IWH Research Alert
October 11, 2019

Missed an issue? Catch up on previous *Research Alerts* available on the IWH website https://www.iwh.on.ca/journal-articles/research-alerts

Research Alert is a service provided to you by the Institute for Work & Health (IWH) to help you keep abreast of recent literature in the areas of occupational health and safety, epidemiology, public health and others within the IWH mandate. Please note that these articles have not been reviewed by Institute scientists to assess the quality of the studies. *Research Alerts* should not be considered an endorsement of the findings. Readers are cautioned not to act on the results of single studies, but rather to seek bodies of evidence. It should also be noted that the Institute for Work & Health cannot provide full-text of articles listed in *Research Alerts* to individuals outside of the organization, as this violates copyright legislation.

***Van Eerd D, Smith P, and Vu U. Implications of an aging workforce for work injury, recovery, returning to work and remaining at work. Journal of the Ontario Occupational Health Nurses Association. 2019; Spring/Summer:30-36.**
https://www.iwh.on.ca/sites/iwh/files/oohna_journal_fw_2019_agingrtw.pdf

***Verstappen SMM, Lacaille D, Boonen A, Escorpizo R, Hofstetter C, Bosworth A, Leong A, Leggett S, Gignac AM, et al. Considerations for evaluating and recommending worker productivity outcome measures: an update from the OMERACT worker productivity group. Journal of Rheumatology. 2019; 46(10):1401-1405.**
https://doi.org/10.3899/jrheum.181201
Abstract: OBJECTIVE: The Outcome Measures in Rheumatology (OMERACT) Worker Productivity Group continues efforts to assess psychometric properties of measures of presenteeism. METHODS: Psychometric properties of single-item and dual answer multiitem scales were assessed, as well as methods to evaluate thresholds of meaning. RESULTS: Test-retest reliability and construct validity of single item global measures was moderate to good. The value of measuring both degree of difficulty and amount of time with difficulty in multiitems questionnaires was confirmed. Thresholds of meaning vary depending on methods and external anchors applied. CONCLUSION: We have advanced our understanding of the performance of presenteeism measures and have developed approaches to describing thresholds of meaning

Ahn J, Cho SS, Kim HR, Myong JP, and Kang MY. Comparison of work environment and occupational injury in direct and indirect employment in Korea and Europe. Annals of Occupational and Environmental Medicine. 2019; 31(1):e24.
https://doi.org/10.35371/aoem.2019.31.e24 [open access]
Abstract: Background: To investigate the risk of injury for indirect employment in Korea, we compared work environment, workplace exposure, and injury risk according to the type of employment contract between Korea and European Union (EU) countries.

Methods: We analyzed data of blue-collar workers from the fourth Korean Working Conditions Survey (2014) and the sixth European Working Conditions Survey (2015) and compared workplace risk factors and preventive factors for occupational injuries. Multiple logistic regression analysis was conducted to identify the relationship between occupational injury and the type of employment contract after adjusting for age and sex.

Results: For descriptive characteristics, a relatively older age, lower income, lower proportion of full-time work, greater proportion in small-sized companies, and fewer unionizations were noted in indirect employment in Korea than in direct employment. Workplace exposure was significantly higher in indirect employment in both Korea and Europe. Among safety-related factors, indirect employment in both Korea and Europe lacked the support of company education, coworkers, and supervisors. Indirectly employed blue-collar workers had a significantly higher risk of occupational injury than those directly employed in Korea (odds ratio [OR]: 1.876), whereas there was no significant difference between directly and indirectly employed workers in EU countries (OR: 1.038).

Conclusions: Indirectly employed blue-collar workers have an increased risk of occupational injury in Korea.

