IWH Research Alert
February 14, 2020

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.

***Mofidi A, Tompa E, Mortazavi SB, Esfahanipour A, and Demers PA. A probabilistic approach for economic evaluation of occupational health and safety interventions: a case study of silica exposure reduction interventions in the construction sector. BMC Public Health. 2020; 20(1):210.**
https://doi.org/10.1186/s12889-020-8307-7 [open access]
Abstract: BACKGROUND: Construction workers are at a high risk of exposure to various types of hazardous substances such as crystalline silica. Though multiple studies indicate the evidence regarding the effectiveness of different silica exposure reduction interventions in the construction sector, the decisions for selecting a specific silica exposure reduction intervention are best informed by an economic evaluation. Economic evaluation of interventions is subjected to uncertainties in practice, mostly due to the lack of precise data on important variables. In this study, we aim to identify the most cost-beneficial silica exposure reduction intervention for the construction sector under uncertain situations. METHODS: We apply a probabilistic modeling approach that covers a large number of variables relevant to the cost of lung cancer, as well as the costs of silica exposure reduction interventions. To estimate the societal lifetime cost of lung cancer, we use an incidence cost approach. To estimate the net benefit of each intervention, we compare the expected cost of lung cancer cases averted, with expected cost of implementation of the intervention in one calendar year. Sensitivity analysis is used to quantify how different variables affect interventions net benefit. RESULTS: A positive net benefit is expected for all considered interventions. The highest number of lung cancer cases are averted by combined

use of wet method, local exhaust ventilation and personal protective equipment, about 107 cases, with expected net benefit of $45.9 million. Results also suggest that the level of exposure is an important determinant for the selection of the most cost-beneficial intervention. CONCLUSIONS: This study provides important insights for decision makers about silica exposure reduction interventions in the construction sector. It also provides an overview of the potential advantages of using probabilistic modeling approach to undertake economic evaluations, particularly when researchers are confronted with a large number of uncertain variables

***Smith P, LaMontagne AD, Lilley R, Hogg-Johnson S, and Sim M. Are there differences in the return to work process for work-related psychological and musculoskeletal injuries? A longitudinal path analysis. Social Psychiatry and Psychiatric Epidemiology. 2020; [Epub ahead of print]. https://doi.org/10.1007/s00127-020-01839-3**
Abstract: PURPOSE: To examine differences in the return to work (RTW) process for workers' compensation claimants with psychological injuries compared to those with musculoskeletal (MSK) injuries. METHODS: We collected data from 869 workers' compensation claimants in Victoria, Australia, at three time points over a 12-month period (21% with psychological injury claims). RTW was assessed through self-report. Potential mediators were identified at the personal, health-care provider, workplace and system levels. The relationships between injury type, mediating factors and RTW were assessed using path analysis, with adjustment for confounders through inverse probability weighting. RESULTS: We observed better RTW outcomes for claimants with MSK injuries (compared to those with psychological injuries) at T1 and T2, but not at T3. We also observed differences between psychological injuries and MSK injuries and all but two of the mediating factors examined. These differences, in particular related to supervisor response to injury, consultative RTW planning and offers of accommodation, as well as differences in mental health symptoms, explained approximately two-thirds of differences in RTW between injury types at T1. Differences in RTW at T2 were explained by mediating factors, and differences in RTW at T1. CONCLUSION: Claimants with work-related psychological injuries experience a variety of challenges in RTW compared to those with MSK injuries. While treating and preventing further exacerbation of psychological symptoms should remain an important part of the rehabilitation process, other modifiable factors, in particular supervisor response to injury and consultative RTW planning and modified duties, should be prioritised to reduce inequalities in RTW across injury types

Anand P and Honeycutt TC. Long-term outcomes for transition-age youth with mental health conditions who receive postsecondary education support. Journal of Disability Policy Studies. 2019; 30(4):223-232. https://doi.org/10.1177/1044207319848069

