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

***Dharma C, Smith P, Salway T, Gesink D, Escobar M, and Landsman V. A two-step approach to simultaneously correct for selection and misclassification bias in nonprobability samples from hard-to-reach populations. *American Journal of Epidemiology*. 2025; [epub ahead of print].**

<https://doi.org/10.1093/aje/kwaf132>

Abstract: Researchers studying hard-to-reach or minority populations are increasingly implementing nonprobability sampling strategies which are often prone to selection bias. To address this problem, existing statistical methods suggest integrating data from external probability sample, often collected by government agencies, with the nonprobability sample from the hard-to-reach population. These methods assume that all information collected in the probability sample is recorded without errors. This may not be the case if participants are unwilling to report their minority status, such as sexual orientation, truthfully in large-scale population-based surveys, leading to misclassification bias. In this paper, we propose a novel two-step approach aimed at addressing misclassification bias in the probability sample to improve the performance of the data integration methods aimed at addressing selection bias in the nonprobability sample. By applying the proposed method to simulated data, we demonstrate a significant reduction in bias and validate the proposed bootstrap variance estimator of the estimated mean (prevalence) under low, moderate, and high misclassification rates. This method is particularly beneficial when the misclassification rate is high. Finally, we illustrate the application of the two-step approach to estimate the prevalence of measures of social connectedness among sexual minority men using a real-world nonprobability sample

***Naik H, Zhu B, Er L, Sbihi H, Janjua NZ, Smith PM, et al. Work productivity loss in people living with long COVID symptoms over 2 years from infection. *Journal of Occupational & Environmental Medicine*. 2025; 67(8):588-594.**

<https://doi.org/10.1097/JOM.0000000000003440>

Abstract: OBJECTIVE: To evaluate the work productivity loss in people experiencing long COVID symptoms more than 2 years after infection. METHODS: In a cross-sectional study, employed adults from British Columbia, Canada, who had a polymerase chain reaction-confirmed SARS-CoV-2 infection more than 2 years earlier, completed an online survey incorporating the Valuation of Lost Productivity questionnaire. Long COVID status was self-reported. The data were weighted to mirror the demographic and clinical profile of COVID-19 survivors in British Columbia. RESULTS: Of 906 participants, 165 (18.7%) reported long COVID symptoms. These individuals reported greater total productivity loss than other COVID-19 survivors (adjusted mean difference, 99.2 hours per 3 months; 95% confidence interval, 44.9-167.5). CONCLUSIONS: Long COVID is associated with substantial work productivity loss. Given the large number of individuals affected by long COVID, this has significant implications for healthcare systems, the workforce, and economies

***Portt AE, Lay C, Chen H, Ge E, and Smith PM. Measuring migraine in Canada and the USA: an online survey of emergency room and smartphone application use. *Canadian Journal of Neurological Sciences*. 2025; [epub ahead of print].**

<https://doi.org/10.1017/cjn.2025.10140>

Abstract: BACKGROUND: Knowledge of environmental triggers for migraine attacks is limited and has mostly been acquired by studies using emergency room (ER) visits. However, it is unlikely that ER visits are a random sample of migraine events, even within strata of migraine severity. Additionally, time lags between attack onset and ER visits may vary across the population, posing challenges for assessing causal links of migraine with community-level or ecologic exposures. OBJECTIVE: Our objective was to assess the relationship between demographic and geographic measures and self-reported migraine-related ER visits. METHODS: We analyzed a targeted non-probability survey of ER use related to migraine in Canada and the USA. The 18-question online survey addressed ER use and behaviors related to recording attacks. RESULTS: The final dataset included 389 respondents (Canada = 164 [42.2%], USA = 225 [57.8%]); 51 (13.1%) were Migraine Buddy app users who shared their diaries. In both countries, participants reported similar migraine symptoms. Barriers to attending the ER included cost and wait times. There was more variability in delays between attack onset and arrival to the ER than between onset and recording in the smartphone app. Younger participants and participants living in Canada were significantly more likely to present to the ER. CONCLUSION: The sample of patients presenting to the ER for migraine may be biased toward younger patients and depend on the jurisdiction. Smartphone app records may have fewer barriers to creation and more consistent time lags compared to ER visit records

Akbar R and Banerjee R. Assessing the impact of the post graduate work permit program on the earnings of international students: evidence from Canadian employer employee dynamics dataset. *Labour*. 2025; 39(3):219-232.

