

IWH Research Alert
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***McLeod C. Evaluating the effect of an audit-based occupational health and safety recognition program on firm work-injury rates in British Columbia, Canada, 2003-2016: a matched difference-in-difference approach. 2019; Partnership for Work, Health and Safety, University of British Columbia.**

***Mofidi A, Tompa E, Williams A, Yazdani A, Lero D, and Mortazavi SB. Impact of a caregiver-friendly workplace policies intervention: a prospective economic evaluation. *Journal of Occupational and Environmental Medicine*. 2019; 61(6):461-468.**

<https://doi.org/10.1097/JOM.0000000000001564>

Abstract: OBJECTIVE: We estimate the potential cost-benefit of a caregiver-friendly workplace policies (CFWPs) educational intervention to facilitate uptake of supports for carer-employees (CEs) at a post-secondary institution. METHODS: We identified CEs through a voluntary survey and estimated the economic burden of caregiving activities from the CEs' and employer's perspective. The latter is used as the baseline of comparison for evaluating the cost-benefit of the intervention. RESULTS: The economic cost of caregiving-related activities for the "no intervention" scenario was estimated at \$33,841,789 (\$32,922 per-case) and \$8,916,342 (\$8,674 per-case) from the CEs' and employer's perspectives, respectively. We find the educational intervention is a cost-beneficial program with the net benefit ranging from \$48,010 to \$676,657, based on six scenarios of effectiveness. CONCLUSION: This study provides practical information for human resources and operations management decision-making in terms of a CFWPs educational intervention

Cherry N, Galarneau JM, Haan M, Haynes W, and Lippel K. Work injuries in internal migrants to Alberta, Canada. Do workers' compensation records provide an unbiased estimate of risk? American Journal of Industrial Medicine. 2019; 62(6):486-495.

<https://doi.org/10.1002/ajim.22981>

Abstract: INTRODUCTION: It is not known whether out-of-province Canadians, who travel to Alberta for work, are at increased risk of occupational injury. METHODS: Workers' compensation board (WCB) claims in 2013 to 2015 for those injured in Alberta were extracted by home province. Denominator data, from Statistics Canada, indicated the numbers from Alberta and Newfoundland and Labrador (NL) employed in Alberta in 2012. Both datasets were stratified by industry, age, and gender. Logistic regression estimated the risk of a worker from NL making a WCB claim in 2013 or 2014, stratified by time lost from work. Bias from under-reporting was examined in responses to injury questions in a cohort of trades' workers across Canada and in a pilot study in Fort McMurray, Alberta. RESULTS: Injury reporting rate in workers from NL was lower than those from Alberta, with a marked deficit (odds ratio [OR] = 0.17; 95% confidence interval [CI], 0.12-0.27) for injuries resulting in 1 to 30 days off work. Among the 1520 from Alberta in the trades' cohort, 327 participants reported 444 work injuries: 34.5% were reported to the WCB, rising to 69.4% in those treated by a physician. A total of 52 injuries in Alberta were recorded by 151 workers in the Fort McMurray cohort. In logistic regression, very similar factors predicted WCB reporting in the trades and Fort McMurray cohorts, but those from out-of-province or recently settled in Alberta were much less likely to report (OR = 0.02; 95% CI, 0.00-0.40). CONCLUSION: Differential rates of under-reporting explain in part the overall low estimates of injuries in interprovincial workers but not the deficit in time-loss 1 to 30 days

Durand AC, Bompard C, Sportiello J, Michelet P, and Gentile S. Stress and burnout among professionals working in the emergency department in a French university hospital: prevalence and associated factors. Work. 2019; 63(1):57-67.

