



# Workplace Research Monthly

Formerly Emerging Evidence Alert

June 2024

This Workplace Research Monthly includes the latest peer-reviewed articles, reports and evidence on a range of workplace health and safety, prevention, recovery at work and return to work topics that were published in May 2024 only.

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## 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

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## Enabling Healthy and Safe Workplaces

### Health and Wellbeing

*This month we explore health and wellbeing issues associated with temporary employment and dietary quality, and cardiac parameters across occupations.*

#### **Temporary employment is associated with poor dietary quality in middle-aged workers in Korea: A nationwide study based on the Korean Healthy Eating Index, 2013-2021**

**Background:** Temporary employment is associated with an elevated risk of cardiovascular diseases and mortality. This study explored the association between temporary employment and dietary quality in middle-aged workers. **Methods:** This cross-sectional study included a nationwide sample of middle-aged Korean workers (n = 6467). Employment type was categorized into regular, fixed-term, and daily employment, based on labor contract duration. Dietary quality was assessed using the Korean Health Eating Index (KHEI), which ranges from 0 to 100, with higher scores indicating superior dietary quality. Linear regression was used to estimate beta coefficients ( $\beta$ ) and 95% confidence intervals (CI). **Results:** The survey-weighted proportion of regular, fixed-term, and daily employment was 79.0%, 14.2%, and 6.8%, respectively. Fixed-term and daily employment were associated with a reduced KHEI compared with regular employment ( $\beta$  [95% CI]: -1.07 [-2.11, -0.04] for fixed-term and -2.46 [-3.89, -1.03] for daily employment). In sex-stratified analysis, the association between temporary employment and dietary quality was more pronounced in men ( $\beta$  [95% CI]: -1.69 [-3.71, 0.33] for fixed-term and -2.60 [-4.63, -0.53] for daily employment) than in women. **Conclusion:** this study suggests that temporary employment is a social determinant of dietary quality in middle-aged workers.

**Baek et al. 2024.**

**Nutrients, vol. 16, no. 10.**

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**Keywords:** Diet; eating habit; health behavior; lifestyle; non-standard employment; precarious employment.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/2072-6643/16/10/1482>

#### **Structural and functional cardiac parameters across occupations: A cross-sectional study in differing work environments**

**Background:** Previous investigations have highlighted notable variations in cardiovascular risk indicators associated with various professional categories. However, only a few studies have examined structural and functional cardiac parameters using echocardiography within distinct occupational groups. Hence, this study endeavored to assess cardiac structural and functional parameters in three additional occupations: firefighters (FFs), police officers (POs), and office workers (OWs). **Method:** This prospective study encompassed 197 male participants (97 FFs, 54 POs, and 46 OWs) from Germany. All participants underwent 2D and Doppler echocardiography in resting conditions; standard parasternal and apical axis views were employed to evaluate structural (diastolic and systolic) and functional (systolic and diastolic function, and strain) cardiac parameters. **Results:** All three occupational groups exhibited a tendency towards septal hypertrophy. Notably, OWs exhibited the largest diastolic interventricular septum diameter (IVSd), at  $1.33 \pm 0.25$  cm. IVSd significantly varied between POs and OWs ( $p = 0.000$ ) and between POs and FFs ( $p = 0.025$ ). Additionally, during diastole a substantially larger left ventricular posterior wall diameter (LVPWd) was observed in OWs compared to FFs ( $p = 0.001$ ) and POs ( $p = 0.013$ ). The left ventricular diastolic cavity diameter (LVIDd) and the left ventricular systolic cavity diameter (LVIDs) were significantly higher in POs than they were in FFs (LVIDd:  $p = 0.001$ ; LVIDs:  $p = 0.009$ ), and the LVIDd was notably higher in FFs ( $p = 0.015$ ) and POs compared to OWs ( $p = 0.000$ ). FFs exhibited significantly better diastolic function, indicated by higher diastolic peak velocity ratios (MV E/A ratio) and E/E' ratios, compared to POs (E/A ratio:  $p = 0.025$ ; E/E' ratio:  $p = 0.014$ ). No significant difference in diastolic performance was found between OWs and FFs. Significantly higher E'(lateral) values were noted in POs compared to FFs ( $p = 0.003$ ) and OWs ( $p = 0.004$ ). Ejection fraction did not significantly differ among FFs, POs, and OWs ( $p > 0.6$ ). The left ventricular mass (LV Mass) was notably higher in POs than it was in FFs ( $p = 0.039$ ) and OWs ( $p = 0.033$ ). Strain

parameter differences were notably improved in two- ( $p = 0.006$ ) and four-chamber ( $p = 0.018$ ) views for FFs compared to POs. Concentric remodeling was the predominant change observed in all three occupational groups. Significant differences in the presence of various forms of hypertrophy were observed in FFs, POs, and OWs (exact Fisher test p-values: FFs vs. OWs = 0.021, POs vs. OWs = 0.002). OWs demonstrated notably higher rates of concentric remodeling than FFs did (71.77% vs. 47.9%).

**Conclusion:** This study underscores disparities in both functional and structural parameters in diverse occupational groups. Larger prospective studies are warranted to investigate and delineate differences in structural and functional cardiac parameters across occupational groups, and to discern their associated effects and risks on the cardiovascular health of these distinct professional cohorts.

**Leischik et al. 2024.**

**Scientific Reports, vol. 14, no. 1.**

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**Keywords:** Cardiac function; cardiovascular risk; echocardiography; firefighters; office workers; police officers.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-024-62190-0>

## Work Health and Safety

*This month we explore work health and safety issues associated with effectiveness of occupational safety and health interventions, mosquito control among construction workers, and noise-induced hearing loss among workers.*

### **Effectiveness of occupational safety and health interventions: A long way to go**

**Background:** Occupational Safety and Health (OSH) has become an area of increasing concern for organizations and institutions. As it evolves, it has gradually posed ongoing challenges, becoming more complex, for organizations. Consequently, more comprehensive studies are required to advance academic and institutional research. From this perspective, this study aims to gather research contributions on the effectiveness of existing interventions for OSH improvement and identify areas for further exploration.

**Methods:** According to the nature of scientific literature, the overall process of a literature review was investigated following an integrative approach, which involved searching for, selecting, and analyzing various literature in a creative and integrated manner, without a predefined structure. **Results:** The analysis suggests that there is room for improvement in understanding the effectiveness of OSH interventions and more concrete guidance is still desirable. Based on the literature, some research areas for future developments in OSH interventions are identified. One potential area to explore further is fostering human-centered technological development and a more conscious network of stakeholders, with higher coordination, shared knowledge, and open communication. **Conclusions:** Focusing on the proposed directions will support scholars and practitioners in pursuing continuous OSH improvement through more effective and well-grounded workplace interventions and encourage organizations to be proactive in daily OSH management.

**Vitrano et al. 2024.**

**Frontiers in Public Health, vol. 12.**

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**Keywords:** Effectiveness; integrative review; interventions; literature review; management; occupational health; occupational safety; research agenda.

**Evidence Level:** 6A

**Link:** <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1292692/full>

### **Factors associated with mosquito control among construction workers: A systematic review**

**Background:** Workers in the construction industry frequently work in construction sites with numerous areas that can potentially accumulate water, such as tanks, wet cement surfaces, or water puddles. These water collection sites become ideal breeding grounds for mosquito infestation, which leads to a higher prevalence of mosquito-borne diseases, especially malaria and dengue among construction workers.

Despite that numerous factors have been identified in controlling vector-borne diseases, the specific factors that influence mosquito control at construction sites have yet to be explored. This systematic review aims to determine the factors associated with mosquito control among construction workers. **Methods:** Primarily, articles related to factors associated with mosquito control among construction workers were collected from two different online databases (ScienceDirect and EBSCOhost). Two independent reviewers were assigned to screen the titles and abstracts of the collected data, stored in Microsoft Excel, against the inclusion and exclusion criteria. Afterwards, the quality of the included articles was critically assessed using the Mixed Method Appraisal Tool (MMAT). Of the 171 articles identified, 4 were included in the final review. **Results:** Based on the thorough evaluation, mosquito-related knowledge, practical mosquito prevention measures, and Larval Source Management (LSM) were identified as vital factors associated with mosquito control among construction workers. The significant association between mosquito-related knowledge and control practices indicates higher knowledge linked to effective practices, particularly among female workers and those who were recently infected with malaria. Concurrently, there were notable challenges regarding sustainable preventive measures and larval control methods in construction settings. **Conclusion:** Implementing effective mosquito control, including knowledge and practice on mosquito control together with vector control, is highly required to suppress the expanding mosquito population. It is recommended that employers provide continuous mosquito control education and training to their employees and reward them with incentives, while employees should comply with the guidelines set by their employers to ensure successful mosquito control and reduce the spread of mosquito-borne diseases in the construction industry.

**Dapari et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Mosquito control; construction workers.

**Evidence Level:** 1A

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0303330>

### **Prevalence and associated factors of noise-induced hearing loss among workers in Bishoftu Central Air Base of Ethiopia**

**Background:** Excessive occupational exposure to noise results in a well-recognized occupational hearing loss which is prevalent in many workplaces and now it is taken as a global problem. Therefore, this study aims to assess the prevalence of noise-induced hearing loss and associated factors among workers in the Bishoftu Central Air Base in Ethiopia. **Method:** An institutional-based cross-sectional study was conducted among 260 central air base workers through face-to-face interviews, an environment noise survey, and an audiometric test for data collection. Data were entered by Epi-data version 3.1 and SPSS was used to analyze the data. Finally, a statistical analysis such as descriptive and binary logistic regression analysis was applied. A P-value < 0.05 at 95% CI was considered statistically significant. **Results:** The overall prevalence of noise-induced hearing loss and hearing impairments was 24.6 and 30.9%, respectively. The highest prevalence of noise-induced hearing loss was recorded for workers who were exposed to noise levels greater than 90 dBA. Out of 132 workers exposed to the average noise level of 75 dB A, only 5% of workers were affected with noise-induced hearing loss, while 128 workers exposed to an average noise level equal to or greater than 90 dB A, 19.6% of workers were identified with noise-induced hearing loss. Regarding sex, around 21.9% of male workers were identified with noise-induced hearing loss. Workers who were exposed to a high noise level workplace previously or before the Central Air Base workplace were five times (AOR = 5.0, 95% CI 1.74-14.36) more likely affected by noise-induced hearing loss than those workers not previously exposed. Those workers who were exposed to greater or equal to 90dBA noise level were 4.98 times (AOR = 4.98, 95% CI 2.59-9.58) more likely to be exposed to noise-induced levels than those who were exposed to less than 90dBA noise level. Moreover, male air base workers were 3.5 times more likely exposed to hearing impairment than female workers (AOR = 3.5, 95% CI 1.01-12.0). **Conclusion:** This study identified that the prevalence of noise-induced hearing loss and hearing impairments was significantly high. So implementation of a hearing conservation program, giving noise education, and supplying adequate hearing protective devices (HPDs) are essentials.

**Hailu et al. 2024.**

**Scientific Reports, vol. 14, no. 1.**

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**Keywords:** Hearing conservation program; noise; noise level; noise-induced hearing loss.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-024-56977-4>

### **Risk analysis of noise-induced hearing loss of workers in the automobile manufacturing industries based on back-propagation neural network model: A cross-sectional study in Han Chinese population**

**Background:** This study aims to predict the risk of noise-induced hearing loss (NIHL) through a back-propagation neural network (BPNN) model. It provides an early, simple and accurate prediction method for NIHL. **Method:** A population based, cross sectional study set in Han, China. Participants were 3266 Han male workers from three automobile manufacturing industries. Primary outcome measures collected: information of personal life habits, occupational health test information and occupational exposure history plus predictive factors of NIHL were screened from these workers. BPNN and logistic regression models were constructed using these predictors. **Results:** The input variables of BPNN model were 20, 16 and 21 important factors screened by univariate, stepwise and lasso-logistic regression. When the BPNN model was applied to the test set, it was found to have a sensitivity (TPR) of 83.33%, a specificity (TNR) of 85.92%, an accuracy (ACC) of 85.51%, a positive predictive value (PPV) of 52.85%, a negative predictive value of 96.46% and area under the receiver operating curve (AUC) is: 0.926 (95% CI: 0.891 to 0.961), which demonstrated the better overall properties than univariate-logistic regression modelling (AUC: 0.715) (95% CI: 0.652 to 0.777). The BPNN model has better predictive performance against NIHL than the stepwise-logistic and lasso-logistic regression model in terms of TPR, TNR, ACC, PPV and NPV ( $p < 0.05$ ); the area under the receiver operating characteristics curve of NIHL is also higher than that of the stepwise and lasso-logistic regression model ( $p < 0.05$ ). It was a relatively important factor in NIHL to find cumulative noise exposure, auditory system symptoms, age, listening to music or watching video with headphones, exposure to high temperature and noise exposure time in the trained BPNN model. **Conclusions:** The BPNN model was a valuable tool in dealing with the occupational risk prediction problem of NIHL. It can be used to predict the risk of an individual NIHL.

**Ruan et al. 2024.**

**BMJ Open, vol. 14, no. 5.**

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**Keywords:** Occupational & industrial medicine; public health; risk factors; risk management.

