

IWH Research Alert
February 7, 2020

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***Nadalin V and Smith PM. Examining the impact of occupational health and safety vulnerability on injury claim reporting in three Canadian provinces. *American Journal of Industrial Medicine*. 2020; [Epub ahead of print].**

<https://doi.org/10.1002/ajim.23094>

Abstract: INTRODUCTION: The workers' compensation system covers wages and health care costs associated with work-related injuries or illnesses. We explore if dimensions of occupational health and safety vulnerability are associated with differences in reporting work-related injuries to workers' compensation boards (WCBs). **METHODS:** We examined data from adults reporting physical workplace injuries requiring time off or health care. We explored relationships between exposure to nine hazards, risk from inadequate policies and procedures, inadequate occupational health and safety (OHS) awareness, inadequate empowerment, and reporting to provincial WCBs. Odds ratios (ORs) were calculated to assess risk from dimensions of workplace vulnerability for not reporting an injury to WCBs. **RESULTS:** Of 326 participants, 64% did not report injuries to WCBs. Reporting was higher among those with hazardous workplace exposures compared to those without (40% vs 22%, $P = .01$), lower among those with inadequate policy and procedures and

inadequate awareness protections. Inadequate OHS awareness protection was related to not reporting to WCBs in logistic regression models. Women, those working part-time, workers in education, health, and public administration, and non-unionized workers were less likely to report injuries (nonsignificant), while workers with postgraduate educations were significantly less likely to report an injury compared to referent (OR = 3.89, 95% CI: 1.57-9.62).

CONCLUSION: A general lack of knowledge about OHS rights and responsibilities was associated with low levels of reporting. This suggests there is a knowledge deficit among some workers, possibly amenable to joint efforts to increase rights and responsibilities related to OHS with the dissemination of information about rights to workers' compensation

***Yanar B, Robson LS, Tonima SK, and Amick III BC.**

Understanding the organizational performance metric, an occupational health and safety management tool, through workplace case studies. International Journal of Workplace Health Management. 2020; [Epub ahead of print].

<https://doi.org/10.1108/IJWHM-09-2018-0126>

Hjuler BS, Stokholm ZA, Vestergaard JM, Mohr MS, Sondergaard K, Toren K, et al. A follow-up study of occupational styrene exposure and risk of autoimmune rheumatic diseases.

Occupational and Environmental Medicine. 2020; 77(2):64-69.

<https://doi.org/10.1136/oemed-2019-106018> [open access]

Abstract: OBJECTIVES: Increased risk has been suggested for autoimmune rheumatic diseases following solvent exposure. The evidence for specific solvents is limited, and little is known about exposure-response relations. Styrene is an aromatic, organic solvent and the objective of this study was to analyse the association between occupational styrene exposure and autoimmune rheumatic diseases in men and women. METHODS: We followed 72 212 styrene-exposed workers of the Danish reinforced plastics industry from 1979 to 2012. We modelled full work history of styrene exposure from employment history, survey data and historical styrene exposure measurements. We identified cases in the national patient registry and investigated gender-specific exposure-response relations by cumulative styrene exposure for different exposure time windows

adjusting for age, calendar year and educational level. RESULTS: During 1 515 126 person-years of follow-up, we identified 718 cases of an autoimmune rheumatic disease, of which 73% were rheumatoid arthritis. When adjusting for potential confounders and comparing the highest with the lowest styrene exposure tertile, we observed a statistically non-significantly increased risk of systemic sclerosis among women (incidence rate ratio (IRR)=2.50; 95% CI 0.50 to 12.50) and men (IRR=1.86; 95 % CI 0.50 to 7.00), based on 9 and 22 cases, respectively. Results were inconsistent for the other autoimmune rheumatic diseases examined. CONCLUSION: This study suggests an association between occupational styrene exposure and systemic sclerosis in men as well as in women but based on few cases. This is a new finding and has to be replicated before conclusions can be drawn

Curtis S, Norman P, Cookson R, Cherrie M, and Pearce J. Recession, local employment trends and change in self-reported health of individuals: a longitudinal study in England and Wales during the 'great recession'. Health & Place. 2019; 59:102174. <https://doi.org/10.1016/j.healthplace.2019.102174>

Danielsson L, Waern M, Hensing G, and Holmgren K. Work-directed rehabilitation or physical activity to support work ability and mental health in common mental disorders: a pilot randomized controlled trial. Clinical Rehabilitation. 2020; 34(2):170-181.