<https://doi.org/10.3233/WOR-192908>

Abstract: BACKGROUND: Work-related stress is a significant health and safety concern. OBJECTIVES: To assess the prevalence of burnout and occupational stress among emergency department (ED) professionals and to identify associated factors. METHODS: A cross-sectional study included all ED professionals of a French university hospital. Data were collected using the French versions of the Maslach Burnout Inventory and the Karasek Job Content Questionnaire. RESULTS: Of the 166 respondents (75.8%), 19.3% reported burnout and 27.1% job strain. Factors associated with burnout were work-related dissatisfaction, fear of making mistakes, lack of time to perform tasks, and being younger. Those factors associated with job strain were having at least one sick leave in the past year, being affected by hard work, interpersonal conflicts at workplace, and sleep disorders. CONCLUSIONS: Compared to the literature, our

results showed a lower prevalence of burnout among physicians but similar among paramedics. The proportion of professionals with job strain was higher than that of the whole French working population. Organizational factors and the work environment were the primary causes of burnout and job strain, while being younger was the only associated sociodemographic factor. The identification of professionals experiencing difficulty is essential to ensure patient safety, particularly in the high-risk field of emergency medicine

Freedland KE, King AC, Ambrosius WT, Mayo-Wilson E, Mohr DC, Czajkowski SM, et al. The selection of comparators for randomized controlled trials of health-related behavioral interventions: recommendations of an NIH expert panel. Journal of Clinical Epidemiology. 2019; 110:74-81.

<https://doi.org/10.1016/j.jclinepi.2019.02.011>

Abstract: OBJECTIVES: To provide recommendations for the selection of comparators for randomized controlled trials of health-related behavioral interventions. STUDY DESIGN AND SETTING: The National Institutes of Health Office of Behavioral and Social Science Research convened an expert panel to critically review the literature on control or comparison groups for behavioral trials and to develop strategies for improving comparator choices and for resolving controversies and disagreements about comparators. RESULTS: The panel developed a Pragmatic Model for Comparator Selection in Health-Related Behavioral Trials. The model indicates that the optimal comparator is the one that best serves the primary purpose of the trial but that the optimal comparator's limitations and barriers to its use must also be taken into account. CONCLUSION: We developed best practice recommendations for the selection of comparators for health-related behavioral trials. Use of the Pragmatic Model for Comparator Selection in Health-Related Behavioral Trials can improve the comparator selection process and help resolve disagreements about comparator choices

Kurowski A, Pransky G, and Punnett L. Impact of a safe resident handling program in nursing homes on return-to-work and re-injury outcomes following work injury. Journal of Occupational Rehabilitation. 2019; 29(2):286-294.

<https://doi.org/10.1007/s10926-018-9785-7>

Abstract: Purpose This study examined the impact of a Safe Resident Handling Program (SRHP) on length of disability and re-injury, following work-related injuries of nursing home workers. Resident handling-related injuries and back injuries were of particular interest. Methods A large national nursing home corporation introduced a SRHP followed by three years of training for 136 centers. Lost-time workers' compensation claims (3 years pre-SRHP and 6 years post-SRHP) were evaluated. For each claim, length of first episode of disability and recurrence of disabling injury were evaluated over time. Differences were assessed using Chi square analyses and a generalized linear model, and

"avoided" costs were projected. Results The SRHP had no impact on length of disability, but did appear to significantly reduce the rate of recurrence among resident handling-related injuries. As indemnity and medical costs were three times higher for claimants with recurrent disabling injuries, the SRHP resulted in significant "avoided" costs due to "avoided" recurrence. Conclusions In addition to reducing overall injury rates, SRHPs appear to improve long-term return-to-work success by reducing the rate of recurrent disabling injuries resulting in work disability. In this study, the impact was sustained over years, even after a formal training and implementation program ended. Since back pain is inherently a recurrent condition, results suggest that SRHPs help workers remain at work and return-to-work

Lemmers GPG, van LW, Westert GP, van der Wees PJ, and Staal JB. Imaging versus no imaging for low back pain: a systematic review, measuring costs, healthcare utilization and absence from work. European Spine Journal. 2019; 28(5):937-950.