**Evidence Level:** 4B

**Link:** <https://bmjopen.bmj.com/content/14/5/e079955.long>

## **Ergonomics**

### **Computer vision syndrome and ergonomic risk factors among workers of the Commercial Bank of Ethiopia in Addis Ababa, Ethiopia: An institutional-based cross-sectional study**

**Background:** Computer vision syndrome (CVS) is the most pressing public health concern that affects vision and reduces quality of life and productivity, particularly in developing countries. Most of the previous studies conducted in Ethiopia focus on the knowledge and personal risk factors of bank workers. Moreover, ergonomic workstation design was not objectively assessed, which could hinder the implementation of effective intervention strategies. Therefore, this study aimed to determine CVS and ergonomic factors among commercial bank workers in Addis Ababa, Ethiopia. **Methods:** An institutional-based cross-sectional study was carried out among 466 study participants from May 26 to July 24, 2022. A multistage sampling technique was applied to select the study participants. Data were collected via a standardized tool of CVS (CVS-Q). Besides, workstation ergonomics were pertinently assessed. The collected data was entered into EpiData version 3.1 and exported to SPSS version 26 for data analysis and cleaning. Multivariable logistics regression analysis was performed to identify factors associated with CVS. The variables with a  $p$ -value  $< 0.05$  were considered statistically significant factors. **Results:** Prevalence of CVS was 75.3% (95% CI: 71.2-

79.2%). Blurred vision, eye redness, and headache, 59.8%, 53.7%, and 50.7%, respectively, were frequently reported symptoms. Glare (AOR = 4.45; 95% CI: 2.45-8.08), 20-20-20 principle (AOR = 1.98, 95% CI: 1.06-3.67), wearing non-prescription eyeglasses (AOR = 4.17; 95% CI: 1.92-9.06), and poor workstation (AOR = 7.39; 95% CI: 4.05-13.49) was significantly associated with CVS. **Conclusion:** The prevalence of CVS was found to be high. Glare at work, ignoring the 20-20-20 principle, wearing non-prescription eyeglasses, and poor workstation ergonomic design were independent predictors of CVS. Therefore, comprehensive interventional activities like adhering to the 20-20-20 principle, avoiding the use of non-prescription glasses, minimizing glare, and improving workstation ergonomic setup are essential to prevent CVS.

**Gasheya et al. 2024.**

**Frontiers in Public Health, vol. 12.**

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**Keywords:** Addis Ababa; bank worker; computer vision syndrome; ergonomic risk factors; workstation ergonomic setup.

**Evidence Level:** 4B

**Link:** <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1341031/full>

## Chronic Health Issues

*This month we explore chronic health issues associated with ischemic heart disease, Type 2 diabetes and silicosis.*

### **The role of working conditions in educational differences in all-cause and ischemic heart disease mortality among Swedish men**

**Background:** This study aims to investigate the extent to which low job control and heavy physical workload in middle age explain educational differences in all-cause and ischemic heart disease (IHD) mortality while accounting for important confounding factors. **Methods:** The study is based on a register-linked cohort of men who were conscripted into the Swedish military at around the age of 18 in 1969/1970 and were alive and registered in Sweden in 2005 (N=46 565). Cox proportional hazards regression models were built to estimate educational differences in all-cause and IHD mortality and the extent to which this was explained by physical workload and job control around age 55 by calculating the reduction in hazard ratio (HR) after adjustments. Indicators of health, health behavior, and other factors measured during conscription were accounted for. **Results:** We found a clear educational gradient for all-cause and IHD mortality (HR 2.07 and 2.47, respectively, for the lowest compared to the highest education level). A substantial part was explained by the differential distribution of the confounding factors. However, work-related factors, especially high physical workload, also played important explanatory roles. **Conclusion:** Even after accounting for earlier life factors, low job control and especially high physical workload seem to be important mechanistic factors in explaining educational inequalities in all-cause and IHD mortality. It is therefore important to find ways to reduce physical workload and increase job control in order to decrease inequalities in mortality.

**Almroth et al. 2024.**

**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 4.**

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**Keywords:** Physical workload; working conditions; all-cause; ischemic heart disease; mortality.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4158>

### **Type 2 diabetes in the employed population: Do rates and trends differ among nine occupational sectors? An analysis using German health insurance claims data**

**Background:** Socioeconomic inequalities in type 2 diabetes (T2D) are well established in the literature. However, within the background of changing work contexts associated with digitalization and its effect on lifestyle and sedentary behavior, little is known on T2D prevalence and trends among different occupational groups. This study aims to examine occupational sector differences in T2D prevalence and trends thereof between 2012 and 2019. **Methods:** The study was done on 1.683.644 employed individuals

using data from the German statutory health insurance provider in Lower Saxony, the "Allgemeine Ortskrankenkasse Niedersachsen" (AOKN). Predicted probabilities for T2D prevalence in four two-year periods between 2012 and 2019 were estimated based on logistic regression analyses for nine occupational sectors. Prevalence ratios were calculated to illustrate the effect of time period on the prevalence of T2D among the nine occupational sectors. Analyses were stratified by gender and two age groups. **Results:** showed differences among occupational sectors in the predicted probabilities for T2D. The occupational sectors "Transport, logistics, protection and security" and "Health sector, social work, teaching & education" had the highest predicted probabilities, while those working in the sector "Agriculture" had by far the lowest predicted probabilities for T2D. Over all, there appeared to be a rising trend in T2D prevalence among younger employed individuals, with gender differences among occupational sectors. **Conclusion:** The study displayed different vulnerability levels among occupational sectors with respect to T2D prevalence overall and for its rising trend among the younger age group. Specific occupations within the vulnerable sectors need to be focused upon in further research to define specific target groups to which T2D prevention interventions should be tailored.

**Safieddine et al. 2024.**

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

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**Keywords:** Employment; Germany; health insurance claims data; occupational sector; trends; Type 2 diabetes.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-18705-5>

#### **Association of smoking cessation with airflow obstruction in workers with silicosis: A cohort study**

**Background:** Studies in general population reported a positive association between tobacco smoking and airflow obstruction (AFO), a hallmark of chronic obstructive pulmonary disease (COPD). However, this attempt was less addressed in silica dust-exposed workers. **Methods:** his retrospective cohort study consisted of 4481 silicotic workers attending the Pneumoconiosis Clinic during 1981-2019. The lifelong work history and smoking habits of these workers were extracted from medical records. Spirometry was carried out at the diagnosis of silicosis (n = 4177) and reperformed after an average of 9.4 years of follow-up (n = 2648). AFO was defined as forced expiratory volume in one second (FEV1)/force vital capacity (FVC) less than lower limit of normal (LLN). The association of AFO with smoking status was determined using multivariate logistics regression, and the effect of smoking cessation on the development of AFO was evaluated Cox regression. **Results:** Smoking was significantly associated with AFO (current smokers: OR = 1.92, 95% CI 1.51-2.44; former smokers: OR = 2.09, 95% CI 1.65-2.66). The risk of AFO significantly increased in the first 3 years of quitting smoking (OR = 1.23, 95% CI 1.02-1.47) but decreased afterwards with increasing years of cessation. Smoking cessation reduced the risk of developing AFO no matter before or after the confirmation of silicosis (pre-silicosis cessation: HR = 0.58, 95% CI 0.46-0.74; post-silicosis cessation: HR = 0.62, 95% CI 0.48-0.79). **Conclusions:** Smoking cessation significantly reduced the risk of AFO in the workers with silicosis, although the health benefit was not observed until 3 years of abstinence. These findings highlight the importance of early and long-term smoking cessation among silicotic or silica dust-exposed workers.

**Yang et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Smoking; airflow obstruction; workers; silicosis.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0303743>



## Occupational Exposure

*This month we explore occupational exposure issues associated with copper, ammonia, radon, polycyclic aromatic hydrocarbons and pesticides. In other studies, we explore the effects of particulate matter exposure on lung function and biomarkers, cardiovascular, and pulmonary function. We also explore issues associated with low-level respirable crystalline silica and silicosis, occupational asbestos exposure, metal and oxidative exposure and reducing workers' exposure to noise.*

### **Biomonitoring for workplace exposure to copper and its compounds is currently not interpretable**

**Background:** This paper sets out to explore the requirements needed to recommend a useable and reliable biomonitoring system for occupational exposure to copper and its inorganic compounds. Whilst workplace environmental monitoring of copper is used to measure ambient air concentrations for comparison against occupational exposure limits, biological monitoring could provide complementary information about the internal dose of workers, taking into account intra-individual variability and exposure from all routes.

**Method:** For biomonitoring to be of reliable use for copper, a biomarker and the analytical ability to measure it with sufficient sensitivity must be identified and this is discussed in a range of matrices. In addition, there needs to be a clear understanding of the dose-response relationship of the biomarker with any health-effect (clinical or sub-clinical) or, between the level of external exposure (by any route) and the level of the copper biomarker in the biological matrix being sampled, together with a knowledge of the half-life in the body to determine accurate sampling times. For many biologically non-essential metals the requirements for reliable biomarkers can be met, however, for 'essential' metals such as copper that are under homeostatic control, the relationship between exposure (short- or long-term) and the level of any copper biomarker in the blood or urine is complex, which may limit the use and interpretation of measured levels. **Results:** There are a number of types of biomarker guidance values currently in use which are discussed in this paper, but no values have yet been determined for copper (or its inorganic compounds) due to the complexity of its essential nature; the US The American Conference of Governmental Industrial Hygienists (ACGIH) has however indicated that it is considering the development of a biological exposure index for copper and its compounds. In light of this, we present a review of the reliability of current copper biomarkers and their potential use in the occupational context to evaluate whether there is value in carrying out human biomonitoring for copper exposure. **Conclusion:** Based on the available evidence we have concluded that the reliable use of biomonitoring of occupational exposure to copper and its application in risk assessment is not possible at the present time.

**Bevan et al. 2024.**

**International Journal of Hygiene and Environmental Health, vol. 258.**

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**Keywords:** Biomonitoring; copper; feasibility; guidance values; workplace.

**Evidence Level:** 5B

**Link:** <https://www.sciencedirect.com/science/article/pii/S1438463924000397?via%3Dihub>

### **Metal and oxidative potential exposure through particle inhalation and oxidative stress biomarkers: A 2-week pilot prospective study among Parisian subway workers**

**Background:** In this pilot study on subway workers, we explored the relationships between particle exposure and oxidative stress biomarkers in exhaled breath condensate (EBC) and urine to identify the most relevant biomarkers for a large-scale study in this field. **Methods:** We constructed a comprehensive occupational exposure assessment among subway workers in three distinct jobs over 10 working days, measuring daily concentrations of particulate matter (PM), their metal content and oxidative potential (OP). Individual pre- and post-shift EBC and urine samples were collected daily. Three oxidative stress biomarkers were measured in these matrices: malondialdehyde (MDA), 8-hydroxy-2'-deoxyguanosine (8-OHdG) and 8-isoprostane. The association between each effect biomarker and exposure variables was estimated by multivariable multilevel mixed-effect models with and without lag times. **Results:** The OP was positively associated with Fe and Mn, but not associated with any effect biomarkers. Concentration changes of effect biomarkers in EBC and urine were associated with transition metals in PM (Cu and Zn)

and furthermore with specific metals in EBC (Ba, Co, Cr and Mn) and in urine (Ba, Cu, Co, Mo, Ni, Ti and Zn). The direction of these associations was both metal- and time-dependent. Associations between Cu or Zn and MDA<sub>EBC</sub> generally reached statistical significance after a delayed time of 12 or 24 h after exposure. Changes in metal concentrations in EBC and urine were associated with MDA and 8-OHdG concentrations the same day. **Conclusion:** Associations between MDA in both EBC and urine gave opposite response for subway particles containing Zn versus Cu. This diverting Zn and Cu pattern was also observed for 8-OHdG and urinary concentrations of these two metals. Overall, MDA and 8-OHdG responses were sensitive for same-day metal exposures in both matrices. We recommend MDA and 8-OHdG in large field studies to account for oxidative stress originating from metals in inhaled particulate matter.

**Sauvain et al. 2024.**

**International Archives of Occupational and Environmental Health, vol. 97, no. 4.**

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**Keywords:** Biomarkers of oxidative stress; exhaled breath condensate; metals; particulate matter; subway; urine.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00420-024-02054-2>

### **Assessing the impact of PM(2.5)-bound arsenic on cardiovascular risk among workers in a non-ferrous metal smelting area: Insights from chemical speciation and bioavailability**

**Background:** Inhalation of fine particulate matter PM<sub>2.5</sub>-bound arsenic (PM<sub>2.5</sub>-As) may cause significant cardiovascular damage, due to its high concentration, long transmission range, and good absorption efficiency in organisms. However, both the contribution and the effect of the arsenic exposure pathway, with PM<sub>2.5</sub> as the medium, on cardiovascular system damage in nonferrous smelting sites remain to be studied. **Method:** In this work, a one-year site sample collection and analysis work **Results:** showed that the annual concentration of PM<sub>2.5</sub>-As reached 0.74 µg/m<sup>3</sup>, which was 120 times the national standard. The predominant species in the PM<sub>2.5</sub> samples were As (V) and As (III). A panel study among workers revealed that PM<sub>2.5</sub>-As exposure dominantly contributed to human absorption of As. After exposure of mice to PM<sub>2.5</sub>-As for 8 weeks, the accumulation of As in the high exposure group reached equilibrium, and its bioavailability was 24.5%. A series of animal experiments revealed that PM<sub>2.5</sub>-As exposure induced cardiac injury and dysfunction at the environmental relevant concentration and speciation. **Conclusion:** By integrating environmental and animal exposure assessments, more accurate health risk assessment models exposed to PM<sub>2.5</sub>-As were established for metal smelting areas. Therefore, our research provides an important scientific basis for relevant departments to formulate industry supervision, prevention and control policies.

**Qi et al. 2024.**

**Environmental Science and Technology, vol. 58, no. 19.**

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**Keywords:** Bioavailability; chemical speciation; health risk assessment; heart dysfunction; PM<sub>2.5</sub>-As.

**Evidence Level:** 5B

**Link:** <https://pubs.acs.org/doi/10.1021/acs.est.3c10761>

### **Ammonia detection by electronic noses for a safer work environment**

**Background:** Providing employees with proper work conditions should be one of the main concerns of any employer. Even so, in many cases, work shifts chronically expose the workers to a wide range of potentially harmful compounds, such as ammonia. Ammonia has been present in the composition of products commonly used in a wide range of industries, namely production in lines, and also laboratories, schools, hospitals, and others. Chronic exposure to ammonia can yield several diseases, such as irritation and pruritus, as well as inflammation of ocular, cutaneous, and respiratory tissues. In more extreme cases, exposure to ammonia is also related to dyspnea, progressive cyanosis, and pulmonary edema. As such, the use of ammonia needs to be properly regulated and monitored to ensure safer work environments. The Occupational Safety and Health Administration and the European Agency for Safety and Health at Work have already commissioned regulations on the acceptable limits of exposure to ammonia. Nevertheless, the monitoring of ammonia gas is still not normalized because appropriate sensors can be difficult to find

as commercially available products. **Results:** To help promote promising methods of developing ammonia sensors, this work will compile and compare the results published so far.

