

IWH Research Alert
November 5, 2021

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***Buchman DZ, Ding P, Lo S, Dosani N, Fazelzad R, Furlan AD, et al. Palliative care for people who use substances during communicable disease epidemics and pandemics: a scoping review protocol. *BMJ Open*. 2021; 11(10):e053124.**

<https://doi.org/10.1136/bmjopen-2021-053124> [open access]

Abstract: INTRODUCTION: Communicable disease epidemics and pandemics magnify the health inequities experienced by marginalised populations. People who use substances suffer from high rates of morbidity and mortality and should be a priority to receive palliative care, yet they encounter many barriers to palliative care access. Given the pre-existing inequities to palliative care access for people with life-limiting illnesses who use substances, it is important to understand the impact of communicable disease epidemics and pandemics such as COVID-19 on this population. METHODS AND ANALYSIS: We will conduct a scoping review and report according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews reporting guidelines. We conducted a comprehensive literature search in seven bibliographical databases from the inception of each database to August 2020. We also performed a grey literature search to identify the publications not indexed in the bibliographical databases. All the searches will be



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rerun in April 2021 to retrieve recently published information because the COVID-19 pandemic is ongoing at the time of this writing. We will extract the quantitative data using a standardised data extraction form and summarise it using descriptive statistics. Additionally, we will conduct thematic qualitative analyses and present our findings as narrative summaries. ETHICS AND DISSEMINATION: Ethics approval is not required for a scoping review. We will disseminate our findings to healthcare providers and policymakers through professional networks, digital communications through social media platforms, conference presentations and publication in a scientific journal

***Tatangelo M, Tomlinson G, Paterson JM, Keystone E, Bansback N, and Bombardier C. Health care costs of rheumatoid arthritis: a longitudinal population study. PLoS ONE. 2021; 16(5):e0251334.**

<https://doi.org/10.1371/journal.pone.0251334> [open access]

Abstract: Quantifying the contribution of rheumatoid arthritis to the acquisition of subsequent health care costs is an emerging focus of the rheumatologic community and payers of health care. Our objective was to determine the healthcare costs before and after diagnosis of rheumatoid arthritis (RA) from the public payer's perspective. The study design was a longitudinal observational administrative data-based cohort with RA cases from Ontario Canada (n = 104,933) and two control groups, matched 1:1 on year of cohort entry from 2001 to 2016. The first control group was matched on age, sex and calendar year of cohort entry (diagnosis year for those with RA); the second group added medical history to the match before RA diagnosis year. The main exposure was new onset RA. The secondary exposure was calendar year of RA diagnosis to compare attributable costs over the study observation window. Main outcomes were health care costs in 2015 Canadian dollars, overall and by cost category. We used attribution methods to classify costs into those associated with RA, those associated with comorbidities, and age/sex-related underlying costs. Health care costs associated with RA increased up to the year of diagnosis, where they reached \$8,591: \$4,142 in RA associated costs; \$1,242 in RA comorbidity associated costs; and \$3,207 in underlying costs. In the eighth-year post diagnosis, the RA costs declined to \$2,567 while the RA



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comorbidity associated costs remained relatively constant at \$1,142, and the underlying age/sex related cost increased to \$4,426. RA patients had lower costs when diagnosed in later calendar years. Our results suggest a large proportion of disease related health care costs are a result of costs associated with RA comorbidities, which may appear many years before diagnosis

Abd-Elseyed A, Hussain N, and Stanley G. Combining virtual reality and behavioral health to promote pain resiliency: analysis of a novel biopsychosocial modality for solving pain in the workplace. *Pain and Therapy*. 2021; [epub ahead of print].