Barul C, Richard H, and Parent ME. Night-shift work and risk of prostate cancer: results from a Canadian case-control study, the prostate cancer and environment study. American Journal of Epidemiology. 2019; 188(10):1801-1811.
https://doi.org/10.1093/aje/kwz167
Abstract: Night-shift work involving disruption of circadian rhythms has been associated with breast cancer risk. A role in prostate cancer is also suspected, but evidence is limited. We investigated the association between night-shift work and prostate cancer incidence in the Prostate Cancer and Environment Study (PROtEuS), a population-based case-control study conducted in 2005-2012 in Montreal, Quebec, Canada. Participants were 1,904 prostate cancer cases (432 high-grade cancers) and 1,965 population controls. Detailed work schedules for each job held for at least 2 years (n = 15,724) were elicited in face-to-face interviews. Night-shift work was defined as having ever worked >/=3 hours

between midnight and 5:00 am >/=3 nights/month for >/=1 year. Unconditional logistic regression was used to estimate odds ratios and 95% confidence intervals for the association between night-shift work and prostate cancer, adjusting for age, ancestry, and education. No association was found between overall prostate cancer and night-shift work metrics, including ever exposure, duration, intensity, cumulative exposure, rotating shifts, and early-morning shifts. For none of the exposure indices was there evidence of heterogeneity in odds ratios between low- and high-grade cancers. Sensitivity analyses restricting exposures to >/=7 nights/month or considering screening history yielded similar results. Our findings lend no support for a major role of night-shift work in prostate cancer development

Boffetta P, Donato F, Pira E, Luu HN, and La Vecchia C. Risk of mesothelioma after cessation of asbestos exposure: a systematic review and meta-regression. International Archives of Occupational & Environmental Health. 2019; 92(7):949-957.
https://doi.org/10.1007/s00420-019-01433-4
Abstract: PURPOSE: A 'risk reversal' has been observed for several human carcinogens following cessation of exposure, but it is unclear whether it also exists for asbestos-related mesothelioma. METHODS: We conducted a systematic review of the literature and identified nine studies that reported information on risk of mesothelioma after cessation of asbestos exposure, and performed a meta-regression based on random effects models. As comparison we analyzed results on lung cancer risk from four of these studies. RESULTS: A total of six risk estimates from five studies were included in the meta-analysis. The summary relative risk (RR) of mesothelioma for 10-year interval since cessation of exposure was 1.02 [95% confidence interval (CI) 0.87-1.19; p-heterogeneity 0.01]. The corresponding RR of lung cancer was 0.91 (95% CI 0.84-0.98). CONCLUSIONS: This analysis provides evidence that the risk of mesothelioma does not decrease after cessation of asbestos exposure, while lung cancer risk does

Chen Z, Prosperi M, Bian J, Min J, Wang M, and Li C. Clinical correlates of workplace injury occurrence and recurrence in adults. PLoS ONE. 2019; 14(9):e0222603.
https://doi.org/10.1371/journal.pone.0222603 [open access]
Abstract: OBJECTIVES: To examine the morbidities associated with workplace injury and to explore how clinical variables modify the risk of injury recurrence. METHODS: A case-control study was designed using Florida's statewide inpatient, outpatient, and emergency visits data obtained from the Healthcare Cost and Utilization Project. We included adults who were admitted for a workplace injury (WPI) or injury at other places (IOP), and a matched population of random controls without WPI/IOP. The associations between WPI and clinical morbidities were assessed by univariate and multivariable regression, ranking predictors by information gain, area under the receiver operating characteristic

(AUROC), and odds ratios. We analyzed WPI recurrence using survival methods (Kaplan-Meier, Cox regression, survival decision trees) and developed prediction models via regularized logistic regression, random forest, and AdTree. Performance was assessed by 10-fold cross-validation comparing AUROC, sensitivity, specificity, and Harrell's c-index. RESULTS: A total of 80,712 WPI, 161,424 IOP, and 161,424 control patients were included; 485 distinct clinical diagnostic and 160 procedure codes were analyzed after filtering. Acute bronchitis and bronchiolitis, sprains and strains of shoulder and upper arm, ankle and foot, or other and unspecified parts of back, accidents caused by cutting and piercing instruments or objects, and overexertion and strenuous movements were identified as important consequences of WPI. The prediction models of injury recurrence identified several key factors, such as insurance type and prior injury events, although none of the models exhibited high predictive performance (best AUROC = 0.60, best c-index = 0.62). CONCLUSIONS: WPI is associated to diverse serious physical comorbidity burden. There are demographic, social and clinical comorbidity components associated to the risk of WPI recurrence, although their predictive value is moderate, which warrants future investigation in other information source domains, e.g. deepening into the environmental and societal sphere

