

IWH Research Alert
March 22, 2019

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***McAllister A, Bentley L, Bronnum-Hansen H, Jensen NK, Nylen L, Andersen I, et al. Inequalities in employment rates among older men and women in Canada, Denmark, Sweden and the UK. BMC Public Health. 2019; 19(1):319.**

<https://doi.org/10.1186/s12889-019-6594-7> [open access]

Abstract: BACKGROUND: In most developed countries, governments are implementing policies encouraging older persons to work past 65 years to reduce the burden on societies related to disability benefits and pension payments. Despite this push to extend working lives, we know little about who already works past this age and any inequalities that may exist. Our study investigates the employment rates of those aged 65-75 years of age by educational level, health status and sex in Canada (CAN), Denmark (DK), Sweden (SE) and the United Kingdom (UK). Secondly, we aim to relate findings on employment rates to prevailing policies in the different countries, to increase the understanding on how to further extend working lives. **METHODS:** We used nationally representative cross-sectional survey data from the 2012-2013 Canadian Community Health Survey, 2013/14 Survey of Health, Ageing and Retirement in Europe for Denmark and Sweden and the 2013 English Longitudinal Study of Ageing to examine employment rates for those aged 65-75 years by sex, educational level and health status (having limiting longstanding

illness (LLI) or not). RESULTS: Employment rates decline by age, but we see a linear decline in CAN and the UK compared to an initial decline then a plateau of employment rates from 66 to 68 years in DK and SE. Employment rates among persons aged 65-75 years were lower in the UK than in CAN, DK and SE. Among women, employment rates were highest in SE. Women with low education and a LLI had considerably lower employment rates than men with low education and a LLI (employment rates for men ranged from 27% to 12% compared with employment rates for women which ranged from 12% to 0%). CONCLUSIONS: Our results suggest that educational level, sex and health all play a role in extending working lives. The variation in employment rates between the four countries implies that policies do matter, but that social differentials show that policies cannot be 'one size fits all'. Policy-makers must consider different groups (i.e. low-educated women with a LLI) when designing policies to extend working lives

Asadi H, Yu D, and Mott JH. Risk factors for musculoskeletal injuries in airline maintenance, repair & overhaul. International Journal of Industrial Ergonomics. 2019; 70:107-115.

<https://doi.org/10.1016/j.ergon.2019.01.008>

Barnetson B, Foster J, and Matsunaga-Turnbull J. Estimating under-claiming of compensable workplace injuries in Alberta, Canada. Canadian Public Policy. 2018; 44(4):400-410.

<https://doi.org/10.3138/cpp.2018-014>

Enez K and Nalbantoglu Sibel S. Comparison of ergonomic risk assessment outputs from OWAS and REBA in forestry timber harvesting. International Journal of Industrial Ergonomics. 2019; 70:51-57.

<https://doi.org/10.1016/j.ergon.2019.01.009>

Finnes A, Enebrink P, Ghaderi A, Dahl J, Nager A, and Ost LG. Psychological treatments for return to work in individuals on sickness absence due to common mental disorders or musculoskeletal disorders: a systematic review and meta-analysis of randomized-controlled trials. International Archives of Occupational & Environmental Health. 2019; 92(3):273-293.

<https://doi.org/10.1007/s00420-018-1380-x>

Abstract: **PURPOSE:** Common mental disorders (CMDs) and musculoskeletal disorders are highly prevalent in the population and cause significant distress and disability, and high costs to society. The main objective of this systematic review and meta-analysis was to examine the outcome and comparative effectiveness of psychological interventions in reducing sickness absence (SA) due to CMDs or musculoskeletal disorders, compared to a waitlist control group, usual care or another clinical intervention. **METHODS:** We reviewed 3515 abstracts of randomized controlled trials published from 1998 to 2017. Of these, 30 studies were included in the analysis. **RESULTS:** The psychological interventions were overall more effective than treatment as usual in reducing SA (small effect sizes), but not compared to other clinical interventions. Results were similar for studies on CMDs and musculoskeletal pain. A few significant moderating effects were found for treatment-specific variables. However, these were difficult to interpret as they pointed in different directions. **CONCLUSION:** There was a small but significant effect of psychological treatments in reducing SA. We identified areas of improvement such as methodological problems among the included studies and failure to specifically address RTW in the interventions that were evaluated. Clinical implications of the findings, and ways of improving methodological rigour of future studies are discussed

Hanvold TN, Sterud T, Kristensen P, and Mehlum IS. Mechanical and psychosocial work exposures: the construction and evaluation of a gender-specific job exposure matrix (JEM). Scandinavian Journal of Work, Environment & Health. 2018; [epub ahead of print].