<https://doi.org/10.1111/labr.12291> [open access]

Abstract: This study examines the impact of Canada's Post-Graduation Work Permit Program (PGWPP) on the experience premium of former international students using the Canadian Employer-Employee

Dynamics Dataset (CEEDD). The PGWPP allows former international students to work in Canada without restrictions, theoretically equalizing their job prospects with Canadian-born workers and immigrants arriving directly from abroad. Using employer-employee fixed effects models, the study found that the PGWPP reduced the experience premium for former international students by 4.6%. Additionally, the policy had unintended negative effects on other immigrant groups. We explore potential explanations for these outcomes and offer policy recommendations.

Angelini M, Seyyedsalehi MS, and Boffetta P. Occupational benzene exposure and skin cancers: a systematic review and meta-analysis. *Occupational Medicine*. 2025; 75(3):163-170.

<https://doi.org/10.1093/occmed/kqae112> [open access]

Abstract: Background: Exposure to benzene is a widespread occupational hazard that has been associated with haematopoietic neoplasms. The increasing awareness of the health effects that can arise from extended dermal contact with aromatic hydrocarbons, such as benzene, may elevate the risk of skin cancer. Aims: This study addresses the association between occupational benzene exposure and its incidence and mortality, encompassing non-melanoma skin cancer (NMSC), including basal cell carcinoma and squamous cell carcinoma, as well as cutaneous melanoma (CM). Methods: After removing duplicates, we screened 5652 articles from four different sources (Embase, Pubmed, Scopus and IARC Monographs), retrieving 29 independent studies on occupational benzene exposure and skin cancer. The meta-analysis used a random-effects model, overall and stratifying by gender, publication year, outcome, geographic region, industry type and study design. Results: The analysis encompasses 18 risk estimates on CM and 21 on either NMSC or not-specified skin cancer (NM/NS) mostly from Europe and North America and predominantly from oil industry cohorts. There was no association with either CM (relative risk [RR] = 0.99, 95% confidence interval [CI] 0.81; 1.21) or NM/NS (RR = 1.19, 95% CI 0.94; 1.50), except for a positive association between employment in the chemical industry and NM/NS risk. There was no evidence of publication bias for either type of cancer ($P = 0.70$ and $P = 0.08$). Conclusions: Our meta-analysis found no association between occupational benzene exposure and skin cancer. Further research should aim to describe the association of benzene exposure with skin cancer in less developed countries and among various occupations.

Bossi E, Cassadou S, Beaumont A, and Lesage FX. Unfitness for a job among construction workers. *International Archives of Occupational & Environmental Health*. 2025; 98(4):409-420.

<https://doi.org/10.1007/s00420-025-02139-6>

Abstract: Purpose The aim of this study is to assess the incidence of job loss related to health issues (fitness for work) over one year within the population of construction trades, to analyze the medical diagnoses associated with these unfitness for work situations, and to define the demographic and professional characteristics associated with them at the regional level in France (Occitania). Methods This prospective multicenter study was conducted between September 2019 and September 2020 and included employees monitored by 23 inter-company occupational health services in Occitania, France. Results In total, 71,772 employees from the construction sector were followed. The incidence of work unfitness during this period was estimated at 6.69 per thousand (95% CI [6.11; 7.32]). The two main causes of work unfitness were related to mental pathologies or musculoskeletal disorders. The identified risk factors, considering all causes, notably included age, particularly within the age intervals of 56–60 years (adjusted OR = 3.78, 95% CI [2.94–4.85]) and 61–62 years (adjusted OR = 6.17, 95% CI [4.17–8.91]) (reference 14–40 years), as well as the nature of the occupation, especially if

it involved higher physical demands. Conclusion This study highlights the personal and professional determinants associated with job loss for medical reasons among workers in the construction sector. These findings provide further insights into the risk factors leading to work unfitness and thus enable the development of targeted preventive actions aimed at promoting workers' health and retention in employment.