Deltour I, Massardier-Pilonchery A, Schlehofer B, Schlaefer K, Hours M, and Schuz J. Validation of self-reported occupational noise exposure in participants of a French case-control study on acoustic neuroma. International Archives of Occupational & Environmental Health. 2019; 92(7):991-1001.
https://doi.org/10.1007/s00420-019-01427-2
Abstract: OBJECTIVES: To validate self-reported occupational loud noise exposure against expert evaluation of noise levels in a French case-control study on acoustic neuroma and to estimate the impact of exposure misclassification on risk estimation. METHODS: Noise levels were evaluated in 1006 jobs held by 111 cases and 217 population controls by an expert. Case-control differences in self-reporting were analyzed with logistic models. Sensitivity, specificity, positive and negative predictive values, and observed agreement of the self-reports were computed relative to the expert evaluation. They were used to calibrate the odds ratio (OR) between lifetime ever occupational loud noise exposure and the risk of acoustic neuroma, without adjustment for measurement error of the expert assessments. RESULTS: Cases reported noise levels in individual jobs closer to the expert assessment than controls, but the case-control difference was small for lifetime exposures. For expert-rated exposure of 80 dB(A), reporting of individual jobs by cases was more sensitive (54% in cases, 37% in controls), whereas specificity (91% in cases, 93% in controls) and observed agreement (82% in cases, 81% in controls) were similar. When lifetime exposure was considered, sensitivity increased (76% in cases, 65% in controls), while cases specificity decreased (84%). When these values were used to calibrate self-reports for exposure misclassification compared to expert evaluation at 80 dB(A),

the crude OR of 1.7 was reduced to 1.3. CONCLUSIONS: Despite the relatively accurate reporting of loud noise, the impact of the calibration on the OR was non-negligible

Fang YY, Huang CY, and Hsu MC. Effectiveness of a physical activity program on weight, physical fitness, occupational stress, job satisfaction and quality of life of overweight employees in high-tech industries: a randomized controlled study. International Journal of Occupational Safety & Ergonomics. 2019; 25(4):621-629.
https://doi.org/10.1080/10803548.2018.1438839
Abstract: Introduction. This study aimed to examine the effectiveness of a physical activity (PA) program on weight control, physical fitness, occupational stress, job satisfaction and quality of life of overweight and sedentary employees in high-tech industries. Methods. Participants in the intervention group (n = 37) were instructed to carry out a PA program at moderate intensity for 60 min/session, 3 sessions/week for 12 weeks. Those in the control group (n = 38) received no PA program and were asked to continue their routine lifestyle. Evaluations were performed at baseline and at the end of the intervention. Results of structured questionnaires and blood biochemistry tests and evaluations of physical fitness were analyzed. Results. The PA program effectively reduced the number of risk factors for metabolic syndrome and body fat percentage, and improved physical fitness such as flexibility, muscular strength and endurance and cardiorespiratory endurance. The intervention also significantly decreased levels of serum triglyceride, total cholesterol and low-density lipoprotein cholesterol. Significant positive effects on work control, interpersonal relationships at work, global job satisfaction and quality of life were also demonstrated. Conclusion. This study showed that a PA program can be helpful in improving physical, physiological and psychological outcomes for overweight and sedentary employees in high-tech industries

Kett AR and Sichting F. Sedentary behaviour at work increases muscle stiffness of the back: why roller massage has potential as an active break intervention. Applied Ergonomics. 2020; 82:102947.
https://doi.org/10.1016/j.apergo.2019.102947
Abstract: There is increasing evidence that subjects who are exposed to long sitting periods suffer from musculoskeletal discomfort and back pain. The underlying mechanism and effective prevention strategies are still largely unknown. In this study, muscle stiffness of the back was measured in 59 office workers who followed their usual desk work regime for 4.5h in a sitting posture. The sitting period was either followed by an 8-min roller massage intervention or a controlled standing task. Results showed that muscle stiffness increased significantly after the 4.5h sitting period. When the sitting period was followed by roller massage, the stiffness values dropped slightly below baseline stiffness. In contrast, the stiffness values remained increased when the sitting period was followed by controlled standing. This study indicates that short-duration tissue

manipulation can be an effective active break between prolonged sitting periods to prevent musculoskeletal issues, such as musculoskeletal discomfort and back pain

