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

Bazzoli A and Probst TM. COVID-19 moral disengagement and prevention behaviors: the impact of perceived workplace COVID-19 safety climate and employee job insecurity. *Safety Science*. 2022; 150:105703.

<https://doi.org/10.1016/j.ssci.2022.105703>

Fauser D, Banaschak H, Zimmer JM, Golla A, Schmitt N, Mau W, et al. Rehabilitation utilization of non-migrant and migrant persons with back pain: a cohort study using different definitions of migrant background. *EClinicalMedicine*. 2022; 46:101351.

<https://doi.org/10.1016/j.eclinm.2022.101351> [open access]

Abstract: Background: Medical rehabilitation (MR) by the German Pension Insurance is approved to maintain and to restore work ability and to avoid disability pensions. Studies on the rehabilitation utilization by people with a migration background (PMB) compared to people without a migration background (non-PMB) showed heterogeneous results, which may be partly due to different definitions of migration status. The aim of this paper was to test whether there are differences in utilization of MR between employed PMB and non-PMB with self-reported back pain. Methods: We used data from a large German cohort study that analyzed the effectiveness of MR for individuals with back pain and was conducted between 1st January 2017 and 31st December 2019. Employees aged 45 to 59 years who reported back pain in the last three months completed the baseline questionnaire in 2017. We used four definitions of migration background (MB) to differentiate by first- and second-generation migration, by one- and two-sided migration background, by language, or by

nationality. Data on rehabilitation utilization was extracted from administrative records covering the period until the end of 2018. Findings: Data of 6,713 participants were included, and 514 individuals utilized MR during follow-up. Adjusted analyses showed a decreased risk of rehabilitation utilization in people with a first-generation MB (HR = 0.46; 95% CI 0.29; 0.72), people with a two-sided MB (HR = 0.47; 95% CI 0.31; 0.72), people whose native language was not German (HR = 0.52; 95% CI 0.30; 0.91), and people without German nationality (HR = 0.29; 95% CI 0.12; 0.72) when compared to non-PMB. Interpretation: This study showed that employees with a MB reporting back pain had a significantly reduced risk for utilization of rehabilitation services. This underutilization could be observed considering different definitions of MB. Future research on rehabilitation utilization by PMB should consider the impact of different definitions on the results. Funding: The study was funded by the German Research Foundation (grant numbers: BE 5885/2-1; MA 6981/2-1). The German Research Foundation functions as a self-governing institution for the promotion of science and research in Germany.

El Ghaziri M, Johnson S, Purpora C, Simons S, and Taylor R. Registered nurses' experiences with incivility during the early phase of COVID-19 pandemic: results of a multi-state survey. *Workplace Health & Safety*. 2022; 70(3):148-160.

<https://doi.org/10.1177/21650799211024867> [open access]

Abstract: BACKGROUND: Incivility among workers in the health sector is recognized as an occupational hazard. The COVID-19 outbreak brought sudden and profound changes to many health care settings, many of which have been identified as antecedents to workplace incivility. The purpose of this retrospective study was to explore the experiences of registered nurses with workplace incivility, cyber-incivility, and incivility outside of work during the early phase of the COVID-19 pandemic. METHODS: This mixed-methods study used convenience sampling. Data were collected from June to September 2020 via an online survey, which consisted of both closed- and open-ended questions. Participants were recruited from national nursing organizations and unions. Data were analyzed using descriptive statistics and thematic analysis for open-ended responses. FINDINGS: A total of 526 nurses' responses were included in the analysis. More than one third experienced greater incivility at work during the COVID-19 outbreak than before the pandemic (37.4%), and almost half (45.7%) said they witnessed more incivility than before the pandemic. Cyber-incivility and incivility outside of work were also issues. Qualitative results indicated that respondents felt they were on edge during this period. Other themes included leadership failure, fractured co-worker relationships, heightened incivility from patients and families, and hostility and ostracism from the general public. CONCLUSION/APPLICATION TO PRACTICE: Occupational health nurses, nursing leaders, and staff nurses need to work to restore relations that were fractured by incivility during the pandemic. In the future, improved preparedness, including establishing clear channels of communication, may lessen incivility by decreasing role stress and organizational chaos

Han X, Jiang F, Shen L, Liu Y, Liu T, Liu H, et al. Workplace violence, workforce stability, and well-being in China's psychiatric hospitals. American Journal of Preventive Medicine. 2022; 62(4):e265-e273.