<https://doi.org/10.1007/s00586-019-05918-1>

Abstract: PURPOSE: Imaging (X-ray, CT and MRI) provides no health benefits for low back pain (LBP) patients and is not recommended in clinical practice guidelines. Whether imaging leads to increased costs, healthcare utilization or absence from work is unclear. Therefore, this study systematically reviews if imaging in patients with LBP leads to an increase in these outcomes. METHODS: We searched PubMed, CINAHL, EMBASE, Cochrane Library and Web of Science until October 2017 for randomized controlled trials (RCTs) and observational studies (OSs), comparing imaging versus no imaging on targeted outcomes. Data extraction and risk of bias assessment was performed independently by two reviewers. The quality of the body of evidence was determined using GRADE methodology. RESULTS: Moderate-quality evidence (1 RCT; n = 421) supports that direct costs increase for patients undergoing X-ray. Low-quality evidence (3 OSs; n = 9535) supports that early MRI may lead to an increase in costs. There is moderate-quality evidence (1 RCT, 2 OSs; n = 3897) that performing MRI or imaging (MRI or CT) is associated with an increase in healthcare utilization (e.g., future injections, surgery, medication, etc.). There is low-quality evidence (5 OSs; n = 15,493) that performing X-ray or MRI is associated with an increase in healthcare utilization. Moderate-quality evidence (2 RCTs; n = 667) showed no significant differences between X-ray or MRI groups compared with non-imaging groups on absence from work. However, low-quality evidence (2 Ossa; n = 7765) did show significantly greater mean absence from work in the MRI groups in comparison with the non-imaging groups. CONCLUSIONS: Imaging in LBP may be associated with higher medical costs, increased healthcare utilization and more absence from work. These slides can be retrieved under Electronic Supplementary Material

Mokhlespour Esfahani MI, Nussbaum MA, and Kong ZJ. Using a smart textile system for classifying occupational manual material handling tasks:

evidence from lab-based simulations. *Ergonomics*. 2019; 62(6):823-833.

<https://doi.org/10.1080/00140139.2019.1578419>

Abstract: Physical monitoring systems represent potentially powerful assessment devices to detect and describe occupational physical activities. A promising technology for such use is smart textile systems (STSs). Our goal in this exploratory study was to assess the feasibility and accuracy of using two STSs to classify several manual material handling (MMH) tasks. Specifically, commercially-available 'smart' socks and a custom 'smart' shirt were used individually and in combination. Eleven participants simulated nine separate MMH tasks while wearing the STSs, and task classification accuracy was quantified subsequently using several common models. The shirt and socks, both individually and in combination, could classify the simulated tasks with greater than 97% accuracy. Thus, using STSs appears to have potential utility for discriminating occupational physical tasks in the work environment. Practitioner summary: A smart textile system could classify diverse MMH tasks with high accuracy. This technology may help in developing future ergonomic exposure assessment systems, with the goal of preventing occupational injuries

Nicholas MK, Costa DSJ, Linton SJ, Main CJ, Shaw WS, Pearce R, et al. Predicting return to work in a heterogeneous sample of recently injured workers using the brief OMPSQ-SF. *Journal of Occupational Rehabilitation*. 2019; 29(2):295-302.

<https://doi.org/10.1007/s10926-018-9784-8>

Abstract: Purpose (1) to examine the ability of the Orebro Musculoskeletal Pain Screening Questionnaire-short version (OMPSQ-SF) to predict time to return to pre-injury work duties (PID) following a work-related soft tissue injury (regardless of body location); and (2) to examine the appropriateness of 50/100 as a suitable cut-off score for case identification. Methods Injured workers (IW) from six public hospitals in Sydney, Australia, who had taken medically-sanctioned time off work due to their injury, were recruited by insurance case managers within 5-15 days of their injury. Eligible participants (N = 213 in total) were administered the OMPSQ-SF over the telephone by the case manager. For objective (1) Cox proportional hazards regression analysis was used to predict days to return to PID using the OMPSQ-SF. For objective (2) receiver operator characteristic (ROC) analysis was used to determine the OMPSQ-SF total score that optimises sensitivity and specificity in detecting whether or not participants had returned to PID within 2-7 weeks. Results The total OMPSQ-SF score significantly predicted number of days to return to PID, such that for every 1-point increase in the total OMPSQ-SF score the predicted chance of returning to work reduced by 4% (i.e., hazard ratio = 0.96), $p < 0.001$. Sensitivity and specificity for the ROC analysis comparing OMPSQ-SF total score to return to PID within 2-7 weeks suggested 48 as the optimal cut off (sensitivity = 0.65, specificity = 0.79). Conclusion The results provide strong support for the use of the OMPSQ-SF in an applied setting for identifying those IW likely to have delayed RTW when administered within 15 days of the injury. While a score of 48/100 was the optimal cut point for sensitivity

and specificity, pragmatically, 50/100 should be acceptable as a cut-off in future studies of this type

Noguchi M, Glinka M, Mayberry GR, Noguchi K, and Callaghan JP. Are hybrid sit-stand postures a good compromise between sitting and standing? *Ergonomics*. 2019; 62(6):811-822.