Kim J, Peters CE, Arrandale VH, Labreche F, Ge CB, McLeod CB, et al. Burden of lung cancer attributable to occupational diesel engine exhaust exposure in Canada. Occupational & Environmental Medicine. 2018; 75(9):617-622.
https://doi.org/10.1136/oemed-2017-104950
Abstract: OBJECTIVE: To estimate the population attributable fraction (PAF) and number of incident and fatal lung cancers in Canada from occupational exposure to diesel engine exhaust (DEE). METHODS: DEE exposure prevalence and level estimates were used with Canadian Census and Labour Force Survey data to model the exposed population across the risk exposure period (REP, 1961-2001). Relative risks of lung cancer were calculated based on a meta-regression selected from the literature. PAFs were calculated using Levin's equation and applied to the 2011 lung cancer statistics obtained from the Canadian Cancer Registry. RESULTS: We estimated that 2.4% (95% CI 1.6% to 6.6%) of lung cancers in Canada are attributable to occupational DEE exposure, corresponding to approximately 560 (95% CI 380 to 1570) incident and 460 (95% CI 310 to 1270) fatal lung cancers in 2011. Overall, 1.6 million individuals alive in 2011 were occupationally exposed to DEE during the REP, 97% of whom were male. Occupations with the highest burden were underground miners, truck drivers and mechanics. Half of the attributable lung cancers occurred among workers with low exposure. CONCLUSIONS: This is the first study to quantify the burden of lung cancer attributable to occupational DEE exposure in Canada. Our results underscore a large potential for prevention, and a large public health impact from occupational exposure to low levels of DEE

Krick A, Felfe J, and Klug K. Turning intention into participation in occupational health promotion courses? The moderating role of organizational, intrapersonal, and interpersonal factors. Journal of Occupational & Environmental Medicine. 2019; 61(10):779-799.
https://doi.org/10.1097/JOM.0000000000001670
Abstract: OBJECTIVE: Investigate organizational, intrapersonal (expectations, risk, strain, self-care), and interpersonal (health-oriented leadership) factors as predictors for employees' participation in occupational health promotion (OHP) and the mediating effect of intention. Identifying moderators that strengthen the relationship between intention and participation. METHODS: Two cross-sectional studies using moderated mediation and moderator analyses analyzed data from N = 269 to N = 503 employees. RESULTS: Study 1 showed that favorable expectations and a supportive context predict participation via intention and strengthen the effect of intention on participation. The relationship between intention and participation was also stronger if leaders' staff-care was higher. Study 2 showed that the relationship between intention and participation was

stronger, if employees' self-care was higher, and strain, neuroticism, and agreeableness was lower. CONCLUSIONS: Findings provide suggestions how organizations may increase participation by supporting employees in building intention and turning their intention into participation

Liang K and Fung IWH. The impact of macroeconomic and industrial fluctuation on fatalities of construction workers in China. Journal of Safety Research. 2019; 70:149-158.
https://doi.org/10.1016/j.jsr.2019.06.004

Missikpode C, Peek-Asa C, Wright B, and Ramirez M. Characteristics of agricultural and occupational injuries by workers' compensation and other payer sources. American Journal of Industrial Medicine. 2019; 62(11):969-977.
https://doi.org/10.1002/ajim.23040
Abstract: BACKGROUND: Workers' compensation claims data are routinely used to identify and describe work-related injury for public health surveillance and research, yet the proportion of work-related injuries covered by workers' compensation, especially in the agricultural industry, is unknown. METHODS: Using data from the Iowa Trauma Registry, we determined the sensitivity and specificity of the use of workers' compensation as a payer source to ascertain work-related injuries requiring acute care comparing agriculture with other rural industries. RESULTS: The sensitivity of workers' compensation as a payer source to identify work-related agricultural injuries was 18.5%, suggesting that the large majority of occupational agricultural injuries would not be accurately identified through workers' compensation records. For rural nonagricultural, rural occupational injuries, the sensitivity was higher (64.2%). Work-related agricultural injuries were most frequently covered by private insurance (39.6%) and public insurance (21.4%), while rural nonagricultural injuries were most frequently covered by workers' compensation (65.2%). CONCLUSIONS: Workers' compensation claims data will not include the majority of work-related agricultural injuries

