including CBT, might be achieved in future studies that carefully address the issues with feasibility and acceptability and the resulting low fidelity of some intervention components that were identified in this study.
Larisch et al. 2023.
International Journal of Qualitative Studies on Health and Well-being, vol. 18.

Keywords: Physical activity; acceptability; behaviour change; cognitive behavioural therapy; ecological model; feasibility; fidelity; mental health; sedentary behaviour; workplace health promotion.
Evidence Level: 5B
Link: https://www.tandfonline.com/doi/full/10.1080/17482631.2023.2258564

Individualized behavior-based safety-leadership training: A randomized controlled trial.
Background: Construction site managers play a critical role in occupational safety in the construction industry. This study aimed to develop and test a method for training construction site managers in positive feedback and active listening by incorporating the behavioral training components of behavior analysis, goal setting, practice with behavior feedback, homework, and maintenance planning into individualized behavior-based safety-leadership training (IBST), and to assess the effect of IBST on construction site managers' safety-leadership behaviors and performance. **Method:** In a naturalistic randomized controlled trial, construction site managers were randomly assigned to an experimental group (n = 16) or a control group (n = 19). The experimental-group managers received IBST, while the control-group managers received no training. Paired sample t-tests on pre- to post-training (i.e., six weeks after the final training session) were performed separately for the experimental- and control-group managers. **Results:** The safety-leadership behaviors of the experimental-group managers improved in terms of favorable feedback (d = 0.99, p <.01), safety-specific feedback (d = 0.89, p =.02), behavior-specific feedback (d = 0.66, p =.02), antecedent listening (d = 0.68, p =.02), and consequential listening (d = 0.78, p =.01). In addition, safety-leadership performance improved in terms of transformational leadership (d = 0.78, p =.01) and contingent-reward leadership (d = 0.64, p =.02). No significant change was found for the

control-group managers. **Conclusions:** The results indicate that behavior analysis, goal setting, practice with behavior feedback, homework, and maintenance planning are effective behavioral training components of safety-leadership training. Positive feedback and active listening were also found to be important behavioral requisites for transformational and contingent-reward leadership. **Practical applications:** IBST can be used to develop occupational safety in the construction industry by improving construction site managers' safety-leadership behaviors and performance.
Grill et al. 2023.
Journal of Safety Research, vol. 87.

Keywords: Active listening; behavior analysis; construction site managers; goal setting; homework; maintenance planning; positive feedback; practice with behavior feedback.
Evidence Level: 2A
Link: https://www.sciencedirect.com/science/article/pii/S002243752300107X?via%3Dihub

Work Ability

Work productivity in patients with axial spondyloarthritis initiating biological or targeted synthetic disease-modifying antirheumatic drugs: A systematic literature review and meta-analysis.
Background: Axial spondyloarthritis (axSpA) can limit work participation. Our objective was to characterise productivity in patients with axSpA, including changes after 12-16 weeks of treatment with biological and targeted synthetic disease-modifying antirheumatic drugs (b/tsDMARDs). **Methods:** A systematic literature review identified studies published from 1 January 2010 to 21 October 2021 reporting work productivity using the Work Productivity and Activity Impairment (WPAI) questionnaire in patients with axSpA initiating b/tsDMARDs. Baseline and Week 12-16 overall work productivity, absenteeism, presenteeism and activity impairment scores were used in a random-effects meta-analysis to calculate absolute mean change from baseline for each WPAI-domain. **Results:** Eleven studies in patients with axSpA who received either placebo (n=727) or treatment with adalimumab, bimekizumab, etanercept, ixekizumab, secukinumab or tofacitinib (n=994) were included. In working patients initiating a b/tsDMARD, mean baseline overall work productivity impairment, absenteeism and presenteeism scores were 52.1% (N=7 studies), 11.0% and 48.8% (N=6 studies), respectively. At Week 12-16, the pooled mean change from baseline in overall work impairment for b/tsDMARDs or placebo was -21.6% and -12.3%. When results were extrapolated to 1 year, the potential annual reductions in cost of paid and unpaid productivity loss per patient ranged from €11 962.88 to €14 293.54. **Conclusions:** Over 50% of employed patients with active axSpA experienced work impairment, primarily due to presenteeism. Overall work productivity improved at Weeks 12-16 to a greater extent for patients who received b/tsDMARDs than placebo. Work productivity loss was associated with a substantial cost burden, which was reduced with improvements in impairment.
Rudwaleit et al. 2023.
RMD Open, vol. 9, no. 4.

