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

***Alavinia SM, Jetha A, Hitzig SL, McCauley D, Routhier F, Noonan VK, et al. Development of employment indicators to advance the quality of spinal cord injury rehabilitation care: SCI-High Project. *Journal of Spinal Cord Medicine*. 2021; 44(sup1):S118-S133.**

<https://doi.org/10.1080/10790268.2021.1955205> [open access]

Abstract: CONTEXT: Employment and Return to Work (RTW) rates following spinal cord injury/disease (SCI/D) are low due to individual and impairments characteristics, secondary health conditions, social and environmental barriers, prior work experience, workplace supports and resources, and physical or psychosocial work demands. To improve RTW, the SCI-High Project team developed a set of Employment structure, process, and outcome indicators for adults with SCI/D in the first 18 months after rehabilitation admission. METHODS: A pan-Canadian Working Group of diverse stakeholders: (1) defined the Employment construct; (2) conducted a systematic search of available outcomes measures; (3) constructed a Driver diagram summarizing factors associated with employment. Subsequent facilitated meetings allowed for the creation of structure and process indicators, and the selection of outcome indicators. RESULTS: The structure indicator is the proportion of SCI/D rehabilitation programs with an employment resource center. The process indicator is the proportion of SCI/D rehabilitation inpatients who receive an employment assessment during inpatient rehabilitation. The intermediary and final outcome measures are the Readiness for Return-to-Work Scale (RRTW) and Work Productivity and Activity Impairment (WPAI). Scale A of the RRTW for those who are unemployed and Scale B of RRTW and WPAI

will be used for those who are employed. CONCLUSION: This framework of Employment indicators intends to support the RTW needs of persons with SCI/D by ensuring that rehabilitation professionals provide opportunities to explore RTW within the first 18 months after rehab admission. Increased employment rates have the potential to enhance the wellbeing, health, and longevity of individuals with SCI/D

***Saffari N, Senthanaar S, Koehoorn M, McGrail K, and McLeod C. Immigrant status, gender and work disability duration: findings from a linked, retrospective cohort of workers' compensation and immigration data from British Columbia, Canada. *BMJ Open*. 2021; 11(12):e050829.**

<https://doi.org/10.1136/bmjopen-2021-050829> [open access]

Abstract: OBJECTIVES: To compare differences in work disability durations of immigrant men and women injured at work to comparable Canadian-born injured workers in British Columbia, Canada. METHODS: Data on accepted workers compensation claims and immigration status from 1995 and 2012 were used to compare the number of work disability days paid at the 25%, 50% and 75% for immigrant and Canadian-born injured workers stratified by gender and recency of immigration. RESULTS: Immigrant workers comprised 8.9% (78 609) of the cohort. In adjusted quantile regression models, recent and established immigrant women received 1.3 (0.8, 1.9) and 4.0 (3.4, 4.6) more paid disability days at the 50% of the disability distribution than Canadian-born counterparts. For recent and established immigrant men, this difference was 2.4 (2.2, 2.6) and 2.7 (2.4, 4.6). At the 75%, this difference increased for recent immigrant men and established immigrant men and women but declined for recent immigrant women. CONCLUSIONS: Injured immigrants receive more work disability days than their Canadian-born counterparts except for recent immigrant women. Both immigrant status and gender matter in understanding health disparities in work disability after work injury. KEYWORDS WORK DISABILITY: immigrant health; linked administrative data

***Wells GA, Tugwell P, Tomasson G, Guillemin F, Maxwell LJ, Shea BJ, Grosskleg S, Merkel PA, March L, Beaton DE. Composite outcomes at OMERACT: multi-outcome domains and composite outcome domains. *Seminars in Arthritis and Rheumatism*. 2021; [epub ahead of print].**

<https://doi.org/10.1016/j.semarthrit.2021.11.001>

Abstract: The OMERACT Technical Advisory Group recognises that working groups during the process of creating a core outcome set may identify an outcome domain that would be best represented as a composite that encapsulates these component outcome domains by bringing them together into a single outcome. A multi-outcome domain (MOD) is a within-patient combination of component outcomes, and an individual patient's evaluation depends on the observation of all of the components in that patient with a single overall rating determined according to a specified rule; which is often applicable when we consider a disease activity score. A composite outcome domain (COD) consists of a number of

component outcomes and is defined as the occurrence in a patient of one, some or all of these specified components; which is often applicable when we consider the risk of adverse events or remission criteria. We review the general benefits, challenges, reporting and interpretation of using MODs and CODs. The development of the MOD or COD instrument for an OMERACT core outcome measurement set is considered through four distinct steps: choosing relevant outcome domains; finding high quality instruments for each of these outcome domains; weighting the outcome domain instruments in the MOD/COD instrument; and putting MOD/COD instrument through the OMERACT Filter. Guidance and training are in preparation for working groups who will be completing the OMERACT Instrument Selection Algorithm (OFISA). As for other initiatives in OMERACT, we will seek feedback from OMERACT working groups who complete the development of their MOD/COD, which will then be incorporated into the refinement of the guidance and training