<https://doi.org/10.5271/sjweh.3774>

Abstract: **Objectives** The aim of this study was to (i) construct and evaluate a gender-specific job exposure matrix (JEM) for mechanical and psychosocial work exposures and (ii) test its predictive validity for low-back pain. **Methods** We utilized data from the Norwegian nationwide Survey of Living Conditions on work environment in 2006 and 2009. We classified occupations on a 4-digit level based on the Norwegian version of the International Standard Classification of Occupations (ISCO-88). The mechanical and psychosocial exposure information was collected by personal telephone interviews and

included exposures that were known risk factors for low-back pain. We evaluated the agreement between the individual- and JEM-based exposure estimates, with kappa, sensitivity and specificity measures. We assessed the JEM's predictive validity by testing the associations between low-back pain and the individual- and JEM-based exposure. Results The results showed an overall fair-to-moderate agreement between the constructed JEM and individual work exposures. The JEM performed considerably better for mechanical work exposures compared with psychosocial work exposures. The predictive validity of the mechanical and psychosocial JEM showed a consistently lower but predominantly reproducible association with low-back pain for both genders. Conclusions The mechanical estimates and psychosocial stressors, such as psychological demands, monotonous work and decision latitude in the constructed JEM, may be useful in large epidemiological register studies. The predictive validity of the matrix was evaluated as being overall acceptable, it can thus be an effective and versatile approach to estimate the relationship between work exposures and low-back pain

Jiang L, Lavaysse LM, and Probst TM. Safety climate and safety outcomes: a meta-analytic comparison of universal vs. industry-specific safety climate predictive validity. *Work and Stress*. 2019; 33(1):41-57.

<https://doi.org/10.1080/02678373.2018.1457737>

Kulikowski K. One, two or three dimensions of work engagement? Testing the factorial validity of the Utrecht Work Engagement Scale on a sample of Polish employees. *International Journal of Occupational Safety & Ergonomics*. 2019; 25(2):241-249.

<https://doi.org/10.1080/10803548.2017.1371958>

Abstract: Work engagement, as conceptualized by the Utrecht Work Engagement Scale (UWES), is a work-related positive state of mind that is characterized by vigour, dedication and absorption; however, it still remains unclear how many dimensions work engagement comprises. This study tested the factorial validity of 11 different UWES factorial models that are available in the literature using a confirmatory factor analysis approach on a large sample of multi-occupational Polish employees (N = 1420). The two-factor UWES-6,

comprising vigour and dedication, was found to be reliable and remained invariant across samples drawn from four different organizational positions. It also presented a better fit than the three-factor UWES-9, which is a scale used as a standard in contemporary research on work engagement. The findings suggest that the three-factor UWES-9 might not be an optimal measure of work engagement in Poland

Loibner M, Hagauer S, Schwantzer G, Berghold A, and Zatloukal K. Limiting factors for wearing personal protective equipment (PPE) in a health care environment evaluated in a randomised study. PLoS ONE. 2019; 14(1):e0210775.

<https://doi.org/10.1371/journal.pone.0210775> [open access]

Abstract: Pandemics and re-emerging diseases put pressure on the health care system to prepare for patient care and sample logistics requiring enhanced personnel protective equipment (PPE) for health care workers. We generated quantifiable data on ergonomics of PPE applicable in a health care setting by defining error rates and physically limiting factors due to PPE-induced restrictions. Nineteen study volunteers tested randomly allocated head- or full body-ventilated PPE suits equipped with powered-air-purifying-respirators and performed four different tasks (two laboratory tutorials, a timed test of selective attention and a test investigating reaction time, mobility, speed and physical exercise) during 6 working hours at 22 degrees C on one day and 4 working hours at 28 degrees C on another day. Error rates and physical parameters (fluid loss, body temperature, heart rate) were determined and ergonomic-related parameters were assessed hourly using assessment sheets. Depending on the PPE system the most restrictive factors, which however had no negative impact on performance (speed and error rate), were: reduced dexterity due to multiple glove layers, impaired visibility by flexible face shields and back pain related to the respirator of the fully ventilated suit. Heat stress and liquid loss were perceived as restrictive at a working temperature of 28 degrees C but not 22 degrees C