Keywords: Antirheumatic Agents; inflammation; outcome assessment, health care; patient reported outcome measures; spondylitis, ankylosing.
Evidence Level: 1A
Link: https://rmdopen.bmj.com/content/9/4/e003468.long

Adapting to the Future of Work

Aging Workforce

This month we explore the occupational characteristics and epigenetic aging among older adults, long-term life satisfaction in ageing women with work disability due to mental and musculoskeletal disorders, the longitudinal profiles of occupational physical activity during late midlife and their association with functional limitations at old age and results from a retirement and aging study.

Occupational characteristics and epigenetic aging among older adults in the United States.
Background: Occupational characteristics have been studied as risk factors for several age-related diseases and are thought to impact the ageing process, although there has been limited empirical work demonstrating an association between adverse occupational characteristics and accelerated ageing and this prior work has yielded mixed results. **Methods:** We used the 2010 and 2016 waves of the Health and Retirement Study (n = 1,251) to examine the association between occupation categories and self-reported working conditions of American adults at midlife and their subsequent epigenetic ageing as measured through five epigenetic clocks: PCHorvath, PCHannum, PCPhenoAge, PCGrimAge, and DunedinPACE. **Results:** We found that individuals working in sales/clerical, service, and manual work show evidence of epigenetic age acceleration compared to those working in managerial/professional jobs and that the associations were stronger with second- and third-generation clocks. Individuals reporting high stress and high physical effort at work showed evidence of epigenetic age acceleration only on PCGrimAge and DunedinPACE. Most of these associations were attenuated after adjustment for race/ethnicity, educational attainment, and lifestyle-related risk factors. Sales/clerical work remained significantly associated with PCHorvath and PCHannum, while service work remained significantly associated with PCGrimAge. **Conclusions:** The results suggest that manual work and occupational physical activity may appear to be risk factors for epigenetic age acceleration through their associations with socioeconomic status, while stress at work may be a risk factor for epigenetic age acceleration through its associations with health behaviours outside of work. Additional work is needed to understand when in the life course and the specific mechanisms through which these associations occur.
Andrasfay et al. 2023.
Epigenetics, vol. 18, no. 1.

Keywords: DNA methylation age; epigenetic age acceleration; epigenetic clock; occupation; pace of ageing; working conditions.
Evidence Level: 4B
Link: https://www.tandfonline.com/doi/full/10.1080/15592294.2023.2218763

Long-term life satisfaction in ageing women with work disability due to mental and musculoskeletal disorders.
Background: Mental disorders (MDs) and musculoskeletal disorders (MSDs) are the major causes of global disability and increase in prevalence with age. Aims: To support healthy ageing, we studied how work disability due to MDs or MSDs is related to life satisfaction (LS) cross-sectionally and in 5- and 10-year follow-ups among ageing women. **Methods:** In the population-based OSTPRE cohort (women aged 58-67 in 1999), data on lifetime permanent work disability pensions (DPs) due to 'MDs only' (n = 337), 'MSDs only' (n = 942) and 'MDs + MSDs' (n = 212) and 'no DP' (n = 6322) until 1999 was obtained from the Finnish national register. The OSTPRE postal enquiry included a four-item life satisfaction (LS) scale (range 4-20: satisfied 4-6, intermediate 7-11, dissatisfied 12-20) at 5-year intervals, in 1999-2004 (n = 6548) and in 1999-2009 (n = 5562). **Results:** In 1999, the risks of belonging to the dissatisfied LS group (score 12-20) vs. the satisfied group (score 4-6) were higher in 'MDs only' (OR = 4.30; 95%CI 2.95-6.28), 'MSDs only' (OR = 2.69; 2.12-3.40) and 'MDs + MSDs' (OR = 2.72; 1.77-4.16) groups than in the 'no DP' group. In the follow-ups, these risks were OR_{5yr} = 5.59 (3.54-8.84) and OR_{10yr} = 4.94 (2.80-8.73) for 'MDs only', OR_{5yr} = 3.36 (2.58-4.37) and OR_{10yr} = 3.18 (2.40-4.21) for 'MSDs only', and OR_{5yr} = 4.70 (2.75-8.05) and OR_{10yr} = 6.84 (3.53-13.27) for 'MDs + MSDs' (all: $p \leq 0.001$). Adjusting for baseline LS did not change the pattern (all $p \leq$

0.001). **Conclusion:** Work disability due to MDs and MSDs undermines healthy ageing among women via life dissatisfaction.
Heikkinen et al. 2023.
Maturitas, vol. 178.