Alvarez-Fernandez C, Romero-Saldaaa M, Alvarez-Lopez C, Molina-Luque R, Molina-Recio G, and Vaquero-Abellan M. Gender differences and health inequality: evolution of cardiovascular risk in workers. Archives of Environmental & Occupational Health. 2021; 76(7):406-413.

<https://doi.org/10.1080/19338244.2021.1891017>

Abstract: The aim was to find out if there are any such differences due to gender in a cohort of workers followed for ten years, comparing their lifestyles and following the evolution of the main cardiovascular risk factors (CVRF) and their impact on cardiovascular risk. An observational longitudinal study of 698 civil servants workers (186 women and 512 men) of a local government office from Córdoba (Spain), was conducted over the period 2003-2014. We compared the initial and final prevalence of physical activity, smoking, obesity, hypertension, metabolic syndrome and diabetes. Cardiovascular risk was also assessed using the REGICOR (Registre Gironí del Cor) and SCORE (Systematic Coronary Risk Evaluation) equations. There was a greater rise in the prevalence of hypertension and hypercholesterolemia in the cohort in women than in men (94.2% vs. 38% and 92% vs 21.1%), while the reduction in smoking also differed by gender (26.4% vs. 36.5%). It could be that since women present a lower cardiovascular risk profile, they are treated less or less effort is made to keep the risk factors low, resulting in a worse evolution of smoking, hypercholesterolemia and hypertension in women.

Dos Anjos Magri C, Garofallo Garcia R, Binotto E, Duarte da Silva Lima N, de Alencar Naas I, Sgavioli S, et al. Occupational risk factors in health of broiler-farm workers: a systematic review. Archives of Environmental & Occupational Health. 2021; 76(8):482-493.

<https://doi.org/10.1080/19338244.2020.1832036>

Abstract: The present study aimed to identify gaps in literature regarding occupational risks to broiler farming workers. A systematic review was performed in which inclusion criteria were workers in poultry farms. The search was done between May and June 2019 with online papers. Keywords were "poultry farmer," "poultry worker," and "poultry workers" as terms of

an axis of a theoretical framework. Results indicated as predominant topics lung diseases, nasal mucosa or paranasal sinus contamination, and aflatoxicosis. The identified gaps in scientific publications are related to mitigation of occupational risks. Prevalent described risks are associated to exposure to chemicals gases, vapors and aerosols, biological hazards (micro-organisms), ergonomic risks, wrong working posture, excessive body movement and inadequate behaviors. Preventive policies about poultry farmer's health and safety needs to be adopted to reduce potentially dangerous risk factors and increase productivity

Butera S, Brasseur N, Filion N, Bruyneel A, and Smith P. Prevalence and associated factors of burnout risk among intensive care and emergency nurses before and during the coronavirus disease 2019 pandemic: a cross-sectional study in Belgium. *Journal of Emergency Nursing*. 2021; 47(6):879-891.

<https://doi.org/10.1016/j.jen.2021.08.007> [open access]

Abstract: Introduction: This study aimed to assess (1) the prevalence of burnout risk among nurses working in intensive care units and emergency department before and during the coronavirus disease 2019 pandemic and (2) the individual and work-related associated factors. Methods: Data were collected as part of a cross-sectional study on intensive care unit and emergency nurses in Belgium using 2 self-administered online questionnaires distributed just before the pandemic (January 2020, N = 422) and during the first peak of the pandemic (April 2020, N = 1616). Burnout was assessed with the Maslach Burnout Inventory scale. Results: The overall prevalence of burnout risk was higher among emergency nurses than intensive care unit nurses but was not significantly different after the coronavirus disease 2019 pandemic (from 69.8% to 70.7%, $X^2 = 0.15$, $P = .68$), whereas it increased significantly among intensive care unit nurses (from 51.2% to 66.7%, $X^2 = 23.64$, $P < .003$). During the pandemic, changes in workload and the lack of personal protective equipment were significantly associated with a higher likelihood of burnout risk, whereas social support from colleagues and from superiors and management were associated with a lower likelihood of burnout risk. Several determinants of burnout risk were different between intensive care unit and emergency nurses. Conclusion: Our findings indicate that nurses in intensive care unit and emergency department were at risk of burnout but their experience during the coronavirus disease 2019 pandemic was quite different. Therefore, it is important to implement specific measures for these 2 groups of nurses to prevent and manage their risk of burnout.