<https://doi.org/10.1007/s40122-021-00333-1> [open access]

Abstract: Background: The use of virtual reality in treating pain symptoms is a new and emerging modality that has gained more traction, especially in light of the COVID-19 pandemic, which has led to a rise in the remote care of patients. Our study tested the effectiveness of a home-based pain relief program that utilized virtual reality and behavioral health for treating acute and chronic pain. Study design: Retrospective Cohort Study. Methods: Due to the remote nature of the pain clinic during the COVID-19 pandemic, patients with work-related injuries were considered for inclusion in a 90-day Harvard MedTech Vx Pain Relief Program, which consisted of home-based virtual reality therapy (VRT) and tailored behavioral therapy that was conducted through phone consultations. Both the VRT and behavioral therapy focused on the specific workplace injury and centered around setting three personal goals for each patient that were considered meaningful to them. The progress towards achieving these goals was then tracked. The primary outcome of the retrospective analysis was pain scores after completion of home-based VRT. Secondary outcomes included: change in opioid therapy (opioid consumption), psychological awareness/perception of pain, level of immersion, and overall improvement/achievement in patient goals. Results: A total of 36 patients (16 male and 20 female) with acute and chronic pain secondary to workplace injuries were included; these injuries severely limited their activities of daily living and reduced their quality of life. During the course of VRT and after completion of the 90-day program, patients experienced a substantial immediate and legacy pain relief. Specifically, patients reported an average 40% reduction in pain while utilizing the program and an



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additional 2.8 h of continued pain relief at the conclusion of 90 days. Further, 69% of patients also reported either a decrease in opioid use or complete cessation after VRT. The majority of patients also reported reduced depression, fatigue, and sleep disturbance. Conclusions: The Harvard MedTech Vx Therapy appears to be an effective tool in the treatment of pain and the psycho-social issues associated with pain. This translates into a greater degree of pain resiliency and an overall improvement in general wellness and improved workplace functionality.

Bernacki EJ, Kalia N, Soistman S, Minor SA, Barry J, Lavin RA, et al. Prevention, medical management, and adjudication of workplace injuries: a thirty-two year follow-up of an integrated workers' compensation program. Journal of Occupational & Environmental Medicine. 2021; 63(10):828-838.

<https://doi.org/10.1097/JOM.0000000000002275> [open access]

Abstract: OBJECTIVE: To describe the cost outcomes of an integrated workers' compensation program. METHODS: We studied a population that increased from 20K to 59K, incurring 8807 lost-time claims between 1988 and 2020. RESULTS: Lost-time claims decreased from 22.15 to 4.32 per 1000 employees (1988 to 2020), and total closed lost-time claim costs per \$100 payroll, decreased from \$0.62 to \$0.17 (1988 to 2017). The percent of claims resolved within 3 years of the accident increased from 10% to 89% (1988 to 2017). Adjusting for medical inflation and wage increases, total workers' compensation benefits paid per claim decreased \$124 per year, medical benefits decreased \$45 per year and indemnity benefits decreased \$79 per year. CONCLUSION: On both a population (per employee) and on a per claim basis, workers' compensation costs decreased substantially, which is attributable to improvements in accident prevention and decreases in claim duration

Csuhai EA, Nagy AC, Szollosi GJ, and Veres-Balajti I. Impact analysis of 20-week multimodal progressive functional-proprioceptive training among sedentary workers affected by non-specific low-back pain: an interventional cohort study. International Journal of Environmental Research and Public Health. 2021; 18(20):10592.

<https://doi.org/10.3390/ijerph182010592> [open access]



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Abstract: According to the latest data published by the WHO, 1.71 billion people suffer from musculoskeletal disorders and 568 million are affected by back pain, making these the most significant occupational health problems. The aim of this study was to analyze the effects of a newly developed Multimodal Workplace Training Program implemented among young sedentary employees in order to treat and prevent these problems. The 20-week Training Program was conducted at the National Instruments Corporations' Hungarian subsidiary in Debrecen between January and June, 2019. Pre- and post-intervention questionnaires were used to assess subjective parameters. Baseline and follow-up physical examinations were performed using the SpinalMouse, Y-Balance, Sit and Reach, Prone and Side Plank, Timed Abdominal Curl, and Biering-Sorensen tests. The results for 76 subjects were eligible for statistical analysis. Our Training Program was effective in several aspects, including a reduction in musculoskeletal symptoms and improvements in posture ($p < 0.001$), in dynamic ($p < 0.01$) and static-isometric ($p < 0.001$) core strength, in flexibility ($p < 0.001$), in spinal inclination in the sagittal ($p < 0.001$) and frontal ($p < 0.01$) plane, and in balance and coordination ($p < 0.05$). The Multimodal Progressive Functional-Proprioceptive Training was highly effective, and the application of such a complex training program can be recommended in workplace settings