Metzler YA, von Groeling-Muller G, and Bellingrath S. Better safe than sorry: methods for risk assessment of psychosocial

hazards. *Safety Science*. 2019; 114:122-139.
<https://doi.org/10.1016/j.ssci.2019.01.003>

Petrowski K, Herhaus B, Schoniger C, Frank M, and Pycr J. Stress load of emergency service: effects on the CAR and HRV of HEMS emergency physicians on different working days (N = 20). *International Archives of Occupational & Environmental Health*. 2019; 92(2):155-164.

<https://doi.org/10.1007/s00420-018-1362-z>

Abstract: **PURPOSE:** The occupation of the emergency physicians (EPs) of helicopter emergency medical services (HEMS) can be characterized as a high-strain occupation (Karasek in *Adm Sci Q* 24(2):285-308. <https://doi.org/10.2307/2392498>, 1979). Therefore, the aim of this study was to measure and compare the stress load of the EPs of HEMS on duty on air ambulance workdays and on 2 control days. **METHODS:** In this field study (within-subjects design), hormonal, physiological, and self-perceived stress levels of 20 EPs [3 females, 17 males; mean age (M) = 44.95 years, SD = 4.80, 95% confidence interval (CI) (42.71, 47.19)] of HEMS, were recorded on different test days. Measurements of the cortisol awakening response (CAR) and the heart rate variability (HRV) were performed while on duty on the air ambulance and during workdays at the outpatient clinic as well as at home on days of rest. **RESULTS:** There were significant differences in the CAR (area under the curve with respect to ground $F(2,38) = 12.81, p < 0.001$) between the 3 test days with the highest values on the workday at the outpatient clinic [M = 81.24; 98.75% CI (61.24, 101.24)] and not on the air ambulance day [M = 61.82; 98.75% CI (45.18, 78.46)] or on the day of rest [M = 52.96; 98.75% CI (38.17, 67.76)]. In addition, the HRV parameter SDNN [$F(2,38) = 6.369; p = 0.004$] presented significant differences between the 3 test days with lower levels on the day at the outpatient clinic [M = 101.44; 98.75% CI (83.50, 119.38)] in contrast to the air ambulance day [M = 120.16; 98.75% CI (100.02, 140.30)] and to the resting day [M = 123.79; 98.75% CI (106.49, 141.10)]. Furthermore, there were significant differences in the HRV parameter LF/HF [$F(2,38) = 6.215; p = 0.005$] between the 3 testing days with the highest values on the workday at the outpatient clinic [M = 8.69; 98.75% CI (6.29, 11.09)] compared to the air ambulance day [M = 6.54; 98.75% CI (4.50, 8.57)] and the day of rest [M = 6.43; 98.75% CI (4.57, 8.29)].

CONCLUSIONS: Compared with the standard values and previous studies, EPs of HEMS have an increase in hormonal reactivity in the morning and a lack of recovery of the ANS. It can be concluded that-with respect to the psychobiological stress model by McEwen and Lasley (The end of stress as we know it, National Academic Press, Washington, 2003)-work-related stressors persist too long or the stress response is exaggerated (allostatic load) due to chronic stress induction and lack of recovery

Ragan KR, Buchanan Lunsford N, Thomas CC, Tai EW, Sussell A, and Holman DM. Skin cancer prevention behaviors among agricultural and construction workers in the United States, 2015. Preventing Chronic Disease. 2019; 16:E15.

<https://doi.org/10.5888/pcd16.180446> [open access]