<https://doi.org/10.1177/0269215519880230>

Abstract: OBJECTIVE: To evaluate feasibility and potential effectiveness of work-directed rehabilitation in people with common mental disorders. DESIGN: Pilot randomized controlled trial. SETTING: Primary healthcare, Sweden. SUBJECTS: Working adults (n = 42) of mean age 46.2 +/- 11.1 years with depression or anxiety disorder. INTERVENTIONS: Eight weeks of work-directed rehabilitation (n = 21) or physical activity (n = 21). Work-directed rehabilitation included sessions with a physiotherapist and/or an occupational therapist, to develop strategies to cope better at work. Physical activity included a planning session and access to a local gym. MAIN MEASURES: Feasibility: attendance, discontinuation and adverse events. Measurements were the Work Ability Index, the

Global Assessment of Functioning, the Montgomery-Asberg Depression Rating Scale, the Beck Anxiety Inventory and the World Health Organization-Five Well-Being Index. RESULTS: Attendance to rehabilitation sessions was 88% (n = 147/167) and discontinuation rate was 14% (n = 3/21). No serious adverse events were reported. Within both groups, there was a significant improvement in Work Ability Index score (mean change: 3.6 (95% confidence interval (CI): 0.45, 6.7) in work-directed rehabilitation and 3.9 (95% CI: 0.9, 7.0) in physical activity) with no significant difference between groups. For the other outcomes, significant improvements were found within but not between groups. Per-protocol analysis showed a trend toward the antidepressant effect of work-directed rehabilitation compared to physical activity (mean difference in depression score -3.1 (95% CI: -6.8, 0.4), P = 0.075). CONCLUSION: Work-directed rehabilitation was feasible to persons with common mental disorders and improved their work ability and mental health. Comparable improvements were seen in the physical activity group. Suggested modifications for a larger trial include adding a treatment-as-usual control

Harizanova S and Stoyanova R. Burnout among nurses and correctional officers. Work. 2020; 65(1):71-77.

<https://doi.org/10.3233/WOR-193059>

Abstract: BACKGROUND: The work of nurses and correctional officers alike has long been pointed at as among the most stressful in the world. OBJECTIVE: The primary aim was to evaluate the prevalence and level of occupational burnout among 214 hospital nurses and 201 correctional officers from Bulgaria. One of the focuses was to examine whether gender roles or occupational roles were more related to burnout. METHODS: The current work used a descriptive cross-sectional inter-occupational comparative survey design. The participation was voluntary, individually and anonymously without any financial compensation. The only qualification in the sample selection was that the employee had direct contact with patients and inmates respectively. A translated MBI-Bulgarian version was used to measure burnout. Data were entered into SPSS17.0 to carry out data analysis. RESULTS: The level of emotional exhaustion and personal accomplishment of nurses were significantly higher than that of correctional officers. Mean depersonalization score of correctional officers was significantly higher than that of nurses.

Correctional officers demonstrated a higher prevalence of burnout syndrome compared with nurses. To examine whether gender is associated with burnout, Mann-Whitney U test was utilized to assess gender differences of correctional officers. Our results suggest that being male or female is not a critical determinant of burnout.

CONCLUSION: Correctional officers were found to have a higher prevalence of burnout syndrome compared with nurses

Hulls PM, Richmond RC, Martin RM, and de Vocht F. A systematic review protocol examining workplace interventions that aim to improve employee health and wellbeing in male-dominated industries. *Systematic Reviews*. 2020; 9(1):10.