Gewandter JS, Smith SM, Dworkin RH, Turk DC, Gan TJ, Gilron I, et al. Research approaches for evaluating opioid sparing in clinical trials of acute and chronic pain treatments: Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials recommendations. Pain. 2021; 162(11):2669-2681.

<https://doi.org/10.1097/j.pain.0000000000002283>

Abstract: Randomized clinical trials have demonstrated the efficacy of opioid analgesics for the treatment of acute and chronic pain conditions, and for some patients, these medications may be the only effective treatment available. Unfortunately, opioid analgesics are also associated with major risks (eg, opioid use disorder) and adverse outcomes (eg, respiratory depression and falls). The risks and adverse outcomes associated with opioid analgesics have prompted efforts to reduce their use in the treatment of both acute and chronic pain. This article presents Initiative on Methods,



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Measurement, and Pain Assessment in Clinical Trials (IMMPACT) consensus recommendations for the design of opioid-sparing clinical trials. The recommendations presented in this article are based on the following definition of an opioid-sparing intervention: any intervention that (1) prevents the initiation of treatment with opioid analgesics, (2) decreases the duration of such treatment, (3) reduces the total dosages of opioids that are prescribed for or used by patients, or (4) reduces opioid-related adverse outcomes (without increasing opioid dosages), all without causing an unacceptable increase in pain. These recommendations are based on the results of a background review, presentations and discussions at an IMMPACT consensus meeting, and iterative drafts of this article modified to accommodate input from the co-authors. We discuss opioid sparing definitions, study objectives, outcome measures, the assessment of opioid-related adverse events, incorporation of adequate pain control in trial design, interpretation of research findings, and future research priorities to inform opioid-sparing trial methods. The considerations and recommendations presented in this article are meant to help guide the design, conduct, analysis, and interpretation of future trials

Karlsson EA, Sandqvist JL, Seing I, and Stahl C. Social validity of work ability evaluations and official decisions within the sickness insurance system: a client perspective. *Work*. 2021; 70(1):109-124.

<https://doi.org/10.3233/WOR-213558>

Abstract: BACKGROUND: Studies of the social validity of work ability evaluations are rare, although the concept can provide valuable information about the acceptability, comprehensibility and importance of procedures. OBJECTIVE: The aim of this study was to explore clients' perceptions of social validity of work ability evaluations and the following official decisions concerning sickness benefits within the Swedish sickness insurance system. METHODS: This was a longitudinal qualitative study based on interviews with 30 clients on sick leave, analyzed through deductive content analysis. RESULTS: Clients' understanding of the evaluation was dependent on whether the specific tests were perceived as clearly related to the clients' situation and what information they received. For a fair description of their work ability, clients state that the strict structure in the evaluation is not relevant to everyone. CONCLUSION: The work ability



evaluations indicate low acceptability due to lack of individual adaptation, the comprehensibility varied depending on the applicability of the evaluation and information provided, while the dimension 'importance' indicated as higher degree of social validity. The official decision about sickness benefits however was considered unrelated to the evaluation results, lacking solid arguments and sometimes contradictory to other stakeholders' recommendations indicating poor social validity

Labreche F, Ouellet C, Roberge B, Caron NJ, Yennek A, and Bussieres JF. Occupational exposure to antineoplastic drugs: what about hospital sanitation personnel? International Archives of Occupational & Environmental Health. 2021; 94(8):1877-1888.