Brauer C, Mikkelsen S, Pedersen EB, Moller KL, Simonsen EB, Koblauch H, et al. Occupational lifting predicts hospital admission due to low back pain in a cohort of airport baggage handlers. International Archives of Occupational & Environmental Health. 2020; 93(1):111-122.
https://doi.org/10.1007/s00420-019-01470-z [open access]
Abstract: PURPOSE: To examine if occupational lifting assessed as cumulative years as a baggage handler is associated with first-time hospital diagnosis or treatment for low back disorders. METHODS: This study is based on the Copenhagen Airport Cohort consisting of male baggage handlers performing heavy lifting every day and a reference group of unskilled men from the greater Copenhagen area during the period 1990-2012. We followed the cohort in the National Patient Register and Civil Registration System to obtain information on diagnoses, surgery, mortality, and migration. The outcomes were first-time hospital diagnosis or surgery for (1) lumbar disc herniation or (2) low back pain (LBP). RESULTS: Baggage handlers (N = 3473) had a higher incidence rate of LBP, but not of lumbar disc herniation, compared to the reference group (N = 65,702). Baggage handlers with longer employment had a higher incidence of LBP compared to baggage handlers with shorter employment. The linear association of cumulative years as a baggage handler on LBP was significantly increased with an incidence rate ratio of 1.16 (95% CI 1.07-1.25) for a 5-year increase of employment as baggage handler. CONCLUSIONS: In this large cohort study, we found an increased incidence of LBP among baggage handlers compared to the reference group with indications of a dose-response relationship between years of employment and the outcome. For baggage handlers working on the apron, the incidence was particularly increased before introduction of technical lifting equipment, suggesting that preventive measures to reduce cumulative work load may have a positive effect

Castro Nunez RB, Martin Barroso V, and Santero Sanchez R. Wage cost-reducing policies and employment stability for people with disabilities in the Spanish labor market. Journal of Disability Policy Studies. 2019; 30(4):202-212.
https://doi.org/10.1177/1044207319848070

El Ghaziri M, Simons S, Lipscomb J, Storr CL, McPhaul K, London M, et al. Understanding the impact of bullying in a unionized U.S. public sector workforce. Workplace Health & Safety. 2020; 68(3):139-153.
https://doi.org/10.1177/2165079919883286
Abstract: Background: Workplace Bullying (WPB) can have a tremendous, negative impact on the victims and the organization as a whole. The purpose of this study was to examine individual and organizational impact associated with exposure to bullying in a large U.S. unionized public sector workforce. Methods: A cross-sectional Web-based survey was conducted among 16,492 U.S. state government workers. Survey domains included demographics, negative acts (NAs) and bullying, supportiveness of the organizational climate, and individual

and organizational impacts of bullying. Multinomial logistic regression was used to assess the impact among respondents who reported exposure to bullying. Findings: A total of 72% participants responded to the survey (n = 11,874), with 43.7% (n = 5,181) reporting exposure to NAs and bullying. A total of 40% (n = 4,711) participants who experienced WPB reported individual impact(s) while 42% (n = 4,969) reported organization impact(s). Regular NA was associated with high individual impact (negatively impacted them personally; odds ratio [OR] = 5.03) when controlling for other covariates including: female gender (OR =1.89) and job tenure of 6 to 10 years (OR = 1.95); working in a supportive organizational climate and membership in a supportive bargaining unit were protective of high impact (OR = 0.04 and OR = 0.59, respectively). High organizational impact (transferring to another position) was associated with regular NA and bullying (OR = 16.26), female gender (OR = 1.55), providing health care and field service (OR = 1.68), and protective effect of organizational climate (OR = 0.39). We found a dose-response relationship between bullying and both individual and organizational-level impact. Conclusion/Application to Practice: Understanding the impacts of WPB should serve to motivate more workplaces and unions to implement effective interventions to ameliorate the problem by enhancing the organizational climate, as well as management and employee training on the nature of WPB and guidance on reporting

