

IWH Research Alert
September 13, 2019

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***Fritschi L and Smith PM. Value of occupational health research. Occupational and Environmental Medicine. 2019; [epub ahead of print].**

<https://doi.org/10.1136/oemed-2019-106091>

Behrendt C, Nguyen QA, and Rani U. Social protection systems and the future of work: ensuring social security for digital platform workers. International Social Security Review. 2019; 72(3):17-41.

<https://doi.org/10.1111/issr.12212> [open access]

Abstract: Abstract Digitalization is transforming societies and economies worldwide at an unprecedented scale and pace. In the wake of automation and digitalization, new forms of employment have been emerging in various occupations and sectors, such as the digital platform economy. The emergence of new forms of employment, such as work on digital platforms, requires that existing social protection systems adapt to the specific situation and needs of such workers, as to realize the human right to social security for all. Current social protection coverage for workers on digital crowdwork platforms reveals significant gaps in social security coverage. Where such coverage exists, it is often provided through the workers'

previous or additional jobs, or indirectly through their spouses or other family members. This raises questions about digital platforms free riding on the traditional economy with regard to the financing of social security. How can social protection systems adapt to changing forms of work to ensure full and effective coverage for workers in all forms of employment, including those in “new” forms of employment? How can workers in all types of employment, including those on digital platforms, be protected in an adequate and comprehensive way, combining contributory and non-contributory mechanisms and based on equitable and sustainable financing mechanisms, so as to ensure adequate social protection to all?

Burgel BJ and Elshatarat RA. Associations between daily-on-the job hassles with perceived mental exertion and depression symptoms in taxi drivers. American Journal of Industrial Medicine. 2019; 62(9):791-802.

<https://doi.org/10.1002/ajim.23019>

Abstract: INTRODUCTION: Taxi drivers experience frequent hassles that may contribute to mental exertion and depression symptoms. AIM: Mental exertion and depression symptoms in taxi drivers are explored in association with hassles, effort-reward imbalance, job strain, and iso-strain. METHODS: Personal interviews were conducted with 130 drivers in San Francisco. RESULTS: Mental exertion averaged 4.5 (+/-2.68) and physical exertion averaged 3.71 (+/-2.1) on 0 to 10 Borg scales. Based on the Center for Epidemiological Studies-Depression scale, 38% had depression symptoms. Mental exertion and depression symptoms correlated with job strain, iso-strain and effort-reward imbalance in anticipated directions, lending construct validity to the Borg mental exertion scale. Physical exertion, night shift, stressful personal events, and being uninsured for healthcare predicted mental exertion. Lack of respect by dispatchers and stressful personal events predicted depression symptoms. CONCLUSION: Selected hassles may be remedied by communication trainings, emphasizing mutual respect. Recognition and treatment of depression in taxi drivers are important

Couch JR, Grimes GR, Wiegand DM, Green BJ, Glassford EK, Zwack LM, et al. Potential occupational and respiratory hazards in a Minnesota cannabis cultivation and processing facility.

American Journal of Industrial Medicine. 2019; 62(10):874-882.
<https://doi.org/10.1002/ajim.23025>

Abstract: BACKGROUND: Cannabis has been legalized in some form for much of the United States. The National Institute for Occupational Safety and Health (NIOSH) received a health hazard evaluation request from a Minnesota cannabis facility and their union to undertake an evaluation. METHODS: NIOSH representatives visited the facility in August 2016 and April 2017. Surface wipe samples were collected for analysis of delta-9 tetrahydrocannabinol (Delta9-THC), delta-9 tetrahydrocannabinol acid (Delta9-THCA), cannabidiol, and cannabinol. Environmental air samples were collected for volatile organic compounds (VOCs), endotoxins (limulus amoebocyte lysate assay), and fungal diversity (NIOSH two-stage BC251 bioaerosol sampler with internal transcribed spacer region sequencing analysis). RESULTS: Surface wipe samples identified Delta9-THC throughout the facility. Diacetyl and 2,3-pentanedione were measured in initial VOC screening and subsequent sampling during tasks where heat transference was greatest, though levels were well below the NIOSH recommended exposure limits. Endotoxin concentrations were highest during processing activities, while internal transcribed spacer region sequencing revealed that the Basidiomycota genus, *Wallemia*, had the highest relative abundance. CONCLUSIONS: To the authors' knowledge, this is the first published report of potential diacetyl and 2,3-pentanedione exposure in the cannabis industry, most notably during cannabis decarboxylation. Endotoxin exposure was elevated during grinding, indicating that this is a potentially high-risk task. The findings indicate that potential health hazards of significance are present during cannabis processing, and employers should be aware of potential exposures to VOCs, endotoxin, and fungi. Further research into the degree of respiratory and dermal hazards and resulting health effects in this industry is recommended