<https://doi.org/10.1007/s00420-021-01731-w>

Abstract: Objective: Occupational exposure to antineoplastic drugs (ANPs) occurs mainly through dermal contact. Our study was set up to assess the potential exposure of hospital sanitation (HS) personnel, for whom almost no data are available, through contamination of surfaces they regularly touch. Methods: In the oncology departments of two hospitals around Montreal, surface wipe samples of 120-2000 cm² were taken at 10 sites cleaned by the HS personnel and five other sites frequently touched by nursing and pharmacy personnel. A few hand wipe samples were collected to explore skin contamination. Wipes were analyzed by ultra-performance liquid chromatography tandem-mass spectrometry for 10 ANPs. Results: Overall, 60.9% of 212 surface samples presented at least one ANP above the limits of detection (LOD).

Cyclophosphamide and gemcitabine were most often detected (52% and 31% of samples respectively), followed by 5-fluorouracil and irinotecan (15% each). Highest concentrations of five ANPs were found in outpatient clinics on toilet floors (5-fluorouracil, 49 ng/cm²; irinotecan, 3.6 ng/cm²), a perfusion pump (cyclophosphamide, 19.6 ng/cm²) and on a cytotoxic waste bin cover (gemcitabine, 4.97 ng/cm²). Floors in patient rooms had highest levels of cytarabine (0.12 ng/cm²) and methotrexate (6.38 ng/cm²). Hand wipes were positive for two of 12 samples taken on HS personnel, seven of 18 samples on nurses, and two of 14 samples on pharmacy personnel. Conclusions: A notable proportion of surfaces showed measurable levels of ANPs, with highest concentrations found on surfaces



cleaned by HS personnel, who would benefit from appropriate preventive training. As potential sources of worker exposure, several hospital surfaces need to be regularly monitored to evaluate environmental contamination and efficacy of cleaning.

Lee S, Lee W, and Kang SK. Tuberculosis infection status and risk factors among health workers: an updated systematic review. *Annals of Occupational and Environmental Medicine*. 2021; 33:e17.

<https://doi.org/10.35371/aoem.2021.33.e17> [open access]

Abstract: Tuberculosis (TB) infection is a common occupational risk for health workers (HWs) and poses a threat to the patients under their care and to other HWs. Hence, the development of a prevention strategy is crucial. We conducted a study to understand the status and risk factors of TB infection among HWs. The existing literature was searched for all published reports from 1 August 2010 to 31 December 2018, related to TB among HWs according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The inclusion criteria were: (1) study participants working in a health care facility; (2) TB cases diagnosed by medical professionals; (3) original research articles; and (4) English reports in a peer-reviewed journal. We finally included 61 studies from 642 articles searched initially. The TB infection rate in HWs was higher than that of the general population. Based on 39 studies, the prevalence of TB in HWs (tuberculin skin test positive) was 29.94%. In contrast, the global burden of latent TB infection was 23.0% (95% uncertainty interval: 20.4%–26.4%) in 2014. The risk factors of TB among HWs were aging, long duration of employment, nursing professionals, lack of Bacillus Calmette-Guerin vaccination, and low body mass index. HWs have an increased risk for TB infection, which can cause secondary infections in patients or other HWs. An effective prevention strategy must be developed to enable early diagnosis and prompt treatment.

Mediavilla R, Fernandez-Jimenez E, Martinez-Ales G, Moreno-Kustner B, Martinez-Morata I, Jaramillo F, et al. Role of access to personal protective equipment, treatment prioritization decisions, and changes in job functions on health workers' mental health outcomes during the initial outbreak of the COVID-



19 pandemic. Journal of Affective Disorders. 2021; 295:405-409.
<https://doi.org/10.1016/j.jad.2021.08.059> [open access]