Frone MR and Blais AR. Organizational downsizing, work conditions, and employee outcomes: identifying targets for workplace intervention among survivors. International Journal of Environmental Research and Public Health. 2020; 17(3):E719.
https://doi.org/10.3390/ijerph17030719
Abstract: This study broadly assesses the association of organizational downsizing to deleterious work conditions and employee outcomes, and the extent to which work conditions mediate the association of downsizing to employee outcomes, thereby serving as targets for workplace intervention to reduce the harmful effects of downsizing on surviving workers. The cross-sectional data came from a national probability sample of 2,297 U.S. workers. A parallel multiple-mediator model with multiple outcomes was estimated, adjusting for occupational, geographic, and temporal covariates. Exposure to downsizing was the predictor, a set of 12 work conditions served as simultaneous mediators, and a set of 16 employee consequences served as simultaneous outcomes. Downsizing had an adverse association with 9 of the 12 work conditions and all 16 employee outcomes. Moreover, the associations of downsizing to the employee outcomes were indirect, collectively mediated by the 9 work conditions. This study provides the broadest evaluation of the deleterious effects of downsizing on U.S. workers surviving a downsizing, identifies affected work conditions that can serve as targets for workplace interventions, and provides insight into why organizational downsizing often fails to deliver anticipated financial and performance benefits to organizations. In terms of serving as targets for workplace intervention, some work conditions meditated the

associations of downsizing to a broad set of employee outcomes, whereas other work conditions were specific to certain outcomes. The broad mediators should be targets of any intervention aimed at reducing the adverse effects of downsizing, with additional workplace targets depending on the class of outcome to be addressed by the intervention

Gilbert-Ouimet M, Brisson C, and Vezina M. Psychosocial work stressors, high family responsibilities, and psychological distress among women: a 5-year prospective study. American Journal of Industrial Medicine. 2020; 63(2):170-179.
https://doi.org/10.1002/ajim.23070
Abstract: BACKGROUND: Psychological distress is a strong and independent predictor of major depression. Assuming multiple roles (such as being both a mother and an employee) under stressful conditions may lead to psychological distress. This study evaluated, for the first time, the longitudinal effect of the simultaneous exposure to psychosocial work stressors and high family responsibilities on women's psychological distress. METHODS: Women were assessed at baseline (N = 1307) and at 3- and 5-year follow-ups. Psychosocial work stressors of the demand-control and effort-reward imbalance models were measured with validated questionnaires. Family responsibilities were also self-reported and referred to the number of children and their age(s) as well as housework and childcare. Psychological distress was measured with the validated Psychiatric Symptoms Index questionnaire. Prevalence ratios (PR) of psychological distress were modeled with log-binomial regressions. RESULTS: Having high family responsibilities did not increase women's prevalence of psychological distress. However, being exposed to either job strain or effort-reward imbalance led to a higher prevalence of psychological distress at the 3- and 5-year follow-ups (PR of 1.25-1.62). Being simultaneous exposed to these psychosocial work stressors and high family responsibilities also increased the prevalence of psychological distress (PR of 1.44-1.87), but no interactions were observed between stressors and responsibilities. CONCLUSIONS: In this 5-year prospective study, simultaneous exposure to psychosocial work stressors and high family responsibilities increased the prevalence of psychological distress among women. Work stressors were, however, driving most of the effect, which reinforces their importance as modifiable risk factors of women's mental health problems

Lee S, Yoon JH, Kang YJ, Kim T, Koo JW, and Kang MY. Effect of socioeconomic factors on the relationship between musculoskeletal pain and ill-health retirement in Korea: results from the Korean longitudinal study of aging. Journal of Occupational & Environmental Medicine. 2020; 62(2):e27-e32.
https://doi.org/10.1097/JOM.0000000000001786
Abstract: OBJECTIVE: To investigate the relationship between musculoskeletal pain (MSP) and ill-health retirement (IHR) and modifying role of socioeconomic

factors. METHODS: The data used were samples from the Korean Longitudinal Study of Aging from 2006 to 2014. IHR was defined as retirement due to health problems before regular retirement age. Hazard ratio (HR) was calculated using Cox proportional hazards model to determine the effects of MSP and covariance on IHR. RESULTS: People who have "any site of pain" were more likely to experience IHR than people with no pain. In the subgroup analysis, risk of IHR due to MSP was higher in the 60s, white-collar, and high-income earners than the other groups. CONCLUSIONS: MSP has a substantial negative impact on labor force participation, and there was a clear effect modification of socioeconomic status on IHR risk