Abstract: INTRODUCTION: Nearly 5 million people are treated for skin cancer each year in the United States. Agricultural and construction workers (ACWs) may be at increased risk for skin cancer because of high levels of ultraviolet radiation exposure from the sun. This is the first study that uses nationally representative data to assess sun-protection behaviors among ACWs. METHODS: We analyzed data from the 2015 National Health Interview Survey Cancer Control Supplement to examine the prevalence of sun-protection behaviors among ACWs. We calculated national, weighted, self-reported prevalence estimates. We used chi(2) tests to assess differences between ACWs by industry and occupation. RESULTS: Most of the 2,298 agricultural and construction workers studied were male (by industry, 72.4% in agriculture and 89.3% in construction; by occupation, 66.1% in agriculture and 95.6% in construction) and non-Hispanic white. About one-third had at least 1 sunburn in the past year. The prevalence of sunscreen use and shade seeking was low and did not significantly differ among groups, ranging from 15.1% to 21.4% for sunscreen use and 24.5% to 29.1% for shade seeking. The prevalence of wearing protective clothing was significantly higher among agricultural workers than among construction workers by industry (70.9% vs 50.7%) and occupation (70.5% vs 53.0%). CONCLUSION: Our findings could be used to improve occupational health approaches to reducing skin cancer risk among ACWs and to inform education and prevention initiatives addressing skin cancer. Sun-safety initiatives may include modifying

work sites to increase shade and adding sun safety to workplace policies and training. Employers can help reduce occupational health inequities and protect workers by creating workplaces that facilitate sun protection

Ronda-Perez E, Gosslin A, Martinez JM, and Reid A. Injury vulnerability in Spain. Examination of risk among migrant and native workers. Safety Science. 2019; 115:36-41.

<https://doi.org/10.1016/j.ssci.2019.01.026>

Schulte PA, Leso V, Niang M, and Iavicoli I. Current state of knowledge on the health effects of engineered nanomaterials in workers: a systematic review of human studies and epidemiological investigations. Scandinavian Journal of Work, Environment & Health. 2019; [epub ahead of print].

<https://doi.org/10.5271/sjweh.3800>

Abstract: Objectives The widespread application of nano-enabled products and the increasing likelihood for workplace exposures make understanding engineered nanomaterial (ENM) effects in exposed workers a public and occupational health priority. The aim of this study was to report on the current state of knowledge on possible adverse effects induced by ENM in humans to determine the toxicological profile of each type of ENM and potential biomarkers for early detection of such effects in workers. Methods A systematic review of human studies and epidemiological investigations of exposed workers relative to the possible adverse effects for the most widely used ENM was performed through searches of major scientific databases including Web of Science, Scopus, and PubMed. Results Twenty-seven studies were identified. Most of the epidemiological investigations were cross-sectional. The review found limited evidence of adverse effects in workers exposed to the most commonly used ENM. However, some biological alterations are suggestive for possible adverse impacts. The primary targets of some ENM exposures were the respiratory and cardiovascular systems. Changes in biomarker levels compared with controls were also observed; however, limited exposure data and the relatively short period since the first exposure may have influenced the incidence of adverse effects found in epidemiological studies. Conclusions There is a need for longitudinal epidemiologic investigations with clear

exposure characterizations for various ENM to discover potential adverse health effects and identify possible indicators of early biological alterations. In this state of uncertainty, precautionary controls for each ENM are warranted while further study of potential health effects continues

Sharma PP, Benden M, Mehta RK, Pickens A, and Han G. A quantitative evaluation of electric sit-stand desk usage: 3-month in-situ workplace study. ISE Transactions on Occupational Ergonomics and Human Factors. 2018; 6(2):76-83.

<https://doi.org/10.1080/24725838.2018.1521351>

Siddaway AP, Wood AM, and Hedges LV. How to do a systematic review: a best practice guide for conducting and reporting narrative reviews, meta-analyses, and meta-syntheses. Annual Review of Psychology. 2019; 70:747-770.

<https://doi.org/10.1146/annurev-psych-010418-102803>

Abstract: Systematic reviews are characterized by a methodical and replicable methodology and presentation. They involve a comprehensive search to locate all relevant published and unpublished work on a subject; a systematic integration of search results; and a critique of the extent, nature, and quality of evidence in relation to a particular research question. The best reviews synthesize studies to draw broad theoretical conclusions about what a literature means, linking theory to evidence and evidence to theory. This guide describes how to plan, conduct, organize, and present a systematic review of quantitative (meta-analysis) or qualitative (narrative review, meta-synthesis) information. We outline core standards and principles and describe commonly encountered problems. Although this guide targets psychological scientists, its high level of abstraction makes it potentially relevant to any subject area or discipline. We argue that systematic reviews are a key methodology for clarifying whether and how research findings replicate and for explaining possible inconsistencies, and we call for researchers to conduct systematic reviews to help elucidate whether there is a replication crisis

Sun H. North-south gradient of mesothelioma and asbestos consumption-production in the United States: progresses since

the 1st asbestos partial ban in 1973. American Journal of Industrial Medicine. 2019; 62(4):337-346.