Fernando DT, Berecki-Gisolf J, Newstead S, and Ansari Z. Effect of comorbidity on injury outcomes: a review of existing indices. Annals of Epidemiology. 2019; 36:5-14.

<https://doi.org/10.1016/j.annepidem.2019.06.004>

Abstract: PURPOSE: Accounting for comorbidity in predicting outcomes for patients is vital in clinical care, epidemiological research, and health service planning. The aim of this study was to

review published literature to compare the performance of existing comorbidity indices and their use in injury populations. METHODS: A thematic literature search for comorbidity indices and/or injury outcomes was conducted. Methods, results, and recommendations from selected articles were abstracted, documented, and compared; comparisons of results were made in terms of the indices' ability to predict outcomes, using the C-statistic, R(2), and odds ratios. RESULTS: Fifty-two articles relating to the derivation and/or validation of comorbidity measures were found. The most commonly used measures were the Charlson Comorbidity Index (CCI) and the Elixhauser Comorbidity Measure (ECM). The ECM was found to outperform the CCI in terms of predictive ability, although the CCI was more widely used. Derivation of study-specific weights to the CCI added more predictive power to the index. CONCLUSIONS: Existing literature that compared the predictive abilities of the ECM and CCI favors the ECM. This literature review did not identify a measure specifically designed for general injury populations. Development of an injury-specific comorbidity measure will be timely and assist future research in injury epidemiology

Harris-Adamson C, Lam E, Fathallah F, Tong AD, Hill S, and Smith A. The ergonomic impact of a mattress lift tool and bottom sheet type on hotel room cleaners while making beds. Applied Ergonomics. 2019; 81:102880.

<https://doi.org/10.1016/j.apergo.2019.102880>

Abstract: The purpose of this study was to quantify biomechanical and cardiovascular exposure while making beds with and without interventions (mattress lift tool and fitted sheet). Sixteen female hotel room cleaners participated in this multifactorial (tool and sheet) laboratory study of crossover design. Exertion in the upper extremity (<2) and back (<3) was consistently lower when using the tool and fitted sheet ($p < 0.05$). The average number of lifts per bed was reduced by 48% with an 18s increase in cycle time per bed. Peak forearm flexor activity was significantly lower when using a tool ($p < 0.05$). Spinal lateral plane range of motion ($p < 0.02$) and maximum twisting velocity ($p < 0.03$) were lowest using the tool and fitted sheet together. Interventions such as a mattress lift tool used with a fitted sheet reduced the number of mattress lifts and lowered perceived exertion among hotel room cleaners while making beds

Hawkins D and Zhu J. Decline in the rate of occupational injuries and illnesses following the implementation of a paid sick leave law in Connecticut. American Journal of Industrial Medicine. 2019; 62(10):859-873.

<https://doi.org/10.1002/ajim.23028>

Abstract: BACKGROUND: Workers with paid sick leave may have a lower rate of occupational injuries compared with other workers. This study sought to determine whether there was a decline in the rate of occupational injuries and illnesses following the implementation of a paid sick leave law in Connecticut (CT). METHODS: Data from the Bureau of Labor Statistics was used to calculate the rate of occupational injuries and illnesses in CT in the 3 years before (2009-11) and after (2012-14) the law was implemented. These numbers were compared with New York (NY) and the United States, and between the occupations specified by the CT law and other occupations. RESULTS: Among service occupations addressed by the CT paid-sick-leave law, the rate of occupational injuries declined more in CT compared to rates for those same occupations in NY and the United States. Within CT, injury and illness rates showed a greater decline in occupations specified by the law (-17.8%; 95% confidence interval [CI] = -15.6--19.9) compared with other occupations (-6.8%; 95% CI = -6.6%--7.0%) between the two periods. CONCLUSIONS: A paid sick leave law was associated with an increased decline in occupational injuries and illnesses in affected service workers in the period after implementation. Further research should examine the possible reasons for the associations seen here

Hempel S, O'Hanlon C, Lim YW, Danz M, Larkin J, and Rubenstein L. Spread tools: a systematic review of components, uptake, and effectiveness of quality improvement toolkits. Implementation Science. 2019; 14(1):83.