<https://doi.org/10.1016/j.amepre.2021.09.013>

Abstract: INTRODUCTION: Workplace violence against psychiatric professionals is a growing problem, yet nationally representative data in China are lacking. This study examines workplace violence against psychiatrists and psychiatric nurses in China as well as its association with workforce stability and well-being. METHODS: Data came from a 2019 national survey of 14,264 participants (including 4,520 psychiatrists and 9,744 nurses) from 41 psychiatric hospitals across China. The occurrence of physical and verbal assaults among psychiatrists and psychiatric nurses was reported. Logistic regression models were constructed to examine the participants' characteristics associated with encountering workplace violence and the association of encountering violence with self-reported quality of life, health status, turnover intention, and career satisfaction. Analyses were performed during 2020. RESULTS: In 2019, among 14,264 psychiatrists and psychiatric nurses in China, 81% reported encountering workplace violence during the past year. Psychiatrists were 0.68 (95% CI=0.55, 0.83) times less likely to report an encounter of violence than nurses. Male and younger nurses were 2.20 (95% CI=1.72, 2.81) and 1.21 (95% CI=1.01, 1.45) times more likely to report violence. Psychiatrists who had a higher educational degree or a higher professional rank were more vulnerable to violence. Encountering violence was significantly associated with poor quality of life, less satisfaction with health status, greater intention to leave the current job, and career dissatisfaction. CONCLUSIONS: Workplace violence against psychiatrists and psychiatric nurses are common in China, indicating that China's psychiatric professionals are facing a significant threat to occupational safety. To maintain psychiatric workforce stability, actions are needed to reduce the prevalence of workplace violence at the system, institutional, and individual levels

Josse PR, Koutros S, Tardon A, Rothman N, Silverman DT, and Friesen MC. Adapting decision rules to estimate occupational metalworking fluid exposure in a case-control study of bladder cancer in Spain. Annals of Work Exposures and Health. 2022; 66(3):392-401.

<https://doi.org/10.1093/annweh/wxab084>

Abstract: Objectives: We adapted previously developed decision rules from the New England Bladder Cancer Study (NEBCS) to assign occupational exposure to straight, soluble, and synthetic metalworking fluids (MWFs) to participants of the Spanish Bladder Cancer Study (SBCS). Methods: The SBCS and NEBCS are case-control studies that used the same lifetime occupational history and job module questionnaires. We adapted published decision rules from the NEBCS that linked questionnaire responses to estimates of the probability (<5, >=5 to <50, >=50 to <100, and 100%), frequency (in h week⁻¹), and intensity (in mg m⁻³) of exposure to each of the three broad classes of MWFs to assign exposure to 10 182 reported jobs in the SBCS. The decision rules used the participant's module responses to MWF questions wherever possible. We then used these SBCS module responses to calculate job-

industry-, and time-specific patterns in the prevalence and frequency of MWF exposure. These estimates replaced the NEBCS-specific estimates in decision rules applied to jobs without MWF module responses. Intensity estimates were predicted using a previously developed statistical model that used the decade, industry (three categories), operation (grinding versus machining), and MWF type extracted from the SBCS questionnaire responses. We also developed new decision rules to assess mineral oil exposure from non-machining sources (possibly exposed versus not exposed). The decision rules for MWF and mineral oil identified questionnaire response patterns that required job-by-job expert review. Results: To assign MWF exposure, we applied decision rules that incorporated participant's responses and job group patterns for 99% of the jobs and conducted expert review of the remaining 1% (145) jobs. Overall, 14% of the jobs were assessed as having =5% probability of exposure to at least one of the three MWFs. Probability of exposure of =50% to soluble, straight, and synthetic MWFs was identified in 2.5, 1.7, and 0.5% of the jobs, respectively. To assign mineral oil from non-machining sources, we used module responses for 49% of jobs, a job-exposure matrix for 41% of jobs, and expert review for the remaining 10%. We identified 24% of jobs as possibly exposed to mineral oil from non-machining sources. Conclusions: We demonstrated that we could adapt existing decision rules to assess exposure in a new population by deriving population-specific job group patterns.