Keywords: Ageing; disability, mental disorders; life satisfaction; musculoskeletal disorders.
Evidence Level: 4B
Link: https://www.maturitas.org/article/S0378-5122(23)00455-3/fulltext

Longitudinal profiles of occupational physical activity during late midlife and their association with functional limitations at old age: A multi-cohort study.
Background: The aim was to examine longitudinal profiles of occupational physical activity (OPA) from midlife to retirement and to investigate how the different OPA-profiles are associated with mobility limitations (ML) and activities of daily living (ADL-disability) at old age. **Methods:** Harmonized data from two cohort studies from Finland and the United States, that have followed people from midlife until old age were used. Repeated measurements of self-reported OPA were collected during approximately 11- to 12-year period. Persons who had data on OPA from ≥ 2 time points during the period from mid-working life to retirement were included. Latent class growth analysis was used to identify OPA-profiles. Risk ratios (RRs) with 95% confidence intervals for the associations of the OPA-profiles and later life MLs and ADL-disability were estimated. **Results:** Three OPA-profiles were identified in both cohorts: high-persistent, moderate-fluctuating, and low-persistent. For majority OPA remained stable: for workers reporting high or low levels of OPA at midlife, the physical demands of work likely persisted, whereas people reporting moderate level OPA had high fluctuation in their exposure level. Members of high-persistent and moderate-fluctuating OPA-profiles had increased risk of subsequent MLs at old age. The RRs for ADL-disability did not differ between the profiles. **Conclusions:** Perceived OPA remains rather stable for workers reporting high or low physical work demands during midlife, yet fluctuating profiles also exist. Workers exposed to high or moderate OPA have higher risk for MLs when they reach old age. Establishing safe and health-promoting levels of OPA during late working life might have positive long-term consequences on healthy ageing.
Saila et al. 2023.
International Archives of Occupational and Environmental Health, vol. 96, no. 9.

Keywords: Ageing workers; biomechanical exposure; functional ability; physical activity paradox; trajectory analyses.
Evidence Level: 4B
Link: https://link.springer.com/article/10.1007/s00420-023-02003-5

Finnish Retirement and Aging Study: A prospective cohort study.
Background: The Finnish Retirement and Aging (FIREA) Study was set up to study changes in health behavioural and cardiometabolic risk factors across retirement transition, and to examine the long-term consequences of work and retirement on health and functioning with advancing age. **Participants:** Public sector workers whose estimated statutory retirement date was in 2014-2019 were invited to participate by sending them a questionnaire 18 months prior to their estimated retirement date. In the first phase of the FIREA Study, participants were followed up with annual surveys, accelerometer and clinical measurements during retirement transition into post-retirement years. The FIREA survey cohort includes 6783 participants, of which 908 belong also to the activity substudy and 290 to the clinical substudy. **Results:** Collected data include survey measures about health, lifestyle factors, psychosocial distress, work-related factors as well as retirement intentions. Accelerometer and GPS devices are used to measure 24-hour movement behaviours. Clinical examination includes blood and hair sample, measurements of anthropometry, cardiovascular function, physical fitness, physical and cognitive function. Our results suggest that in general retirement transition seems to have beneficial influence on health behaviours as well as on physical and mental health, but there are large individual differences, and certain behaviours such as sedentariness tend to increase especially among those retiring from manual

occupations. Future plans**:** The second phase of the FIREA Study will be conducted during 2023-2025, when participants are 70 years old. The FIREA Study welcomes research collaboration proposals that fall within the general aims of the project.
Stenholm et al. 2023.
BMJ Open, vol. 13, no. 12.

Keywords: Aging; epidemiologic studies; occupational and industrial medicine; preventive medicine; public health.
Evidence Level: 4B
Link: https://bmjopen.bmj.com/content/13/12/e076976.long

Technology

This month we explore the use of technology for pandemic management and to train stress management skills. We also explore the effect of technology on burnout and psychological health among remote workers during the pandemic and work conflict.