<https://doi.org/10.1080/00140139.2019.1577496>

Abstract: Potential alternatives for conventional sitting and standing postures are hybrid sit-stand postures (i.e. perching). The purposes of this study were (i) to identify where lumbopelvic and pelvic angles deviate from sitting and standing and (ii) to use these breakpoints to define three distinct postural phases: sitting, perching, and standing, in order to examine differences in muscle activations and ground reaction forces between phases. Twenty-four participants completed 19 1-min static trials, from sitting (90 degrees) to standing (180 degrees), sequentially in 5 degrees trunk-thigh angle increments. The perching phase was determined to be 145-175 degrees for males and 160-175 degrees for females. For both sexes, knee extensor activity was lower in standing compared to perching or sitting ($p < .01$). Anterior-posterior forces were the highest in perching ($p < .001$), requiring approximately 15% of body-weight. Chair designs aimed at reducing the lower limb demands within 115-170 degrees trunk-thigh angle may improve the feasibility of sustaining the perched posture. Practitioner summary: Individuals who develop low back pain in sitting or standing may benefit from hybrid sit-stand postures (perching), yet kinematic and kinetic changes associated with these postures have not been investigated. Perching can improve lumbar posture at a cost of increased lower limb demands, suggesting potential avenues for chair design improvement. Abbreviations: A/P: anterior-posterior; M/L: medial-lateral; LBP: low back pain; EMG: electromyography; TES: thoracic erector spinae; LES: lumbar erector spinae; VMO: vastus medialis obliquus; MVC: maximum voluntary contraction; ASIS: anterior superior iliac spine; PSIS: posterior superior iliac spine; BW: body weight; RMSE: root mean square error; SD: standard deviation; ROM: range of motion

Probst TM, Goldenhar LM, Byrd JL, and Betit E. The Safety Climate Assessment Tool (S-CAT): a rubric-based approach to measuring construction safety climate. *Journal of Safety Research*. 2019; 69:43-51.

<https://doi.org/10.1016/j.jsr.2019.02.004>

Rafiq M, Wu W, Chin T, and Nasir M. The psychological mechanism linking employee work engagement and turnover intention: a moderated mediation study. *Work*. 2019; 62(4):615-628.

<https://doi.org/10.3233/WOR-192894>

Robichaud MM, Truchon M, St-Arnaud L, and Nastasia I. Insurers' perspective on barriers and facilitators for return to work after occupational injuries. *Work*. 2019; 63(1):81-97.

<https://doi.org/10.3233/WOR-192910>

Abstract: **BACKGROUND:** Despite the importance of the legislative and insurance systems in the return to work process after an occupational injury, the perspective of the insurer on what influences return to work has rarely been documented. **OBJECTIVE:** To understand the barriers or facilitators for return to work, from the perspective of the insurer. **METHODS:** A comprehensive qualitative approach was used. Semi-directed interviews were done with nineteen (19) insurers (claims adjudicator and rehabilitation case manager) from a Canadian workers' compensation board. A thematic analysis was done using QDA Minor Software. **RESULTS:** Fourteen themes (e.g. family reaction, quality of work relationship) were classified into four categories representing the main stakeholders: worker with disability, workplace, healthcare system and compensation system. Emotional, cognitive, and adaptive reactions from the worker and his family were identified. We observed that good work relations and support practices, lack of access to medical resources, focus on the employee's ability, and complexity and consequences of the compensation process are the main barriers and facilitators from the insurers' perspective. Many of the perceived elements are coherent with the compensation system's administrative and legal context. **CONCLUSIONS:** The results enable us to better understand the insurers' perspective regarding what influences return to work. It reinforces the necessity to consider the administrative and legal context to better understand the insurers' perspective