Callens J, Lavreysen O, Goudman L, De Smedt A, Putman K, Van del Velde D, et al. Does rehabilitation improve work participation in patients with chronic spinal pain after spinal surgery: a systematic review. *Journal of Rehabilitation Medicine*. 2025; 57:jrm25156.

<https://doi.org/10.2340/jrm.v57.25156> [open access]

Abstract: OBJECTIVE: Patients with therapy-refractory chronic spinal pain after spinal surgery experience increased disability, resulting in substantial loss of employment and consequently lower quality of life. Despite findings that rehabilitation improves socio-economic outcomes in other chronic pain conditions, evidence for patients with chronic spinal pain after spinal surgery is limited. A systematic review was conducted to provide an overview of rehabilitation interventions and their effectiveness to improve work participation for patients with chronic spinal pain after spinal surgery. METHODS: MEDLINE (via PubMed), Scopus, Embase, and Web of Science, were systematically searched. Risk of bias was assessed using the modified Downs and Black checklist and GRADE was used to assess certainty of evidence. The review protocol was prospectively registered on PROSPERO (CRD42022346091). RESULTS: The search yielded 1,289 publications. Full-text screening of 48 articles resulted in the inclusion of 6 publications. The included interventions comprised multiple treatment components, consisting of back school, self-care, functional restoration, multidisciplinary rehabilitation, physiotherapy, and digital care programmes to improve work participation. CONCLUSION: Rehabilitation to improve return to work for patients with chronic spinal pain after spinal surgery was supported only by low-certainty evidence. Rehabilitation therapies that are personalized and that integrate the patient's work seem most suitable

Dierdorff EC, Ellington JK, and Morgeson FP. Contexts, people, and work designs: developing and testing a multilevel theory for understanding variability in work design consequences. *Journal of Applied Psychology*. 2025; 110(8):1135-1156.

<https://doi.org/10.1037/apl0001267>

Abstract: Work design scholarship has demonstrated that work characteristics are important determinants of a wide range of individual outcomes including well-being, motivation, satisfaction, and performance. Yet this scholarship has also revealed substantial and unaccounted for variance in these effects, prompting calls for theory and research that applies multilevel and contextual perspectives to expand our understanding of work designs. We develop theory that spans occupation, job, and individual levels to connect the influences of both context and personal attributes (e.g., skills) on work design consequences. Central to our multilevel theory is the concept of attribute relevance, which reflects the extent to which different attributes are prioritized within occupational and job contexts in which individuals enact their roles. Results across three studies spanning 3,838 incumbents and 339 unique occupations reveal that attribute relevance systematically moderates the relationships between work designs and individual outcomes and thus demarcates factors that account for variability in the main effects observed in previous work design research. We bring much-needed theory and evidence to open questions about how worker requirements and individual

differences are connected to work designs. (PsycInfo Database Record (c) 2025 APA, all rights reserved)

Gelaw A, Wah W, Glass DC, Sim MR, Hoy R, Berecki-Gisolf J, et al. Non-respiratory health risks and mortality associated with fighting bushfires (wildfires): a systematic review. *International Archives of Occupational & Environmental Health*. 2025; 98(4-5):343-367.