Successful pandemic management through computer science: A case study of a financial corporation with workers on premises.
Background: In November 2019, an infectious agent that caused a severe acute respiratory illness was first detected in China. Its rapid spread resulted in a global lockdown with negative economic impacts. In this regard, we expose the solutions proposed by a multinational financial institution that maintained their workers on premises, so this methodology can be applied to possible future health crisis. **Objectives:** To ensure a secure workplace for the personnel on premises employing biomedical prevention measures and computational tools. **Methods:** Professionals were subjected to recurrent COVID-19 diagnostic tests during the pandemic. The sanitary team implemented an individual following to all personnel and introduced the information in databases. The data collected were used for clustering algorithms, decision trees, and networking diagrams to predict outbreaks in the workplace. Individualized control panels assisted the decision-making process to increase, maintain, or relax restrictive measures. **Results:** 55,789 diagnostic tests were performed. A positive correlation was observed between the cumulative incidence reported by Madrid's Ministry of Health and the headcount. No correlation was observed for occupational infections, representing 1.9% of the total positives. An overall 1.7% of the cases continued testing positive for COVID-19 after 14 days of quarantine. **Conclusion:** Based on a combined approach of medical and computational science tools, we propose a management model that can be extended to other industries that can be applied to possible future health crises. This work shows that this model resulted in a safe workplace with a low probability of infection among workers during the pandemic.
Partida-Hanon et al. 2023.
Frontiers in Public Health, vol. 11.

Keywords: COVID-19; epidemiology; health informatics; information management; occupational and industrial medicine.
Evidence Level: 5B
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1208751/full

Evaluation of a virtual reality platform to train stress management skills for a defense workforce: Multisite, mixed methods feasibility study.
Background: Psychological stress-related injuries within first-responder organizations have created a need for the implementation of effective stress management training. Most stress management training solutions have limitations associated with scaled adoption within the workforce. For instance, those that are effective in civilian populations often do not align with the human performance culture embedded within first-responder organizations. Programs involving expert-led instructions that are high in quality are often expensive. **Objective**: This study sought to evaluate a tailored stress management training platform within the existing training schedule of the Australian Defense Force (ADF). The platform, known

as Performance Edge (PE), is a novel virtual reality (VR) and biofeedback-enabled stress management skills training platform. Focusing on practical training of well-established skills and strategies, the platform was designed to take advantage of VR technology to generate an immersive and private training environment. This study aimed to assess the feasibility of delivering the VR platform within the existing group-based training context and intended training population. In this setting, the study further aimed to collect data on critical predictors of user acceptance and technology adoption in education, including perceived usability, usefulness, and engagement, while also assessing training impacts. **Methods**: This study used a mixed methods, multisite approach to collect observational, self-reported, and biometric data from both training staff and trainers within a real-world "on-base" training context in the ADF. Validated scales include the Presence Questionnaire and User Engagement Scale for perceived usefulness, usability, and engagement, as well as the State Mindfulness Scale and Relaxation Inventory, to gain insights into immediate training impacts for specific training modules. Additional surveys were specifically developed to assess implementation feedback, intention to use skills, and perceived training impact and value. **Results**: PE training was delivered to 189 ADF trainees over 372 training sessions. The platform was easy to use at an individual level and was feasible to deliver in a classroom setting. Trainee feedback consistently showed high levels of engagement and a sense of presence with the training content and environment. PE is overall perceived as an effective and useful training tool. Self-report and objective indices confirmed knowledge improvement, increased skill confidence, and increased competency after training. Specific training elements resulted in increased state mindfulness, increased physical relaxation, and reduced breathing rate. The ability to practice cognitive strategies in a diverse, private, and immersive training environment while in a group setting was highlighted as particularly valuable. **Conclusions**: This study found the VR-based platform (PE) to be a feasible stress management training solution for group-based training delivery in a defense population. Furthermore, the intended end users, both trainers and trainees, perceive the platform to be usable, useful, engaging, and effective for training, suggesting end-user acceptance and potential for technology adoption.

Kluge et al. 2023.

Journal of Medical Internet Research, vol. 25.

Keywords: Defense; stress management; virtual reality; workplace training.

Evidence Level: 5A

Link: https://www.jmir.org/2023/1/e46368

Techno-stress creators, burnout and psychological health among remote workers during the pandemic: the moderating role of e-work self-efficacy.

Background: During the COVID-19 pandemic, remote working was pervasively implemented, causing an increase in technology-related job demands. Concurrently, there was an increase in psychological problems in the occupational population. **Methods:** This study on remote workers tested a moderated mediation model positing burnout, conceptualized according to the Burnout Assessment Tool, as the mediator between techno-stressors and psychological health outcomes and e-work self-efficacy as a protective personal resource. A sample of 225 remote workers filled out anonymous questionnaires measuring techno-stressors, e-work self-efficacy, burnout, and psychological health symptoms (i.e., depressive mood and anxiety symptoms). The data were analyzed using structural equation mediation and moderated mediation models, adopting a parceling technique. **Results:** The results showed that burnout totally mediated the relationship between techno-stressors and depressive mood, while partially mediating the association between techno-stressors and anxiety symptoms. Moreover, e-work self-efficacy buffered the positive effects of techno-stressors on depressive mood and anxiety symptoms through burnout. **Conclusions:** The present research attested to the relevance of techno-stressors for the psychological health of remote workers and supported burnout as a mediator of this process, although anxiety symptoms were also directly related to techno-stressors. Moreover, the protective role of domain-specific self-efficacy was confirmed in the realm of remote working. Limitations and practical implications are discussed.