Kang SY, Min S, Kim WS, Won JH, Kang YJ, and Kim S. Types and characteristics of fatal accidents caused by multiple processes in a workplace: based on actual cases in South Korea. *International Journal of Environmental Research and Public Health*. 2022; 19(4):2047.

<https://doi.org/10.3390/ijerph19042047> [open access]

Abstract: As the social cost of disasters increases and safety is being emphasized, policy regulations at the national level have been implemented. However, various fatal accidents are continually occurring as continued economic development and enhanced technologies have increased demand and complicated the industrial structure. Workers in different industries, performing similar jobs, often experience different workplace hazards, which can result in similar types of accidents. Therefore, new policy regulations have been established to separate multiple processes and work in workplaces and are being implemented in several countries to minimize damage caused by new types of industrial accidents. Supervision and management appropriate for contractors or safety and health officials with legal obligations are required to play a regulatory role when these types of industrial accidents are likely to occur. This study classified accidental types and their characteristics based on actual cases, in which potential risks exist at multiple processes in a workplace. First, raw data of work-related fatalities that occurred in South Korea were reviewed and classified as fatal accidents caused by multiple processes in workplaces using the proposed method. Next, the classified actual cases were prepared as statistical data and analyzed based on the various categories. Finally, the accident type based on multiple processes, including risks and characteristics, in workplaces was proposed. As a result, this study improved the safety awareness and

understanding of regulatory subjects regarding industrial accidents caused by multiple processes in workplaces and is expected to improve the effectiveness of the existing policy to prevent workplace accidents

Kim HR. Associations between workplace violence, mental health, and physical health among Korean workers: the fifth Korean working conditions survey. *Workplace Health & Safety*. 2022; 70(3):161-172.

<https://doi.org/10.1177/21650799211023863>

Abstract: BACKGROUND: Workplace violence (WPV) is a global public health problem and a threat to the health of Korean workers. This study assessed the prevalence and risk factors of WPV and its association with mental and physical health among Korean workers. METHODS: Data obtained for 50,205 respondents to the Fifth Korean Working Conditions Survey were utilized for this study. Verbal abuse, threats, physical violence, and sexual harassment were assessed individually and as a composite for "any WPV." Workers were characterized by education, income, shift work status, access to a health and safety education program, work sector and overall health. Descriptive analyses and multiple logistic regression analyses were used to estimate the prevalence of WPV and its association with mental and physical health. FINDINGS: Overall, 5.6% of workers reported experiencing one of four forms of WPV. The prevalence of verbal abuse, threats, physical violence, and sexual harassment were 4.9%, 0.7%, 0.2%, and 1.1%, respectively. Most perpetrators were customers. Prevalence of WPV was associated with lower education level, poor health status, long working hours, shift work, and no experience of health and safety education; 9.0% of service workers experienced violence. Workers who had experienced WPV were more likely to experience anxiety, sleep-related problems, depressive symptoms, back pain, headache/eye strain, and overall fatigue. CONCLUSIONS/APPLICATIONS TO PRACTICE: Workplace violence is a serious occupational and public health concern in Korea. These results suggest managing WPV may improve workers' well-being and that violence-prevention strategies, policies, and regulations should be implemented across most industries

Lee J, Lee J, Ahn J, Lee DW, Kim HR, and Kang MY. Association of sedentary work with colon and rectal cancer: systematic review and meta-analysis. *Occupational and Environmental Medicine*. 2022; 79(4):277-286.