**Reis et al. 2024.**

**Sensors, vol. 24, no. 10.**

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**Keywords:** Ammonia; e-nose; environment; health at work; review.

**Evidence Level:** 6B

**Link:** <https://www.mdpi.com/1424-8220/24/10/3152>

### **Effects of occupational exposure to metal fume PM<sub>2.5</sub> on lung function and biomarkers among shipyard workers: A 3-year prospective cohort study**

**Background:** This study investigates the associations of  $\alpha$ 1-antitrypsin, inter- $\alpha$ -trypsin inhibitor heavy chain (ITIH4), and 8-isoprostane with lung function in shipyard workers exposed to occupational metal fume fine particulate matter (PM<sub>2.5</sub>), which is known to be associated with adverse respiratory outcomes.

**Methods:** A 3-year follow-up study was conducted on 180 shipyard workers with 262 measurements.

Personal exposure to welding fume PM<sub>2.5</sub> was collected for an 8-h working day. Pre-exposure, post-exposure, and delta ( $\Delta$ ) levels of  $\alpha$ 1-antitrypsin, ITIH4, and 8-isoprostane were determined in urine using enzyme-linked immunosorbent assays. Post-exposure urinary metals were sampled at the beginning of the next working day and analyzed by inductively coupled plasma-mass spectrometry. Lung function measurements were also conducted the next working day for post-exposure. **Results:** An IQR increase in PM<sub>2.5</sub> was associated with decreases of 2.157% in FEV<sub>1</sub>, 2.806% in PEF, 4.328% in FEF<sub>25%</sub>, 5.047% in FEF<sub>50%</sub>, and 7.205% in FEF<sub>75%</sub>. An IQR increase in PM<sub>2.5</sub> led to increases of 42.155  $\mu$ g/g in  $\Delta\alpha$ 1-antitrypsin and 16.273  $\mu$ g/g in  $\Delta$ ITIH4. Notably, IQR increases in various urinary metals were associated with increases in specific biomarkers, such as post-urinary  $\alpha$ 1-antitrypsin and ITIH4. Moreover, increases in  $\Delta\alpha$ 1-antitrypsin and  $\Delta$ ITIH4 were associated with decreases in FEV<sub>1</sub>/FVC by 0.008% and 0.020%, respectively, and an increase in  $\Delta$ 8-isoprostane resulted in a 1.538% decline in FVC. **Conclusion:** Our study suggests that urinary  $\alpha$ 1-antitrypsin and ITIH4 could indicate early lung function decline in shipyard workers exposed to metal fume PM<sub>2.5</sub>, underscoring the need for better safety and health monitoring to reduce respiratory risks.

**Tran et al. 2024.**

**International Archives of Occupational and Environmental Health, vol. 97, no. 4.**

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**Keywords:** ITIH4; lung function; oxidative stress; particulate matter; welding;  $\alpha$ 1-antitrypsin.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00420-024-02055-1>

### **Low-level respirable crystalline silica and silicosis: Long-term follow-up of Vermont granite workers**

**Background:** The lifetime risk of silicosis associated with low-level occupational exposure to respirable crystalline silica remains unclear because most previous radiographic studies included workers with varying exposure concentrations and durations. **Method:** This study assessed the prevalence of silicosis after lengthy exposure to respirable crystalline silica at levels  $\leq 0.10$  mg/m<sup>3</sup>. Vermont granite workers employed any time during 1979-1987 were traced and chest radiographs were obtained for 356 who were alive in 2017 and residing in Vermont. Work history, smoking habits and respiratory symptoms were obtained by interview, and exposure was estimated using a previously developed job-exposure matrix. Associations between radiographic findings, exposure, and respiratory symptoms were assessed by ANOVA, chi-square tests and binary regression. **Results:** Fourteen workers (3.9%) had radiographic evidence of silicosis, and all had been employed  $\geq 30$  years. They were more likely to have been stone cutters or carvers and their average exposure concentrations and cumulative exposures to respirable crystalline silica were significantly higher than workers with similar durations of employment and no classifiable parenchymal abnormalities.

**Conclusion:** This provides direct evidence that workers with long-term exposure to low-level respirable crystalline silica ( $\leq 0.10$  mg/m<sup>3</sup>) are at risk of developing silicosis.

**Vacek et al. 2024.**

**International Journal of Environmental Research and Public Health, vol. 21, no. 5.**

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**Keywords:** Chest radiograph; crystalline silica; exposure; granite; silicosis.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/21/5/608>

### **Global burden of mesothelioma attributable to occupational asbestos exposure in 204 countries and territories: 1990-2019**

**Background:** Malignant mesothelioma, a rare and aggressive cancer primarily caused by occupational asbestos exposure, has a poor prognosis. **Methods:** This study leverages the Global Burden of Disease (GBD) 2019 dataset to analyze the burden of mesothelioma linked to occupational asbestos exposure from 1990 to 2019. The analysis includes the number of mesothelioma deaths and disability-adjusted life years (DALYs) attributable to occupational asbestos exposure, focusing on trends in age-standardized mortality rate (ASMR) and age-standardized disability-adjusted life-year rate (ASDR) by year, age, sex, country, region, and Socio-demographic Index (SDI). **Results:** In 2019, 91.7% of mesothelioma deaths and 85.2% of DALYs were attributable to occupational asbestos exposure, resulting in 26,820 (95% UI 24,312-28,622) deaths and 569,429 (95% UI 509,956-617,484) DALYs. Despite a decline in ASMR and ASDR from 1990 to 2019, the absolute number of deaths and DALYs almost doubled. The United States reported the highest number of mesothelioma deaths, while China had the highest number of DALYs. Age-specific mortality rates and DALYs decreased in the 25-74 age group but increased in the 75+ age group. **Conclusion:** In conclusion, occupational asbestos exposure remains the primary cause of mesothelioma worldwide, with an increasing number of deaths and DALYs. The highest incidence rates are observed in high-income areas, and rates are rising in low-income areas. It is crucial to raise awareness about the hazards of asbestos to reduce the global burden of mesothelioma linked to occupational exposure.

**Chen et al. 2024.**

**Journal of Cancer Research and Clinical Oncology, vol. 150, no. 50.**

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**Keywords:** Global burden of disease (GBD); mesothelioma; occupational asbestos exposure.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00432-024-05802-6>

### **Radon exposure assessment in occupational and environmental settings: An overview of instruments and methods**

**Background:** Radon is a naturally occurring noble radioactive gas that poses significant health risks, particularly lung cancer, due to its colorless, odorless, and tasteless nature, which makes detection challenging without formal testing. It is found in soil, rock, and water, and it infiltrates indoor environments, necessitating regulatory standards and guidelines from organizations such as the Environmental Protection Agency, the World Health Organization, and the Occupational Health and Safety Agency to mitigate exposure. **Method:** In this paper, we present various methods and instruments for radon assessment in occupational and environmental settings. **Results and Conclusion:** Discussion on long- and short-term monitoring, including grab sampling, radon dosimetry, and continuous real-time monitoring, is provided. The comparative analysis of detection techniques-active versus passive-is highlighted from real-time data and long-term exposure assessment, including advances in sensor technology, data processing, and public awareness, to improve radon exposure evaluation techniques.

**Kholopo et al. 2024.**

**Sensors, vol. 24, no. 10.**

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**Keywords:** Assessment strategies; environmental exposure; monitoring; occupational setting; radon.

**Evidence Level:** 6A

**Link:** <https://www.mdpi.com/1424-8220/24/10/2966>

### **Biomonitoring of polycyclic aromatic hydrocarbons exposure and short-time health effects in wildland firefighters during real-life fire events**

**Background:** Human biomonitoring data retrieved from real-life wildland firefighting in Europe and, also, worldwide are scarce. **Method:** Thus, in this study, 176 Portuguese firefighters were biomonitoring pre- and post- unsimulated wildfire combating (average: 12-13 h; maximum: 55 h) to evaluate the impact on the levels of urinary polycyclic aromatic hydrocarbons hydroxylated metabolites (OHPAH; quantified by high-performance liquid chromatography with fluorescence detection) and the associated short-term health effects (symptoms, and total and differentiated white blood cells). Correlations between these variables and data retrieved from the self-reported questionnaires were also investigated. Firefighters were organized into four groups according to their exposure to wildfire emissions and their smoking habits: non-smoking non-exposed (NSNExp), non-smoking exposed (NSExp), smoking non-exposed (SNExp), and smoking and exposed (SExp). **Results:** The most abundant metabolites were 1-hydroxynaphthalene and 1-hydroxyacenaphthene (1OHNaph + 1OHAc) (98-99 %), followed by 2-hydroxyfluorene (2OHFlu) (0.2-1.1 %), 1-hydroxyphenanthrene (1OHPhen) (0.2-0.4 %), and 1-hydroxypyrene (1OHPy) (0.1-0.2 %); urinary 3-hydroxybenzo(a)pyrene was not detected. The exposure to wildfire emissions significantly elevated the median concentrations of each individual and total OHPAH compounds in all groups, but this effect was more pronounced in non-smoking (1.7-4.2 times;  $p \leq 0.006$ ) than in smoking firefighters (1.3-1.6 times;  $p \leq 0.03$ ). The greatest discriminant of exposure to wildfire emissions was 1OHNaph + 1OHAc (increase of 4.2 times), while for tobacco smoke it was 2OHFlu (increase of 10 times). Post-exposure, white blood cells count significantly increased ranging from 1.4 (smokers,  $p = 0.025$ ) to 3.7-fold (non-smokers,  $p < 0.001$ ), which was accompanied by stronger significant correlations ( $0.480 < r < 0.882$ ;  $p < 0.04$ ) between individual and total OHPAH and total white blood cells (and lymphocytes > monocytes > neutrophils in non-smokers), evidencing the impact of PAH released from wildfire on immune cells. **Conclusion:** This study identifies Portuguese firefighters with high levels of biomarkers of exposure to PAH and points out the importance of adopting biomonitoring schemes, that include multiple biomarkers of exposure and biomarkers of effect, and implementing mitigations strategies.

**Paiva et al. 2024.**

**Science of The Total Environment, vol. 926.**

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**Keywords:** Human biomonitoring; Occupational exposure; PAH; Tobacco consumption; White blood cells count; Wildfire emissions.

**Evidence Level:** 4B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0048969724019442?via%3Dihub>

### **Assessing trends and burden of occupational exposure to asbestos in the United States: A comprehensive analysis from 1990 to 2019**

**Background:** This study aimed to analyze the trends and burden of occupational exposure to asbestos in the United States (U.S.) from 1990 to 2019, focusing on mortality rates, geographic distribution, age and sex patterns, and causes of death. **Methods:** Data on the number of deaths attributable to occupational exposure to asbestos were collected from 1990 to 2019 in the U.S. Joinpoint analysis was conducted to assess trends over time, and regression models were applied to calculate annual percentage changes (APC) and annual average percentage changes (AAPC). Geographic distribution was examined using mapping techniques. Age and sex patterns were analyzed, and causes of death were identified based on available data. **Results:** From 1990 to 2019, the overall number of deaths due to occupational exposure to asbestos in the U.S. increased by 20.2%. However, age-standardized mortality rates (ASMR) and age-standardized disability-adjusted life years (DALYs) rates (ASDR) exhibited a decline over the same period. Geographic analysis revealed differences in the number of deaths across states in 2019, with California reporting the highest number of fatalities. Age-specific mortality and DALYs showed an increase with age, peaking in older age groups. Tracheal, bronchus, and lung cancer were the leading causes of death attributed to asbestos exposure, with increasing trends observed over the past five years. **Conclusion:** The study highlights significant trends and burden in occupational exposure to asbestos in the U.S., including overall increases in mortality rates, declining ASMR and ASDR, geographic disparities, age and sex patterns, and

shifts in causes of death. These findings underscore the importance of continued monitoring and preventive measures to mitigate the burden of asbestos-related diseases.

Li et al. 2024.

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

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**Keywords:** Age-standardized rates; annual average percentage changes; annual percentage changes; asbestos; death.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-18919-7>

### **The relative contribution of PM(2.5) components to the obstructive ventilatory dysfunction-insights from a large ventilatory function examination of 305,022 workers in southern China**

**Background:** The new round of WHO/ILO Joint Estimates of the Work-related Burden of Disease assessment requires further research to provide more evidence, especially on the health impact of ambient air pollution around the workplace. However, the evidence linking obstructive ventilatory dysfunction (OVD) to fine particulate matter (PM<sub>2.5</sub>) and its chemical components in workers is very limited. Evidence is even more scarce on the interactive effects between occupational factors and particle exposures. We aimed to fill these gaps based on a large ventilatory function examination of workers in southern China.

**Methods:** We conducted a cross-sectional study among 363,788 workers in southern China in 2020. The annual average concentration of PM<sub>2.5</sub> and its components were evaluated around the workplace through validated spatiotemporal models. We used mixed-effect models to evaluate the risk of OVD related to PM<sub>2.5</sub> and its components. Results were further stratified by basic characteristics and occupational factors.

**Results:** Among the 305,022 workers, 119,936 were observed with OVD. We found for each interquartile range (IQR) increase in PM<sub>2.5</sub> concentration, the risk of OVD increased by 27.8 (95 % confidence interval (CI): 26.5-29.2 %). The estimates were 10.9 % (95 %CI: 9.7-12.1 %), 15.8 % (95 %CI: 14.5-17.2 %), 2.6 % (95 %CI: 1.4-3.8 %), 17.1 % (95 %CI: 15.9-18.4 %), and 11 % (95 %CI: 9.9-12.2 %), respectively, for each IQR increment in sulfate, nitrate, ammonium salt, organic matter and black carbon. We observed greater effect estimates among females, younger workers, workers with a length of service of 24-45 months, and professional skill workers. Furthermore, it is particularly noteworthy that the noise-exposed workers, high-temperature-exposed workers, and less-dust-exposed workers were at a 5.7-68.2 % greater risk than others. **Conclusion:** PM<sub>2.5</sub> and its components were significantly associated with an increased risk of OVD, with stronger links among certain vulnerable subgroups.

Li et al. 2024.