Consiglio et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 22.

Keywords: COVID-19 pandemic; burnout assessment tool; e-work self-efficacy; psychological health; remote working; technostress.
Evidence Level: 5B
Link: https://www.mdpi.com/1660-4601/20/22/**7051**

Work conflict: Another trigger to smartphone addiction of individuals with high rumination?
Background: With the widespread use of smartphones, many people spend much time on smartphones for shopping, learning, socializing, and so on, which can affect an individual's mental health and work performance. Especially, individual perceived conflict at work may increase their social anxiety and thus raise the risk of their smartphone addiction. **Methods:** This study collected data from 577 corporate employees in China through convenience sampling to explain the influence mechanism of work conflict on smartphone addiction and to verify the moderating role of rumination. **Results:** Statistical results show that relationship conflicts, task conflicts, and process conflicts positively affect smartphone addiction by enhancing social anxiety. Moreover, rumination positively moderates the relationship between work conflict and smartphone addiction. People with high rumination are more likely to escape reality due to conflict at work, which further enhances their smartphone addiction behaviors. Our study suggests that a relatively harmonious working atmosphere should be established within organizations, especially for employees with rumination. **Conclusions:** Work conflict is a predisposing factor for social anxiety and smartphone addiction in individuals with high rumination.
Sun et al. 2023.
PLoS One, vol. 18, no. 11.

Keywords: Work conflict; smartphone; addiction.
Evidence Level: 4B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0287669

Work Environment

This month we explore issues associated with work for the prison service, the work environment of health care professionals, challenges of accessing hygiene facilities when on the move and factors affecting job performance of IT professionals working from home.

Work for the prison service: Selected health consequences - investigating the role of personal resources, job demands, work stress, and burnout.
Background: The specific job demands of the Prison Service (PS) may affect the health of officers. The job demands-resources model (JD-R) model was used to design a survey of the consequences of working subject to particular job demands. The aim was to gain an insight into the relationship between job demands, personal resources, occupational stress and burnout and selected health consequence indicators (such as behaviors associated with the consumption of alcohol, stress symptoms). **Methods:** A total of 1732 PS officers in Poland were surveyed. The following tools were used as part of the survey: the *Copenhagen Psychosocial Questionnaire* (COPSOQ II), the *Multidimensional Inventory for Assessing Coping Responses* (COPE), the *Alcohol Use Disorders Identification Test* (AUDIT) and a form with a respondent's particulars. Path analysis using partial least squares structural equation modelling (PLS-SEM) was performed. **Results:** The assumed hypotheses were partially confirmed by the results. Out of 4 job demands categories only work pace turned out not to be a significant predictor of burnout and stress. For alcohol related behaviors, stress level was the only significant predictor, both as a direct and indirect effect taking into account job demands. It transpired that support from superiors rather than support from colleagues or self-efficacy was a significant moderator in the emotional demands - stress relationship. Limitations of the study and perspectives for its continuation are also presented herein. **Conclusions:** Based on the obtained results it may be concluded that job demands and support from superiors do have an impact on stress in the PS group. This is also consistent with available reports in literature. At the same time stress is a significant predictor of alcohol related behaviors. Coping through

the use of psychoactive substances was not a significant factor in statistical analyses and it has still not been subject to sufficient scientific analysis. Int J Occup Med Environ Health. 2023;36(6):744-60.
Sygit-Kowalkowska et al. 2023.
International Journal of Occupational Medicine and Environmental Health, vol. 36, no. 6.