Lehnert M, Behrens T, Tulowietzki J, Guldner K, Bruning T, and Taeger D. Cancer in glass workers: a systematic review and meta-analysis. International Archives of Occupational & Environmental Health. 2020; 93(1):1-10.
https://doi.org/10.1007/s00420-019-01460-1
Abstract: PURPOSE: Due to a potential exposure to several definite or probable carcinogens, the IARC classified manufacturing of art glass, glass containers, and pressed ware as probably carcinogenic to humans in 1993 (Group 2A). Purpose of this study was to update the evidence from recently published scientific reports. METHODS: We searched for peer-reviewed articles published between 1993 and 2018 and combined result in terms of a meta-analysis. Overall, we considered twelve articles for a meta-analytic approach published after 1992. RESULTS: From a meta-analysis we derived a standardized incidence ratio (mSIR) and a standardized mortality ratio (mSMR) for lung cancer in men of 1.25 (95% CI 0.97-1.59) and 1.41 (95% CI 1.11-1.77), respectively. The estimated odds ratio (mOR) from five case-control studies was 1.25 (95% CI 0.90-1.73). Associated with an employment in glass factories, the estimated mSMR for larynx cancer was 2.38 (95% CI 1.23-4.16) based on two cohort studies; the mOR from four case-control studies was 1.35 (95% CI 0.73-2.52). Reports on elevated cancer risks at other sites were not consistent. CONCLUSIONS: Only few studies assessed cancer risk solely in glass workers. Gained evidence from more recent reports supports the IARC rating from 1993. Our combined results add limited evidence to a moderately elevated risk for cancer of the airways

McMichael BJ, Van Horn RL, and Viscusi WK. The impact of cannabis access laws on opioid prescribing. Journal of Health Economics. 2020; 69:102273.
https://doi.org/10.1016/j.jhealeco.2019.102273
Abstract: While recent research has shown that cannabis access laws can reduce the use of prescription opioids, the effect of these laws on opioid use is not well understood for all dimensions of use and for the general United States population. Analyzing a dataset of over 1.5 billion individual opioid prescriptions between 2011 and 2018, which were aggregated to the individual provider-year

level, we find that recreational and medical cannabis access laws reduce the number of morphine milligram equivalents prescribed each year by 11.8 and 4.2 percent, respectively. These laws also reduce the total days' supply of opioids prescribed, the total number of patients receiving opioids, and the probability a provider prescribes any opioids net of any offsetting effects. Additionally, we find consistent evidence that cannabis access laws have different effects across types of providers, physician specialties, and payers

Mishima M, Adachi H, and Mishima C. Number of previous absences is a predictor of sustained attendance after return-to-work in workers with absence due to common mental disorders: a cohort 3-year study. Journal of Occupational & Environmental Medicine. 2020; 62(2):108-112. https://doi.org/10.1097/JOM.0000000000001763
Abstract: OBJECTIVE: This study evaluated the relationship of the number of previous episodes due to common mental disorders (CMDs) with long-term outcomes and sustainability of attendance after return-to-work (RTW). METHODS: Participants were assigned to the following three groups: workers having one (Group 1), two (Group 2), and three or more (Group 3) previous episodes. Outcomes were a recurrent absence and the sustainability rate of attendance after RTW. RESULTS: The sustainability rate in Group 1 was significantly higher than that in Group 3 throughout the observation period. The sustainability rates for Group 2 were significantly higher than for Group 3 at 30 and 36 months. CONCLUSIONS: The number of previous episodes was shown to affect sustainability of attendance after RTW due to CMDs, indicating that repeated previous absences are a significant prognostic factor