**Environment International**, vol. 187.

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**Keywords:** Interaction effect; obstructive ventilatory dysfunction; occupational factors; pm(2.5) and its components; workers.

**Evidence Level:** 4B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0160412024003076?via%3Dihub>

### **Cross-shift changes in pulmonary function and occupational exposure to particulate matter among e-waste workers in Ghana**

**Background:** Little is known on the association between cross-shift changes in pulmonary function and personal inhalation exposure to particulate matter (PM) among informal electronic-waste (e-waste) recovery workers who have substantial occupational exposure to airborne pollutants from burning e-waste.

**Methods:** Using a cross-shift design, pre- and post-shift pulmonary function assessments and accompanying personal inhalation exposure to PM (sizes <1, <2.5 μm, and the coarse fraction, 2.5-10 μm in aerodynamic diameter) were measured among e-waste workers (*n* = 142) at the Agbogbloshie e-waste site and a comparison population (*n* = 65) in Accra, Ghana during 2017 and 2018. Linear mixed models estimated associations between percent changes in pulmonary function and personal PM. **Results:** Declines in forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) per hour were not significantly associated with increases in PM (all sizes) among either study population, despite breathing

zone concentrations of PM (all sizes) that exceeded health-based guidelines in both populations. E-waste workers who worked "yesterday" did, however, have larger cross-shift declines in FVC [-2.4% (95%CI: -4.04%, -0.81%)] in comparison to those who did not work "yesterday," suggesting a possible role of cumulative exposure. **Conclusion:** Overall, short-term respiratory-related health effects related to PM exposure among e-waste workers were not seen in this sample. Selection bias due to the "healthy worker" effect, short shift duration, and inability to capture a true "pre-shift" pulmonary function test among workers who live at the worksite may explain results and suggest the need to adapt cross-shift studies for informal settings.

**Laskaris et al. 2024.**

**Frontiers in Public Health, vol. 12.**

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**Keywords:** Ghana; air pollution; electronic-waste; informal sector; particulate matter; personal inhalation; pulmonary function; respiratory health.

**Evidence Level:** 5B

**Link:** <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1368112/full>

### **Hearing protection field attenuation estimation systems and associated training for reducing workers' exposure to noise**

**Background:** Global Burden of Disease studies identify hearing loss as the third leading cause of years lived with a disability. Their estimates point to large societal and individual costs from unaddressed hearing difficulties. Workplace noise is an important modifiable risk factor; if addressed, it could significantly reduce the global burden of disease. In practice, providing hearing protection devices (HPDs) is the most common intervention to reduce noise exposure at work. However, lack of fit of HPDs, especially earplugs, can greatly limit their effectiveness. This may be the case for 40% of users. Testing the fit and providing instructions to improve noise attenuation might be effective. In the past two decades, hearing protection fit-test systems have been developed and evaluated in the field. They are called field attenuation estimation systems. They measure the noise attenuation obtained by individual workers using HPDs. If there is a lack of fit, instruction for better fit is provided, and may lead to better noise attenuation obtained by HPDs.

**Objectives:** To assess: (1) the effects of field attenuation estimation systems and associated training on the noise attenuation obtained by HPDs compared to no instruction or to less instruction in workers exposed to noise; and (2) whether these interventions promote adherence to HPD use. **Methods:** For the search we used CENTRAL, MEDLINE, five other databases, and two trial registers, together with reference checking, citation searching, and contact with study authors to identify studies. We imposed no language or date restrictions. The latest search date was February 2024. We included randomised controlled trials (RCTs), cluster-RCTs, controlled before-after studies (CBAs), and interrupted time-series studies (ITs) exploring HPD fit testing in workers exposed to noise levels of more than 80 A-weighted decibels (or dBA) who use hearing protection devices. The unit 'dBA' reports on the use of a frequency-weighting filter to adjust sound measurement results to better reflect how human ears process sound. The outcome noise attenuation had to be measured either as a personal attenuation rating (PAR), PAR pass rate, or both. PAR pass rate is the percentage of workers who passed a pre-established level of sufficient attenuation from their HPDs, identified on the basis of their individual noise exposure. For data collection and analysis: two review authors independently assessed study eligibility, risk of bias, and extracted data. We categorised interventions as fit testing of HPDs with instructions at different levels (no instructions, simple instructions, and extensive instructions). **Results:** We included three RCTs (756 participants). We did not find any studies that examined whether fit testing and training contributed to hearing protector use, nor any studies that examined whether age, gender, or HPD experience influenced attenuation. We would have included any adverse effects if mentioned by the trial authors, but none reported them. None of the included studies blinded participants; two studies blinded those who delivered the intervention. Effects of fit testing of HPDs with instructions (simple or extensive) versus fit testing of HPDs without instructions Testing the fit of foam and premoulded earplugs accompanied by simple instructions probably does not improve their noise attenuation in the short term after the test (1-month follow-up: mean difference (MD) 1.62 decibels (dB), 95% confidence interval (CI) -0.93 to 4.17; 1 study, 209 participants; 4-month follow-up: MD 0.40 dB, 95% CI -2.28 to 3.08; 1 study, 197 participants; both moderate-certainty evidence). The intervention probably

does not improve noise attenuation in the long term (MD 0.15 dB, 95% CI -3.44 to 3.74; 1 study, 103 participants; moderate-certainty evidence). Fit testing of premoulded earplugs with extensive instructions on the fit of the earplugs may improve their noise attenuation at the immediate retest when compared to fit testing without instructions (MD 8.34 dB, 95% CI 7.32 to 9.36; 1 study, 100 participants; low-certainty evidence). Effects of fit testing of HPDs with extensive instructions versus fit testing of HPDs with simple instructions Fit testing of foam earplugs with extensive instructions probably improves their attenuation (MD 8.62 dB, 95% CI 6.31 to 10.93; 1 study, 321 participants; moderate-certainty evidence) and also the pass rate of sufficient attenuation (risk ratio (RR) 1.75, 95% CI 1.44 to 2.11; 1 study, 321 participants; moderate-certainty evidence) when compared to fit testing with simple instructions immediately after the test. This is significant because every 3 dB decrease in noise exposure level halves the sound energy entering the ear. No RCTs reported on the long-term effectiveness of the HPD fit testing with extensive instructions. **Conclusions:** HPD fit testing accompanied by simple instructions probably does not improve noise attenuation from foam and premoulded earplugs. Testing the fit of foam and premoulded earplugs with extensive instructions probably improves attenuation and PAR pass rate immediately after the test. The effects of fit testing associated with training to improve attenuation may vary with types of HPDs and training methods. Better-designed trials with larger sample sizes are required to increase the certainty of the evidence.

**Morata et al. 2024.**

**The Cochrane Database of Systematic Reviews, vol. 5, no. 5.**

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**Keywords:** Noise exposure; hearing protection; training.

**Evidence Level:** 1A

**Link:** <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD015066.pub2/full>

### **Physical function as a marker to assess the effects of occupational long-term pesticide exposure**

**Background and Method:** In this cross-sectional study, we determined the relative impact of long-term occupational exposure to pesticides on physical performance and perception of tiredness. Experimental data was collected in locus from agricultural communities and included surveys to assess the duration of exposure to pesticides, social status, habitual physical activity levels, presence of common mental disorders (CMD), and self-reported tiredness. Plasmatic cholinesterase (PChE), body composition and traditional functional performance tests (Handgrip strength-HGS; Time up and go-TUG; and Sit-to-stand-STs) were obtained. From the 127 individuals tested, cluster analysis yielded 80 individuals divided in Direct Exposed (n = 37) and Indirect Exposed (n = 43); Tired (n = 16), and Not Tired (n = 64). PChE values were within the reference values (5209.64-13943.53 U/L). **Results:** Pesticide exposure had no influence on PChE levels, CMD or fatigue ( $p > 0.05$ ), while Self-reported tiredness had ( $p < 0.05$ ). Principal Component Analyses showed that HGS; STs and TUG (i.e., physical performance variables) are negatively influenced by two independent factors: pesticide exposure and self-reported tiredness. **Conclusion:** Chronic pesticide exposure and tiredness can negatively impact physical performance, independently, without clinically significant changes in PChE levels that is a biomarker used to track pesticide intoxication. Functional physical tests can be a useful tool to identify chronic pesticide exposure, and help with the limitations of commonly used parameters (i.e. PChE and CMD). Self-reported tiredness is a confounding variable.

**Coelho et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Physical function; occupational; pesticide exposure.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0300980>



## Sedentary Practices

### Effectiveness of interventions on sedentary behaviors in office workers: A systematic review and meta-analysis

**Background:** Various interventions have sought to break sedentariness among office workers, but their pooled effect on sitting time reduction remains unknown. Also, it is essential to compare the effectiveness of different intervention types. **Study design:** Systematic review and meta-analysis. **Methods:** A literature search was conducted in the PubMed, EMBASE, Scopus, Web of Science, MEDLINE (via EBSCO), PsycINFO, and Cochrane Library databases from inception to May 2, 2023. Two independent reviewers screened eligibility, extracted data, and assessed the risk of bias using the Cochrane risk of bias tool 2.0. Randomized controlled trials aiming to reduce sitting at work were included. The primary outcome was sitting time at work per day. The secondary outcomes included cardiometabolic risk factors, psychological well-being, and work engagement. A random effects model was performed to synthesize continuous data as mean differences with 95% confidence intervals (95% CIs). **Results:** Twenty-four studies with 3169 participants were included. All intervention types in combination significantly reduced workplace sitting by 38 min per workday (95% CI: -47.32 to -28.72;  $P < 0.001$ ;  $I^2 = 49.78\%$ ). Interventions using environmental support (ES), motivational strategies (MS), or multiple components (multi) had all shown a significant reduction in work-time sedentary behavior (SB) relative to control groups. Regarding secondary outcomes, no significant effects were observed in physical or psychological outcomes besides high-density lipoprotein. **Conclusions:** Findings suggest that SB reduction interventions are generally effective for reducing workplace sitting. Multi interventions with both ES and MS are recommended for future clinical applications. Future studies should aim not only to reduce SB but also to attain the benefits of SB reduction interventions on physical and psychological well-being.

**Wang et al. 2024.**

**Public Health, vol. 230.**

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**Keywords:** Environmental support; meta-analysis; motivational strategies; office workers; sedentary behavior.

**Evidence Level:** 1A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0033350624000787?via%3Dihub>

## Physical Activity

### Changes in accelerometer-measured physical activity and sedentary behavior from before to after COVID-19 outbreak in workers

**Background:** The novel coronavirus disease 2019 (COVID-19) pandemic may have reduced opportunities for engaging in physical activity (PA) and increased sedentary behavior (SB) among workers. However, most previous studies used self-reported assessments. This study aimed to examine the changes in accelerometer-measured PA and SB from before to after COVID-19 outbreak among Japanese workers.

**Methods:** This 1-year longitudinal study used data from the annual health check-ups of workers who lived in the Tokyo metropolitan area. Baseline and follow-up data were collected from June to November of 2019 and June to November of 2020, respectively. Participants were asked to wear the accelerometer on their hip during awake hours for at least 10 days in both the surveys. Before the analysis, considering the difference in wearing time, time spent in PA and SB were converted to the percentage of wearing time. To investigate the changes in PA or SB from before to during COVID-19 outbreak, paired t-tests were performed. **Results:** Of the 757 eligible participants, 536 were included in the analysis (70.8%). Participants' mean age was 53.3 years, 69.6% were female, and most were full-time employees. Time spent in PA decreased, regardless of weekdays or weekends, although changes on the weekends were not significant. Conversely, time spent in SB increased on both weekdays and weekends in 2020. These changes corresponded to approximately 10 minutes per day decrease in PA and increase in SB. **Conclusion:** Objectively measured PA decreased and SB increased by approximately 10 minutes per day after the COVID-19 outbreak among Japanese workers.

Fujii et al. 2024.

Journal of Epidemiology, vol. 34, no. 5.

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Keywords: Office worker; physical inactivity; sitting time; social distancing.

Evidence Level: 4B

Link: [https://www.istage.jst.go.jp/article/jea/34/5/34\\_JE20230023/article](https://www.istage.jst.go.jp/article/jea/34/5/34_JE20230023/article)

## Musculoskeletal Health

*This month we explore musculoskeletal health issues associated with shoulder pain and upper extremity disability, carpal tunnel syndrome, hip osteoarthritis, chronic neck pain, and prevalence, associated factors, and impact on quality of life among kitchen workers.*

### Work-related musculoskeletal disorders: Prevalence, associated factors, and impact on quality of life among kitchen workers in hospitality industry, Bahir Dar City, Northwest Ethiopia, 2023

**Background :** Work-related musculoskeletal disorders (WMSDs) are considered major public health problems globally, deteriorating the quality of life of workers in various occupations. Kitchen work is reported as among the occupations most prone to these maladies. Nevertheless, prevalence of WMSDs, contributing factors, and impacts on the quality of life of hospitality industry kitchen workers are insufficiently documented in Ethiopia. Therefore, this study aimed to assess the prevalence of WMSDs, their associated factors, and impact on the quality of life of hospitality industry kitchen workers in Bahir Dar city, Ethiopia. **Methods:** An institution-based, cross-sectional study was conducted from 17 April to 17 May 2023. A total of 422 participants were included using a simple random sampling technique. WMSDs were evaluated using an interviewer-administered Nordic standardized questionnaire. The short form-36 questionnaire was used to assess quality of life. The data were collected using the Kobo tool box. SPSS version 26 software was used to perform both bivariable and multivariable binary logistic regression analyses. Independent t-tests were used to show the impact of WMSDs on quality of life scales across groups with and without WMSD symptoms. **Result:** In this study, the response rate was 98.34% (n = 415). The 1-year prevalence of WMSDs among kitchen workers was 82.7% [95% CI: (79.1, 86.3)]. Age group between 30 and 39 years [AOR: 2.81; 95% CI: (1.46-5.41)], job dissatisfaction [AOR: 2.45; 95% CI: (1.34-4.45)], anxiety [AOR: 2.26; 95% CI: (1.12-4.52)], prolonged standing [AOR: 3.81; 95% CI: (1.58-9.17)], and arm overreaching [AOR: 2.43; 95% CI: (1.34-4.41)] were significantly associated factors with work-related musculoskeletal disorders. Work-related musculoskeletal disorders had a significant impact on all quality of life dimensions, in which the mean SF-36 scores of participants with WMSDs were lower than those of their non-WMSD counterparts. **Conclusion:** This study revealed that the prevalence of WMSDs was relatively high. Age between 30 and 39 years, job dissatisfaction, anxiety, prolonged standing, and arm overreaching were identified as significant determinants of WMSDs among kitchen workers in hospitality industries. The presence of one or multiple WMSDs, in turn, is associated with worse quality of life dimensions of individuals.