Nascimento DP, Costa LOP, Gonzalez GZ, Maher CG, and Moseley AM. Abstracts of low back pain trials are poorly reported, contain spin of information and are inconsistent with the full text: an overview study. Archives of Physical Medicine & Rehabilitation. 2019; 1976-1985.
https://doi.org/10.1016/j.apmr.2019.03.024
Abstract: OBJECTIVE: To investigate trials abstracts evaluating treatments for low back pain with regards to completeness of reporting, spin (i.e., interpretation of study results that overemphasizes the beneficial effects of the intervention), and inconsistencies in data with the full text. DATA SOURCES: The search was performed on Physiotherapy Evidence Database (PEDro) in February 2016. STUDY SELECTION: This is an overview study of a random sample of 200 low back pain trials published between 2010 and 2015. The languages of publication were restricted to English, Spanish and Portuguese. DATA EXTRACTION:

Completeness of reporting was assessed using the CONSORT for Abstracts checklist (CONSORT-A). Spin was assessed using a SPIN-checklist. Consistency between abstract and full text were assessed by applying the assessment tools to both the abstract and full text of each trial and calculating inconsistencies in the summary score (paired t test) and agreement in the classification of each item (Kappa statistics). Methodological quality was analyzed using the total PEDro score. DATA SYNTHESIS: The mean number of fully reported items for abstracts using the CONSORT-A was 5.1 (SD 2.4) out of 15 points and the mean number of items with spin was 4.9 (SD 2.6) out of 7 points. Abstract and full text scores were statistically inconsistent (P=0.01). There was slight to moderate agreement between items of the CONSORT-A in the abstracts and full text (mean Kappa 0.20 SD 0.13) and fair to moderate agreement for items of the SPIN-checklist (mean Kappa 0.47 SD 0.09). CONCLUSIONS: The abstracts were incomplete, with spin and inconsistent with the full text. We advise health care professionals to avoid making clinical decisions based solely upon abstracts. Journal editors, reviewers and authors are jointly responsible for improving abstracts, which could be guided by amended editorial policies

Ohu EA, Spitzmueller C, Zhang J, Thomas CL, Osezua A, and Yu J. When work-family conflict hits home: parental work-family conflict and child health. Journal of Occupational Health Psychology. 2019; 24(5):590-601. https://doi.org/10.1037/ocp0000145

Abstract: Work-family conflict affects employee performance and well-being. However, despite the underlying focus of work-family research on family health and well-being, we have limited knowledge about the impact of role-based stressors, such as work-family conflict, on child health. In this study, we propose and test the stressor-self-regulatory resources-crossover framework. In the spirit of extension of existing work-family research to other cultural settings, we report on two multisource studies conducted in Nigeria to explain whether, how, why, and when parental work-family conflict relates to child health. In Study 1, we collected multisource data from parent-child pairs in low-income families to test whether parental self-regulatory resources explain why work- family conflict relates to child health, resulting in findings that support the stressor-self-regulatory resources-crossover framework. In order to identify possible targets for future organizational-based interventions, we collected Study 2 data from parents and their children (who were enrolled at private schools) to test whether job autonomy and job demands altered the relationship between parental self-regulatory resources and child health. Moderator analyses of the multisource data reveal that self-regulatory resources matter for child health only when job demands are high or when job autonomy is low, pointing to potential intervention and policy levers. (PsycINFO Database Record (c) 2019 APA, all rights reserved)

Polanin JR, Pigott TD, Espelage DL, and Grotpeter JK. Best practice guidelines for abstract screening large-evidence systematic reviews and

meta-analyses. Research Synthesis Methods. 2019; 10(3):330-342. https://doi.org/10.1002/jrsm.1354 [open access]
Abstract: Abstract screening is one important aspect of conducting a high-quality and comprehensive systematic review and meta-analysis. Abstract screening allows the review team to conduct the tedious but vital first step to synthesize the extant literature: winnowing down the overwhelming amalgamation of citations discovered through research databases to the citations that should be "full-text" screened and eventually included in the review. Although it is a critical process, few guidelines have been put forth since the publications of seminal systematic review textbooks. The purpose of this paper, therefore, is to provide a practical set of best practice guidelines to help future review teams and managers. Each of the 10 proposed guidelines is explained using real-world examples or illustrations from applications. We also delineate recent experiences where a team of abstract screeners double-screened 14 923 abstracts in 89 days.