<https://doi.org/10.1136/oemed-2020-107253>

Abstract: Objectives: There has been no research on sedentary behaviour in the occupational domain that occupies a large portion of the daily life. Methods: We conducted a meta-analysis to investigate the association between sedentary work and colorectal cancer. We searched PubMed, Embase and Cochrane databases up to 12 August 2020 for peer-reviewed journal articles that assessed the association between sedentary work and colon or rectal cancer. Pooled estimates of ORs were obtained using random effects models. Statistical tests for publication bias, heterogeneity and sensitivity analysis were applied. Results: Of the 5 381 studies initially identified, 23 studies with 64 reports were eligible for inclusion. Sedentary

work significantly increased the risk of colon cancer (pooled OR=1.21, 95% CI 1.11 to 1.31, p value =0.0001) and rectal cancer (pooled OR=1.08, 95% CI 1.00 to 1.16, p value=0.0395). The adjustment for leisure time physical activity attenuated the association and made the risk estimates non-significant for sedentary behaviour, but the association was independent of sex, control of body mass index and assessment of sedentary behaviour. Conclusions: We found evidence of association between sedentary work and the risk of colon or rectal cancer. Limiting excessive sedentary work could be an important means of preventing colon and rectal cancer.

Maffie MD. The perils of laundering control through customers: a study of control and resistance in the ride-hail industry. ILR Review. 2022; 75(2):348-372.

<https://doi.org/10.1177/0019793920972679>

Omari Shekaftik S, Shirazi H, Yarahmadi R, Rasouli M, and Ashtarinezhad A. Investigating the relationship between occupational exposure to nanomaterials and symptoms of nanotechnology companies' employees. Archives of Environmental & Occupational Health. 2022; 77(3):209-218.

<https://doi.org/10.1080/19338244.2020.1863315>

Abstract: **PURPOSE:** The increasing use of nanomaterials in academic and industrial environments has raised concerns about the potential effects of these materials on human and the environment. Researches have shown that occupational exposure to nanomaterials can affect employees' health. Many companies are active in the field of nanotechnology in Iran. Therefore, this study was designed and conducted to investigate the relationship between the symptoms of these companies' employees and exposure to nanomaterials. **METHODS:** The study was conducted among employees of 52 nanotechnology companies in Tehran. For this study, the employees of these companies were categorized in two groups: "exposed" and "non-exposed" to nanomaterials. Data collection tools included the NanoTool method form and a nonspecific symptom questionnaire designed and validated by a team of 19 experts in various fields. Finally, data were analyzed using SPSS.22 software. **RESULTS:** The results showed that the frequency of cutaneous (such as roughness, itching and redness), respiratory (such as cough, sneezing, and burning throat) and ocular (such as burning, itching and redness) symptoms were higher among the exposed workers to nanomaterials. Examination of the correlation between these symptoms in the two studied groups showed that symptoms with high frequency have a significant relationship with exposure to nanomaterials. **CONCLUSIONS:** Given the high prevalence of some symptoms among the employees of the studied companies and their association with exposure to nanomaterials, it seems necessary to take control measures to reduce the exposure of employees to nanomaterials and consequently reduce the Investigated symptoms

Pradoto H, Haryono S, and Wahyuningsih SH. The role of work stress, organizational climate, and improving employee performance in the implementation of work from home. *Work*. 2022; 71(2):345-355.