<https://doi.org/10.1186/s13643-019-1260-9> [open access]

Abstract: **BACKGROUND:** The workplace environment potentially provides access to a large population who are employed, and it is an employer's responsibility to provide appropriate conditions for its employees. Whilst the aetiology of cardiovascular disease is multifactorial, it is generally acknowledged that working conditions, gender and age are involved in its development. Male-dominated industries (comprising > 70% male workers, e.g., agriculture, construction, manufacturing, mining, transport and technology) have a higher prevalence of health risk behaviours than other population subgroups. Working in a gender-dominated industry can impact an employee's health and wellbeing, particularly for the opposite sex. This systematic review examines workplace interventions that address the health and wellbeing of employees in male-dominated industries. **METHODS:** We will include randomised controlled trials and studies with non-randomised intervention groups. The interventions must aim to improve employee physical and/or mental health and wellbeing implemented in the workplace in male-dominated industries. There will be no limits on date. The following electronic databases will be searched for published studies: Web of Science, Embase, MedLine, PsycInfo and the Cochrane Database. The search strategy will include free-text terms and MeSH vocabulary, including 'male-dominated industries', 'workplace interventions', 'occupational stress', 'mental health', 'cardiovascular disease', 'blood pressure', 'body mass index' and 'exercise'. Two authors will independently select, review and extract data from studies that meet the inclusion criteria. The Cochrane's Risk of Bias

tool will be used to assess risk of bias. We will perform structured summaries of the included studies and, if possible, conduct meta-analyses or construct an Albatross plot. DISCUSSION: There are an increasing number of interventions designed to improve employee health and wellbeing in the workplace, but no prior review that systematically evaluates their effectiveness. A systematic review is required to prioritise the future implementation of those interventions found to be most effective. SYSTEMATIC REVIEW REGISTRATION: PROSPERO CRD42019161283

Jeyaraman MM, Rabbani R, Al-Yousif N, Robson RC, Copstein L, Xia J, et al. Inter-rater reliability and concurrent validity of ROBINS-I: protocol for a cross-sectional study. Systematic Reviews. 2020; 9(1):12.

<https://doi.org/10.1186/s13643-020-1271-6> [open access]

Abstract: BACKGROUND: The Cochrane Bias Methods Group recently developed the "Risk of Bias (ROB) in Non-randomized Studies of Interventions" (ROBINS-I) tool to assess ROB for non-randomized studies of interventions (NRSI). It is important to establish consistency in its application and interpretation across review teams. In addition, it is important to understand if specialized training and guidance will improve the reliability of the results of the assessments. Therefore, the objective of this cross-sectional study is to establish the inter-rater reliability (IRR), inter-consensus reliability (ICR), and concurrent validity of ROBINS-I. Furthermore, as this is a relatively new tool, it is important to understand the barriers to using this tool (e.g., time to conduct assessments and reach consensus-evaluator burden). METHODS: Reviewers from four participating centers will appraise the ROB of a sample of NRSI publications using the ROBINS-I tool in two stages. For IRR and ICR, two pairs of reviewers will assess the ROB for each NRSI publication. In the first stage, reviewers will assess the ROB without any formal guidance. In the second stage, reviewers will be provided customized training and guidance. At each stage, each pair of reviewers will resolve conflicts and arrive at a consensus. To calculate the IRR and ICR, we will use Gwet's AC1 statistic. For concurrent validity, reviewers will appraise a sample of NRSI publications using both the New-castle Ottawa Scale (NOS) and ROBINS-I. We will analyze the concordance between the two tools for similar domains and for the overall judgments using

Kendall's tau coefficient. To measure the evaluator burden, we will assess the time taken to apply the ROBINS-I (without and with guidance), and the NOS. To assess the impact of customized training and guidance on the evaluator burden, we will use the generalized linear models. We will use Microsoft Excel and SAS 9.4 to manage and analyze study data, respectively. DISCUSSION: The quality of evidence from systematic reviews that include NRS depends partly on the study-level ROB assessments. The findings of this study will contribute to an improved understanding of the ROBINS-I tool and how best to use it

Kim S, Moore A, Srinivasan D, Akanmu A, Barr A, Harris-Adamson C, et al. Potential of exoskeleton technologies to enhance safety, health, and performance in construction: industry perspectives and future research directions. ISE Transactions on Occupational Ergonomics and Human Factors. 2019; 7(3-4):185-191.