Abebaw et al. 2024.

Frontiers in Public Health, vol. 12.

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Keywords: Ethiopia; Nordic; SF-36; kitchen workers; quality of life; work-related musculoskeletal disorders.

Evidence Level: 4B

Link: <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1358867/full>

### Occupational tasks associated with shoulder pain and upper extremity disability: A cross-sectional study in the Johnston County Osteoarthritis Project

**Background:** Shoulder pain is a leading cause of disability. Occupations requiring high upper extremity demands may put workers at greater risk of shoulder injury and resulting pain. We examined associations of occupation with shoulder pain and upper extremity disability in the Johnston County Osteoarthritis Project. **Methods:** Work industry and occupational tasks for the longest job held were collected from participants. At follow-up ranging from 4-10 years later, participants were asked about shoulder symptoms

(pain, aching, or stiffness occurring most days of 1 month in the last year) and given a 9-item, modified Disabilities Arm Shoulder and Hand (DASH) questionnaire to categorize disability from 0-4 (none-worst). Logistic regression and cumulative logit regression models were used to estimate associations with prevalent shoulder symptoms and with worse disability category, respectively. Models were adjusted for cohort, age, sex, race, education and time to follow-up. Sex- and race-stratified associations were evaluated. **Results:** Among 1560 included participants, mean age was 62 years (standard deviation  $\pm$  9 years); 32% were men, and 31% were Black. Compared to the managerial/professional industry, higher odds of both shoulder symptoms and worse upper extremity disability were seen for most industrial groups with physically demanding jobs, particularly the service industry. Work that often or always required lifting/moving > 10 lbs. was associated with higher odds of shoulder symptoms. Work that sometimes or always required heavy work while standing was associated with higher odds of shoulder symptoms, and this association was stronger among men and White workers. **Conclusion:** Physically demanding occupations were associated with increased occurrence of shoulder pain and disability. Mitigating specific physical work demands may reduce shoulder-related disability.

**Yanik et al. 2024.**

**BMC Musculoskeletal Disorders, vol. 25, no. 1.**

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**Keywords:** Disability; physical work; shoulder.

**Evidence Level:** 4B

**Link:** <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-024-07487-x>

### **Physical and psychosocial work-related exposures and the incidence of carpal tunnel syndrome: A systematic review of prospective studies**

**Background:** This systematic review summarizes the evidence on associations between physical and psychosocial work-related exposures and the development of carpal tunnel syndrome (CTS). **Method:** Relevant databases were searched up to January 2020 for cohort studies reporting associations between work-related physical or psychosocial risk factors and the incidence of CTS. Two independent reviewers selected eligible studies, extracted relevant data, and assessed risk of bias (RoB). **Results:** We identified fourteen articles for inclusion which reported data from nine cohort studies. Eight reported associations between physical exposure and the incidence of CTS and five reported associations between psychosocial exposures and the incidence of CTS. Quality items were generally rated as unclear or low RoB. **Conclusion:** Work-related physical exposure factors including high levels of repetition, velocity, and a combination of multiple physical exposures were associated with an increased risk of developing CTS. No other consistent associations were observed for physical or psychosocial exposures at work and CTS incidence.

**Gerger et al. 2024.**

**Applied Ergonomics, vol. 117.**

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**Keywords:** CTS; cohort studies; occupational medicine.

**Evidence Level:** 1A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0003687023002491?via%3Dihub>

### **Hip osteoarthritis and occupational mechanical exposures: A systematic review and meta-analysis**

**Background:** The aim was to conduct a systematic review and meta-analysis investigating the association between occupational mechanical exposures and hip osteoarthritis. **Methods:** The study was registered in PROSPERO. A systematic literature search was conducted in six databases to identify relevant articles. Two authors independently excluded articles, extracted data, assessed the risk of bias of each included article, and graded the level of evidence. We conducted a meta-analysis using random-effects model and performed a sensitivity analysis stratifying articles based on the risk of bias assessment, study design, and the outcome measurement. **Results:** Twenty-four articles were eligible for inclusion. The highest pooled odds ratio (OR) was found for combined mechanical exposures [OR 1.7, 95% confidence interval (CI) 1.4-2.0], non-neutral postures (OR 1.7, 95% CI 1.4-2.1), lifting/carrying loads (OR 1.6, 95% CI 1.3-1.9), and climbing stairs (OR 1.6, 95% CI 1.1-2.2). The range of pooled OR for the remaining mechanical exposures

(eg, standing, walking, kneeling, squatting, and sitting) was 0.6-1.6. Grading the quality of evidence, a moderate level of evidence was found for the combined mechanical exposures and for lifting/carrying loads. The remaining exposure categories were graded as having either low or very low levels of evidence. **Conclusions:** Considerable heterogeneity was observed across the included studies, and high-quality literature using objective exposure measurements is warranted. Despite various limitations affecting the comparability, occupational mechanical exposures seem to influence the likelihood of developing hip osteoarthritis.

**Jahn et al. 2024.**

**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 4.**

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**Keywords:** Hip osteoarthritis; occupational mechanical exposures.

**Evidence Level:** 1A

**Link:** <https://www.sjweh.fi/article/4152>

### **The impact of inertial exercises performed in the workplace on shoulder muscles' strength and muscles' fatigue resistance in women with disabilities**

**Background:** Workers who do monotonous and repetitive work in a static position often complain about fatigue and decreased work efficiency. Some studies indicate that to improve muscle fatigue, resistance strength training can be used. **Methods:** To investigate the effect of 4-week inertial training on shoulder muscles' strength and muscles' fatigue resistance 44 female workers with disabilities were examined. The participants were randomized into the training group (T) (N = 32) and the control group (C) (N = 12). Before the training and after that shoulder muscles' strength were tested at the start and at the end of the workday (Monday and Friday). The participants were asked to complete questionnaire concerning their fatigue at work (T and C), inertial training and work efficiency (T). **Results:** The work performed during the last day of the workweek, i.e., Friday (before training) resulted in a significant decrease in shoulder muscles' strength in T and C. Muscle strength achieved at the end of the workweek (Friday afternoon) was significantly lower than achieved at the start of the workweek (Monday morning) in both tested groups (before training). Moreover, inertial training resulted in a significant increase in shoulder muscles' strength in T; 34-74% for different muscles. No changes in muscles' strength were noted in C. Increased muscle strength in T following inertial training effectively prevented muscle fatigue. After training the differences in shoulder muscles' strength noted in T during different times of the workday and workweek were insignificant. Moreover, 4-week inertial training increased significantly the work efficiency of women from T by 4%; no changes were noted in C. Inertial training was well tolerated by the participants. **Conclusions:** Using inertial training in women with disabilities to prevent shoulder muscles' fatigue during the workday and workweek is recommended. *Med Pr Work Health Saf.* 2024;75(2):113-122.

**Nacz et al. 2024.**

**Medycyna Pracy, vol. 75, no. 2.**

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**Keywords:** Disability; fatigue; inertial training; work; workday; workweek.

**Evidence Level:** 3A

**Link:** <https://medpr.imp.lodz.pl/The-impact-of-inertial-exercises-performed-in-the-workplace-on-shoulder-muscles-strength,185296,0,2.html>

### **The influence of exercise on pain, disability and quality of life in office workers with chronic neck pain: A systematic review and meta-analysis**

**Background:** Exercise is recommended for office workers with neck pain. However, recent reviews evaluated the effectiveness of workplace interventions only. Our aims were to evaluate the effect of exercise on pain, disability, and quality of life (QoL) in office workers with chronic neck pain. **Methods:** Study design employed was a systematic review with meta-analysis. Electronic databases were searched from inception to April 30, 2022, to identify studies in which participants were adults aged  $\geq 18$  years undergoing any form of neck exercises (e.g., strengthening, motor control) or physical activity (e.g., aerobic exercise) performed for a minimum of two-weeks without any other additional treatment besides advice or

education. Two reviewers independently screened papers and determined the certainty of the evidence. **Results:** Eight randomised controlled trials met the eligibility criteria. Seven studies reported a significant decrease in Visual Analogue Scale (VAS) scores for neck pain intensity and five studies reported a significant decrease in Neck Disability Index (NDI) scores following strengthening exercises. Only one study assessed the effect of strengthening exercises on QoL and reported no significant effect. All eight included studies had a high risk of bias and the overall certainty of evidence was low. Meta-analyses demonstrated a significant decrease of neck pain intensity and disability for strengthening exercises compared to a control ( $p < 0.01$ ). **Conclusion:** There is low certainty of evidence that strengthening of the neck, shoulder and scapular musculature is effective at reducing neck pain and disability in office workers. Further research evaluating the effect of exercise on QoL is required.

**Jones et al. 2024.**

**Applied Ergonomics, vol. 117.**

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**Keywords:** Chronic neck pain; effectiveness; exercise; office workers; strengthening.

**Evidence Level:** 1A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0003687023002545?via%3Dihub>

## Guiding and Supporting Mental Health and Wellbeing

### Mental Health

*This month we explore mental health issues associated with manager training for mental health and attitudes to depression, the interaction of occupational stress and job burnout on depressive symptoms, job insecurity, precarious employment, postpartum depression, and suicidal ideation.*

#### Typology of employers offering line manager training for mental health

**Background:** Mental ill health has a high economic impact on society and employers. National and international policy advocates line manager (LM) training in mental health as a key intervention, but little is known about employer training provisions. To explore the prevalence and characteristics of organizations that offer LM training in mental health. **Methods:** Secondary analysis of existing longitudinal anonymised organizational-level survey data derived from computer-assisted telephone interview surveys collected in four waves (2020:1900 firms, 2021:1551, 2022:1904, 2023:1902) in England, before, during and after a global pandemic. **Results:** The proportion of organizations offering LM training in mental health increased pre- to post-pandemic (2020:50%, 2023:59%) but 41% do not currently provide it. Logistic regression confirmed that LM training is more likely to be offered by large-sized enterprises, organizations with a larger proportion of employees who are younger (aged 25-49), female, disabled and from ethnic minority communities. Sector patterns were inconsistent, but in 2023, organizations from the 'Hospitality' and 'Business Services' sectors were more likely to provide LM training than other sectors.

**Conclusions:** Continued efforts are needed to increase the proportion of employers offering LM training in mental health, particularly small- to medium-sized enterprises, and organizations with predominantly male, White and/or older workforces.

**Blake et al. 2024.**

**Occupational Medicine, vol. 74, no. 3.**

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**Keywords:** Employers; line manager training; mental health.

**Evidence Level:** 4B

**Link:** <https://academic.oup.com/occmed/article/74/3/242/7667610?login=false>

#### The interaction of occupational stress and job burnout on depressive symptoms in railway workers in Fuzhou City

**Background:** To explore the relationship between occupational stress, burnout and depressive symptoms among railroad workers in Fuzhou, and to analyze the interaction of burnout and occupational stress on depressive symptoms. **Methods:** In this study, 861 railway employees of Fuzhou railway bureau were

randomly selected from January to April, 2022. Occupational stress inventory revised edition (OSI-R), China job burnout inventory (CMBI) and Symptom Checklist-90 (SCL-90) were used to investigate the occupational stress, job burnout and depressive symptoms of railway workers. Interactions associated with depressive symptoms were assessed by linear hierarchical regression analysis and SPSS macros (PROCESS).

**Results:** Occupational stress, job burnout and depressive symptoms accounted for 50.58%, 93.47%, and 11.19% of the study population, respectively. There were intergroup differences between age, marriage status, and length of service ( $P < 0.05$ ). Occupational stress and job burnout are the main risk factors for depressive symptoms (OR: 2.01, 95% CI: 1.17-3.45; 1.94, 1.69-2.23, respectively). More importantly, further analysis of the interaction between occupational stress and job burnout showed that those with high levels of job burnout had a high-risk effect on depressive symptoms at high levels of occupational stress.

**Conclusion:** Occupational stress and job burnout are risk factors for depressive symptoms among railroad workers in Fuzhou City. The interaction of job burnout and occupational stress increases the risk of depressive symptoms.

**Yu et al. 2024.**

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

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**Keywords:** Depressive symptoms; interaction effect; job burnout; occupational stress; rail workers.

**Evidence Level:** 4B

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11134703/>

### **Trajectories of job insecurity and the probability of poorer mental health among prime working-age Australian women and men**

**Background:** Precarious and insecure employment arrangements are important social determinants of health. Prior evidence has consistently found perceived job insecurity to be associated with poorer mental health. Nonetheless, several key under-researched areas remain in the existing evidence base. This study addresses some of these gaps by examining trajectories of job (in)security and assessing the effect of various persistent job security trajectories on subsequent mental health of both men and women. **Method:** Utilising 15 waves of data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, we employed group-based trajectory modelling (GBTM) to identify trajectories of job (in)security through men and women's prime working years (from baseline age of 28-38yrs to 41-51yrs) across 14 years (waves 5-18), before subsequently examining the associations between these estimated trajectories and mental health at wave 19 (aged 42-52yrs). **Results:** We identified four distinct trajectories of job (in)security for both men and women: persistently secure, becoming more secure, becoming less secure, and persistently insecure. Examining the association between these trajectories and mental health, we found that chronic exposure to any amount of persistent job insecurity (improving, worsening or persistently insecure) is detrimental to the mental health of both men and women. Furthermore, a somewhat incremental or dose dependant effect was found, with persistent job insecurity associated with the largest declines in mental health scores. **Conclusion:** Given mental health disorders are a substantial cause of disability globally, our study provides evidence that developing policy and practice interventions to reduce job insecurity (as an increasingly recognised and highly modifiable social determinant of mental health) has considerable potential to enact positive population health improvements.