<https://doi.org/10.3233/WOR-210678>

Abstract: BACKGROUND: The spread of COVID-19 around the world has caused many undesirable effects on human health. The pandemic forced the employees to resort to Remote Work (RW)/Work from Home (WFH) according to the nature of the jobs. Consequently, organizations, business process and results are affected and organizational and commercial activities are significantly reduced. OBJECTIVE: This study investigates the impact of work stress and organizational climate on employee performance in the context of WFH in the era of the COVID-19 pandemic in micro, small and medium enterprises (MSMEs). METHOD: This study used a purposive sampling strategy and determined using the Slovin equation and equals 95 employees in marketing, business restructuring and finance. The Partial Least Square (PLS) approach and the SmartPLS version 3.0 software for data analysis processing procedures for hypothesis testing were used. RESULTS: The results revealed that the organizational environment has a negative and significant effect on job stress. Furthermore, job stress had a negative impact on employee performance and the organizational climate had a favorable and considerable impact on employee performance. CONCLUSION: The lower the level of work stress, the higher the employee performance, and vice versa. Organizational climate has a positive and significant effect on employee performance, which means that the organization's climate is conducive, so the employee performance will increase and vice versa

Rice SPM, Greenspan LS, Bauer TN, Rimby J, Bodner TE, and Olson R. The impact of COVID-19 on transit workers: perceptions of employer responses and associations with health factors. *Annals of Work Exposures and Health*. 2022; 66(3):334-347.

<https://doi.org/10.1093/annweh/wxab080>

Abstract: COVID-19 has had a substantial impact on transit workers' lives, especially among public-facing vehicle operators. The current project examined relationships between workers' knowledge and perceptions of their employer's COVID-19 safety responses, job attitudes, and health. We surveyed transit workers (N = 174) between July and August 2020 and followed up 3 months later. Fifty-seven workers responded to the follow-up survey. Surveys addressed workers' knowledge and perceptions of their employer implementing Centers for Disease Control and Prevention (CDC)-recommended COVID-19 safety responses, COVID-19 risk perceptions, job attitudes, and health factors. Employees reported knowledge of their employer implementing ~8 of 12 CDC-recommended responses. The most reported response was informational poster placements; the least reported was designating a point-person for COVID-19 concerns. Significant associations were found between knowledge of employer safety responses and lower COVID-19 risk perceptions, better job attitudes, and greater mental and global health. Operators (i.e. public-facing workers) reported worse perceptions of employer responses, and higher COVID-19 risk perceptions, work stress, and turnover

intentions, compared with non-operators. A time-lagged panel model found that COVID-19 risk perceptions significantly mediated the relationship between public-facing work status and follow-up depression, anxiety, stress, and global health. Results reveal opportunities for transit authorities to broaden and better communicate their responses to emergent occupational safety and health crises

Rysstad T, Grotle M, Aasdahl L, Hill JC, Dunn KM, Tingulstad A, et al. Stratifying workers on sick leave due to musculoskeletal pain: translation, cross-cultural adaptation and construct validity of the Norwegian Keele STarT MSK tool. *Scandinavian Journal of Pain*. 2022; [epub ahead of print].

<https://doi.org/10.1515/sjpain-2021-0144>

Abstract: OBJECTIVES: Stratified care using prognostic models to estimate the risk profiles of patients has been increasing. A refined version of the popular STarT Back tool, the Keele STarT MSK tool, is a newly developed model for matched treatment across a wide range of musculoskeletal pain presentations. The aim of this study was to translate and culturally adapt the Keele STarT MSK tool into Norwegian, examine its construct validity and assess the representativeness of the included sample. METHODS: The Keele STarT MSK tool was formally translated into Norwegian following a multistep approach of forward and backward translation. A pre-final version was tested in 42 patients. Minor changes were implemented. To assess its construct validity, an online survey was conducted among workers aged 18-67 years who were on sick leave (>4weeks) due to musculoskeletal disorders. Construct validity was evaluated in terms of convergent and discriminant validity using Pearson's correlation coefficient, and known-group validity by comparing risk subgroups as suggested by the COSMIN checklist. The representativeness of the sample was assessed by comparing demographic and sick leave information of participants to eligible non-participants (n=168,137). RESULTS: A representative sample of 549 workers participated in the validity assessment; 74 participants (13.5%) were categorised as low risk, 314 (57.2%) as medium risk and 161 (29.3%) as high risk. The construct validity was found sufficient, with 90.9% and 75.0% of the pre-defined hypotheses confirmed for convergent and discriminant validity, and known-group validity, respectively. Floor or ceiling effects were not found. CONCLUSIONS: The Keele STarT MSK tool was successfully translated into Norwegian. The construct validity of the tool was acceptable in a representative cohort of workers on sick leave as a result of musculoskeletal pain. However, the analyses raised concerns as to whether one of the questions captures the construct it is intended to measure