Chaman S, Zulfiqar S, Shaheen S, and Saleem S. Leadership styles and employee knowledge sharing: exploring the mediating role of introjected motivation. *PLoS ONE*. 2021; 16(9):e0257174.

<https://doi.org/10.1371/journal.pone.0257174> [open access]

Abstract: Drawing on Social Exchange Theory and Self-Determination Theory, this study examines the impact of three leadership styles (ethical, transformational, and passive avoidant) on employee knowledge sharing. Further, this study explores the mediating effect

of introjected motivation in the relationship between three leadership styles and employee knowledge sharing. Using time lag data this study employed a sample of 254 faculty members of public sector universities in Pakistan. Results supported the positive relationship between three styles of leadership and employee knowledge sharing. Moreover, our findings confirmed the mediating role of introjected motivation in the relationship between three leadership styles and employee knowledge sharing. Our study is unique, as it simultaneously examines how various styles of leadership predict introjected motivation and employee knowledge sharing. Implications along with limitations and future research directions are discussed

Dear K, Toholka R, and Nixon R. Occupational skin disease in mining: an Australian case series. Archives of Environmental & Occupational Health. 2021; 76(8):504-510.

<https://doi.org/10.1080/19338244.2020.1857674>

Abstract: The mining industry has one of the highest rates of occupational disease across all industries. However, occupational skin disease (OSD) is not commonly reported in this industry, although has been estimated to affect up to 51 people per 100,000 workers, with contact dermatitis accounting for the majority of cases. It often has a poor prognosis and leads to days lost from work. There have been relatively few reports regarding the specific forms of OSD encountered by miners worldwide. We report our experience of miners attending our Occupational Dermatology Clinic and our investigations at two Australian mines. We compare our findings with other reports of OSD in the mining population. The most commonly observed skin condition was irritant contact dermatitis, but miliaria and allergic contact dermatitis were also observed. It is not surprising that most cases of OSD appear to be related to harsh working conditions and exposures to multiple skin irritants, however, specific exposures causing ACD should not be forgotten. Our findings are consistent with previous studies of OSD in miners

Ejlertsson L, Heijbel B, Brorsson A, Troein M, and Andersson IH. Customized interventions improved employees' experience of recovery during the workday. Work. 2021; 70(2):509-519.

<https://doi.org/10.3233/WOR-213588>

Abstract: Background: There is a lack of research regarding factors promoting recovery during the workday and effective interventions. Objective: To evaluate how different intervention activities may impact employees' experiences of recovery at the workplace. Methods: Customized intervention activities based on qualitative results and a participatory approach were integrated among the employees at six primary health care centres (PHCCs; n = 166) during one year. Recovery and workplace factors were measured with a questionnaire at the start and end of intervention, and also in a control group (15 PHCCs; n = 328). Group differences were tested (Chi-2) and explanatory factors compared by logistic regression models. Results: The proportion of employees reporting workday recovery increased in the intervention group (19.9% to 29.1%; p = 0.01), whereas the control group showed no

significant change. Recovery was explained by self-reflection and reflection with co-workers. After intervention, having influence on work situation, energy-building experience, and opportunity for laughter also contributed significantly to recovery. Conclusions: The results contribute to work recovery research by confirming that a customized intervention may have an impact on employees' recovery experiences. The study showed that considering the factors of reflection, influence, and companionship can positively impact workplace recovery.