**Ervin et al. 2024.**

**Social Science & Medicine, vol. 349.**

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**Keywords:** Australia; gender; job insecurity; job security; longitudinal; mental health; precarious employment; trajectory analysis.

**Evidence Level:** 4A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0277953624003460?via%3Dihub>

### **Can psychosocial risk factors mediate the association between precarious employment and mental health problems in Sweden? Results from a register-based study**

**Background:** The aim of this study was to examine the mediating effect of the psychosocial work environment on the association between precarious employment (PE) and increased risk of common mental disorders (CMD), substance use disorders and suicide attempts. **Methods:** This longitudinal register-study was based on the working population of Sweden, aged 25-60 years in 2005 (N=2 552 589). Mediation analyses based on a decomposition of counterfactual effects were used to estimate the indirect effect of psychosocial risk factors (PRF) (mediators, measured in 2005) on the association between PE (exposure, measured in 2005) and the first diagnosis of CMD, substance use disorders, and suicide attempts occurring over 2006-2017. **Results:** The decomposition of effects showed that the indirect effect of the PRF is practically null for the three outcomes considered, among both sexes. PE increased the odds of being diagnosed with CMD, substance use disorders, and suicide attempts, among both men and women. After adjusting for PE, low job control increased the odds of all three outcomes among both sexes, while high job demands decreased the odds of CMD among women. High job strain increased the odds of CMD and suicide attempts among men, while passive job increased the odds of all three outcomes among women. **Conclusion:** The results of this study did not provide evidence for the hypothesis that psychosocial risks could be the pathways linking precarious employment with workers' mental health. Future studies in different social contexts and labour markets are needed.

**Méndez-Rivero et al. 2024.**

**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 4.**

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**Keywords:** Psychosocial risk factors; precarious employment; mental health.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4151>

### **Managers' attitudes to depression and the association with their rating of how work capacity is affected in employees with common mental disorders**

**Background:** This explorative, cross-sectional study assessed the association between managers' attitudes to employee depression and their rating of how common mental disorders (CMDs) affect employee work capacity. **Method:** A principal component analysis was performed for the nine variables concerning managers' rating of how CMDs can affect work capacity among employees. **Results:** The analysis resulted in two factors: task-oriented- and relational work capacity. The result of the multivariate analysis of covariance showed a p value of 0.014 (Pillai's trace) indicating a statistically significant association between managers' attitudes towards employee depression and managers' rating of how CMDs affect work capacity. The association was significant for both factors as indicated by the p value of 0.024 for task-oriented work capacity and the p value of 0.007 for relational work capacity. The R<sup>2</sup> value was 0.022 for task-oriented work capacity and 0.017 for relational work capacity. We assumed that negative attitudes towards employee depression would be associated with a perception of decreased work capacity among employees with CMDs. The results showed a significant association; however, the effect (~ 2%) was small. **Conclusion:** Further studies of manager's attitudes and other possible determinants of managers' rating of CMD-related work capacity are needed to better understand these factors.

**Hultqvist et al. 2024.**

**BMC Research Notes, vol. 17, no. 1.**

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**Keywords:** Attitudes; common mental disorder; employee; manager; work capacity.

**Evidence Level:** 4B

**Link:** <https://bmresnotes.biomedcentral.com/articles/10.1186/s13104-024-06750-7>

### **Prevalence and associated risk factors for suicidal ideation, non-suicidal self-injury and suicide attempt among male construction workers in Ireland**

**Background:** Suicide among male construction workers are reported to be disproportionately high compared to the working age population. However, there is minimal understanding of the prevalence and associated factors for suicidal ideation, non-suicidal self-injury, and suicide attempt among this occupational group globally. **Methods:** A cross-sectional study was conducted on a large sample of male construction workers in Ireland (n = 1,585). We investigated the prevalence of suicidal ideation, non-suicidal self-injury and suicide attempts and sociodemographic, occupational, and mental health factors associated with these three outcomes. Multivariable Poisson regression was performed to estimate the prevalence rate ratio of suicidal ideation (model 1 primary outcome), while multivariable logistic regression was used to estimate the odds ratio of non-suicidal self-injury (model 2 primary outcome), and suicide attempt (model 3 primary outcome). **Results:** The lifetime prevalence rate for suicidal ideation was 22%, 6% for non-suicidal self-injury, and 6% for suicide attempt. In univariate modelling, socio-demographic and occupation-specific factors associated with the three outcomes included younger age (suicidal ideation and non-suicidal self-injury), not being in a relationship (suicide attempt) and working 35-44 h per week (suicidal ideation and suicide attempt). The mental health factors generalized anxiety disorder, depression, and suicide bereavement were significantly associated with increased risk of the three outcomes. In fully adjusted multivariable models, increasing severity of generalized anxiety disorder and depression were associated with an increased prevalence rate ratio of suicidal ideation, and a higher odds ratio of non-suicidal self-injury and suicide attempt. **Conclusion:** Suicidal ideation, non-suicidal self-injury and suicide attempt are significant issues for male construction workers that require specific attention. Findings highlight a need to support younger male construction workers and those bereaved by suicide. They also highlight the need for the early detection and treatment of generalized anxiety disorder and depression in order to intervene in, and potentially prevent, suicidality among male construction workers.

**O'Donnell et al. 2024.**

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

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**Keywords:** Construction industry; male; non-suicidal self-injury; suicidal ideation; suicide attempt; workplace.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-18483-0>

### **Postpartum depression and risk factors among working women one year after delivery in Beijing, China: A cross-sectional study**

**Background:** Postpartum depression (PPD) is the most common mental illness affecting women after childbirth, and working mothers may be faced with unique challenges. This study aimed to examine the depression status among working postpartum women in 1 year of childbirth and explore the relationship between occupational factors and PPD in urban Beijing, China. **Methods:** A cross-sectional survey of 554 postpartum women was conducted among ten community health service centers in six urban districts of Beijing, China. Sociodemographic, occupational, childbirth and postpartum information were collected. Depression status was obtained using the Edinburgh Postnatal Depression Scale. Prevalence of postpartum depression (PPD) was assessed in relation to occupational characteristics, and influencing factors were analyzed through logistic regression. **Results:** Of the postpartum women, 29.42% met the criteria for depression. PPD prevalence was significantly higher among women employed in commercial enterprises (39.81%). The analysis of influencing factors showed that age, family or personal monthly income, maternity leave, feeding methods, and postpartum care affected the psychological health of occupational women after childbirth. **Conclusion:** PPD prevalence is notably elevated among women employed in commercial enterprises, and specific risk factors contribute to its occurrence. These findings highlight the need for targeted interventions to address these risk factors and prevent PPD in this population.

**Zhao et al. 2024.**

**Frontiers in Public Health, vol. 12.**

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**Keywords:** Commercial enterprises; maternal mental health; postpartum depression; risk factors; working women.

**Evidence Level:** 4B

**Link:** <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1346583/full>

## Psychosocial Issues

*This month we explore psychosocial issues associated with soft-skills training intervention, a seasonal comparison of a 14-day swing on cognitive function and psycho-physiological responses, workplace drug policies, opioid misuse, and psychological distress, and the role of innovative human resource management practices, organizational support and knowledge worker effort in counteracting job burnout. In other studies, we explore the impact of mindfulness on sleep quality, work pressure, and coping styles and occupational burnout. In COVID-19 related research we explore changes in mental distress, and work and life stress experienced by workers during the pandemic.*

### Changes in mental distress among employees during the three years of the COVID-19 pandemic in Germany

**Background:** The COVID-19 pandemic changed the future of work sustainably and led to a general increase in mental stress. A study conducted during the second and third pandemic wave with a retrospective survey of the first wave among 1,545 non-healthcare workers confirmed an increase in anxiety and depression symptoms and showed a correlation with the occupational SARS-CoV-2 infection risk. This online follow-up survey aims to examine changes in mental distress as the pandemic progressed in Germany and to identify factors influencing potential changes. **Methods:** Longitudinal data from 260 subjects were available for this analysis. Mental distress related to anxiety and depression symptoms, assessed by the Patient Health Questionnaire-4 (PHQ-4), and occupational risk factors were solicited at the end of 2022 and retrospectively at the fifth wave. Categorized PHQ-4 scores were modelled with mixed ordinal regression models and presented with odds ratios (OR) and 95% confidence intervals (95% CI).

**Results:** A previous diagnosis of a depressive or anxiety disorder was a strong risk factor for severe symptoms (OR 3.49, 95% CI 1.71-7.11). The impact of occupational SARS-CoV-2 infection risk on mental distress was increased, albeit failing to reach the formal level of statistical significance (high risk OR 1.83, 95% CI 0.59-5.63; probable risk OR 1.72, 95% CI 0.93-3.15). Mental distress was more pronounced in those with a previous diagnosis of anxiety and depression. Confirmed occupational risk factors were protective measures against occupational SARS-CoV-2 infection perceived as inadequate, chronic work-related stress, overcommitment, reduced interactions with fellow-workers, and work-privacy conflicts. **Conclusions:** The pandemic had a negative impact on anxiety and depression symptoms among the studied non-healthcare workers, particularly early in the pandemic, although this effect does not appear to be permanent. There are modifiable risk factors that can protect workers' mental health, including strengthening social interactions among employees and reducing work-privacy conflicts.

**Casjens et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Mental stress; COVID-19.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0302020>

### Reducing work-related stress through soft-skills training intervention in the mining industry

**Background:** The aim of the study was to verify if soft-skills training is an effective intervention in reducing work-related stress among miners, that is, people who run the risk of losing health and/or life due to unpredictable natural forces or human error at work. The motivation for the intervention was based on Job Demands-Resources model where soft skills are job resources that help individuals to cope with or prevent high demands of the environment. The needed skills as well as work demands were first investigated and then a custom training was developed. The rationale for introducing soft-skills training into the work environment can be seen as compatible with the Human Capital Model (HCM) which is designed to

stimulate positive organizational behaviour by providing an effective approach to ensure employees' adequate coping with work-related stress. **Method:** 96 volunteer employees were assigned to intervention (n = 48) and comparison (n = 48) groups. 16-hour tailored training covered tasks and simulation games related to communication, teambuilding, self-management and conflict resolution skills. Job Content Questionnaire, Occupational Stress Indicator (modified to fit the mining environment) and General Health Questionnaire were used in the study. A MANOVA with effect-size measures was conducted. **Results:** Results revealed a significant increase in decision latitude and social support for the trainees. A substantial decrease in stress was also observed, along with a significant decrease in general health problems. There were no such changes in the comparison group. **Conclusions:** A soft-skills training, including communication, teamwork, self-motivation and conflict-resolution skills, helped participants to cope better with the stressful environment and improved their mental health. These effects lasted three months later. The intervention improved miners' psychosocial health and the strategies of coping with stress, which increased safety and health in the company. Investigating the effectiveness of such interventions included in the general Human Capital Model, as it was done in the study, might be a step forward towards building an interdisciplinary approach for health and safety and human resources.

**Molek-Winiarska et al. 2024.**

**Human Factors, vol. 66, no. 5.**

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**Keywords:** Human capital; interventions; job stress; mining; team collaboration; team training.

**Evidence Level:** 5B

**Link:** <https://journals.sagepub.com/doi/full/10.1177/00187208221139020>

#### **A seasonal comparison of a 14-day swing on cognitive function and psycho-physiological responses in mine service workers**

**Background:** This study assessed the effect of season on cognitive function and psycho-physiological responses during a 14-day swing in mine-service workers. **Method:** Cognitive function, thermal sensation and comfort, rating of perceived exertion, fatigue, hydration, core temperature and heart rate were assessed throughout a shift, on three separate days over a swing. **Results:** Working memory and processing efficiency did not differ between seasons ( $p > 0.05$ ), however counting and recall latencies improved throughout the swing ( $p < 0.05$ ). Participants reported greater fatigue post-shift compared to pre-shift ( $p < 0.05$ ). Thermal sensation, thermal comfort, and hydration were significantly elevated in summer compared to winter ( $p < 0.05$ ). Specifically, workers were significantly/minimally dehydrated in summer/winter (urinary specific gravity =  $1.025 \pm 0.007/1.018 \pm 0.007$ ). **Conclusions:** Although cognitive function and thermal strain were not impaired in summer compared to winter, it is essential to reinforce worker's knowledge regarding hydration requirements. Additional education and/or incorporating scheduled rest breaks for hydration should be considered to ensure the health and safety of mine workers.

**Taggart et al. 2024.**

**Applied Ergonomics, vol. 117.**

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**Keywords:** Dehydration; fatigue; mining industry; thermal strain; work.

**Evidence Level:** 3A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0003687024000188?via%3Dihub>

#### **Work & life stress experienced by professional workers during the pandemic: A gender-based analysis**

**Background:** The COVID-19 pandemic impacted work and home life exacerbating pre-existing stressors and introducing new ones. These impacts were notably gendered. **Method:** In this paper, we explore the different work and home life related stressors of professional workers specifically as a result of the COVID-19 pandemic through the gender-based analysis of two pan Canadian surveys: The Canadian Community Health Survey (2019, 2020, 2021) and the Healthy Professional Worker Survey (2021). **Results:** Analyses revealed high rates of work stress among professional workers compared to other workers and this was particularly notable for women. Work overload emerged as the most frequently selected source of work stress, followed by digital stress, poor work relations, and uncertainty. Similar trends were noted in life stress among professional workers, particularly women. Time pressure consistently stood out as the

primary source of non-work stress, caring for children and physical and mental health conditions.

**Conclusion:** These findings can help to develop more targeted and appropriate workplace mental health promotion initiatives that are applicable to professional workers taking gender more fully into consideration.

**Corrente et al. 2024.**

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

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**Keywords:** Gender-based analysis; life stress; professional workers; work stress.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-18677-6>

### **The relationship between workplace drug policies, opioid misuse, and psychological distress: Evidence from the 2020 national survey on drug use and health**

**Background:** This study, using a nationally representative dataset of the U.S. workforce, examines how punitive workplace drug policies relate to opioid use/misuse and psychological distress. **Methods:** The sample included adults aged  $\geq 18$  years who participated in the National Survey on Drug Use and Health and were employed in 2020. Hierarchical multivariate logistical models were constructed to address the research questions. **Results:** The weighted, design-based estimates indicate that of 147 831 081 workers, 3.38% reported misusing opioids in the last 12 months. Having a punitive workplace policy was associated with higher rates of opioid use/misuse among workers aged  $\leq 34$  compared to their same-aged counterparts in nonpunitive workplaces, and among workers identifying as Black, Indigenous, or Person of Colour who also experienced severe psychological distress the past year. **Conclusion:** Some employers may think drug testing policies are net-beneficial to worker well-being; these findings indicate such policies may interact in harmful ways with psychological distress.