<https://doi.org/10.1186/s13012-019-0929-8> [open access]

Abstract: BACKGROUND: The objective was to conduct a systematic review of toolkit evaluations intended to spread interventions to improve healthcare quality. We aimed to determine the components, uptake, and effectiveness of publicly available toolkits. METHODS: We searched PubMed, CINAHL, and the Web of Science from 2005 to May 2018 for evaluations of publicly available toolkits, used a forward search of known toolkits, screened references, and contacted

topic experts. Two independent reviewers screened publications for inclusion. One reviewer abstracted data and appraised the studies, checked by a second reviewer; reviewers resolved disagreements through discussion. Findings, summarized in comprehensive evidence tables and narrative synthesis addressed the uptake and utility, procedural and organizational outcomes, provider outcomes, and patient outcomes. **RESULTS:** In total, 77 studies evaluating 72 toolkits met inclusion criteria. Toolkits addressed a variety of quality improvement approaches and focused on clinical topics such as weight management, fall prevention, vaccination, hospital-acquired infections, pain management, and patient safety. Most toolkits included introductory and implementation material (e.g., research summaries) and healthcare provider tools (e.g., care plans), and two-thirds included material for patients (e.g., information leaflets). Pre-post studies were most common (55%); 10% were single hospital evaluations and the number of participating staff ranged from 17 to 704. Uptake data were limited and toolkit uptake was highly variable. Studies generally indicated high satisfaction with toolkits, but the perceived usefulness of individual tools varied. Across studies, 57% reported on adherence to clinical procedures and toolkit effects were positive. Provider data were reported in 40% of studies but were primarily self-reported changes. Only 29% reported patient data and, overall, results from robust study designs are missing from the evidence base. **CONCLUSIONS:** The review documents publicly available toolkits and their components. Available uptake data are limited but indicate variability. High satisfaction with toolkits can be achieved but the usefulness of individual tools may vary. The existing evidence base on the effectiveness of toolkits remains limited. While emerging evidence indicates positive effects on clinical processes, more research on toolkit value and what affects it is needed, including linking toolkits to objective provider behavior measures and patient outcomes. **TRIAL REGISTRATION:** PROSPERO registration number: PROSPERO 2014: CRD42014013930

Lee JH, Choi KH, Kang S, Kim DH, Kim DH, Kim BR, et al. Nonsurgical treatments for patients with radicular pain from lumbosacral disc herniation. Spine Journal. 2019; 19(9):1478-1489.

<https://doi.org/10.1016/j.spinee.2019.06.004>

Abstract: **BACKGROUND CONTEXT:** Lumbosacral disc herniation (LDH) is one of the most frequent musculoskeletal diseases causative of sick leave in the workplace and morbidity in daily activities. Nonsurgical managements are considered as first line treatment before surgical treatment. **PURPOSE:** This clinical practice guideline (CPG) is intended to provide physicians who treat patients diagnosed with LDH with a guideline supported by scientific evidence to assist in decision-making for appropriate and reasonable treatments. **STUDY DESIGN/SETTING:** A systematic review. **PATIENT SAMPLE:** Studies of human subjects written in Korean or English that met the following criteria were selected: patients aged ≥ 18 years, clinical presentation of low back and radicular leg pain, diagnosis of LDH on radiological evaluation including computed tomography or magnetic resonance imaging. **OUTCOMES MEASURES:** Pain and functional evaluation scales such as visual analogue scale, numeric rating scale, and Oswestry disability index **METHODS:** The MEDLINE (PubMed), EMBASE, Cochrane Review, and KoreaMed databases were searched for articles regarding non-surgical treatments for LDH published up to July 2017. Of the studies fulfilling these criteria, those investigating clinical results after non-surgical treatment including physical and behavioral therapy, medication, and interventional treatment in terms of pain control and functional improvements were chosen for this study. **RESULTS:** Nonsurgical treatments were determined to be clinically effective with regards to pain reduction and functional improvement in patients with LDH. Nevertheless, the evidence level was generally not evaluated as high degree, which might be attributed to the paucity of well-designed randomized controlled trials. Exercise and traction were strongly recommended despite moderate level of evidence. Epidural injection was strongly recommended with high degree of evidence and transforaminal approach was more strongly recommended than caudal approach. **CONCLUSIONS:** This CPG provides new and updated evidence-based recommendations for treatment of the patients with LDH, which suggested that, despite an absence of high degrees of evidence level, non-surgical treatments were clinically effective

