research alert

October 13, 2023

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Journal articles marked with an asterisk indicate an IWH scientist or adjunct scientist is included in the list of authors.

***Portt AE, Orchard C, Chen H, Ge E, Lay C, and Smith PM. Migraine and air pollution: a systematic review. Headache. 2023; [epub ahead of print].**
https://doi.org/10.1111/head.14632 [open access]

Abstract: OBJECTIVE: To systematically synthesize evidence from a broad range of studies on the association between air pollution and migraine. BACKGROUND: Air pollution is a ubiquitous exposure that may trigger migraine attacks. There has been no systematic review of this possible association. METHODS: We searched for empirical studies assessing outdoor air pollution and any quantified migraine outcomes. We included short- and long-term studies with quantified air pollution exposures. We excluded studies of indoor air pollution, perfume, or tobacco smoke. We assessed the risk of bias with the World Health Organization's bias assessment instrument for air quality guidelines. RESULTS: The final review included 12 studies with over 4,000,000 participants. Designs included case-crossover, case-control, time series, and non-randomized pre-post intervention. Outcomes included migraine-related diagnoses, diary records, medical visits, and prescriptions. Rather than pooling the wide variety of exposures and outcomes into a meta-analysis, we tabulated the results. Point estimates above 1.00 reflected associations of increased risk. In single-pollutant models, the percent of point estimates above 1.00 were carbon monoxide 5/5 (100%), nitrogen dioxide 10/13 (78%), ozone 7/8 (88%), PM(2.5) 13/15 (87%), PM(10) 2/2 (100%), black carbon 0/1 (0%), methane 4/6 (75%), sulfur dioxide 3/5 (60%), industrial toxic waste 1/1 (100%), and proximity to oil and gas wells 6/13 (46%). In two-pollutant models, 16/17 (94%) of associations with nitrogen dioxide were above 1.00; however, more than 75% of the

confidence intervals included the null value. Most studies had low to moderate risks of bias. Where differences were observed, stronger quality articles generally reported weaker associations. CONCLUSIONS: Balancing the generally strong methodologies with the small number of studies, point estimates were mainly above 1.00 for associations of carbon monoxide, nitrogen dioxide, ozone, and particulate matter with migraine. These results were most consistent for nitrogen dioxide

Adi NP, Nagata T, Odagami K, Nagata M, Kajiki S, Kuroishi M, et al. Association between lifestyle habits and presenteeism. Occupational Medicine. 2023; 73(6):346-352.
https://doi.org/10.1093/occmed/kqad082
Abstract: BACKGROUND: Presenteeism is affected by work-related and individual factors. Among individual factors, the effect of combining various lifestyle habits on presenteeism is unknown. AIMS: This study aimed to determine the relationship between changes in multiple good lifestyle habits with a change in presenteeism and to examine the effect of psychological factors on this relationship. METHODS: We performed a 1-year retrospective cohort study on employees of large Japanese companies. Data were collected from health check-ups and a self-administered questionnaire. Changes in presenteeism were measured using the Quality and Quantity method. Changes in lifestyle habits were measured using a modified form of Breslow's seven health practices. Psychological factors were measured using the Kessler 6-Item Psychological Distress Scale. Linear regression was used for statistical analysis. RESULTS: The number of practised lifestyle habit changes was negatively correlated with a change in presenteeism. This result was consistent when adjusted for age, sex and company (B, -0.010; $P < 0.05$), but became non-significant when additionally adjusted for psychological distress (B, -0.006). When analysed separately, only an improvement in the body mass index (B, -0.054; $P < 0.05$) and a worsened sleep habit (B, 0.040; $P < 0.01$) influenced a change in presenteeism. CONCLUSIONS: This study suggests that improving various practised lifestyle habits in combination, rather than improving a single lifestyle habit, is beneficial in reducing presenteeism. Our finding that psychological distress altered the relationship of practised lifestyle habit changes with presenteeism indicates the importance of organizational-level intervention in presenteeism

Burstyn I and Jones RM. The chronicles of statistical methods employed in occupational hygiene. Annals of Work Exposures and Health. 2023; 67(8):920-925.
https://doi.org/10.1093/annweh/wxad042