Rowbotham S, Conte K, and Hawe P. Variation in the operationalisation of dose in implementation of health promotion interventions: insights and recommendations from a scoping review. *Implement Science*. 2019; 14(1):56

<https://doi.org/10.1186/s13012-019-0899-x>

Abstract: **BACKGROUND:** While 'dose' is broadly understood as the 'amount' of an intervention, there is considerable variation in how this concept is defined. How we conceptualise, and subsequently measure, the dose of interventions has important implications for understanding how interventions produce their effects and are subsequently resourced and scaled up. This paper aims to explore the degree to which dose is currently understood as a distinct and well-defined implementation concept outside of clinical settings. **METHODS:** We searched four databases (MEDLINE, PsycINFO, EBM Reviews and Global Health) to identify original research articles published between 2000 and 2015 on health promotion interventions that contained the word 'dose' or 'dosage' in the title, abstract or keywords. We identified 130 articles meeting inclusion criteria and extracted data on how dose/dosage was defined and operationalised, which we then synthesised to reveal key themes in the use of this concept across health promotion interventions. **RESULTS:** Dose was defined in a variety of ways, including in relation to the amount of intervention delivered and/or received, the level of participation in the intervention and, in some instances, the quality of intervention delivery. We also observed some conflation of concepts that are traditionally kept separate (such as fidelity) either as slippage or as part of

composite measures (such as 'intervention dose'). **DISCUSSION:** Dose is not a well-defined or consistently applied concept in evaluations of health promotion interventions. While current approaches to conceptualisation and measurement of dose are suitable for interventions in organisational settings, they are less well suited to policies delivered at a population level. Dose often accompanies a traditional monotonic linear view of causality (e.g. dose response) which may or may not fully represent the intervention's theory of how change is brought about. Finally, we found dose and dosage to be used interchangeably. We recommend a distinction between these terms, with 'dosage' having the advantage of capturing change to amount 'dispensed' over time (in response to effects achieved). Dosage therefore acknowledges the inevitable dynamic and complexity of implementation

Wainwright E, Wainwright D, Coghill N, Walsh J, and Perry R. Resilience and return-to-work pain interventions: systematic review. Occupational Medicine (London). 2019; 69(3):163-176.

<https://doi.org/10.1093/occmed/kqz012>

Abstract: **BACKGROUND:** Resilience is a developing concept in relation to pain, but has not yet been reviewed in return-to-work (RTW) contexts. **AIMS:** To explore the role of resilience enhancement in promoting work participation for chronic pain sufferers, by reviewing the effectiveness of existing interventions. **METHODS:** Resilience was operationalized as: self-efficacy, active coping, positive affect, positive growth, positive reinforcement, optimism, purpose in life and acceptance. Five databases were searched for randomized controlled trials (RCTs) whose interventions included an element of resilience designed to help RTW/staying at work for chronic pain sufferers. Study appraisal comprised the Cochrane risk of bias (RoB) tool and additional quality assessment. Findings were synthesized narratively and between-group differences of outcomes were reported. Heterogeneous PICO (population, intervention, comparator, outcome) elements precluded meta-analysis. **RESULTS:** Thirty-four papers from 24 RCTs were included. Interventions varied; most were multidisciplinary, combining behavioural, physical and psychological pain management and vocational rehabilitation. Four found RTW/staying at work improved with intensive multidisciplinary interventions compared with less intensive, or no, treatment. Of these, one had low RoB; three scored poorly on allocation concealment and selective outcome reporting. Four trials had mixed results, e.g. interventions enabling reduced sick leave for people on short-term not long-term leave; 16 showed no improvement. Five trials reported resilience outcomes were improved by interventions but these were not always trials in which RTW improved. **CONCLUSIONS:** Effectiveness of resilience interventions for chronic pain sufferers on RTW is uncertain and not as helpful as anticipated. Further agreement on its conceptualization and terminology and that of RTW is needed

*IWH authored publications.