<https://doi.org/10.1007/s00420-025-02138-7> [open access]

Abstract: BACKGROUND: Bushfires (also known as wildland or forest fires) expose emergency responders to occupational hazards under exceptional circumstances. Whilst the health impacts of structural firefighting have been studied, less is known about the non-respiratory health impacts or risk of mortality amongst bush firefighters, who can be volunteers. More information about health risks is needed to generate effective prevention strategies. OBJECTIVE: To critically evaluate and synthesise the published evidence about the non-respiratory health risks and risk of mortality associated with bushfire fighting. METHODS: A systematic literature search was conducted in Medline, Scopus, and Embase to identify studies evaluating morbidity or mortality or associated risk factors among bushfire fighters. The quality of included studies was evaluated twice independently using a specific quality assessment tool. RESULTS: Twenty-seven studies were included. 11(41%) were assessed as moderate quality and 16(59%) as low quality. There is a growing body of evidence for adverse short-term impacts of bushfire fighting on mental health and injuries. Linkage studies showed that volunteer firefighters had lower mortality and cancer risk in their late forties compared to the general population. CONCLUSION: Most studies relied on cross-sectional and retrospective designs without comparison groups, limiting the ability to draw robust conclusions. It is essential to conduct higher-quality research using prospective designs and longer-term follow-up to better understand the health outcomes of bushfire fighting, particularly given the anticipated increase in the frequency and severity of bushfires

Ibrahim A, Xu J, Cheon S, Wang X, and Nnaji C. Human-robot interaction in dynamic work environment: implications for workers' situational awareness. *Journal of Construction Engineering and Management*. 2025; 151(9):04025133.

<https://doi.org/10.1061/JCEMD4.COENG-16453>

Kreuger DCC, Donker-Cools BHPM, Oomens S, Luymes C, Anema JR, and Schaafsma FG. The return-to-work journey: experiences with communication and collaboration among employees and employers during long-term sick leave and return-to-work. *Disability and Rehabilitation*. 2025; 47(16):4168-4175.

<https://doi.org/10.1080/09638288.2024.2446610>

Abstract: Purpose To explore the experiences of long-term sick-listed employees and those of employers with communication and collaboration during sick leave and the return-to-work (RTW) process. Methods Previously long-term sick-listed employees (N = 9) and employers (N = 9) were interviewed about their experiences with communication and collaboration during sick leave and RTW. Thematic analysis, utilizing patient journey mapping was applied to analyze and map out their experiences. Results Three central themes emerged from the analysis: 1. Maintaining communication between employees and employers during early sick leave stages fostered trust and enabled discussions about RTW, lowering the barriers for engaging in RTW activities. 2. Organizing joint meetings involving employees, employers, and occupational health professionals (OHPs) helped align

expectations and facilitated shared decision-making to navigate RTW. 3. Both employees and employers reported lacking knowledge of RTW legislation and feeling reliant on OHP guidance to navigate the RTW process. Conclusion Employees and employers underscored the need to be involved, supported, and well informed during the sick leave and RTW process. Both parties mentioned that early and ongoing communication, joint meetings with OHPs, and information on RTW legislation were important prerequisites.

Mueller N, Haerdter L, Scholz M, Steinke J, Haun VC, and Kempen R. Improving work-nonwork balance and well-being through a boundary fit microintervention. *Journal of Occupational and Organizational Psychology*. 2025; 98(3):e70043.

<https://doi.org/10.1111/joop.70043> [open access]

Abstract: This study examines the effectiveness of a microintervention targeting the alignment between employees' preferred and enacted boundaries separating work and nonwork roles (i.e., boundary fit). Drawing on boundary fit theory and the action regulation at the work–family interface model, we developed a self-guided boundary fit microintervention incorporating education, goal-setting, and self-reflection components. Based on a randomized controlled trial, we compared an experimental group with two control groups. We assessed changes in perceived boundary fit, work–nonwork balance satisfaction, and subjective well-being across three waves—pre-intervention (T1), post-intervention (T2), and follow-up (T3)—with two-week intervals between assessments (NT1–T2 = 90; NT1–T2–T3 = 75). Participants in the experimental group exhibited greater increases in these outcomes than both control groups. Mediation analyses revealed that increases in perceived boundary fit mediated the intervention's effects on work–nonwork balance satisfaction and subjective well-being. Although the findings' generalizability may be constrained by the sample—comprising predominantly women and participants without caregiving responsibilities—the study contributes to the boundary management literature by demonstrating the effectiveness of a time-efficient intervention and illuminating its underlying mechanisms.

