



Emerging Evidence Alert October 2019

This Emerging Evidence Alert includes the latest peer-reviewed articles, reports and evidence on a range of workplace health and safety, prevention, recovery at work and return to work topics. It provides a review of recent journal articles and relevant content related to Comcare’s five research themes: Fostering Work Participation and Recovery; Enhancing Employer Capability; Adapting to the Future of Work; Guiding and Supporting Mental Health and Wellbeing; and Enabling Healthy and Safe Workplaces. Collated articles are published in September 2019 only.

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How effective is health promotion and prevention in the workplace?

In a [comprehensive summary](#) of 74 reviews into workplace health promotion interventions from across Australia, New Zealand, USA, Canada, and Europe, researchers found preventative programs and services helped employees and their employers.

The current evidence demonstrates that different types of health promotion intervention in the workplace are effective, for example, exercise practices can help prevent musculoskeletal disorders and stress management programs can help support mental health.

Supporting injured or unwell employees to recover and return to work is another critical part of health promotion in the workplace—learn about the 10 key strategies employers can follow, such as developing and maintaining a positive work culture.

[Watch videos](#) from leading experts Christine Morgan—CEO National Mental Health Commission, Dr Tristan Casey—Griffith University and Dr Genevieve Healy—University of Queensland, who discuss different but equally important insights covering mental health, safety leadership and culture, and sedentary work.

Please see below for more research that will help guide health and safety programs in your workplace.

Description of evidence levels definitions used in this review

- 1. Level of Evidence** – certain study designs are scientifically stronger at answering a question. The scoring hierarchy we provided is presented below

Level of Evidence	Description
Level 1	Evidence from a systematic review or meta-analysis of relevant studies.
Level 2	Evidence from a randomised controlled trial
Level 3	Evidence from a controlled intervention trial without randomisation (i.e. quasi-experimental).
Level 4	Evidence from a case-control or cohort study.
Level 5	Evidence from a single case study, a case series, or qualitative study.
Level 6	Evidence from opinion pieces, reports of expert committees and/or from literature reviews (scoping or narrative).

- 2. Relevance** – research carried out in Australia or similar countries is most relevant to Australian readers

Level	Description
A	Study conducted in Australia or the study has been conducted outside Australia but confounders unlikely to affect relevance
B	Study conducted outside Australia and confounders likely to affect generalisability

Fostering Work Participation and Recovery

Return to work

Barriers to and facilitators of implementing programs for Return to Work (RTW) of cancer survivors in four European countries: A qualitative study.

Purpose: Implementation of return to work (RTW) programs for cancer survivors has proved to be challenging. The purpose of our study was to gather experiences about barriers to and facilitators of implementing RTW programs for cancer survivors in four European countries. Methods:

Separate multidisciplinary focus groups were held in Belgium (n = 8), the Netherlands (n = 8), Ireland (n = 6), and UK (n = 4) in 2017 and included among others a physician, and a representative of an employer, a cancer society, and the government. Primary focus of thematic analysis was what could be done to improve the implementation of RTW programs for cancer survivors.

Analysis used the 'Arena in work disability prevention model' as the conceptual framework.

Results: Many barriers to and facilitators of implementing RTW programs for cancer survivors were described including the personal, workplace, healthcare and legislative system as well as the overall societal and political context. That is, for example cooperation between stakeholders, time, money and ability issues at the workplace, and insufficient/inadequate legislation. Insufficient knowledge of cancer and its implications for work was identified as an overarching theme in all countries leading to stigma, misconceptions and lack of communication. This was mentioned in relation to the workplace, personal and healthcare system, and in the overall societal context.

Conclusions: Results indicate that a prerequisite for implementing RTW programs is raising sufficient knowledge regarding cancer and its implications for work. Greater knowledge could be a first step to better implement RTW programs which may result in better supporting cancer survivors with their RTW.

Tamminga et al. 2019.

Journal of Occupational Rehabilitation, vol. 29, no. 3.

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Keywords: Focus groups; Implementation; Intervention; Neoplasms; Return to work.