**Le et al. 2024.**

**New Solutions, vol. 34, no. 1.**

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**Keywords:** National Survey on Drug Use and Health; drug policy; opioids; psychological distress; well-being; workplace.

**Evidence Level:** 4B

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11003197/>

### **The role of innovative human resource management practices, organizational support and knowledge worker effort in counteracting job burnout in the Polish business services sector**

**Background:** This study focuses on analyzing the impact of innovative human resource management practices (IHRMP) on knowledge worker burnout, and how organizational support and employee effort help explain this relationship in the context of the business services sector. To explore the problem, investigated whether IHRMP have a significant negative impact on employee burnout, and organizational support and employee effort mediate the negative impact of IHRMP on employee burnout. **Methods:** A survey was conducted, collected using the computer assisted web interview method on 1000 knowledge workers employed at business services sector (BSS) organizations in Poland. The quantitative results obtained were analyzed using AMOS software to test the main statistical relationships and through structural equation modeling. **Results:** The study outlines direct and indirect mechanisms to counteract perceived burnout among knowledge workers. The article contributes to the understanding of how IHRMP reduce burnout among knowledge workers and highlights the central importance of organizational support and employee effort as mediating factors against burnout in the context of high-skill, high-intensity work. **Conclusions:** The expected results in terms of application provide a proposal of measures for managers' consideration that can be implemented in the organization with a view to counteracting the incidence of burnout among BSS employees. *Int J Occup Med Environ Health.* 2024;37(2):220-33.

**Rogońska-Pawelczyk 2024.**

**International Journal of Occupational Medicine and Environmental Health, vol. 37, no. 2.**

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**Keywords:** Business services sector; employee effort; innovative human resource management practices; job burnout; micro-based behavioral economics; organizational support.

**Evidence Level:** 5B

**Link:** <https://ijomeh.eu/The-role-of-innovative-human-resource-management-practices-organizational-support,186416,0,2.html>

### **Impact of mindfulness on sleep quality in innovative corporate employees: A chain mediation of social interaction anxiety and bedtime procrastination**

**Background:** In the context of innovative enterprises in China, the significance of sleep quality for employees' physical and mental well-being cannot be understated. This study explores the complex relationship between Mindfulness and sleep quality and examines the potential interaction between Social Interaction Anxiety and prolonged sleep behavior. **Method:** a thorough evaluation involving the administration of the Mindfulness scale, Social Interaction Anxiety scale, sleep delay scale, and the Pittsburgh Sleep Quality Index (PSQI) was conducted among a significant sample of innovative enterprise employees (N = 1648). **Results:** The findings reveal that a notable proportion of these employees, 31.1% to be precise (as per PSQI 8), grapple with compromised sleep quality. Subsequent analyses shed light on compelling patterns, underscoring a robust negative correlation between Mindfulness and factors like Social Interaction Anxiety, sleep delay, and sleep quality ( $\beta = -0.71, -0.37, -0.35; P < 0.01$ ). Conversely, a significant positive correlation emerges connecting Social Interaction Anxiety, sleep delay, and sleep quality ( $\beta = 0.23, 0.37, 0.32; P < 0.01$ ). Interestingly, mediation analysis demonstrates that Mindfulness significantly negatively influences sleep quality, independent of demographic factors such as sex and age. This impact is mediated by sleep delay, which also interacts with Social Interaction Anxiety. **Conclusion:** In summary, the research emphasizes the predictive function of Mindfulness in improving sleep quality among employees in innovative enterprises, achieved through its reduction of Social Interaction Anxiety and bedtime procrastination tendencies.

**Zheng et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Mindfulness; sleep quality; corporate employees.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0302881>

### **Work pressure, coping styles and occupational burnout among Chinese police officers: A meta-analytic review**

**Background and Methods:** The present study conducted a comprehensive meta-analysis to systematically review the relationship between occupational burnout and work pressure among Chinese police officers. Additionally the study explored the mediating role of coping styles using a meta-analytic structural equation model. The investigation involved a thorough search of CNKI, PubMed, PsychInfo, Web of Science, and Google Scholar databases, resulting in the identification of a total of 39 studies with 124 effect sizes and 14,089 police officers. **Results:** The findings revealed a positive correlation between work pressure and occupational burnout among Chinese police officers ( $r = 0.410, 95\% \text{ CI} = [0.347, 0.469]$ ). Furthermore, negative coping styles mediate the relationship between work pressure and occupational burnout. Importantly, these conclusions held true across various work regions for police officers. **Conclusions:** These results provide insights into the relationship magnitude between work pressure and occupational burnout in Chinese police work and shed light on the underlying mechanisms. Based on these findings, it is recommended that interventions focusing on reducing work pressure and fostering positive coping styles be implemented to mitigate occupational burnout among police officers.

**Zhou et al. 2024.**

**BMC Psychology, vol. 12, no. 1.**

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**Keywords:** Coping styles; meta-analytic; meta-analytic structural equation modeling (MASEM); occupational burnout; work pressure.

**Evidence Level:** 1B

**Link:** <https://bmcpyschology.biomedcentral.com/articles/10.1186/s40359-024-01779-6>

## Fostering Work Participation

### Return to Work

#### **Getting an outsider's perspective - sick-listed workers' experiences with early follow-up sessions in the return to work process: A qualitative interview study**

**Background:** The aim of this study was to explore how early follow-up sessions (after 14 and 16 weeks of sick leave) with social insurance caseworkers was experienced by sick-listed workers, and how these sessions influenced their return-to-work process. **Methods:** A qualitative interview study with sick-listed workers who completed two early follow-up sessions with caseworkers from the Norwegian Labor and Welfare Administration (NAV). Twenty-six individuals aged 30 to 60 years with a sick leave status of 50-100% participated in semi-structured interviews. The data was analyzed with thematic analysis. **Results:** Participants' experiences of the early follow-up sessions could be categorized into three themes: (1) Getting an outsider's perspective, (2) enhanced understanding of the framework for long term sick-leave, and (3) the empathic and personal face of the social insurance system. Meeting a caseworker enabled an outsider perspective that promoted critical reflection and calibration of their thoughts. This was experienced as a useful addition to the support many received from their informal network, such as friends, family, and co-workers. The meetings also enabled a greater understanding of their rights and duties, possibilities, and limitations regarding welfare benefits, while also displaying an unexpected empathic and understanding perspective from those working in the social insurance system. **Conclusion:** For sick-listed individuals, receiving an early follow-up session from social insurance caseworkers was a positive experience that enhanced their understanding of their situation, and promoted reflection towards RTW. Thus, from the perspective of the sick-listed workers, early sessions with social insurance caseworkers could be a useful addition to the overall sickness absence follow-up.

**Standal et al. 2024.**

**BMC Health Services Research, vol. 24, no. 1.**

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**Keywords:** Early follow-up; interview study; return to work; sick leave; social insurance.

**Evidence Level:** 5B

**Link:** <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-024-11007-x>

## Presenteeism and Absenteeism

#### **Sickness absence and associations with sociodemographic factors, health risk behaviours, occupational stressors and adverse mental health in 40,343 UK police employees**

**Background:** Police employees may experience high levels of stress due to the challenging nature of their work which can then lead to sickness absence. To date, there has been limited research on sickness absence in the police. This exploratory analysis investigated sickness absence in UK police employees.

**Methods:** Secondary data analyses were conducted using data from the Airwave Health Monitoring Study (2006-2015). Past year sickness absence was self-reported and categorised as none, low (1-5 days), moderate (6-19 days) and long-term sickness absence (LTSA, 20 or more days). Descriptive statistics and multinomial logistic regressions were used to examine sickness absence and exploratory associations with sociodemographic factors, occupational stressors, health risk behaviours, and mental health outcomes, controlling for rank, gender and age. **Results:** From a sample of 40,343 police staff and police officers, forty-six per cent had no sickness absence within the previous year, 33% had a low amount, 13% a moderate amount and 8% were on LTSA. The groups that were more likely to take sick leave were women, non-uniformed police staff, divorced or separated, smokers and those with three or more general practitioner consultations in the past year, poorer mental health, low job satisfaction and high job strain. **Conclusions:**

The study highlights the groups of police employees who may be more likely to take sick leave and is unique in its use of a large cohort of police employees. The findings emphasise the importance of considering possible modifiable factors that may contribute to sickness absence in UK police forces.

**Parkes et al. 2024.**

**Epidemiology and Psychiatric Sciences, vol 33.**

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**Keywords:** Airwave Health Monitoring Study; mental health; police; sick leave; sickness absence.

**Evidence Level:** 4B

**Link:** <https://www.cambridge.org/core/journals/epidemiology-and-psychiatric-sciences/article/sickness-absence-and-associations-with-sociodemographic-factors-health-risk-behaviours-occupational-stressors-and-adverse-mental-health-in-40343-uk-police-employees/A7FE9662875E28E624319F0B3947C9F1>

## Working hours

*This month we explore workplace issues associated with working hours and smoking behaviours, hypertension and general health.*

### Relationship between long working hours and smoking behaviors: Evidence from population-based cohort studies in Korea

**Background:** Long working hours and overwork are growing public health concerns in the Western-Pacific region. We explored the relationship between working hours and smoking behaviors of Korean workers.

**Methods:** This study included 284 782 observations (50 508 workers) from four nationwide cohort studies in Korea. Using generalized estimating equations, we estimated the associations of working hours with current smoking status, smoking initiation, and smoking cessation within each cohort. Cohort-specific estimates were combined through random-effect meta-analysis. Effect sizes were presented as odds ratios (OR) and 95 confidence intervals (CI). **Results:** The overall smoking prevalence was 26.8% within the cohorts. The adjusted OR (95% CI) of the association between working hours and current smoking were 1.01 (0.94-1.08) for <35 hours/week, 1.04 (1.01-1.09) for 41-48 hours/week, 1.06 (1.01-1.10) for 49-54 hours/week, and 1.07 (1.04-1.10) for ≥55 hours/week compared with 35-40 hours/week. The adjusted OR (95% CI) of the association between working hours and smoking cessation in the follow-up were 0.93 (0.85-1.02) for <35 hours/week, 0.89 (0.83-0.96) for 41-48 hours/week, 0.87 (0.81-0.95) for 48-54 hours/week, and 0.91 (0.85-0.98) for ≥55 hours/week compared with 35-40 hours/week. No clear associations were observed between working hours and smoking initiation. **Conclusion:** Long working hours are associated with high current smoking risk and reduced likelihood of smoking cessation among Korean workers. Policy interventions are required to promote smoking cessation and reduce excess overwork for individuals experiencing long working hours.

**Baek et al. 2024.**

**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 4.**

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**Keywords:** Long working hours; smoking; behaviors; Korea.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4147>

### Multiple job holding, working hours, and hypertension by race/ethnicity and sex

**Background:** The number of Americans with multiple jobs is increasing and multiple jobholders work more hours per week. However, the associations between multiple jobholding and hypertension are unknown.

The aim of this study was to examine the associations of multiple jobholding with hypertension and determine whether weekly working hours moderated this association. **Method:** Data from the 2015 National Health Interview Survey on adults (age ≥18 years) were used and included participants who self-identified as non-Hispanic Asian, non-Hispanic Black, Hispanic, or non-Hispanic White in the U.S. (n = 16,926). The associations of multiple jobholding with self-reported hypertension by sex were assessed using modified Poisson regressions. **Results:** Both the number of working hours per week and race/ethnicity were assessed as moderators using multiplicative interaction terms. Multiple jobholding was

not associated with hypertension among women. However, there was a significant three-way interaction such that multiple jobholding was associated with hypertension among non-Hispanic Black men who worked  $\geq 55$  hours per week (relative risk = 1.02, 95% confidence interval = 1.01-1.05). **Conclusion:** The results suggest that the associations between multiple jobholding, number of working hours, and hypertension should be examined at the intersection of race/ethnicity and sex. Future studies should further characterize multiple jobholding and hypertension among non-Hispanic Black men.

**Bell et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Multiple jobs; working hours; race; ethnicity; sex.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0300455>

### **Working hours and health - key research topics in the past and future**

**Background:** This paper discusses the past and present highlights of working hours and health research and identifies key research needs for the future. **Method:** We analyzed over 220 original articles and reviews on working hours and health in the *Scandinavian Journal of Work, Environment & Health* published during the last 50 years. Key publications from other journals were also included. **Results:** The majority of identified articles focussed on the effects of shift and night work, with fewer studying long and reduced working hours and work time control. We observed a transition from small-scale experimental and intensive field studies to large-scale epidemiological studies utilizing precise exposure assessment, reflecting the recent emergence of register-based datasets and the development of analytic methods and alternative study designs for randomized controlled designs. The cumulative findings provide convincing evidence that shift work and long working hours, which are often associated with night work and insufficient recovery, increase the risk of poor sleep and fatigue, sickness absence, occupational injuries, and several chronic health conditions such as cardiovascular diseases and cancer. The observed risks are strongly modified by individual and work-related factors. **Conclusions:** Although the observed health risks of shift work and long working hours are mostly low or moderate, the widespread prevalence of exposure and the hazardousness of the many associated potential outcomes makes such working time arrangements major occupational health risks. Further research is needed to identify exposure-response associations, especially in relation to the chronic health effects, and to elucidate underlying pathways and effective personalized intervention strategies.

**Härmä et al. 2024.**

**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 4.**

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**Keywords:** Working hours; health research; research topics.