Navarro-Prados AB, Rodriguez-Ramirez Y, Delhom I, Bueno C, Satorres E, and Melendez JC. Anxiety among workers in institutions for older adults during the COVID-19 pandemic. *Journal of Occupational & Environmental Medicine*. 2025; 67(8):632-637.

<https://doi.org/10.1097/JOM.0000000000003415>

Abstract: OBJECTIVE: The present study examined the factors that predict anxiety in workers of institutions for older adults in Puerto Rico during the COVID-19 pandemic. METHODS: Nine hundred nursing home and assisted living workers were assessed via self-administered questionnaires. Data were collected online from October 2020 to February 2021, during Puerto Rico's third COVID-19 wave peak. RESULTS: Experiential avoidance, emotional exhaustion, negative mood, perceived stress, and, to a lesser extent, depersonalization, predicted anxious feelings and thoughts during the pandemic. This study highlights the psychological distress faced by these workers during the COVID-19 pandemic and emphasizes considering maladaptive psychological factors when assessing and addressing anxiety in clinical practice during crises. CONCLUSIONS: These results underscore the urgent need for mental health support and interventions for these professionals to mitigate the pandemic's long-term impact on their well-being

Rysstad T, Grotle M, Traeger AC, Aasdahl L, Vigdal O, Aanesen F, et al. Predicting prolonged work absence due to musculoskeletal disorders: development, validation, and clinical usefulness of prognostic prediction models. *International Archives of Occupational & Environmental Health*. 2025; 98(4-5):385-397.

<https://doi.org/10.1007/s00420-025-02129-8> [open access]

Abstract: Purpose: Given the lack of robust prognostic models for early identification of individuals at risk of work disability, this study aimed to develop and externally validate three models for prolonged work absence among individuals on sick leave due to musculoskeletal disorders. Methods: We developed three multivariable logistic regression models using data from 934 individuals on sick leave for 4-12 weeks due to musculoskeletal disorders, recruited through the Norwegian Labour and Welfare Administration. The models predicted three outcomes: (1) > 90 consecutive sick days, (2) > 180 consecutive sick days, and (3) any new or increased work assessment allowance or disability pension within 12 months. Each model was externally validated in a separate cohort of participants (8-12 weeks of sick leave) from a different geographical region in Norway. We evaluated model performance using discrimination (c-statistic), calibration, and assessed clinical usefulness using decision curve analysis (net benefit). Bootstrapping was used to adjust for overoptimism. Results: All three models showed good predictive performance in the external validation sample, with c-statistics exceeding 0.76. The model predicting > 180 days performed best, demonstrating good calibration and discrimination (c-statistic 0.79 (95% CI 0.73-0.85), and providing net benefit across a range of decision thresholds from 0.10 to 0.80. Conclusions: These models, particularly the one predicting > 180 days, may facilitate secondary prevention strategies and guide future clinical trials. Further validation and refinement are necessary to optimise the models and to test their performance in larger samples.

Schubauer-Berigan MK, Bertke SJ, Kelly-Reif K, and Daniels RD. Updated cancer mortality among uranium miners on the Colorado Plateau: interactions of radon exposure with smoking and temporal factors. *Occupational and Environmental Medicine*. 2025; 82(5):230-237.

<https://doi.org/10.1136/oemed-2025-110297>

Abstract: OBJECTIVES: Understanding of long-term lung cancer risks from radon decay products (RDP) exposure derives largely from studies of uranium miners. We aimed to compare mortality for lung and other cancers to the general population, to estimate excess absolute rate (EAR) and excess relative rate (ERR) from RDP exposure, and to estimate the joint effects of RDP and cigarette smoking in extended follow-up of a cohort of 4137 male uranium miners from the US Colorado Plateau. METHODS: We extended mortality follow-up through 2016 and re-evaluated RDP exposure against original work history and mine records. We calculated standardised mortality ratios (SMRs) compared with a regional population, evaluated EAR of lung cancer mortality using standardised rate ratios and modelled ERR using Cox proportional hazards regression. We evaluated interactions of RDP with smoking pack-years, attained age (AA) and time-since-exposure (TSE). RESULTS: There were 695 lung cancer deaths, including 146 among never-smokers and light smokers. The overall SMR was >4; the EAR per unit RDP exposure increased substantially with smoking pack-years and decades of follow-up. Lung cancer ERR decreased with AA and TSE. ERR attenuation at high exposure rates was smaller than observed elsewhere. Joint effects of RDP and smoking were submultiplicative but greater-than-additive, appearing closer to multiplicative at lower RDP exposures. Pancreas was the only other site