Dimitriadis I. Migrants and undeclared employment within the European construction sector: challenging dichotomous approaches to workers' agency. Work, Employment and Society. 2023; 37(5):1321-1338.
https://doi.org/10.1177/09500170211072777

Gorry D and Slavov SN. The effect of retirement on health behaviors. Health Economics. 2023; 32(10):2234-2259.
https://doi.org/10.1002/hec.4723
Abstract: This paper analyzes the effect of retirement on health behaviors using three nationally representative U.S. datasets. Findings show a decrease in drinking at the intensive margin, particularly for males. Individuals change their composition of exercise behaviors upon retirement, with varying effects of retirement depending on exercise intensity and gender. Dining patterns also change, with changes in eating out among men and more time spent on food preparation. Finally, although retirement increases time spent watching TV and movies as well as time spent sleeping, it reduces overall sedentary time

Hendricks JW, Smith A, Peres SC, and Sasangohar F. Workers' acceptance of digital procedures: an application of the technology acceptance model. IISE Transactions on Occupational Ergonomics and Human Factors. 2023; 11(1-2):59-68.
https://doi.org/10.1080/24725838.2023.2240342
Abstract: OCCUPATIONAL APPLICATIONS There are increasing numbers of organizations that are implementing digital procedures (e.g., standard operating procedures). These efforts are often assumed to be a positive development but can be quite costly-both in terms of money and training for a digital rollout. As a result, organizations and practitioners may find themselves at risk for failure when implementing digital procedures. The results of the current study suggest that if workers perceive digital procedures as useful and easy to use, this perception translates into positive attitudes, which subsequently result in fewer deviations. Since acceptance is relatively easy to assess, practitioners can benefit from using these assessments prior to a digital transition/roll-out to both compare competing hardware and software applications, and to initiate and continuously monitor the development of digital procedures. We consider this approach as advantageous to having management develop a system and fully deploying digital procedures without any consideration of worker acceptance

Van Hootegem A, Grosemans I, and De Witte H. Trajectories of employees' learning intentions and training opportunities in relation to job insecurity and psychological contract breach. European Journal of Work and Organizational Psychology. 2023; 32(5):645-661.
https://doi.org/10.1080/1359432X.2023.2214317

Jahn A, Andersen JH, Christiansen DH, Seidler A, and Dalboge A. Occupational mechanical exposures as risk factor for chronic low-back pain: a systematic review and meta-analysis. Scandinavian Journal of Work, Environment & Health. 2023; 49(7):453-465.
https://doi.org/10.5271/sjweh.4114 **[open access]**
Abstract: OBJECTIVES: The association between occupational mechanical exposures and low-back pain (LBP) has been studied in several systematic reviews. However, no systematic review addressing chronic LBP exists. The aim of this systematic review and meta-analysis

was to examine the association between occupational mechanical exposures and chronic LBP. METHODS: The study was registered in PROSPERO. We used an existing systematic review to identify articles published before January 2014. For studies published between January 2014 and September 2022, a systematic literature search was conducted in six databases. Two authors independently excluded articles, extracted data, and assessed risk of bias and level of evidence (GRADE). Meta-analyses were conducted using random-effects models comparing highest versus lowest exposure group with sensitivity analyses based on study quality (low/moderate versus high risk of bias), study design (cohort versus case-control), and outcome definition (non-specific LBP versus specific chronic LBP). RESULTS: Twenty-six articles were included. Highest pooled odd ratios (OR) were found for combined mechanical exposures [OR 2.2, 95% confidence interval (CI) 1.4-3.6], lifting/carrying loads (OR 1.7, 95% CI 1.4-2.2), and non-neutral postures (OR 1.5, 95% CI 1.2-1.9). For the remaining mechanical exposures (ie, whole-body vibrations, standing/walking, and sitting), OR ranged between 1.0 and 1.4. In the sensitivity analyses, generally, higher pooled OR were found in low/moderate risk of bias studies, case-control studies, and studies of specific chronic LBP. CONCLUSIONS: Moderate evidence of an association was found for lifting/carrying loads, non-neutral postures, and combined mechanical exposures. Low or very low evidence was found for whole-body vibrations, standing/walking, and sitting. Studies using standardized exposure definition, metric, and technical measurements are highly warranted