Abstract: BACKGROUND: During the initial COVID-19 outbreak, organizational changes were required to ensure adequate staffing in healthcare facilities. The extent to which organizational changes impacted the mental wellbeing of healthcare workers (HCWs) remains unexplored. Here we analyzed the association between three work-related stressors (reported access to protective equipment, change in job functions, and patient prioritization decision-making) and mental health outcomes (depression symptoms, psychological distress, suicidal thoughts, and fear of infection) in a large sample of Spanish HCWs during the initial COVID-19 outbreak. METHODS: We conducted a cross-sectional study including HCWs from three regions of Spain between April 24th and June 22nd, 2020. An online survey measured sociodemographic characteristics, work-related stressors, fear of infection, and mental health outcomes (depression [PHQ-9], psychological distress [GHQ-12], death wishes [C-SSRS]). We conducted mixed-effects regression models to adjust all associations for relevant individual- and region-level sources of confounding. RESULTS: We recruited 2,370 HCWs. Twenty-seven percent screened positive for depression and 74% for psychological distress. Seven percent reported death wishes. Respondents were more afraid of infecting their loved ones than of getting infected themselves. All work-related stressors were associated with depression symptoms and psychological distress in adjusted models. LIMITATIONS: Non-probabilistic sampling, potential reverse causation. CONCLUSIONS: Modifiable work-related stressors are associated with worse mental health among HCWs. Our results suggest that workplace prevention strategies for HCWs should provide sufficient protective equipment, minimize changes in job functions, favor the implementation of criteria for patient triage and on-call bioethics committees, and facilitate access to stepped-care, evidence-based mental health treatment

O'Brady S. Fighting precarious work with institutional power: union inclusion and its limits across spheres of action. British Journal of Industrial Relations. 2021; 59(4):1084-1107.
<https://doi.org/10.1111/bjir.12596>



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Rother D and Schluter U. Occupational exposure to diisocyanates in the European union. *Annals of Work Exposures and Health*. 2021; 65(8):893-907.

<https://doi.org/10.1093/annweh/wxab021> [open access]

Abstract: OBJECTIVES: Diisocyanates are a chemical group that are widely used at workplaces in many sectors. They are also potent skin- and respiratory sensitizers. Exposure to diisocyanates is a main cause of occupational asthma in the European Union. To reduce occupational exposure to diisocyanates and consequently the cases of diisocyanate-induced asthma, a restriction on diisocyanates was recently adopted under the REACH Regulation in the European Union. METHODS: A comprehensive evaluation of the data on occupational exposure to the most important diisocyanates at workplaces was made and is reported here. The diisocyanates considered are methylene diphenyl diisocyanate (MDI), toluene diisocyanate (TDI), and hexamethylene diisocyanate (HDI), accounting for more than 95% of the market volume in the EU. The exposure assessment is based on data from Chemical Safety Reports (CSRs) of REACH Registration Dossiers, workplace air monitoring data from Germany, from the UK Health and Safety Executive (HSE), and literature data relevant for the EU, and the USA. RESULTS: Occupational exposure to diisocyanates is particularly relevant in: (i) C.A.S.E. applications (Coatings, Adhesives, Sealants, Elastomers), (ii) production of polyurethanes (PUs) (e.g. slab-stock foam), (iii) handling of partly uncured PU products (e.g. cutting, demoulding, spray application of foam), and (iv) when diisocyanates/PUs are heated (e.g. hot lamination, foundry applications/casting forms). Ranking of the reported data on inhalation to diisocyanate exposure at workplaces (maximum values) leads to following order: (i) HDI and its oligomers in coatings, (ii) MDI in spray foam applications, (iii) TDI in manufacture of foam, (iv) TDI in manufacture of PUs and PU composite materials, (v) TDI in adhesives, (vi) MDI in adhesives, (vii) MDI in manufacture of PUs and PU composite materials, (viii) TDI in coatings, (ix) MDI in manufacture of foam, and (x) HDI in adhesives

Rugulies R, Sorensen JK, Madsen IEH, Nordentoft M, Sorensen K, and Framke E. Can leadership quality buffer the association between emotionally demanding work and risk of long-term



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sickness absence? *European Journal of Public Health*. 2021; 31(4):739-741.