Evidence Level: 5B

Link: <https://link.springer.com/article/10.1007%2Fs10926-018-9818-2>

The influence of social support and social integration factors on return to work outcomes for individuals with work-related injuries: a systematic review.

Purpose: In occupational rehabilitation, the biopsychosocial model endorses the role of social factors in worker recovery. We conducted a systematic review to explore three questions examining the role of social support for the return-to-work (RTW) of individuals with work-related injury: (1) What are the worker-identified social barriers and facilitators in RTW; (2) What is the relationship between social factors and RTW; and (3) What is the effectiveness of social interventions for RTW. Methods: Systematic searches of six databases were conducted for each research question. These identified 11 studies meeting inclusion criteria for Research Question 1, and 12 studies for Research Question 2. No studies were identified that met inclusion criteria for Research Question 3. A narrative synthesis approach was used to analyse the included studies.

Results: Research Question 1 identified five themes in social barriers and facilitators to RTW, including contact/communication, person-centred approaches, mutual trust, reaction to injury, and social relationships. Research Question 2 identified moderate support for reaction to injury and social integration/functioning as predictors of RTW and weak evidence for co-worker support. Four studies reported significant associations between social factors and RTW, six reported mixed findings with at least one significant social predictor, and two found no significant relationships. However, conclusions were limited by the inconsistency in measurement of social factors.

Conclusions: Our findings indicate that social support and integration may influence RTW following work-related injury and highlights the need for further systematic examination of social factors in the field of occupational rehabilitation.

White et al. 2019.

Journal of Occupational Rehabilitation vol.29, no.3.

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Keywords: Occupational injuries; Return to work; Social support.

Evidence Level: 1A

Link: <https://link.springer.com/article/10.1007%2Fs10926-018-09826-x>

No association between preoperative physical activity level and time to return to work in patients after total hip or knee arthroplasty: A prospective cohort study.

Purpose: It is important for patients of working age to resume work after total hip or knee arthroplasty (THA/TKA). A higher preoperative level of physical activity is presumed to lead to a better or faster recovery. Aim is to examine the association between preoperative physical activity (PA) level (total and leisure-time) and time to return-to-work (RTW). Methods: A prospective multicenter survey study. Time to RTW was defined as the length of time (days) from surgery to RTW. PA level was assessed with the SQUASH questionnaire. Questionnaires were filled in before surgery and 6 weeks and 3, 6 and 12 months post-surgery. Multiple regression analyses were conducted separately for THA and TKA patients. Results: 243 patients were enrolled. Median age was 56 years; 58% had undergone a THA. Median time to RTW was 85 (THA) and 93 (TKA) days. In the multiple regression analysis, neither preoperative total PA level nor leisure-time PA level were significantly associated with time to RTW. Conclusions: Preoperative physical activity level is not associated with a shorter time to RTW in either THA or TKA patients. Neither preoperative total PA level nor leisure-time PA level showed an association with time to RTW, even after adjusting for covariates.

Boersma et al. 2019.

PLoS One, vol. 3, no. 14.

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Keywords: Physical activity; Return to work; Hip arthroplasty, Knee arthroplasty.

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0221932>

Recurrent sick leave and resignation rates among female cancer survivors after return to work: the Japan sickness absence and return to work (J-SAR) study.

Background: To date, there have not been any workforce-based Japanese cohort studies investigating work sustainability after return to work (RTW). The objective of this study was to investigate the post-RTW cumulative recurrent sick leave rate and cumulative resignation rate among female cancer survivors. Methods: Among Japanese employees who were registered in the Japan sickness absence and return to work (J-SAR) study, the subjects were those female employees who returned to work after sick leave due to newly clinically diagnosed cancer (C01-C99; ICD-10), based on a physician's certificate, between 2000 and 2011. The last day of the follow-up period was December 31, 2012. The recurrent sickness leave rate and resignation rate were calculated using competing risk survival analysis. Results: Of 223 cancer survivors, 61 took further physician-certified sick leave after their RTW. The median duration of the post-RTW work period among all cancer survivors was 10.6 years. The work continuance rates of the female cancer survivors were 83.2 and 60.4% at 1 and 5 years after they returned to work, respectively. There was a steep reduction in the work continuance rate during the first post-RTW year. There were considerable differences in the work continuance rate according to the primary cancer site.