Potter RE, O'Keeffe V, Leka S, and Dollard M. Australian work health and safety policy for the regulation of psychosocial risks: perspectives from key informants. Policy and Practice in Health and Safety. 2019; 17(2):112-132.
https://doi.org/10.1080/14773996.2019.1590765

Tao XG, Kalia N, Lavin RA, Minor SA, Yuspeh L, Leung N, et al. Do work-related lost-time injuries sustained early in employment predict multiple lost-time injuries throughout employment? Journal of Occupational & Environmental Medicine. 2019; 61(10):e422-e426.
https://doi.org/10.1097/JOM.0000000000001683
Abstract: OBJECTIVE: The aim of this study was to identify a simple surrogate to predict the future risk of multiple lost-time injuries. METHOD: Employees of an academic medical center who sustained 5,906 injuries were followed from 1994 to 2017 or 1,046,218 person years. RESULTS: The odds ratio of having three or more lost-time injuries during their entire duration of employment was 2.12 (95% confidence interval: 1.60 to 2.79) for employees having their first lost-time injury within the first 6 months of employment versus those injured after that, controlling for demographics and employment duration. For each increasing year before the first lost-time injury, the probability of having three or more lost-time injuries decreased by 13%. CONCLUSIONS: Employment duration before the first lost-time injury may be used to predict future lost-time injuries without detailed information of underlying risk factors

Zhao X, Shah D, Gandhi K, Wei W, Dwibedi N, Webster L, et al. The association of pain interference and opioid use with healthcare utilization and costs, and wage loss among adults with osteoarthritis in the United States. Journal of Medical Economics. 2019; 22(11):1192-1201.
https://doi.org/10.1080/13696998.2019.1658590
Abstract: Aim: To examine associations of opioid use and pain interference with activities (PIA), healthcare resource utilization (HRU) and costs, and wage loss in

noninstitutionalized adults with osteoarthritis in the United States (US). Methods: Adults with osteoarthritis identified from the Medical Expenditure Panel Survey for 2011/2013/2015 were stratified by no-opioid use with no/mild PIA, no-opioid use with moderate/severe PIA, opioid use with no/mild PIA, and opioid use with moderate/severe PIA. Outcomes included annualized total HRU, direct healthcare costs, and wage loss. Multivariable regression analyses were used for comparisons versus no-opioid use with no/mild PIA (referent). The counterfactual recycled prediction method estimated incremental costs. Results reflect weighted nationally representative data. Results: Of 4,921 participants (weighted n = 20,785,007), 46.5% had no-opioid use with no/mild PIA; 23.2% had no-opioid use with moderate/severe PIA; 9.6% had opioid use with no/mild PIA; and 20.7% had opioid use with moderate/severe PIA. Moderate/severe PIA and/or opioid use were associated with significantly higher HRU and associated costs, and wage loss. Relative to adults with no/mild PIA, opioid users with moderate/severe PIA were more likely to have hospitalizations, specialist visits, and emergency room visits (all $p < .001$). Relative to the referent, opioid use with no/mild PIA had higher per-patient incremental annual total healthcare costs ($11,672, 95% confidence interval [CI] = $11,435-$11,909) and wage loss ($1,395, 95% CI = $1,376-$1,414) as did opioid use with moderate/severe PIA ($13,595, 95% CI = $13,319-$13,871; and $2,331, 95% CI = $2,298-$2,363) (all $p < .001$). Compared with the referent, estimated excess national total healthcare costs/lost wages were $23.3 billion/$1.3 billion for opioid use with no/mild PIA, and $58.5 billion/$2.2 billion for opioid use with moderate/severe PIA. Limitations: Unobservable/unmeasured factors that could not be accounted for. Conclusions: Opioid use with moderate/severe PIA had significantly higher HRU, costs, and wage loss; opioid use was more relevant than PIA to the economic burden. These results suggest unmet needs for alternative pain management strategies

*IWH authored publications.