**Evidence Level:** 6B

**Link:** <https://www.sjweh.fi/article/4157>

### **Wellness Programs**

#### **A workplace health promotion program for a predominantly military population: Associations with general health, mental well-being and sustainable employability**

**Background:** Due to the globally increasing life expectancies, many countries are raising their official retirement age to prevent labor shortages and sustain retirement systems. This trend emphasizes the need for sustainable employability. Unhealthy lifestyles pose a risk to sustainable employability as they contribute to chronic diseases and decreased productivity. Workplace Health Promotion (WHP) programs have gained attention as a strategy to enhance employee health and well-being. **Method:** The Netherlands Armed Forces, a unique employer with demanding psychological and physical requirements, was used as a case study to investigate the associations of a WHP Program with workers health and sustainable employability. The program offered tailor-made guidance to participants (N = 341) through individual coaching trajectories. The program's impact was evaluated by measuring self-reported health, mental well-being, and sustainable employability over a 6-month period. **Results** indicated significant improvements

across all these dimensions after participation in the program. **Conclusion:** This study provides valuable insights into the benefits of tailor-made WHP programs. While this was an observational study without a control group, this study supports the importance of incorporating individualized approaches in WHP initiatives to foster positive outcomes in health and sustainable employability.

**Bogaers et al. 2024.**

**International Journal of Environmental Research and Public Health, vol. 21, no. 5.**

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**Keywords:** Health; military; sustainable employability; workplace health programs.

**Evidence Level:** 3B

**Link:** <https://www.mdpi.com/1660-4601/21/5/625>

## Shift Work

### **Mediation Mendelian randomisation study on the effects of shift work on coronary heart disease and traditional risk factors via gut microbiota**

**Background:** Epidemiological evidence suggests that there is an increased risk of coronary heart disease (CHD) related to jobs involving shift work (JSW), but the causality of and mechanism underlying such a relationship remain unclear. Therefore, we aimed to explore the relationship between JSW and CHD, investigating both causality and potential mediating factors. **Methods:** We performed univariate, multivariate, and mediation Mendelian randomisation (MR) analyses using data from large genome-wide association studies focussed on JSW and CHD, as well as data on some CHD risk factors (type 2 diabetes, hypertension, obesity, and lipids measurement) and 196 gut microbiota taxa. Single-nucleotide polymorphisms significantly associated with JSW acted as instrument variables. We used inverse-variance weighting as the primary method of analysis. **Results:** Bidirectional MR analysis indicated a robust effect of JSW on increased CHD risk; however, the existence of CHD did not affect the choice of JSW. We identified a mediating effects of type 2 diabetes and hypertension in this relationship, accounting for 11.89% and 14.80% of the total effect of JSW on CHD, respectively. JSW were also causally associated with the risk of type 2 diabetes and hypertension and had an effect on nine microbial taxa. The mediating influence of the Eubacterium brachy group at the genus level explained 16.64% of the total effect of JSW on hypertension. We found limited evidence for the causal effect of JSW on obesity and lipids measurements. **Conclusions:** Our findings suggest a causal effect of JSW on CHD, diabetes, and hypertension. We also found evidence for a significant connection between JSW and alterations in the gut microbiota. Considering that certain microbial taxa mediated the effect of JSW on hypertension risk, targeting gut microbiota through therapeutics could potentially mitigate high risks of hypertension and CHD associated with JSW.

**Zhang et al. 2024.**

**Journal of Global Health, vol. 28.**

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**Keywords:** Shift work; coronary heart disease; gut microbiota.

**Evidence Level:** 3B

**Link:** <https://jogh.org/2024/jogh-14-04110>

## Management and Leadership

### **Managerial (dis)preferences towards employees working from home: Post-pandemic experimental evidence**

**Background:** Work from home (WFH) has been a part of the professional landscape for over two decades, yet it was the COVID-19 pandemic that has substantially increased its prevalence. The impact of WFH on careers is rather ambiguous, and a question remains open about how this effect is manifested in the current times considering the recent extensive and widespread use of WFH during the pandemic. To answer these questions, this article investigates whether managerial preferences for promotion, salary increase and training allowance depend on employee engagement in WFH. We take into account the employee's gender, parental status as well as the frequency of WFH. Furthermore, we examine whether



managers' experience with WFH and its prevalence in the team moderate the effect of WFH on careers.

**Method:** An online survey experiment was run on a sample of over 1,000 managers from the United Kingdom. The experiment was conducted between July and December 2022. **Results:** The findings indicate that employees who WFH are less likely to be considered for promotion, salary increase and training than on-site workers. The pay and promotion penalties for WFH are particularly true for men (both fathers and non-fathers) and childless women, but not mothers. We also find that employees operating in teams with a higher prevalence of WFH do not experience negative career effects when working from home.

Additionally, the more WFH experience the manager has, the lesser the career penalty for engaging in this mode of working. **Conclusion:** Our study not only provides evidence on WFH and career outcomes in the post-pandemic context but also furthers previous understanding of how WFH impacts careers by showing its effect across different groups of employees, highlighting the importance of familiarisation and social acceptance of flexible working arrangements in their impact on career outcomes.

**Kasperska et al. 2024.**

**PLoS One, vol. 19, no. 5.**

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**Keywords:** Working from home; managerial preferences; post-pandemic.

**Evidence Level:** 5B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0303307>

## Work Ability

*This month we explore workplace issues associated with work ability and physical fitness and long-COVID autonomic syndrome.*

### Association between physical fitness and perceived work ability among Finnish population: A cross-sectional study

**Background:** This cross-sectional study aims to examine association between different components of physical fitness and perceived work ability among working age population. **Methods:** The population-based study sample included 2050 participants aged 18-74 from the Finnish national Health 2011 study. Physical fitness was assessed by the single leg stand test, the modified push-up test, the vertical jump test and the six-minute walk test, and perceived work ability was assessed via interview. Logistic regression was used for examining the associations between physical fitness and work ability. **Results:** After adjusting for potential confounders (age, sex, marital status, educational level, work characteristics, total physical activity, daily smoking, BMI and number of diseases), odds ratios indicated that good work ability was more likely among those who had better balance in single leg stand test (OR = 1.54; 95% CI 1.07-2.24), and who belonged in the high fitness thirds in six-minute walking test (OR = 2.08; 95% CI 1.24-3.49) and in vertical jump test (OR = 2.51; 95% CI 1.23-5.12) compared to lowest third. Moreover, moderate (OR = 1.76; 95% CI 1.02-3.05) to high fitness (OR = 2.87; 95% CI 1.40-5.92) in modified push-up test increased the likelihood of good work ability compared to lowest third. **Conclusion:** These study results indicate that good musculoskeletal as well as cardiorespiratory fitness are associated with better perceived work ability. Promoting physical fitness in individual and societal level may be potential targets for maintaining good work ability in working age population.

**Pohjola et al. 2024.**

**International Archives of Occupational and Environmental Health, vol. 97, no. 4.**

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**Keywords:** Cross-sectional studies; health-related fitness; occupational health; physical capacity; workability.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00420-024-02058-y>

### Long-COVID autonomic syndrome in working age and work ability impairment

**Background:** Long-COVID19 has been recently associated with long-sick leave and unemployment. The autonomic nervous system functioning may be also affected by SARS-CoV-2, leading to a chronic autonomic

syndrome. This latter remains widely unrecognized in clinical practice. **Method:** In the present study, we assessed the occurrence of Long-COVID19 Autonomic Syndrome in a group of active workers as well as the relationships between their autonomic dysfunction and work ability. This prospective observational study was conducted during the 2nd wave of the pandemic in Italy. Forty-five patients ( $53.6 \pm 8.4$  years; 32 M) hospitalized for COVID19, were consecutively enrolled at the time of their hospital discharge (T0) and followed-up for 6 months. Autonomic symptoms and work ability were assessed by COMPASS31 and Work Ability Index questionnaires at T0, one (T1), three and six (T6) months after hospital discharge and compared to those retrospectively collected for a period preceding SARS-CoV-2 infection. Clinical examination and standing test were also performed at T1 and T6. **Results:** One in three working-age people developed a new autonomic syndrome that was still evident 6 months after the acute infection resolution. This was associated with a significant reduction in the work ability. **Conclusion:** Recognition of Long-COVID19 Autonomic Syndrome may promote early intervention to facilitate return to work and prevent unemployment.

**Rinaldi et al. 2024.**

**Scientific Reports, vol. 14, no. 1.**

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**Keywords:** Long COVID; sick leave; working ability; impairment.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-024-61455-y>

## Adapting to the Future of Work

### Aging Workforce

*This month we explore aging workforce issues related to policies for older workers and associations between precarious employment trajectories and mental health.*

#### **More 50+ workers means more 50+ policy-until it doesn't. The non-linear relation between proportion of older workers and implementation of policies for older workers**

**Background:** Personnel policies specifically for older workers can benefit both the older workers and their organization. It is often assumed that a higher percentage of older workers in an organization is associated with more policies for older workers. **Method:** We hypothesize that policies accommodating older workers, such as extra leave or a reduced workload, become unfeasible if the proportion of older workers is high. We pooled data from five datasets to study eleven older-worker policies in 7330 Dutch establishments.

**Results:** The results show that the number of implemented personnel policies for older workers is highest in establishments where 30-50% of the workers are 50 years and older. **Conclusion:** The number of implemented policies is lower in establishments with more older than younger workers. This pattern is found for most phasing out policies.

**Lössbroek et al. 2024.**

**Journal of Applied Gerontology, vol. 43, no. 5.**

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**Keywords:** International; older workers; personnel policies; sociology; training.

**Evidence Level:** 4B

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10981204/>

#### **Associations between precarious employment trajectories and mental health among older workers in Germany: Vertical and horizontal inequalities**

**Background:** The aim of the study was to investigate the longitudinal association between multi-dimensionally measured precarious employment (PE) trajectories and mental health among older employees in Germany. **Methods:** Current data from the German lidA study was used, including panel cases, who participated in all four survey waves (2011, 2014, 2018, 2022). The study comprised 1636 subjects, aged 46 and 52 years at baseline. Group-based trajectory modelling was used to model PE trajectories based on a score combining multiple items from the dimensions employment insecurity and

income inadequacy. The association between PE trajectories (2011-2022) and mental health (2022) was tested using weighted logistic regression. **Results:** We identified a PE trajectory with upward movement that best described 13.6% of the study sample. Representation in this group was socially unequally distributed with noticeably larger shares of female, lower-educated and lower-skilled workers in PE. Women following this trajectory had increased odds [odds ratio (OR) 1.68-1.82] of reporting poor mental health in 2022 compared to their counterparts in constant non-PE. This was not the case for men (OR 0.37-0.51). **Conclusions:** Our findings highlight horizontal and vertical inequalities with respect to exposure to and consequences of PE. Future labor market reforms should improve protection of women, who will likely be disadvantaged by accumulating employment-related mental health risks over the course of their lives. **Rohrbacher et al. 2024.**

**Scandinavian Journal of Work, Environment and Health, vol. 50, no. 4.**

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**Keywords:** Precarious employment; mental health; older workers.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4160>

## Technology

### **Effects of a mobile health intervention on health-related outcomes in Japanese office workers: A pilot study**

**Background:** The purpose of the current study was to explore the effects of a mobile health (mHealth) intervention based on the Persuasive System Design (PSD) model on health-related outcomes among office workers. **Methods:** The authors conducted a trial that consisted of a 4-week baseline and an 8-week intervention period by reference to 23 office workers in a private research company. The mHealth application was developed to improve these workers' daily step count, decrease their sedentary time, and increase their sleep duration in accordance with the PSD model. The app features included at least 1 principal factor from each of the 4 main categories of the PSD model (primary task support, dialogue support, system credibility support, and social support). The objective health-related variables were measured using a smartwatch (Fitbit Luxe) that was synchronized with the application using the Fitbit Web Application Programming Interface. Subjects used the app, which included self-monitoring, personalized messages, education, and a competition system for users, during the intervention period. **Results:** Sedentary time exhibited a significant decrease (a median reduction of 14 min/day,  $p < 0.05$ ) during the intervention period. No significant differences in daily step count and sleep duration were observed between the baseline and intervention periods. **Conclusions:** This study suggests that the mHealth intervention based on the PSD model was useful for reducing sedentary time among office workers. Given that many previous studies on this topic have not been based on any theories, future studies should investigate the impact of structured selection behavior change theories on health-related outcomes among office workers.

**Meguro et al. 2024.**

**International Journal of Occupational Medicine and Environmental Health, vol. 37, no. 2.**

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**Keywords:** Behavior therapy; exercise; sedentary time; sleep duration; telemedicine; wearable electronic devices.

**Evidence Level:** 3B

**Link:** <https://ijomeh.eu/Effects-of-a-mobile-health-intervention-on-health-related-outcomes-in-Japanese-office,181953,0,2.html>

## Work Environment

### **Working from home during COVID-19: boundary management tactics and energy resources management strategies reported by public service employees in a qualitative study**

**Background:** Increased working from home has imposed new challenges on public service employees, while also granting opportunities for job crafting. Grounding on the Job Demands-Resources model and Hobfoll's Conservation of Resources theory this exploratory research aims to investigate the work-nonwork balance of employees one and a half years after the outbreak of the COVID-19 pandemic. Therefore, the research focus lies on employees' job crafting strategies to optimize their working from home experience concerning boundary management and energy resource management. **Methods:** Twelve semi-structured telephone interviews were conducted with public service employees from different sectors in Germany. The experiences were content analyzed using the software MaxQDA and inductive and deductive categories were derived. **Results:** Boundary management comprised different strategies such as communicative (e.g., negotiating work time), physical (e.g., going to the garden), temporal (e.g., logging off in between the work day) and behavioral (e.g., prioritizing tasks) strategies. The job crafting strategies regarding energy management included preventing exhaustion (e.g. taking breaks), healthy cooking and energy management in case of sickness (e.g. deciding on sick leave). **Conclusions:** This qualitative case study enriches research on job crafting by offering insights on boundary tactics and energy resources management strategies for remote working during the COVID-19 pandemic. The results point out different starting points for employees and decision makers, how a work-nonwork balance, energy management and thus employees' wellbeing may be increased when working from home in the future. **Trial registration:** The study design and methodology were approved by the Ethics Committee of the University of Cologne and the study was prospectively registered (Ref No. 21-1417\_1).

**Seinsche et al. 2024.**

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

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**Keywords:** Boundary management; COVID-19; energy management; exhaustion; public service; well-being; work delimitation; work-home conflict; working from home.

**Evidence Level:** 5B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-024-18744-y>