<https://doi.org/10.1093/eurpub/ckab090> [open access]

Abstract: We examined whether the association between emotionally demanding work and risk of register-based long-term sickness absence (LTSA, ≥ 6 weeks) was buffered by high leadership quality among 25 416 Danish employees during 52-week follow-up. Emotional demands were measured at the job group level, whereas leadership quality was measured by workers rating their closest manager. Emotionally demanding work was associated with a higher risk of LTSA, regardless if leadership quality was high or low, with neither multiplicative nor additive interaction. We conclude that we found no evidence for high leadership quality buffering the effect of emotionally demanding work on risk of LTSA.

Ryan ED, Laffan MR, Trivisonno AJ, Gerstner GR, Mota JA, Giuliani HK, et al. Neuromuscular determinants of simulated occupational performance in career firefighters. *Applied Ergonomics*. 2021; 98:103555.

<https://doi.org/10.1016/j.apergo.2021.103555>

Abstract: Purpose: Although firefighters are required to perform various high-intensity critically essential tasks, the influence of neuromuscular function on firefighter occupational performance is unclear. The primary aim of the current study was to identify the key neuromuscular determinants of stair climb (SC) performance in firefighters. Methods: Leg extension isometric peak torque (PT), peak power (PP), torque steadiness at 10% (Steadiness10%) and 50% (Steadiness50%) of PT, fatigability following 30 repeated isotonic concentric contractions at 40% of PT, percent body fat (%BF), and a weighted and timed SC task were examined in 41 (age: 32.3 ± 8.2 yrs; %BF: $24.1 \pm 7.9\%$) male career firefighters. Results: Faster SC times (74.7 ± 13.4 s) were associated with greater PT and PP, less fatigability, younger age, and lower %BF ($r = -0.530-0.629$; $P = 0.014$), but not Steadiness10% or Steadiness50% ($P = 0.193$). Stepwise regression analyses indicated that PP and Steadiness50% were the strongest predictors of SC time ($R^2 = 0.442$, $P < 0.001$). However, when age and %BF were included in the model, these variables became the only significant predictors of SC time ($R^2 = 0.521$, $P < 0.001$) due to age and %BF being collectively associated



with all the neuromuscular variables (excluding Steadiness10%).
Conclusions: Lower extremity neuromuscular function, specifically PP and steadiness, and %BF are important modifiable predictors of firefighter SC performance, which becomes increasingly important in aging firefighters.

Zhang X, Schall MC, Jr., Chen H, Gallagher S, Davis GA, and Sesek R. Manufacturing worker perceptions of using wearable inertial sensors for multiple work shifts. Applied Ergonomics. 2021; 98:103579.

<https://doi.org/10.1016/j.apergo.2021.103579>

Abstract: Wearable inertial sensors may be used to objectively quantify exposure to some physical risk factors associated with musculoskeletal disorders. However, concerns regarding their potential negative effects on user safety and satisfaction remain. This study characterized the self-reported daily discomfort, distraction, and burden associated with wearing inertial sensors on the upper arms, trunk, and dominant wrist of 31 manufacturing workers collected over 15 full work shifts. Results indicated that the workers considered the devices as generally comfortable to wear, not distracting, and not burdensome to use. Exposure to non-neutral postures (discomfort, right arm, beta = 0.02; trunk, beta = -0.01), non-cyclic tasks (distraction, beta = -0.26), and higher body mass indices (discomfort, beta = 0.05; distraction, beta = 0.02) contributed to statistically significant ($p < 0.05$), albeit practically small increases in undesirable ratings. For instance, for each additional percentage of time working with the right arm elevated $\approx 60^\circ$, self-reported discomfort ratings increased 0.02 cm on a standard 10 cm visual analog scale. Female workers reported less discomfort and distraction while wearing the sensors at work than males (discomfort, beta = -0.93; distraction, beta = -0.3). In general, the low ratings of discomfort, distraction, and burden associated with wearing the devices during work suggests that inertial sensors may be suitable for extended use among manufacturing workers.

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