Tohiar M, Jaafar S, Aizuddin AN, Leong TK, and Abdul Rahim AS. Workplace influenza vaccination in private hospital setting: a cost-benefit analysis. *Annals of Occupational and Environmental Medicine*. 2022; 34(1):e3.

<https://doi.org/10.35371/aoem.2022.34.e3> [open access]

Abstract: Background Influenza illness causes several disruptions to the workforce. The absenteeism that often ensues has economic implications for employers. This study aimed to estimate the cost-benefit of influenza vaccination in a healthcare setting from the employer's perspective. Methods A cross-sectional questionnaire survey was conducted in a private hospital in 2018–2019 comparing voluntary vaccinated with non-vaccinated employees with influenza vaccine. The analyses were made based on self-reporting on absenteeism and presenteeism from Influenza-like illnesses (ILIs). The costs incurred, both direct and indirect costs, were included in the study. A cost-benefit analysis was performed by measuring the cost of the vaccination program. The costs of absenteeism and reduced productivity were calculated using 3 hypothesised levels of effectiveness in the following percentage of productivity of 30%, 50%, and 70%. The costs were also calculated based on four scenarios: with and without operating income and with and without replacement. The benefits of the influenza vaccination from the employer's perspective were analysed. The benefit to cost ratio was determined. Results A total of four hundred and twenty-one respondents participated. The influenza vaccination rate was 63.0%. The rate of ILI of 38.1% was significantly lower among vaccinated. The ILI-related absenteeism reported was also significantly lower amongst vaccinated employees at 30% compared to 70% non-vaccinated. Employers could save up to USD 18.95 per vaccinated employee when only labour cost was included or 54.0% of cost savings. The cost-saving rose to USD 155.56 when the operating income per employee was also included. The benefit to cost ratio confirmed that the net cost-benefit gained from the vaccination was more than the net cost of vaccination. Conclusions Influenza vaccination for working adults was cost-saving and cost-beneficial when translated into financial investments for the employer. A workplace vaccination demonstrates a significant cost-benefit strategy to be applied in any institutional setting.

Yeoman K, Weakley A, DuBose W, Honn K, McMurry T, Eiter B, et al. Effects of heat strain on cognitive function among a sample of miners. *Applied Ergonomics*. 2022; 102:103743.

<https://doi.org/10.1016/j.apergo.2022.103743>

Abstract: Heat stress is associated with workplace injuries, likely through a combination of fatigue, reduced cognitive function, and thermal discomfort. The purpose of this study was to evaluate four cognitive tasks for sensitivity to heat stress. Eight participants performed treadmill exercise followed by assessments of serial reaction time (RT), Stroop effect, verbal delayed memory, and continuous performance working memory in an environmental chamber. A control (21.1 °C) trial, and "Hot 1" and "Hot 2" (both 37.8 °C) trials were run sequentially on two separate days to evaluate the four cognitive tasks. Heat strain (comparing Hot 1 and Hot 2 with the control trial) resulted in impairments in the serial RT test response and Stroop accuracy. Delayed memory was impacted only in the Hot 2 trial

compared with the control trial. Given the demonstrated impact of heat on cognitive processes relevant to workers' real-world functioning in the workplace, understanding how to assess and monitor vigilant attention in the workplace is essential.

Yu M, Qin W, and Li J. The influence of psychosocial safety climate on miners' safety behavior: a cross-level research. *Safety Science*. 2022; 150:105719.
<https://doi.org/10.1016/j.ssci.2022.105719>

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