<https://doi.org/10.1080/24725838.2018.1561557> [open access]

LOvgren V, Hillborg H, Bejerholm U, and Rosenberg D. Supported education in a Swedish context: opportunities and challenges for developing career-oriented support for young adults with mental health problems. Scandinavian Journal of Disability Research. 2020; 22(1):1-11.

<https://doi.org/10.16993/sjdr.648> [open access]

McMahon BT, Grover JM, McMahon MC, and Kim JH. Workplace discrimination for persons with hearing loss: before and after the 2008 ADA Amendments Act. Work. 2020; 65(1):39-51.

<https://doi.org/10.3233/WOR-193056>

Abstract: BACKGROUND: Individuals with hearing loss experience unique barriers to employment frequently documented in the areas of communication and education. The purpose of this article is to contribute to extend this inquiry to the uniqueness of workplace discrimination involving persons with hearing loss. OBJECTIVE: This study investigated differences in allegations of workplace discrimination filed by persons with hearing loss ("Hearing") compared to those filed by persons with other physical or neurological disabilities (General Disability, or "GENDIS") before and

after the enactment of the 2008 Americans with Disabilities Act Amendments Act (2008 Amendments). METHODS: Using secondary data collected from the Equal Employment Opportunity Commission (EEOC) Integrated Mission System, we employ simple measures of proportion and odds ratios to describe differences between allegations derived from GENDIS and Hearing loss populations. These are population statistics, and not samples, of all allegations of discrimination reported to the EEOC through 2016. The comparisons involve Characteristics of the Charging Parties, Issues or discriminatory behaviors alleged, and closure statuses or Merit Rate of the EEOC's investigations - both before and after the 2008 Amendments. RESULTS: Following the 2008 Amendments, Charging Parties changed dramatically on age and gender status. Reasonable Accommodation, Hiring, Harassment, and employment Terms and Conditions showed unique features between groups and/or time periods. The "veracity" (confirmed truthfulness or merit) of the EEOC allegation (or Merit) rate also changed following the Amendments: higher for GENDIS; lower for Hearing. CONCLUSIONS: Possible rationale for these findings are offered, and new research questions are raised. Finally, implications for the cross-disability movement are presented

Mokarami H and Toderi S. Reclassification of the work-related stress questionnaires scales based on the work system model: a scoping review and qualitative study. Work. 2019; 64(4):787-795. <https://doi.org/10.3233/WOR-193040>

Abstract: BACKGROUND: Given the wide variety of factors affecting work-related stress, a work system approach could be adopted in order to better identify factors that impact individual stress. OBJECTIVES: To provide a scoping review of the available work-related stress questionnaires and to reclassify their scales on the basis of the five elements included in the work system model using a content analysis method. METHODS: The main available work-related stress questionnaires used in previous studies in the time range of 1975 to 2017 were collected through a search in several indexing and citation databases. To reclassify the scales of these questionnaires, a qualitative content analysis was used and then reclassified in accordance with the five components of work system model: job (tasks), organizational condition, individual characteristics,

technology and tools, and physical environmental. RESULTS: In total, 22 questionnaires met the conditions required to be entered into the final stage of the study. Emphasis of these questionnaires was on measuring job-related factors and organizational condition-related factors. 22.7% of them had considered no scales to measure the individual characteristics-related factors. CONCLUSIONS: The results of the reclassification can help organizations select areas that encompass their own specific problems. Practical implications are also discussed

Petkovic J, Riddle A, Akl EA, Khabisa J, Lytvyn L, Atwere P, et al. Protocol for the development of guidance for stakeholder engagement in health and healthcare guideline development and implementation. Systematic Reviews. 2020; 9(1):21.