Cumulative recurrent sick leave rates of 11.8 and 28.9% were seen at 1 and 5 years after the subjects returned to work. The cumulative resignation rate was 5.0 and 10.7% at 1 and 5 years after the subjects returned to work. Most recurrent sick leave occurred in the first year after the subjects returned to work, followed by the second year. Conclusions: Sixty percent of female cancer survivors were still working at 5 years after returning to work, although the work continuance rates for different types of cancer varied significantly.

Endo et al. 2019.

BMC Public Health, vol. 19, no. 1.

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Keywords: Cancer survivors; Recurrent sick leave; Resignation; Return to work (RTW).

Evidence level: 4B

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7509-3>

Presenteeism & absenteeism

Health differences between multiple and single job holders in precarious employment in the Netherlands: A cross-sectional study among Dutch workers.

Introduction: Precarious employment is associated with poor health. Among employees in precarious employment, those with multiple jobs may face additional health risks, e.g. due to combining work schedules and job roles. Our research question is: do differences in health exist between multiple and single job holders in precarious employment? Methods: Participants in the Netherlands Working Conditions Survey 2012 aged 25-64 years who were not employed through the Act on Social Work Provision and who had a precarious job were included. To select employees in precarious employment (n = 3,609), latent class analysis was performed, based on variables based on indicators described by Van Aerden. Differences in general self-perceived health, burnout complaints, musculoskeletal health, and sickness absence between multiple and single job holders were studied cross-sectionally using logistic regression analyses. Results: No significant differences were found between multiple and single job holders in precarious employment for self-perceived health (OR = 0.9; 95%CI = 0.7-1.3), burnout complaints (OR = 0.9; 95%CI = 0.7-1.2), and musculoskeletal health (OR = 1.1; 95%CI = 0.8-1.5). In crude analyses, multiple job holders experienced less sickness absence than single job holders (OR = 0.7; 95%CI = 0.5-0.9). In adjusted analyses, this difference was no longer statistically significant (OR = 0.8; 95%CI = 0.6-1.0). Conclusions: Despite potential health risks related to multiple job holding, we did not find health differences between multiple and single job holders in precarious employment in the Netherlands. More longitudinal research is necessary to provide recommendations for policy makers regarding multiple job holders in precarious employment.

Bouwhuis et al. 2019.

PLoS One, vol. 14, no. 9.

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Keywords: Health differences; Single job; Multiple jobs; Precarious employment.

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222217>

Sickness absence and disability pension before and after first childbirth and in nulliparous women: longitudinal analyses of three cohorts in Sweden.

Objective: Childbirth is suggested to be associated with elevated levels of sickness absence (SA) and disability pension (DP). However, detailed knowledge about SA/DP patterns around childbirth is lacking. We aimed to compare SA/DP across different time periods among women according to their childbirth status. Design: Register-based longitudinal cohort study. Setting: Sweden.

Participants: Three population-based cohorts of nulliparous women aged 18-39 years, living in Sweden 31 December 1994, 1999 or 2004 (nearly 500 000/cohort). Outcome measures: Sum of SA >14 and DP net days/year. Methods: We compared crude and standardised mean SA and DP days/year during the 3 years preceding and the 3 years after first childbirth date (Y-3 to Y+3), among women having (1) their first and only birth during the subsequent 3 years (B1), (2) their first birth and at least another delivery (B1+), and (3) no childbirths during follow-up (B0). Results: Despite an increase in SA in the year preceding the first childbirth, women in the B1 group, and especially in B1+, tended to have fewer SA/DP days throughout the years than women in the B0 group. For cohort 2005, the mean SA/DP days/year (95% CIs) in the B0, B1 and B1+ groups were for Y-3: 25.3 (24.9-25.7), 14.5 (13.6-15.5) and 8.5 (7.9-9.2); