

**IWH Research Alert**  
**June 19, 2020**

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**\*Laberge M and Tondoux A. Student occupational health and safety hazard assessment: toolkit for teachers supervising work-oriented training path practicums. Report no: DF-1099. Montreal, QC: Institut de recherche Robert-Sauvé en santé et en sécurité du travail; 2020.**

<https://www.irsst.qc.ca/media/documents/PubIRSST/DF-1099.pdf?v=2020-06-19>

**\*Rotondi NK, Beaton DE, Sujic R, Bogoch E, Inrig T, Linton D, et al. Factors associated with screening positive for high falls risk in fragility fracture patients: a cross-sectional study. BMC Musculoskeletal Disorders. 2020; 21(1):372.**

<https://doi.org/10.1186/s12891-020-03410-2> [open access]

Abstract: BACKGROUND: We sought to report the prevalence of fragility fracture patients who were screened at high falls risk using a large provincial database, and to determine the characteristics associated with being screened at high falls risk. METHODS: The study population included fragility fracture patients 50+ years of age who were screened at 35 hospital fracture clinics in Ontario over a 3.5 year period. The outcome was based on two screening questions measuring the risk of falling, both adapted from the STEADI

(Stopping Elderly Accidents, Deaths & Injuries) tool. Multivariable associations of sociodemographic, fracture-related, and health-related characteristics were evaluated using logistic regression. RESULTS: Of the sample, 9735 (44.5%) patients were classified as being at high falls risk, and 12,089 (55.3%) were not. In the multivariable logistic regression, being 80+ years of age (vs. 50-64 years of age), non-community dwelling (vs. living with spouse, family member, roommate), having a mental/physical impairment (vs. none), and taking multiple medications, were all strongly associated with being screened at high falls risk. CONCLUSIONS: Living in a non-community dwelling and taking 4+ medications were the variables most strongly associated with being screened at high falls risk. These are potentially modifiable characteristics that should be considered when assessing falls risk in fragility fracture patients, and particularly when designing interventions for preventing subsequent falls. Ongoing work to address the higher risk of falls in the fragility fracture population is warranted

**Ajslev JZN, Wahlin-Jacobsen CD, Brandt M, Moller JL, and Andersen LL. Losing face from engagement: an overlooked risk in the implementation of participatory organisational health and safety initiatives in the construction industry. Construction Management and Economics. 2020; [epub ahead of print].**

<https://doi.org/10.1080/01446193.2020.1759811> [open access]

Abstract: Participatory designs are regarded as a positive way to develop and execute organisational health and safety interventions in the construction industry. While most studies focus on effect measures, little is known about process-related factors shaping the outcomes of interventions. In this article, the authors suggest that success in implementing organisational interventions is tied to microsocial mechanisms that affect whether engagement and creativity materialise into improvements. In this regard, interaction within intervention activities has been overlooked as relevant data sources. To exemplify how these may be useful, video-recorded interactions between participants in an intervention workshop setting are analysed. The framework focuses on threats to the participants' face (i.e. their public self-image), the participants "facework", and on how social action is oriented to deontic, epistemic and emotional domains of order. The analysis shows how threats to the participants'

faces arise in interaction, diverting the focus of discussions away from the aim of the workshops; developing initiatives to improve employees' health and safety. The analysis highlights that participatory interventions may be ineffective if potential face threats are not mitigated and managed actively. We suggest that the manager-facilitator-employee communicational design should be an area of increased focus.

**Akanbi MO, Iroz CB, O'Dwyer LC, Rivera AS, and McHugh MC. A systematic review of the effectiveness of employer-led interventions for drug misuse. Journal of Occupational Health. 2020; 62(1):e12133.**

<https://doi.org/10.1002/1348-9585.12133> [open access]

**Abstract:** AIMS: Employers in the United States incur substantial costs associated with substance use disorders. Our goal was to examine the effectiveness of employer-led interventions to reduce the adverse effects of drug misuse in the workplace. **METHODS:** We conducted a systematic review of studies that evaluated the effectiveness of recommended workplace interventions for opioids and related drugs: employee education, drug testing, employee assistance programs, supervisor training, written workplace drug-free policy, and restructuring employee health benefit plans. We searched PubMed MEDLINE, EMBASE (embase.com), PsycINFO (Ebsco), ABI Inform Global, Business Source Premier, EconLit, CENTRAL, Web of Science (Thomson Reuters), Scopus (Elsevier), Proquest Dissertations, and Epistemonikos from inception through May 8, 2019, with no date or language restrictions. We included randomized controlled trials, quasi-experimental studies, and cross-sectional studies with no language or date restrictions. The Downs and Black questionnaire was used to assess the quality of included studies. The results were reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. **RESULTS:** In all, 27 studies met our inclusion criteria and were included in the systematic review. Results were mixed, with each intervention shown to be effective in at least one study, but none showing effectiveness in over 50% of studies. Studies examining the impact of interventions on workplace injuries or accidents were more commonly reported to be effective. Although four studies were randomized controlled trials, the quality of all included studies was

"fair" or "poor." CONCLUSIONS: Despite the opioid epidemic, high-quality studies evaluating the effectiveness of employer-led interventions to prevent or reduce the adverse effects of substance use are lacking. Higher quality and mixed methods studies are needed to determine whether any of the interventions are generalizable and whether contextual adaptations are needed. In the meantime, there is a reason to believe that commonly recommended, employer-led interventions may be effective in some environments

**Alkaissy M, Arashpour M, Ashuri B, Bai Y, and Hosseini R. Safety management in construction: 20 years of risk modeling. Safety Science. 2020; 129:104805.**

<https://doi.org/10.1016/j.ssci.2020.104805>

**Bowleg L. We're not all in this together: on COVID-19, intersectionality, and structural inequality. American Journal of Public Health. 2020; 110(7):917.**

<https://doi.org/10.2105/AJPH.2020.305766> [open access]

**Bronnum-Hansen H, Foverskov E, and Andersen I. Occupational inequality in health expectancy in Denmark. Scandinavian Journal of Public Health. 2020; 48(3):338-345.**

<https://doi.org/10.1177/1403494819882138>

Abstract: Background: The pension age in Denmark is adjusted in line with projected increasing life expectancy without taking health differentials between occupational groups into account. The purpose was to study occupational disparities in partial life expectancy and health expectancy between the ages of 50 and 75. Methods: Register data on occupation and mortality were combined with data from the Danish part of Survey of Health, Ageing and Retirement in Europe in 2010-2014 (N=3179). Expected lifetime without and with activity limitations and without and with long-term illness was estimated by Sullivan's method and comparisons made between four occupational groups. Results: We found clear differences between occupational groups. Expected lifetime without activity limitations between the ages of 50 and 75 was about 4.5 years longer for men and women in high skilled white-collar occupations than for men and women in low skilled blue-collar occupations. Men in high skilled blue-collar and low skilled white-collar occupations could expect 2.3 and 3.8 years

shorter lifetimes without activity limitations, respectively, than men in high skilled white-collar occupations. For women in low skilled white-collar occupations, lifetime without activity limitations was 2.6 years shorter than for women in high skilled white-collar occupations. Due to few observations, no results were obtained for women in the high skilled blue-collar group. The social gradient was also significant when health was measured by years without long-term illness. Conclusions: The results support implementation of a flexible pension scheme to take into account the health differentials between occupational groups

**Dennerlein JT, Burke L, Sabbath EL, Williams JAR, Peters SE, Wallace L, et al. An integrative Total Worker Health framework for keeping workers safe and healthy during the COVID-19 pandemic. Human Factors. 2020; [epub ahead of print].**

<https://doi.org/10.1177/0018720820932699>

Abstract: OBJECTIVE: The aim was to recommend an integrated Total Worker Health (TWH) approach which embraces core human factors and ergonomic principles, supporting worker safety, health, and well-being during the COVID-19 pandemic. BACKGROUND: COVID-19 has resulted in unprecedented challenges to workplace safety and health for workers and managers in essential businesses, including healthcare workers, grocery stores, delivery services, warehouses, and distribution centers. Essential workers need protection, accurate information, and a supportive work environment with an unwavering focus on effective infection control. METHOD: The investigators reviewed emerging workplace recommendations for reducing workers' exposures to the novel coronavirus and the challenges to workers in protecting their health. Using a theoretical framework and guidelines for integrating safety and health management systems into an organization for TWH, the investigators adapted the framework's key characteristics to meet the specific worker safety and health issues for effective infection control, providing supports for increasing psychological demands while ensuring a safe work environment. RESULTS: The recommended approach includes six key characteristics: focusing on working conditions for infection control and supportive environments for increased psychological demands; utilizing participatory approaches involving workers in identifying daily challenges and unique solutions;

employing comprehensive and collaborative efforts to increase system efficiencies; committing as leaders to supporting workers through action and communications; adhering to ethical and legal standards; and using data to guide actions and evaluate progress. CONCLUSION: Applying an integrative TWH approach for worker safety, health, and well-being provides a framework to help managers systematically organize and protect themselves, essential workers, and the public during the COVID-19 pandemic. APPLICATION: By using the systems approach provided by the six implementation characteristics, employers of essential workers can organize their own efforts to improve system performance and worker well-being during these unprecedented times

**Djebrouni M and Wolbring G. Impact of robotics and human enhancement on occupation: what does it mean for rehabilitation? Disability and Rehabilitation. 2020; 42(11):1518-1528.**

<https://doi.org/10.1080/09638288.2018.1527401>

Abstract: Purpose: People with disabilities face participation challenges in all occupations. Scientific and technological advancements impact the occupational landscape of humans. This scoping review aimed to ascertain the academic engagement with occupation in relation to robotics and human enhancement focusing in particular on how people with disabilities and rehabilitation were mentioned. Method: SCOPUS and the 70 databases of EBSCO host were searched. Manifest and latent content coding and thematic grouping of codes relevant to answering the review questions was performed. Results: Only four articles engaged with occupation in relation to human enhancement. As to occupation and robotics, some occupational fields were visible and not others; occupational health and safety was the most visible one; people with disabilities were covered from a medical, therapeutic angle and not in relation to social issues caused by the occupational impact of robotics. Change in the scope, meaning, and clients of rehabilitation efforts related to occupation enabled by human enhancement and robotics was not covered. Conclusions: The gaps found should be filled. The impact of robotics and human enhancement on the occupational landscape indicates the need for rehabilitation to think beyond recovery to the species typical as a goal. The ultrabilitation concept could help to

meet this need. Implications for rehabilitation Advances in robotics and human enhancement beyond species-typical levels modify the occupational landscape, human ability expectations in this setting, and the meaning and scope of disability and rehabilitation (clinical and community based). There is a need to elucidate the impact of these changes on the meaning, scope and goals of recovery-oriented rehabilitation. The recently coined term "ultrabilitation" creates space to discuss an ability expectation creep triggered by developments in robotics and human enhancement, particularly within occupation focused rehabilitation

**Ilies R, Ju H, Liu Y, and Goh Z. Emotional resources link work demands and experiences to family functioning and employee well-being: the emotional resource possession scale (ERPS). European Journal of Work and Organizational Psychology. 2020; 29(3):434-449.**

<https://doi.org/10.1080/1359432X.2020.1718655>

**Park S, Johnson MD, and Hong O. Analysis of Occupational Safety and Health Administration (OSHA) noise standard violations over 50 years: 1972 to 2019. American Journal of Industrial Medicine. 2020; 63(7):616-623.**

<https://doi.org/10.1002/ajim.23116>

Abstract: Introduction: Noise exposure has long been an occupational health concern and has been an important area of focus of the Occupational Safety and Health Administration (OSHA) since its founding. Nevertheless, it remains unclear what effects OSHA's noise standards have had on employer efforts to reduce risks.

Consequently, a review of OSHA noise standard violations was performed to clarify the violation trends between 1972 and 2019. Methods: Using the OSHA Information System, researchers identified 119 305 violations involving four noise standards between 1972 and 2019: 29 CFR 1910.95, occupational noise exposure in general industry; 1926.52, occupational noise exposure in construction; 1926.101, hearing protection in construction, and 1904.10, recording criteria for cases involving occupational hearing loss. Violation frequencies of noise standard subparagraphs and relationships to factors such as industry differences were analyzed using descriptive statistics and t tests. Results: The most commonly violated noise

standard was 1910.95 in manufacturing. Such violations rose between 1972 and 1985 and then declined steadily. Whether in general industry or construction, four noise standards were most-frequently cited: lack of feasible administrative or engineering controls (1910.95[b] and 1926.52[d]) and inadequate hearing conservation program (1910.95[c] and 1926.52[b]). These violations were more highly penalized (mean = \$1036.50) than other subparagraph violations (mean = \$915.80). Programmed and unprogrammed inspections generated similar violation quantities except between 1980 and 1985, when programmed inspections exhibited a sharp spike in violations. Conclusion: The study identified trends in OSHA noise standard violations and possible explanations for those trends. The study findings can support development of more practical noise-exposure protection policy.

**Rai R, Fritschi L, Carey RN, Lewkowski K, Glass DC, Dorji N, et al. The estimated prevalence of exposure to carcinogens, asthmagens, and ototoxic agents among healthcare workers in Australia. American Journal of Industrial Medicine. 2020; 63(7):624-633.**

<https://doi.org/10.1002/ajim.23108>

Abstract: BACKGROUND: Healthcare workers are occupationally exposed to various hazardous chemicals and agents that can potentially result in long-term adverse health effects. These exposures have not been comprehensively examined at a population level. The aim of this study was to examine occupational exposures to a wide range of asthmagens, carcinogens, and ototoxic agents among healthcare workers in Australia. METHODS: Data were collected as part of the Australian Work Exposures Studies, which were computer-assisted telephone surveys conducted in 2011, 2014, and 2016 to assess the prevalence of occupational exposures to carcinogens, asthmagens, and ototoxic agents, respectively, among Australian workers. Using data on healthcare workers, the prevalence of exposures to these agents was calculated and associations of demographic variables and occupation groups with exposure status were examined. RESULTS: The prevalence of exposure to at least one asthmagen, carcinogen, and ototoxic agent was 92.3%, 50.7%, and 44.6%, respectively. The most common exposures were to (a) cleaning and sterilizing agents in the asthmagen group; (b) shift work



in the carcinogen group; and (c) toluene and p-xylene among ototoxic agents. Exposure varied by occupation, with exposure to carcinogens and ototoxic agents highest among personal carers and exposure to carcinogens most likely among nursing professionals and health and welfare support workers. **CONCLUSION:** The results demonstrate that a substantial proportion of Australian healthcare workers are occupationally exposed to asthmagens, carcinogens, and ototoxic agents. These exposures are more common among certain occupational groups. The information provided by this study will be useful in prioritizing and implementing control strategies

**Rodrigues MA, Sa A, Masi D, Oliveira A, Boustras G, Leka S, et al. Occupational Health & Safety (OHS) management practices in micro- and small-sized enterprises: the case of the Portuguese waste management sector. Safety Science. 2020; 129:104794. <https://doi.org/10.1016/j.ssci.2020.104794>**

**Ruhle SA, Breitsohl H, Aboagye E, Baba V, Biron C, Correia Leal C, et al. "To work, or not to work, that is the question": recent trends and avenues for research on presenteeism. European Journal of Work and Organizational Psychology. 2020; 29(3):344-363. <https://doi.org/10.1080/1359432X.2019.1704734>**

**Smith DL, Graham E, Stewart D, and Mathias KC. Cardiovascular disease risk factor changes over 5 years among male and female US firefighters. Journal of Occupational and Environmental Medicine. 2020; 62(6):398-402. <https://doi.org/10.1097/JOM.0000000000001846>**

**Abstract:** Objective: To examine changes in measures of cardiovascular health in male and female firefighters over 5 years. Methods: Anthropometrics and biomarkers of cardiovascular health from two occupational medical exams separated by 5 years (2009 to 2016) were examined from a cohort of US career firefighters in Virginia (males, n = 603; females, n = 69). Changes over time were tested using paired t-tests and McNemar's tests. Results: At baseline, 29% of males and 10% of females were obese. Body weight and body mass index significantly increased ( $P < 0.05$ ) in males ( $2.5 \pm 0.2$  kg) ( $0.8 \pm 0.1$  kg·m) and females ( $2.5 \pm 0.8$  kg) ( $1.0 \pm 0.3$  kg·m) over

the 5-year period. The prevalence of obesity, hypercholesterolemia, hypertensive medication usage, and high blood glucose significantly increased in males over the 5-year period. Conclusions: While improvements in blood pressure were observed, large percentages of firefighters, particularly males, had cardiovascular disease risk factors that increased over time.

**Wagner SL, White N, Fyfe T, Matthews LR, Randall C, Regehr C, et al. Systematic review of posttraumatic stress disorder in police officers following routine work-related critical incident exposure. American Journal of Industrial Medicine. 2020; 63(7):600-615.**

<https://doi.org/10.1002/ajim.23120>

**Abstract:** Background: The prevalence of PTSD in police officers has been the subject of a large and highly variable empirical literature. The present systematic review evaluates the extant literature on PTSD in police officers using an international dataset. Methods: We employed best-evidence narrative synthesis to evaluate whether PTSD prevalence in police is elevated in comparison to the general population of Canada (8%), which itself has a higher lifetime PTSD prevalence than many other regions and thus serves as a conservative standard of comparison. Results: PTSD prevalence in police varied considerably across studies from 0% - 44% (M = 14.87%, Median = 9.2%). Despite this variability, strong evidence exists to suggest PTSD prevalence is elevated in police officers. Examination of possible sources of variability in prevalence outcomes highlighted substantial variability in outcomes due to the selection of measurement tool for assessing PTSD (e.g., DSM vs. IES). Examination of commonly-assessed predictive factors for PTSD risk across the literature showed that individual-difference factors (e.g., age, years of service) bear weak-to-nonexistent relationships with PTSD risk, while incident-specific factors (e.g., severity of exposure) are more strongly and consistently associated with PTSD prevalence. Organizational factors (e.g., low support from supervisor) are at present understudied but important possible contributors to PTSD risk. Conclusions: PTSD prevalence is elevated in police officers and appears most strongly related to workplace exposure. Measurement variability remains a critical source of inconsistencies across the

literature with drastic implications for accurate detection of officers in need of mental health intervention.

**Wurzelbacher SJ, Lampl MP, Bertke SJ, and Tseng CY. The effectiveness of ergonomic interventions in material handling operations. *Applied Ergonomics*. 2020; 87:103139.**

<https://doi.org/10.1016/j.apergo.2020.103139>

Abstract: This study evaluated the effectiveness of ergonomic interventions in material handling operations involving 33 employers and 535 employees from 2012 to 2017. Outcomes included employee-reported low back/upper extremity pain and safety incidents at baseline, every three months, and annually for up to two years. A total of 32.5% of employees completed at least one survey, while 13.6% completed all nine surveys over two years. Among highly exposed employees (who reported handling  $\geq 50$  lbs.  $> 33\%$  of the time), upper extremity pain frequency and severity were lower among those who reported using the intervention routinely versus those that reported using their body strength alone to handle objects  $\geq 50$  lbs. After excluding from analyses one employer that used anti-fatigue mats, low back pain frequency was also significantly lower among highly exposed intervention users. In conclusion, there was some evidence that the interventions were effective in reducing employee-reported pain for highly exposed employees.

\*IWH authored publications.