Kainulainen S, Elovainio M, Laaksonen M, Jaaskelainen T, Rissanen H, and Koskinen S. Self-rated work ability as a risk factor for disability retirement. European Journal of Public Health. 2023; 33(5):828-833.
https://doi.org/10.1093/eurpub/ckad121 [open access]
Abstract: BACKGROUND: Simple and efficient survey measures to predict staying in or leaving work are needed. We examined the association of single-item self-rated work ability (SRWA) with disability retirement in two large population-based samples and compared the association of SRWA to two other scales, work ability score (WAS) and self-rated health (SRH), used earlier in studies. METHODS: The study population comprised 6034 participants aged 35-58 from the population-based Health 2000 and FinHealth 2017 cohort studies, pooled together. SRWA, WAS and SRH were all classified in three categories: poor, limited and good. A 36-month follow-up for disability retirement via linkage to electronic records was included in the analysis. RESULTS: Of the participants, 195 retired during the follow-up. All three measures strongly predicted disability retirement. Hazard ratio (HR) for poor SRWA (vs. good) was 8.48 [95% confidence interval (CI) 5.41-13.28], WAS 7.99 (95% CI 5.62-11.37) and SRH 5.96 (95% CI 4.17-8.51). HR for limited SRWA (vs. good) was 4.35 (95% CI 3.21-5.91), WAS 3.54 (95% CI 2.49-5.04) and SRH 2.27 (95% CI 1.59-3.23). Taking into account gender, age, education and mental health narrowed the gap between poor and limited vs. good work ability as predictors of disability retirement, but the differences remained clear. CONCLUSIONS: Limited or poor self-rated work ability or health are strong predictors of

disability retirement. The SRWA measure is a useful survey-measure of work ability in community-based surveys

Lincoln JM and Elliott KC. Emerging technology in agriculture: opportunities and considerations for occupational safety and health researchers. Journal of Safety Research. 2023; 86:92-95.
https://doi.org/10.1016/j.jsr.2023.06.001
Abstract: INTRODUCTION: A variety of factors are driving the development of robotics and automation in the agriculture industry including the nature of work, workforce shortages, and a variety of economic, climatic, technologic, political, and social factors. While some new robotics and automated machines are available commercially, most are still being developed. This provides occupational safety and health researchers an unprecedented opportunity to mitigate risks and benefit the health and safety of agriculture workers. METHOD: The NIOSH Office of Agriculture Safety and Health (OASH) is working to better understand how the advancements in automation and robotics is affecting workers. OASH is coordinating with the NIOSH Center of Occupational Robotics Research (CORR) to help to increase the understanding of human/machine interactions; improve the ability to identify injuries and fatalities involving automation/ robotics; and provide guidance on working safely with automation/ robotics. OASH also joined a small team of academics and industry to organize the SAfety For Emerging Robotics and Autonomous aGriculture or (SAFER AG) Workshop to identify gaps in knowledge and research needs that connect to issues related to risks and regulations/standards, occupational safety research, and impacts on workforce and society. This workshop was sponsored by USDA NIFA. PRACTICAL APPLICATIONS: Occupational safety and health experts need to engage and collaborate with developers of technology. It is also increasingly important for occupational safety and health researchers and practitioners to not only become familiar with existing manufacturing safety standards, but also the lengthy standards development process. Joining consensus standards groups to help shape new standards for emerging technologies may help to mitigate adverse worker impacts. NIOSH's Office of Agriculture Safety and Health will continue to identify research gaps, support new research projects, education, outreach efforts and the development of best practices with our partners

Moon D and Kim H. The impacts of working time flexibilization on occupational safety and health: an expert survey. Annals of Occupational and Environmental Medicine. 2023; 35(1):e20.
https://doi.org/10.35371/aoem.2023.35.e20 [open access]
Abstract: The policy proposal by the current Korean government that proposes flexible overtime rules is causing social controversy. This study has explored the 612 experts' opinions on the occupational safety and health impacts of the policy using an online self-report survey. They expected short-term overwork (87.25%), overwork inequality (86.44%), irregular working hours (84.31%), chronic overwork (84.15%), long working hours (83.66%), and

unpredictability of working hours (81.86%) as a result of the policy change. They also responded that the policy change would increase industrial accident deaths (87.25%), mental illnesses (87.09%), deaths due to overwork or cardiovascular diseases (83.84%), and accidents (83.33%). They disagreed that the government's flexibilization policy, while agreeing that the necessity of policies on regulating night work (94.77%), guaranteeing wages to eliminate overtime (90.36%), establishing working time regulations for the bogus self-employed (82.84%), and applying the 52-hour workweek system to all workplaces (76.47%). These expert opinions are consistent with previous research on the health effects of working hours.