Kaltenegger HC, Becker L, Rohleder N, Nowak D, and Weigl M. Associations of working conditions and chronic low-grade inflammation among employees: a systematic review and meta-analysis. *Scandinavian Journal of Work, Environment & Health*. 2021; 47(8):565-581. <https://doi.org/10.5271/sjweh.3982> [open access]

Abstract: OBJECTIVES: Chronic low-grade inflammation has been identified as a key pathway linking stress experience to human health. However, systematic evaluations on the relationship of work stress and immune function are scarce and predominantly based on cross-sectional studies. We performed a systematic review and meta-analysis of prospective studies on associations of working conditions and inflammatory biomarkers. METHODS: In line with our previously established study protocol and the PRISMA-guidelines, we systematically searched electronic databases for prospective studies on working conditions as well as workplace interventions and inflammatory markers in employees. We classified studies (by design, type of exposure/intervention, outcome) and performed rigorous risk-of-bias assessments. Studies were summarized qualitatively, and a meta-analysis was conducted. RESULTS: We identified 23 eligible studies (N=16 432) with a broad scope of working conditions and inflammatory markers. For interventional designs, we differentiated between individual-directed/behavioral (including physical and mental) and organization-directed/structural interventions. Workplace physical exercise interventions were associated with a decrease in C-reactive protein (k=5; d=-0.61; P<0.001). For other workplace interventions, ie, mental and organizational/structural, results were inconclusive. Concerning observational studies, dimensions of the job demand-control(-support) model were most frequently investigated, and results showed weak - if any - associations with inflammatory markers. CONCLUSIONS: The research base was heterogeneous and high-level evidence was limited. More prospective studies are needed with broader consideration of work stressors and inflammatory markers. For practical occupational health management, exercise interventions are effective measures to reduce chronic low-grade inflammation

Kausto J, Rosenstrom TH, Ervasti J, Pietilainen O, Kaila-Kangas L, Rahkonen O, et al. Intervention targeted at physicians' treatment of musculoskeletal disorders and sickness certification: an interrupted time series analysis. *BMJ Open*. 2021; 11(12):e047018. <https://doi.org/10.1136/bmjopen-2020-047018> [open access]

Abstract: OBJECTIVE: An intervention was carried out at the occupational healthcare services (OHS) of the City of Helsinki beginning in 2016. We investigated the association between the intervention and employee sick leaves using interrupted time series analysis. DESIGN:

Register-based cohort study with a quasi-experimental study design. SETTING: Employees of the City of Helsinki. PARTICIPANTS: We analysed individual-level register-based data on all employees who were employed by the city for any length of time between 2013 and 2018 (a total 86 970 employees and 3 014 075 sick leave days). Sick leave days and periods that were OHS-based constituted the intervention time series and the rest of the sick leave days and periods contributed to the comparison time series. INTERVENTION: Recommendations provided to physicians on managing pain and prescribing sick leave for low back, shoulder and elbow pain. OUTCOME MEASURES: Number of sick leave days per month and sick leave periods per year. RESULTS: For all sick leave days prescribed at OHS, there was no immediate change in sick leave days, whereas a gradual change showing decreasing number of OHS-based sick leave days was detected. On average, the intervention was estimated to have saved 2.5 sick leave days per year per employee. For other sick leave days, there was an immediate increase in the level of sick leave days after the intervention and a subsequent gradual trend showing decreasing number of sick leave days. CONCLUSIONS: The intervention may have reduced employee sick leaves and therefore it is possible that it had led to direct cost savings. However, further evidence for causal inferences is needed

Pineda-Santoyo C, Campos-Romero A, Luna-Ruiz Esparza MA, Lopez-Luna LE, Sanchez-Zarate ME, Zepeda-Gonzalez A, et al. Control and prevention of SARS-CoV-2 outbreaks among healthcare workers from 129 healthcare facilities in Mexico. International Journal of Environmental Research and Public Health. 2021; 18(22):11772.

<https://doi.org/10.3390/ijerph182211772> [open access]

Abstract: Few reports have shared the workflows to reduce SARS-CoV-2 infections among risk groups, including healthcare workers (HCWs). This study describes an occupational health program implemented to reduce the incidence of COVID-19 and establishes a back-to-work algorithm in HCWs of 129 Salud Digna outpatient care clinics in Mexico. This program was composed of training plans, screening SARS-CoV-2 infections, the containment of infections, follow-up COVID-19 cases, and continuing supervision in addition to the steady supply and training for the correct use of PPE. From 16 April 2020 to 15 April 2021, 7376 individuals were enrolled, of which 423 were excluded because they did not meet the inclusion criteria or refused the follow-up. In the cohort studied, we found a COVID-19 incidence of 35.4% (2610 individuals), lower hospitalization (0.11%), ICU (0.04%) and lethality rate (0.04%).

Additionally, 85.9% of COVID-19 cases tested negative for SARS-CoV-2 after 14 days of the first positive test with an average isolation time of 26-33 days. Finally, 99% of people received personal protective equipment and adequate training to use it. Our results show that the program implemented reduced the hospitalization ICU admission and lethality in HCWs; we consider this workflow to help other workplaces offer safe conditions for HCWs and patients

Pyoria P, Ojala S, and Natti J. Precarious work increases depression-based disability among male employees. *European Journal of Public Health*. 2021; 31(6):1223-1230.

<https://doi.org/10.1093/eurpub/ckab119> [open access]

Abstract: BACKGROUND: Precarious employment is a potent occupational health risk, but little is known about its association with work-related disability and its causes. This study analyzes whether employment precariousness is associated with receiving disability pension (DP) due to depression and whether this differs according to gender. METHODS: Statistics Finland's Quality of Work Life Surveys (1997, 2003, 2008 and 2013) were merged with register-based DP data obtained from the Finnish Centre for Pensions. The survey material was used to measure employment precariousness using five variables: fear of job loss, poor employability prospects, previous unemployment, low earnings and temporary contracts. We followed 20-60-year-old employees until 2016 and studied Cox proportional hazard ratios (HRs) for receiving DP among women and men, adjusting for sociodemographic covariates, working conditions and health at baseline. RESULTS: The overall risk of receiving DP tended to increase as precarious job features accumulated. Among men, a higher risk of receiving DP due to depression was associated with previous unemployment [HR 2.2, 95% confidence interval (CI) 1.1-4.2] and poor employability (HR 2.4, 95% CI 1.3-4.7), whereas no corresponding association was found among women. CONCLUSIONS: Employment precariousness may reflect a psychological stress mechanism that predisposes the individual to mental health problems, predicting future disability. Work disability risk shows gendered differences depending on the cause of DP. Promoting employability at workplace and policy levels could offset the health risks associated with precariousness

Rudkjoebing LA, Hansen AM, Rugulies R, Kolstad H, and Bonde JP. Exposure to workplace violence and threats and risk of depression: a prospective study. *Scandinavian Journal of Work, Environment & Health*. 2021; 47(8):582-590.

<https://doi.org/10.5271/sjweh.3976> [open access]

Abstract: OBJECTIVES: Several studies have examined the health consequences of workplace threats and violence, however, due to methodological issues the epidemiological evidence is limited. The purpose of this study was to examine the prospective association between self-labelled exposure to work-related threats and violence and the risk of depression, measured by a standardized psychiatric interview and new prescriptions of anti-depressive medication. METHODS: Employees were recruited from the Danish PRISME cohort established in 2007 where 4489 Danish public employees answered a postal questionnaire with follow-ups in 2009 and 2011. In all three waves, depression was diagnosed by clinical interviews with the Schedules for Clinical Assessment in Neuropsychiatry (SCAN). In addition, we ascertained prescription of anti-depressive medication from a national register. Using logistic regression and Cox proportional hazard models, we estimated the association between exposure to threats and violence at baseline and SCAN depression and prescription of anti-depressive medication during two years of follow-up. RESULTS: Self-labelled exposure to work-related threats and violence was associated with a risk of SCAN diagnosed depression two years

later, odds ratios (OR) 2.20 [95% confidence interval (CI) 1.13-4.28] and OR 2.11 (95% CI 1.05-4.24), respectively, with indication of a dose-response. Self-labelled exposure to work-related threats and violence was associated with prescription of anti-depressive medication in a two-year period, hazard ratios (HR) 2.55 (95% CI 1.47-4.40) and HR 1.47 (95% CI 0.70-3.06), respectively. CONCLUSION: Exposure to work-related threats or violence is associated with an increased risk of depression two years later, measured with a psychiatric interview and register data on prescribed antidepressants

Snella DL, Hackneyb JJ, Maggob J, Martinb RA, Nunnerleya JL, Bourkeb JA, et al. Early vocational rehabilitation after spinal cord injury: a survey of service users. Journal of Vocational Rehabilitation. 2021; 55(3):323-333.

<https://doi.org/10.3233/JVR-211166>

Ziam S, Gignac P, Courant E, and Mc Sween-Cadieux E. Essential skills for using research evidence in public health policy: a systematic review. Evidence & Policy. 2021; 17(4):567-591.

<https://doi.org/10.1332/174426421X16250726996691>

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