Keywords: Burnout; health; health resources; prisons; professional role; working conditions.
Evidence Level: 4B
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10743350/

Working environment of health care professionals - Focus on occupational stress.
Background: Healthcare professionals most often encounter occupational stress. The aim of the study was to investigate the working environment of health care professionals with the focus on expression of occupational stress, and oversee the possibilities of stress management and prevention.
Material and methods: 326 representatives from five different healthcare institutions were surveyed in Siauliai city, Lithuania. The validated questionnaires HSE Management Standards Indicator Tool and the SF-36 questionnaire were used. **Results:** The study revealed that the most important organizational factors were lack of communication, inappropriate relations with authorities and colleagues, big workload and long working hours, quick decision-making, and manifestations of mobbing. Financial support was reported as one of the main motivators in stress management. The most frequent individual factors were emotional relations with patients and their relatives. The healthcare professionals who experienced stress at work more often felt aches that disturbed their work routine, and their health interfered more their ordinary social activities. The main stress prevention measures are involvement of employees in decision-making, annual interviews with authorities, education, assurance of a safe work environment, and elimination of manifestations of mobbing. **Conclusions:** More attention must be paid to occupational stress management. It appeared that there is a lack of knowledge by institutions about the models of occupational stress management and internal stress management policy of organization. Therefore, this stimulates the search for measures that could help to change the situation.
Saparniene et al. 2023.
Annals of Agricultural and Environmental Medicine, vol. 30, no. 4.

Keywords: Healthcare professionals; healthcare workers; occupational stress; stress management; stress prevention; working environment.
Evidence Level: 5B
Link: https://www.aaem.pl/Working-environment-of-health-care-professionals-focus-on-occupational-stress,172116,0,2.html

Challenges of accessing hygiene facilities when on the move: An exploratory interview study with UK mobile workers.
Background: Access to hygiene facilities is essential for health and well-being, and in many countries, employers are legally obliged to ensure that hygiene facilities are readily available. This interview study considers how being on the move impacts the ability of mobile workers (such as community care workers, police, delivery drivers, gardeners, cleaners, utility workers) to access hygiene facilities, and the challenges they face. **Methods:** Using a qualitative exploratory research design, we investigate through semi-structured interviews with 22 United Kingdom (UK) mobile workers (1) what influences their access to hygiene facilities, (2) their hygiene needs, and (3) where mobile workers are accessing hygiene facilities. The interview data was analysed qualitatively using a coding framework developed from a literature review of hand hygiene in fixed workplaces. **Results:** Mobile workers' access to hygiene facilities is influenced by the wider cultural environment, the biological environment, the organisational environment, the physical environment, the facility owner, the worker's role, and the individual themselves, all underpinned by social norms. Our participants needed hygiene facilities so they could use the toilet, clean themselves, and do their work, and for First Aid. Access to facilities is challenging, and our participants needed to access facilities where they were working, travel to find them, or use hygiene kits.

The quality of facilities is frequently poor, and mobile workers must often seek permission and may incur financial costs. Our participants often had to rely on the goodwill of people in private homes. In the absence of facilities, workers often resort to strategies that may affect their health (such as restricting drinking and eating, and ignoring urges) or their dignity (such as relieving themselves outdoors or even soiling their clothes). **Conclusions:** The lack of hygiene facilities available to mobile workers is a serious health and well-being concern. Given that there are many occupations where workers are mobile at least some of the time, the scale of the problem needs to be recognised. This study adds to our understanding of hygiene in workplaces and highlights the inadequacy of current legislation, which appears to serve primarily those working in fixed workplaces such as offices. Recommendations are made to policy makers and organisations.
Rutter et al. 2023.
BMC Public Health, vol. 23, no. 1.

Keywords: Hand hygiene; inequalities; mobile workers; toilets; workplaces.
Evidence Level: 5B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-17465-y

Factors affecting job performance of Sri Lankan IT professionals working from home.
Background: This study investigated the influence of the physical work environment, work life balance, work flexibility, and effective communication on the job performance of IT professionals in Sri Lanka's IT industry who work from home (WFH). **Methods:** A standard questionnaire was used to collect data from 293 IT specialists in 50 different IT organizations in Sri Lanka, and a stepwise probit model was employed for data analysis. **Results:** According to the findings, both the physical work environment and work life balance had a significantly positive effect on job performance. A one-unit increase in the physical work environment and work life balance increased the likelihood of high job performance by 0.21% and 0.19%, respectively. In contrast, work flexibility had a negative effect on job performance, with an increase of one unit resulting in a 0.18% decrease in the likelihood of high job performance. The positive impact of effective communication on job performance was less significant. **Conclusions:**The study emphasises the significance of providing a conducive work environment and promoting work life balance to enhance the job performance of IT professionals in Sri Lanka's IT industry who WFH.
Jaysanandana et al. 2023.
PLoS One, vol. 18, no. 12.

Keywords: Job performance; IT; working from home.
Evidence Level: 5B
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295305