<https://doi.org/10.1002/ajim.22955>

Abstract: BACKGROUND: Temporal trends and broad geographical distributions of asbestos use and the incidence of malignant mesothelioma (MM) in the US still need to be studied. METHODS: Data on asbestos consumption and production between 1900 and 2015 and MM mortality and incidence rates between 1975 and 2015 in the US were examined. Spatial distributions of MM mortality and incidence rates and their association with climate zone were analyzed. RESULTS: Decline of MM incidence and mortality rates in the US occurred about 20 years after the peak of asbestos consumption-production in 1973. There are apparent north-south (N-S) gradients in MM mortality and incidence rates in the US. CONCLUSION: Recent decline of MM incidence and mortality rates in the US may be associated with reduced US asbestos consumption. N-S MM gradients between 1999 and 2015 were likely related to larger asbestos requirements in building materials in the northern states

Toledo MJL, Mullane SL, Larouche ML, Rydell SA, Mitchell NR, Pereira MA, et al. Stand and Move at Work sedentary behavior questionnaire: validity and sensitivity to change. Annals of Epidemiology. 2019; 31:62-68.

<https://doi.org/10.1016/j.annepidem.2019.01.002>

Abstract: PURPOSE: We evaluated the validity and sensitivity to change of a workplace questionnaire to assess sedentary behavior (SB) during and outside work. METHODS: Participants wore an activPAL and completed an SB questionnaire at two time points (baseline and 3-month follow-up). Ecological momentary assessments were used to assess workplace location (at desk vs. away from desk). Intraclass correlation coefficients, mean difference, root of mean square error, kappa agreement, and Bland-Altman plots assessed validity. Sensitivity to change after 3 months of intervention was assessed using the standardized effect size. RESULTS: Data from 546 participants (age = 45.1 +/- 16.4 years, 24.9% males, 72.7% white) were analyzed. Intraclass correlation coefficients ranged from 0.08 to 0.23. SB was overestimated d (95%CI)[] by 47.9 (39.2, 56.6) min during work hours but underestimated for both non-work hours

and nonworkdays by -38.3 (-47.4, 29.1) and -106.7 (124.0, -89.5) min, respectively. Participants slightly underestimated SB by -3.4 (-12.6, 5.7)% when at their desk but overestimated SB by 2.8 (-2.4, 8.0)% when not at their desk. The questionnaire demonstrated similar standardized effect size (>0.6) to the activPAL for sedentary and standing time. CONCLUSIONS: Agreement between the questionnaire and activPAL was on par with other self-report measures. The questionnaire yielded valid estimates of at/away from desk SB and was sensitive to change

Wojnarowska-Soldan M, Panczyk M, Iwanow L, Zarzeka A, and Gotlib J. Validation of the positive health behaviours scale: a nationwide survey of nurses in Poland. *International Journal of Occupational Safety & Ergonomics*. 2019; 25(1):76-85.

<https://doi.org/10.1080/10803548.2018.1436124> a

Abstract: PURPOSE: The aim was to adjust the positive health behaviours scale (PHBS) to make it suitable for use by nurses, and to validate the new version of the tool. METHODS: A previously formulated PHBS was modified. The scale comprises 29 statements describing certain positive health behaviours in four subscales: nutrition, physical activity, relaxation and behaviours related to mental health, and preventive behaviours. The scale was enriched with items on avoiding risky behaviours and a question regarding respondents' own assessment of their care for health. Analyses were conducted of reliability, construct validity, criterion validity and dimensionality of subscales. The questionnaire was completed by 1017 nurses. RESULTS: Cronbach's alpha reached 0.844 for the entire scale and 0.623-0.761 for specific subscales. Empirical data did not confirm theoretical assumptions regarding the existence of a four-element structure of the PHBS. The scale's diagnostic criteria were validated on the basis of positive results of correlation and trend analysis. Only one of the subscales proved homogeneous and could be considered unidimensional. CONCLUSIONS: The results confirmed the high internal consistency of the scale and its subscales. The factor structure of the PHBS was equivocal. The PHBS could be used in workplace-based health promotion programmes designed for nurses

*IWH authored publication.