Quansah PE, Zhu Y, and Guo M. Assessing the effects of safety leadership, employee engagement, and psychological safety on safety performance. Journal of Safety Research. 2023; 86:226-244.
https://doi.org/10.1016/j.jsr.2023.07.002
Abstract: INTRODUCTION: The study assessed the impact mechanisms of employee engagement and psychological safety in safety leadership and safety performance relationships. METHOD: We collected 539 valid responses from contract miners using a multi-wave survey research design. We analyzed the data quantitatively using the structural equation model (SEM) and hierarchical regression analysis (HRA) in AMOS and SPSS version 26 software. We used SEM to examine our proposed framework's main and structural mediation effects. HRA was used to test the moderation effect of our framework. RESULTS: From the SEM results of our study, safety leadership significantly and positively influenced all two dimensions of safety performance-safety compliance and safety participation -- and all three dimensions of employee engagement-vigor, dedication, and absorption. Also, vigor, dedication, and absorption partially mediated the relationship between safety leadership and safety compliance, but fully mediated the safety leadership-safety participation relationship. From the HRA results, psychological safety significantly moderated two employee engagement variables (thus, vigor and dedication) and safety compliance. Also, it moderated all three variables of employee engagement (vigor, dedication, and absorption) and safety participation. PRACTICAL APPLICATIONS: This current study highlights the importance of examining safety leadership on specific job performance, such as safety performance. It also highlights the necessity of having psychological safety and enhancing employee engagement in the mines

Santiago Oliveira S, de Albuquerque Soares W, and Vasconcelos BM. Fatal fall-from-height accidents: statistical treatment using the Human Factors Analysis and Classification System - HFACS. Journal of Safety Research. 2023; 86:118-126.
https://doi.org/10.1016/j.jsr.2023.05.004
Abstract: Introduction: The civil construction industry (CCI) is one of the most dangerous sectors for occupational accidents. Studies conducted in several countries show that occupational accidents involving falls from height are the main cause of deaths in recent

years. Method: This article analyzed the combinations of causal factors with the highest likelihood of accidents involving falls from height in construction to assist in decision-making. The methodology was divided into four stages: accident collection and sample definition; accident analysis; probability determination; and obtaining the theoretical curve of an accident probability distribution. The methodology was applied to reports of fatal fall-from-height accidents that occurred in the United States between 1997 and 2020. Results: The results show that among the accidents analyzed, the highest probability of fatality is when a roofer aged between 31 and 44 years performs their activity on a roof between 10:00 and 11:59 am. It is also noted that the three causal factors most present in the accidents were: organizational process (97.7%); poor management of worker resources (96.6%); and organizational climate (95.4%). From the probability distribution curve, 68% of the fatal accidents occurred after reaching between 18 and 34 causal factors present in the HFACS method categories.