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann T, Mulrow CD, et al. Mapping of reporting guidance for systematic reviews and meta-analyses generated a comprehensive item bank for future reporting guidelines. Journal of Clinical Epidemiology. 2020; 118:60-68. https://doi.org/10.1016/j.jclinepi.2019.11.010
Abstract: OBJECTIVES: The aim of the study was to generate a comprehensive bank of systematic review (SR) reporting items to inform an update of the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2009 statement. METHODS: We searched the Enhancing the QUAlity and Transparency Of health Research Network library in May 2019 to identify all reporting guidelines for SRs that were published after 2009, regardless of the scope of the guideline. We also conducted a selective review of four guidance manuals for SRs, three tools for assessing the risk of bias in SRs, six meta-research studies evaluating the reporting quality of SRs using a tailored checklist, and five reporting guidelines for other study designs. One author screened and selected sources for inclusion, extracted reporting guidance from sources, and mapped guidance against the PRISMA 2009 checklist items. RESULTS: We included 60 sources providing guidance on reporting of SRs and meta-analyses. From these, we collated a list of 221 unique reporting items. Items were

categorized into title (four items), abstract (10 items), introduction (12 items), methods (111 items), results (61 items), discussion (12 items), funding and conflicts of interest (four items), administrative information (three items), and data availability (four items). This exercise generated 175 reporting items that could be added to the guidance in the PRISMA 2009 statement. CONCLUSION: Generation of a comprehensive item bank through review and mapping of the literature facilitates identification of missing items and those needing modification, which may not otherwise be identified by the guideline development team or from other activities commonly used to develop reporting guidelines

Ropponen A, Gemes K, Frumento P, Almondo G, Bottai M, Friberg E, et al. Predicting the duration of sickness absence spells due to back pain: a population-based study from Sweden. Occupational & Environmental Medicine. 2020; 77(2):115-121.
https://doi.org/10.1136/oemed-2019-106129 [open access]
Abstract: OBJECTIVES: We aimed to develop and validate a prediction model for the duration of sickness absence (SA) spells due to back pain (International Statistical Classification of Diseases and Related Health Problems 10th Revision: M54), using Swedish nationwide register microdata. METHODS: Information on all new SA spells >14 days from 1 January 2010 to 30 June 2012 and on possible predictors were obtained. The duration of SA was predicted by using piecewise constant hazard models. Nine predictors were selected for the final model based on a priori decision and log-likelihood loss. The final model was estimated in a random sample of 70% of the SA spells and later validated in the remaining 30%. RESULTS: Overall, 64 048 SA spells due to back pain were identified during the 2.5 years; 74% lasted </=90 days, and 9% >365 days. The predictors included in the final model were age, sex, geographical region, employment status, multimorbidity, SA extent at the start of the spell, initiation of SA spell in primary healthcare and number of SA days and specialised outpatient healthcare visits from the preceding year. The overall c-statistic (0.547, 95% CI 0.542 to 0.552) suggested a low discriminatory capacity at the individual level. The c-statistic was 0.643 (95% CI 0.634 to 0.652) to predict >90 days spells, 0.686 (95% CI 0.676 to 0.697) to predict >180 spells and 0.753 (95% CI 0.740 to 0.766) to predict >365 days spells. CONCLUSIONS: The model discriminates SA spells >365 days from shorter SA spells with good discriminatory accuracy

Rosenman K, Reilly MJ, Pechter E, Fitzsimmons K, Flattery J, Weinberg J, et al. Cleaning products and work-related asthma, 10 year update. Journal of Occupational & Environmental Medicine. 2020; 62(2):130-137.
https://doi.org/10.1097/JOM.0000000000001771
Abstract: OBJECTIVE: To describe the frequency of work-related asthma (WRA) and characteristics of individuals with exposure to cleaning products 1998 to 2012, compared with 1993 to 1997. METHODS: Cases of WRA from products used for cleaning or disinfecting surfaces were identified from California, Massachusetts, Michigan (1998 to 2012), New Jersey (1998 to 2011), and New

York (2009 to 2012). RESULTS: There were 1199 (12.4%) cleaning product cases among all 9667 WRA cases; 77.8% women, 62.1% white non-Hispanic, and average age of 43 years. The highest percentages worked in healthcare (41.1%), and were building cleaners (20.3%), or registered nurses (14.1%). CONCLUSIONS: The percentage of WRA cases from exposure to cleaning products from 1998 to 2012 was unchanged from 1993 to 1997 indicating that continued and additional prevention efforts are needed to reduce unnecessary use, identify safer products, and implement safer work processes