showing a significantly positive ERR per unit exposure. CONCLUSIONS: Excess rates of lung cancer mortality persist throughout the lifespan among this cohort of uranium miners. Information about RDP-smoking interactions is of interest for occupational and general population exposure

Sritharan J, Song C, Harris MA, Kirkham TL, Smith BT, Kim J, et al. Incidence of severe COVID-19 among 1.2 million workers in Ontario, Canada. *Occupational Medicine*. 2025; 75(3):179-187.

<https://doi.org/10.1093/occmed/kqaf017> [open access]

Abstract: BACKGROUND: The disproportionate impact of coronavirus disease (COVID-19) on healthcare workers has been highlighted; however, there is a lack of evidence regarding other high-risk occupations and industries. AIMS: This study estimated the risk of severe COVID-19 among a large cohort of workers in Ontario, Canada. METHODS: This study used a cohort of 1.2 million workers identified using workers' compensation claims records (1983-2019). Identified workers were linked with emergency department (ED) visits and hospitalizations (2020-2021). Cases coded as U0.71 (virus detected, confirmed case) were identified from ED visits and hospitalizations. Hazard ratios (HRs) and 95% confidence intervals (CI95%) for COVID-19 for each occupational group compared to all other workers in the cohort were calculated, adjusting for age and birth year. Standardized incidence ratios and 95% CI, comparing workers to the general population of Ontario were also calculated, adjusting for age, sex, year and region. RESULTS: A total of 10 322 severe COVID-19 cases among workers were identified through ED visits and hospitalizations. Workers in material handling (HR=1.32, CI95%=1.21-1.43), medicine and health (HR=1.27, CI95%=1.18-1.37), processing (food, water, textile) (HR=1.23, CI95%=1.12-1.36) and machining occupations (HR=1.11, CI95%=1.02-1.20) had some of the highest risks of COVID-19 when compared to all other workers in the cohort. Findings were somewhat consistent when comparing workers to the general population of Ontario. CONCLUSIONS: Certain groups of workers in this cohort demonstrated elevated risks of severe COVID-19. The findings align with previous studies and emphasize the need to include occupational surveillance methods in future pandemic preparedness in Canada

Wehrle K, Kira M, and Klehe UC. The role of temporality in refugees' work-related meaningfulness-making. *European Journal of Work and Organizational Psychology*. 2025; 34(4):436-450.

<https://doi.org/10.1080/1359432X.2024.2405231> [open access]

Abstract: This study explores how refugees, i.e., people experiencing liminality due to career and life disruptions, make work-related meaningfulness, and it uncovers how they apply temporality in their meaningfulness-making. Analysing 48 interviews of 24 refugees in Germany, the findings show how, post-migration, refugees faced two types of under-institutionalized liminal experiences challenging their meaningfulness - one concerning self-focused and one pertaining to other-focused sources of meaningfulness. To navigate these liminal experiences, refugees actively made meaningfulness. This was a temporal process, as refugees connected their past, present, and future. They drew on their past and present vocational experiences when moving towards their future vocational self, built on their past and acted in the present to secure present and future social connections, amplified synergies and resolved tensions in meaningfulness sources, and compensated unavailable meaningfulness sources with available ones. Based on our findings, we propose a model on how people make meaningfulness despite missing its main ingredients (i.e., a clear sense of self and social connections) and how under-institutionalized liminality can turn from a space devoid of

meaningfulness into an agentic and creative space of meaningfulness-making. We contribute to meaningfulness, temporality, and liminality research.

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