Sheth A, Pagdhune A, and Viramgami A. Prevalence of work-related musculoskeletal disorders (WRMSDs) and its association with modifiable risk factors in metropolitan bus transit drivers: a cross-sectional comparison. Journal of Family Medicine and Primary Care. 2023; 12(8):1673-1678.
https://doi.org/10.4103/jfmpc.jfmpc_532_23 **[open access]**
Abstract: BACKGROUND: Bus drivers are one of the top three occupations with the highest prevalence of work-related musculoskeletal disorders (WRMSDs). The present study aimed to determine the pattern and prevalence of WRMSD among metropolitan bus transit drivers, whose job profiles differ from traditional long-distance bus drivers, and to explore the effect of modifiable lifestyle-related risk factors. MATERIALS AND METHODS: In this cross-sectional study, consenting 254 metropolitan transit bus drivers (with at least five years of job duration) and 73 age-matched indoor desk job workers (administration staff of the same department) as a comparison group enrolled. Sociodemographic and occupational profile were collected on a semi-closed questionnaire. A modified Nordic questionnaire was used to determine musculoskeletal problems. Anthropometric measurement and haematocrit estimation were performed with standard techniques. All statistical analyses including logistic regression were performed with SPSS 26.0. RESULTS: The prevalence of WRMSDs among bus drivers was twice higher than administration staff (49.2% v/s 28.8%). Drivers experienced significantly higher pain for the lower back (36.6% v/s 11%), knee (29.5% v/s 15.1%), and hip (7.5% v/s 1.4%) in comparison with administration staff. Study reported age, tobacco usage, body mass index (BMI) and job profile of drivers (compared to administration staff) as significant predictors of WRMSDs. CONCLUSION: WRMSDs were significantly higher among metropolitan bus transit drivers in comparison with administrative staff. Furthermore, WRMSDs are strongly associated with tobacco use and BMI. These modifiable risk factors may be the targets for preventive strategies to reduce the burden of WRMSDs among bus drivers

Tiesman HM, Konda S, Wurzelbacher SJ, Naber SJ, and Attwood WR. Occupational injuries and illnesses among law enforcement officers, 2001-2019: findings from the Ohio Bureau of Workers' Compensation. American Journal of Industrial Medicine. 2023; [epub ahead of print].

https://doi.org/10.1002/ajim.23541

Abstract: Background: Occupational injuries are common among law enforcement officers (LEOs) and can impact an agency's ability to serve communities. Workers' compensation (WC) data are an underutilized source for occupational injury surveillance in the law enforcement field. Methods: LEOs WC claims from the Ohio Bureau of Workers' Compensation (OHBWC) from 2001 to 2019 were identified based on manual review of the occupation title and injury description. Worker, employer, incident, and injury characteristics were described by claim type-medical-only (MO) and lost-time (8 or more days away from work). Data are presented using injury claim counts. Results: From 2001 to 2019, 50,793 WC claims were identified among Ohio LEOs. Of these, 68% were MO claims (n = 34,622). WC claims significantly decreased over the 19-year period ($p < 0.001$). Seventy-five percent of WC claims were from a LEO with more than one claim and of these, 34% were from a LEO with five or more claims during the study period. Male officers and those aged 25-54 years incurred the highest proportion of total claims (87.8% & 91.8%, respectively). Violence (n = 17,247; 34%), falls/slips/trips (n = 9079; 17.9%), and transportation events (n = 7977; 15.7%) were the leading events. Among the 50,793 claims, there were 79,637 unique clinical diagnosis groups. The most common injury diagnoses were sprains (n = 32,796; 41.2%) followed by contusions (n = 13,529; 17%). Conclusions: Results can guide the development or improvement of workplace injury prevention strategies for LEOs. Efforts should be focused on better understanding and preventing violent injury events and sprains among LEOs, as well as preventing multiple injury events.

Zavando Cerda D and Urquijo LG. Improving the protection of migrant workers with work histories in the European Union and Ibero-America: enhancing the coordination of international social security instruments. International Social Security Review. 2023; 76(3):25-45.

https://doi.org/10.1111/issr.12338 **[open access]**

Abstract: Migration affects almost every nation, emphasizing the need to guarantee social security rights for all migrants and their families. This article focuses on the rights of workers who migrate between the countries of the European Union (EU) and the Ibero-American community. In the EU, social security systems are increasingly coordinated through Regulation No. 883/2004 and its Implementing Regulation No. 987/2009. In the Ibero-American community, coordination is sought through the Ibero-American Social Security Convention. Despite convergence between these two international instruments, coordination is still lacking between them. This article presents a comparative analysis to articulate the necessary mechanisms to guarantee coordination, to respect the social security rights of migrant workers. We focus on the cooperation and coordination between regional as well as

national systems, specifically looking at the need for and aims of a rapprochement between these two major international coordination instruments to provide greater EU-Ibero-American cooperation. Finally, the importance of promoting greater international cooperation in social security policy and administration is highlighted, to engender the adequate protection of the rights as well as the free movement of migrant workers.

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