Saraei M, Najafi A, and Heidarbagi E. Risk factors for obstructive sleep apnea among train drivers. Work. 2020; 65(1):121-125.
https://doi.org/10.3233/WOR-193064
Abstract: BACKGROUND: The screening of risk factors for sleep apnea among drivers with safety-sensitive jobs is considered as an issue of utmost importance in a safe transportation system. OBJECTIVE: This study was conducted to assess the risk factors of sleep apnea among locomotive drivers. METHODS: The present research is a cross-sectional study conducted in Baharloo Hospital, Tehran University of Medical Sciences, Iran. The study population included 281 locomotive drivers referred for their annual physical examination. Demographic characteristics, Epworth Sleepiness Scale (ESS), blood pressure, body mass index (BMI), neck circumference, and laboratory measurements including fasting blood sugar (FBS), cholesterol, high density lipoprotein, and low-density lipoprotein were recorded for each participant. Blood pressure >/=140/90 mmHg, history of drug use, BMI > 35 kg/m2, age >50 years, and neck circumference >40 cm were defined as risk factors for obstructive sleep apnea (OSA-RFs). RESULTS: All participants were male with a mean age of 43+/-10 years. The mean BMI was 26.9+/-3.9 kg/m2. Also, the mean FBS and Total cholesterol of participants was 96.9+/-24.9 and 181.7+/-41.8, respectively. Among participants, 166 (59.9%) drivers had two or more risk factors of obstructive sleep apnea (OSA-RFs) CONCLUSIONS: The findings of this study indicated a high prevalence of obstructive sleep apnea among locomotive drivers. Therefore, further research is warranted to re-evaluate the current screening regulations of diagnosing sleep apnea among locomotive drivers

Sejbaek CS, Pedersen J, Schlunssen V, Begtrup LM, Juhl M, Bonde JP, et al. The influence of multiple occupational exposures on absence from work in pregnancy: a prospective cohort study. Scandinavian Journal of Work, Environment & Health. 2020; 46(1):60-68.
https://doi.org/10.5271/sjweh.3840
Abstract: Objectives Many women experience absence periods from work during pregnancy. Several single risk factors for absence are identified, whereas the impact of multiple concurrent exposures has been sparsely studied. We hypothesized that the presence of multiple occupational exposures would be associated with an increased risk of absence from work during pregnancy. Methods We included women from the Danish National Birth Cohort (1996-

2002), pregnant with one child and working >/=30 hours/week at interview (mean gestational week 17 (standard deviation 4.0); N=50 142). Information about five occupational exposures (job demands, job control, work posture, work shift, lifting) were retrieved from the interview, each assigned values of 0/1, and summed into an index (0-5). The woman's first absence from work (both regular and related to pregnancy) after the interview was available from a nationwide administrative register. We analyzed data with Cox regression using gestational age as the underlying time-variable. Results Few women experienced none of the occupational exposures (3.6%) and most experienced two exposures (34.7%). Only 24.3% of the women were absent from work before gestational week 31. The number of occupational exposures was associated with an increasing risk of absence. The adjusted hazard ratio for absence increased from 1.3 [95% confidence interval (CI) 1.1-1.5] for one exposure to 2.9 (95% CI 2.5-3.3) for four to five exposures compared to no occupational exposure. Conclusion The higher the number of potentially adverse occupational exposures pregnant women experienced, the higher the risk for absence from work during pregnancy

Stephenson A, McDonough SM, Murphy MH, Nugent CD, Wilson IM, and Mair JL. Exploring the views of desk-based office workers and their employers' beliefs regarding strategies to reduce occupational sitting time, with an emphasis on technology-supported approaches. Journal of Occupational & Environmental Medicine. 2020; 62(2):149-155.
https://doi.org/10.1097/JOM.0000000000001777
Abstract: OBJECTIVE: Employee and employer views regarding how technology-supported strategies can best meet their needs to reduce occupational sitting are not well known. This study explored target user and key stakeholder beliefs regarding strategies to reduce occupational sitting focusing on technology-supported approaches. METHODS: Nine focus groups and two interviews (employees, n = 27; employers, n = 19; board members, n = 2) were conducted, transcribed, and analyzed thematically. RESULTS: The main barrier to reducing sitting was job-related tasks taking primary priority. Intervention designers should consider individual preferences, environmental factors, judgmental culture, productivity concerns, and staff knowledge. Technology-supported strategies such as smartphone applications, computer software, wearables, and emails were deemed to be useful tools to provide prompts and allow behavioral self-monitoring in an easily individualized manner. CONCLUSIONS: Technology-supported strategies were seen to be valuable approaches and might fruitfully be incorporated into future interventions to reduce sitting time