<https://doi.org/10.1186/s13643-020-1272-5> [open access]

Abstract: BACKGROUND: Stakeholder engagement has become widely accepted as a necessary component of guideline development and implementation. While frameworks for developing guidelines express the need for those potentially affected by guideline recommendations to be involved in their development, there is a lack of consensus on how this should be done in practice. Further, there is a lack of guidance on how to equitably and meaningfully engage multiple stakeholders. We aim to develop guidance for the meaningful and equitable engagement of multiple stakeholders in guideline development and implementation. METHODS: This will be a multi-stage project. The first stage is to conduct a series of four systematic reviews. These will (1) describe existing guidance and methods for stakeholder engagement in guideline development and implementation, (2) characterize barriers and facilitators to stakeholder engagement in guideline development and implementation, (3) explore the impact of stakeholder engagement on guideline development and implementation, and (4) identify issues related to conflicts of interest when engaging multiple stakeholders in guideline development and implementation. DISCUSSION: We will collaborate with our multiple and diverse stakeholders to develop guidance for multi-stakeholder engagement in guideline development and implementation. We will use the results of the systematic reviews to develop a candidate list of draft guidance recommendations and will seek broad feedback on the draft guidance via an online survey of

guideline developers and external stakeholders. An invited group of representatives from all stakeholder groups will discuss the results of the survey at a consensus meeting which will inform the development of the final guidance papers. Our overall goal is to improve the development of guidelines through meaningful and equitable multi-stakeholder engagement, and subsequently to improve health outcomes and reduce inequities in health

Petrou P, Baas M, and Roskes M. From prevention focus to adaptivity and creativity: the role of unfulfilled goals and work engagement. European Journal of Work and Organizational Psychology. 2020; 29(1):36-48.

<https://doi.org/10.1080/1359432X.2019.1693366>

Rizza S, Neri A, Capanna A, Grecuccio C, Pietroiusti A, Magrini A, et al. Night shift working is associated with an increased risk of thyroid nodules. Journal of Occupational & Environmental Medicine. 2020; 62(1):1-3.

<https://doi.org/10.1097/JOM.0000000000001711>

Abstract: OBJECTIVES: To study thyroid alterations in health care workers according to their working status. METHODS: We performed a retrospective study including 299 hospital employees who underwent in 2016 a periodic health surveillance checks in the Service of Occupational Medicine. According to the working status (rotating night-shift working [no. 160] vs day-working [no. 139]), we divided participant's clinical, anthropometric, and thyroid echographic characteristics. RESULTS: Respect to day workers, rotating night-shift workers were slightly older and more frequently male whereas had similar thyroid stimulating hormone, Ft3, Ft4 levels, and autoimmunity (anti-TPO levels more than 30). Univariate and multivariate regression analysis revealed that rotating night shift work is associated to a significantly increased number of thyroid nodules. CONCLUSIONS: This retrospective report suggests that the alteration in the molecular clocks typical of rotating night-shift workers harbors a higher risk of thyroid nodule development compared with diurnal workers. This novel result deserves replication in larger cohorts since thyroid nodules not rarely can represent thyroid cancers

Besar SH, Mathew S, Richardson M, Bielecki JM, and Sander B. Mapping the evidence on health equity considerations in economic evaluations of health interventions: a scoping review protocol. Systematic Reviews. 2020; 9(1):6.

<https://doi.org/10.1186/s13643-019-1257-4> [open access]

Abstract: **BACKGROUND:** Equity in health has become an important policy agenda around the world, prompting health economists to advance methods to enable the inclusion of equity in economic evaluations. Among the methods that have been proposed to explicitly include equity are the weighting analysis, equity impact analysis, and equity trade-off analysis. This is a new development and a comprehensive overview of trends and concepts of health equity in economic evaluations is lacking. Thus, our objective is to map the current state of the literature with respect to how health equity is considered in economic evaluations of health interventions reported in the academic and gray literature. **METHODS:** We will conduct a scoping review to identify and map evidence on how health equity is considered in economic evaluations of health interventions. We will search relevant electronic, gray literature and key journals. We developed a search strategy using text words and Medical Subject Headings terms related to health equity and economic evaluations of health interventions. Articles retrieved will be uploaded to reference manager software for screening and data extraction. Two reviewers will independently screen the articles based on their titles and abstracts for inclusion, and then will independently screen a full text to ascertain final inclusion. A simple numerical count will be used to quantify the data and a content analysis will be conducted to present the narrative; that is, a thematic summary of the data collected. **DISCUSSION:** The results of this scoping review will provide a comprehensive overview of the current evidence on how health equity is considered in economic evaluations of health interventions and its research gaps. It will also provide key information to decision-makers and policy-makers to understand ways to include health equity into the prioritization of health interventions when aiming for a more equitable distribution of health resources. **SYSTEMATIC REVIEW REGISTRATION:** This protocol was registered with Open Science Framework (OSF) Registry on August 14, 2019 (<https://osf.io/9my2z/registrations>)