Lindsay S, Lamptey DL, Cagliostro E, Srikanthan D, Mortaji N, and Karon L. A systematic review of post-secondary transition

interventions for youth with disabilities. Disability and Rehabilitation. 2019; 41(21):2492-2505.

<https://doi.org/10.1080/09638288.2018.1470260>

Abstract: Purpose: Youth with disabilities have lower rates of enrollment and completion of post-secondary education compared with youth without disabilities. The objective of this systematic review is to understand the best practices and components of post-secondary transition programs for youth with disabilities. Method: Systematic searches of six international databases identified 18 studies meeting our inclusion criteria (youth with a disability, aged 15-30; focusing on post-secondary education program or intervention, published from 1997 to 2017). These studies were analyzed with respect to the characteristics of the participants, methodology, results, and quality of the evidence. Results: Among the 18 studies, 2385 participants (aged 13-28, mean 17.7 years) were represented across three countries (US, Canada, and Australia). Although the outcomes of the post-secondary transition programs varied across the studies, all of them reported an improvement in at least one of the following: college enrollment, self-determination, self-confidence, social and vocational self-efficacy, autonomy, social support, career exploration, and transition skills. The post-secondary transition programs varied in duration, length, number of sessions, and delivery format which included curriculum-based, online, immersive residential experience, mentoring, simulation, self-directed, technology-based, and multi-component. Conclusions: Our findings highlight that post-secondary transition programs have the potential to improve self-determination, transition skills, and post-secondary outcomes among youth with disabilities. Implications for rehabilitation Post-secondary education interventions have a beneficial influence on post-secondary and related transition outcomes in youth with disabilities. Clinicians and educators should consider having multiple components, involving several sessions that include a curriculum, immersive college residential experience, mentoring, and/or simulations in their interventions for optimum program outcomes. More research is needed to explore the types of interventions that work best for whom and the optimal age (including exploring the socio-demographic characteristics), setting, and delivery format

Martin KR, Druce KL, Murdoch SE, D'Ambruoso L, and Macfarlane GJ. Differences in long-term physical activity trajectories among individuals with chronic widespread pain: a secondary analysis of a randomized controlled trial. *European Journal of Pain*. 2019; 23(8):1437-1447.

<https://doi.org/10.1002/ejp.1410>

Abstract: **BACKGROUND:** Little is known about long-term physical activity (PA) maintenance in those with chronic widespread pain (CWP) following an exercise intervention. This study examined PA over time to identify the existence and characteristics of subgroups following distinct PA trajectories. **METHODS:** Data come from individuals with CWP who took part in a 2 x 2 factorial randomized controlled trial, receiving either exercise or both exercise and cognitive behavioural therapy treatment. Information, including self-report PA, was collected at baseline recruitment, immediately post-intervention, 3, 24 and 60+ month post-treatment. Analyses were conducted on 196 men and women with ≥ 3 PA data points. Group-based trajectory modelling was used to identify latent PA trajectory groups and baseline characteristics (e.g., demographics, pain, self-rated health, fatigue, coping-strategy use and kinesiophobia) of these groups. **RESULTS:** The best fitting model identified was one with three trajectories: "non-engagers" (n = 32), "maintainers" (n = 144) and "super-maintainers" (n = 20). Overall, mean baseline PA levels were significantly different between groups (non-engagers: 1.1; maintainers: 4.6; super-maintainers: 8.6, $p < 0.001$) and all other follow-up points. Non-engagers reported, on average, greater BMI, higher disabling chronic pain, poorer self-rated health, physical functioning, as well as greater use of passive coping strategies and lower use of active coping strategies. **CONCLUSIONS:** The majority of individuals with CWP receiving exercise as part of a trial were identified as long-term PA maintainers. Participants with poorer physical health and coping response to symptoms were identified as non-engagers. For optimal symptom management, a stratified approach may enhance initiation and long-term PA maintenance in individuals with CWP. **SIGNIFICANCE:** Chronic pain can be a major barrier to engaging in exercise, a popular self-management strategy. Our findings identify three distinct long-term physical activity trajectories for individuals receiving the same exercise intervention. This suggests an approach by health care providers which identifies