Theurel J and Desbrosses K. Occupational exoskeletons: overview of their benefits and limitations in preventing work-related musculoskeletal disorders. IISE Transactions on Occupational Ergonomics and Human Factors. 2019; 7(3-4):264-280.
https://doi.org/10.1080/24725838.2019.1638331 **[open access]**

Abstract: To address the prevalence of work-related MSDs in physically demanding tasks, research is now focusing on new approaches, such as the use of exoskeletons. Purpose: Based on the available evidence underlying the claimed efficiency of occupational exoskeletons in reducing biomechanical strains at work, the aim of this paper is to relate the claimed effectiveness of exoskeletons at reducing muscle demand to the pathophysiological mechanisms underlying MSDs. A further aim is to analyze the literature to highlight the main deficiencies in current knowledge, in order to guide the research necessary to develop future generations of exoskeletons. Methods: A narrative review was completed, based on an electronic literature search, considering occupational applications of exoskeletons from January 1980 to January 2019. Results: Thirty articles, each of which evaluated the effects of occupational exoskeletons on physical workload, were considered relevant to discuss with respect to the pathophysiological origins of MSDs. We found 22 studies that were directly related to back-assistive exoskeletons. Studies mainly focused on back muscle activity, but additional factors contributing to low back pain were also considered (muscle fatigue, spine loading, perceived pain, and posture). Eight papers were directly related to upper-limb exoskeletons. Conclusions: Within the scope of the specific task for which exoskeleton use has been designed, exoskeletons have been found to have clear potential in limiting local muscular demands. However, the current state of knowledge does not support an unreserved endorsement for using these technologies for MSDs prevention. Additional research is needed to better understand posture and movement control mechanisms, when the postural and/or upper limb muscular chains are assisted. The impacts of movement assistance on neuromuscular coordination and joints kinematics also need to be clarified. Several other questions remain to be examined, in particular related to the occurrence of muscle fatigue and chronic adaptations.

Wijnen BFM, Lokkerbol J, Boot C, Havermans BM, van der Beek AJ, and Smit F. Implementing interventions to reduce work-related stress among health-care workers: an investment appraisal from the employer's perspective. International Archives of Occupational & Environmental Health. 2020; 93(1):123-132.
https://doi.org/10.1007/s00420-019-01471-y [open access]
Abstract: PURPOSE: The Stress-Prevention@Work implementation strategy has been demonstrated to be successful in reducing stress in employees. Now, we assess the economic return-on-investment to see if it would make for a favourable business case for employers. METHODS: Data were collected from 303 health-care workers assigned to either a waitlisted control condition (142 employees in 15 teams) or to Stress-Prevention@Work (161 employees in 15 teams). Main outcome was productivity losses measured using the Trimbos and iMTA Cost questionnaire in Psychiatry. Measurements were taken at baseline, 6, and 12 months post-baseline. RESULTS: The per-employee costs of the strategy were euro50. Net monetary benefits were the benefits (i.e., improved productivity) minus the costs (i.e., intervention costs) and were the main outcome

of this investment appraisal. Per-employee net benefits amounted to euro2981 on average, which was an almost 60-fold payout of the initial investment of euro50. There was a 96.7% likelihood for the modest investment of euro50 to be offset by cost savings within 1 year. Moreover, a net benefit of at least euro1000 still has a likelihood of 88.2%. CONCLUSIONS: In general, there was a high likelihood that Stress-Prevention@Work offers an appealing business case from the perspective of employers, but the employer should factor in the additional per-employee costs of the stress-reducing interventions. Still, if these additional costs were as high as euro2981, then costs and benefits would break even. This study was registered in the Netherlands National Trial Register, trial code: NTR5527

*IWH authored publications.