Sen S, Barlas G, Yakistiran S, Derin IG, Serifi BA, Ozlu A, et al. Prevention of occupational diseases in Turkey: deriving lessons from journey of surveillance. Safety and Health at Work. 2019; 10(4):420-427.

<https://doi.org/10.1016/j.shaw.2019.09.006> [open access]

Abstract: Introduction: To prevent and manage the societal and economic burden of occupational diseases (ODs), countries should develop strong prevention policies, health surveillance and registry systems. This study aims to contribute to the improvement of OD surveillance at national level as well as to identify priority actions in Turkey. Methods: The history and current status of occupational health studies were considered from the perspective of OD surveillance. Interpretative research was done through literature review on occupational health at national, regional and international level. Analyses were focused on countries' experiences in policy development and practice, roles and responsibilities of institutions, multidisciplinary and intersectoral collaboration. OD surveillance models of Turkey, Belgium and the Netherlands were examined through exchange visits. Face-to-face interviews were conducted to explore the peculiarities of legislative and institutional structures, the best and worst practices, and approach principles. Results: Some countries are more focused on exploring OD trends through effective and cost-efficient researches, with particular attention to new and emerging ODs. Other countries try to reach every single case of OD for compensation and rehabilitation. Each practice has advantages and shortcomings, but they are not mutually exclusive, and thus an effective combination is possible. Conclusion: Effective surveillance and registry approaches play a key role in the prevention of ODs. A well-designed system enables monitoring and assessment of OD prevalence and trends, and adoption of preventive measures while improving the effectiveness of redressing and compensation. A robust surveillance does not only provide protection of workers' health but also advances prevention of economic losses

Toren K, Blanc PD, Naidoo RN, Murgia N, Qvarfordt I, Aspevall O, et al. Occupational exposure to dust and to fumes, work as a welder and invasive pneumococcal disease risk. Occupational and Environmental Medicine. 2020; 77(2):57-63.

<https://doi.org/10.1136/oemed-2019-106175>

Abstract: OBJECTIVES: Occupational exposures to metal fumes have been associated with increased pneumonia risk, but the risk of invasive pneumococcal disease (IPD) has not been characterised previously. METHODS: We studied 4438 cases aged 20-65 from a Swedish registry of invasive infection caused by *Streptococcus pneumoniae*. The case index date was the date the infection was diagnosed. Six controls for each case, matched for gender, age and region of residency, were selected from the Swedish population registry. Each control was assigned the index date of their corresponding case to define the study observation period. We linked cases and controls to the Swedish registries for socioeconomic status (SES), occupational history and hospital discharge. We applied a job-exposure matrix to characterise occupational exposures. We used conditional logistic analyses, adjusted for comorbidities and SES, to estimate the OR of IPD and the subgroup pneumonia-IPD, associated with selected occupations and exposures in the year preceding the index date. RESULTS: Welders manifested increased risk of IPD (OR 2.99, 95% CI 2.09 to 4.30). Occupational exposures to fumes and silica dust were associated with elevated odds of IPD (OR 1.11, 95% CI 1.01 to 1.21 and OR 1.33, 95% CI 1.11 to 1.58, respectively). Risk associated with IPD with pneumonia followed a similar pattern with the highest occupational odds observed among welders and among silica dust exposed. CONCLUSION: Work specifically as a welder, but also occupational exposures more broadly, increase the odds for IPD. Welders, and potentially others with relevant exposures, should be offered pneumococcal vaccination

*IWH authored publications.