individuals who would benefit from additional support to enhance initiation and long-term physical activity maintenance could deliver better outcomes for such patients

Ranker LR, Petersen JM, and Fox MP. Awareness of and potential for dependent error in the observational epidemiologic literature: a review. *Annals of Epidemiology*. 2019; 36:15-19.

<https://doi.org/10.1016/j.annepidem.2019.06.001>

Abstract: **PURPOSE:** Measurement error discussions often assume classification errors of key variables are independent. Yet, small amounts of dependent error can create large biases in effect estimates. The purpose of this review was to evaluate frequency of measurement error discussions and potential for dependent error in the observational literature. **METHODS:** Two samples of articles analyzing exposure-outcome contrasts were collected: a random sample (n = 100) from high-impact epidemiology and medical journals (June 2015-July 2016), and a citation-based sample (n = 39) of studies citing one of two prominent dependent misclassification articles (through July 2016). We extracted study details, recorded measurement error mentions, and qualitatively assessed dependent error potential. **RESULTS:** Measurement error was often discussed. No random sample articles explicitly mentioned dependent error, compared with 59% of the citation-based sample. The random sample was found to be at low risk of exposure-outcome (15% plausible/probable) but increased risk for exposure-confounder (38% plausible/probable) dependency. The citation-based sample was at higher risk for dependent error (exposure-outcome: 46% plausible/probable; exposure-confounder: 61% plausible/probable). **CONCLUSIONS:** Although measurement error was frequently mentioned, potential impact on observed results was rarely discussed in-depth or quantified. Dependent error mentions were rare, even among studies deemed susceptible. Further education and steps to avoid dependent error are needed

Rycroft-Malone J, Gradinger F, Owen Griffiths H, Anderson R, Crane RS, Gibson A, et al. 'Mind the gaps': the accessibility and implementation of an effective depression relapse prevention programme in UK NHS services: learning from mindfulness-based cognitive therapy through a mixed-methods study. *BMJ*

Open. 2019; 9(9):e026244.

<https://doi.org/10.1136/bmjopen-2018-026244> [open access]

Abstract: OBJECTIVES: Mindfulness-based cognitive therapy (MBCT) is an evidence-based approach for people at risk of depressive relapse to support their long-term recovery. However, despite its inclusion in guidelines, there is an 'implementation cliff'. The study objective was to develop a better explanation of what facilitates MBCT implementation. SETTING: UK primary and secondary care mental health services. DESIGN, PARTICIPANTS AND METHODS: A national two-phase, multi-method qualitative study was conducted, which was conceptually underpinned by the Promoting Action on Research Implementation in Health Services framework. Phase I involved interviews with stakeholders from 40 service providers about current provision of MBCT. Phase II involved 10 purposively sampled case studies to obtain a more detailed understanding of MBCT implementation. Data were analysed using adapted framework analysis, refined through stakeholder consultation. RESULTS: Access to MBCT is variable across the UK services. Where available, services have adapted MBCT to fit their context by integrating it into their care pathways. Evidence was often important to implementation but took different forms: the NICE depression guideline, audits, evaluations, first person accounts, experiential taster sessions and pilots. These were used to build a platform from which to develop MBCT services. The most important aspect of facilitation was the central role of the MBCT implementers. These were generally self-designated individuals who 'championed' grass-roots implementation. Our explanatory framework mapped out a prototypical implementation journey, often over many years with a balance of bottom-up and top-down factors influencing the fit of MBCT into service pathways. 'Pivot points' in the implementation journey provided windows of either challenge or opportunity. CONCLUSIONS: This is one of the largest systematic studies of the implementation of a psychological therapy. While access to MBCT across the UK is improving, it remains patchy. The resultant explanatory framework about MBCT implementation provides a heuristic that informed an implementation resource

Savitz DA, Wellenius GA, and Trikalinos TA. The problem with mechanistic risk of bias assessments in evidence synthesis of

observational studies and a practical alternative: assessing the impact of specific sources of potential bias. American Journal of Epidemiology. 2019; 188(9):1581-1585.

<https://doi.org/10.1093/aje/kwz131>

Abstract: The trustworthiness of individual studies is routinely characterized in systemic reviews by evaluating risk of bias, often by mechanistically applying standardized algorithms. However, such instruments prioritize the repeatability of the process over a more thoughtful and informative but necessarily somewhat more subjective approach. In mechanistic risk of bias assessments, the focus is on determining whether specific biases are present, but these assessments do not provide insights into the direction, magnitude, and relative importance of individual biases. In such assessments, all potential biases are naively treated as equally important threats to validity and equally important across all research topics, potentially leading to inappropriate conclusions about the overall strength of the available evidence. Instead, risk of bias assessments should be focused on identifying a few of the most likely influential sources of bias, based on methodologic and subject matter expertise, classifying each specific study on the basis of how effectively it has addressed each potential bias, and determining whether results differ across studies in relation to susceptibility to each hypothesized source of bias. This approach provides insight into the potential impact of each specific bias, identifies a subset of studies likely to best approximate the causal effect, and suggests design features needed to improve future research

Scepanovic D, Klavs T, Verdenik I, and Oblak C. The prevalence of musculoskeletal pain of dental workers employed in Slovenia. Workplace Health & Safety. 2019; 67(9):461-469.

<https://doi.org/10.1177/2165079919848137>

Abstract: Work-related musculoskeletal (MS) disorders are considered one of the most frequent occupational diseases among dental workers. Dental work consists of static, demanding tasks that involve repeated gripping of small-sized instruments. The purpose of this study was to investigate the prevalence of MS pain, the areas of pain, and the risk factors for MS pain in dental workers. A self-administrated questionnaire was used as a data collection instrument for dental workers who voluntarily responded to the invitation. To

determine the prevalence and severity location of MS pain, the Cornell Musculoskeletal Discomfort Questionnaire was administered among 87 dental workers, with a total of 79.8%, who reported at least one MS complaint. MS pain occurred in 82.6% of general dentists, 75.0% of dental specialists, 66.7% of dental assistants, and 33.3% of dental technicians. Pain most frequently occurred in the neck (60.7%), upper back (52.4%), right shoulder (44.0%), lower back (41.7%), hips/buttocks (29.8%), and the right wrist (23.8%). The prevalence of pain among dental workers could be reduced by ergonomic working environment, regular breaks, maintenance of health, and performing specific exercises designed to dental workers

Shin D. Characteristics of musculoskeletal disorders and satisfaction with in-house physical therapy clinics in office workers. *Work*. 2019; 63(3):369-374.

<https://doi.org/10.3233/WOR-192943>

Abstract: BACKGROUND: Musculoskeletal disorders are not properly managed in office workers because of their busy work life. In-house physical therapy is a good way to manage the musculoskeletal disorders in office workers. Despite the numerous advantages of in-house physical therapy, the establishment and research of in-house physical therapy were insufficient. OBJECTIVE: The purpose this study was to determine the characteristics of musculoskeletal disorders in office workers and to investigate their satisfaction with in-house physical therapy clinics and the associated factors.

METHODS: In this study, 664 office workers who used in-house physical therapy clinics were surveyed for characteristics of musculoskeletal disorders and satisfaction with in-house physical therapy clinics. **RESULTS:** Of these office workers, the most common causes of damage were nontraumatic (36.8%) and the most common lesion sites were the neck (30.3%) and lower back (25.6%). In the empirical characteristics of in-house physical therapy clinics, basic thermoelectric treatments were the most common (46.8%). The satisfaction with in-house physical therapy clinic was generally high. In addition, the cause of damage and treatment contents affected treatment-related and functional return-related satisfaction.

CONCLUSION: In-house physical therapy, including therapeutic exercises and self-management education, is a good system to manage musculoskeletal disorders in office workers

***IWH authored publication.**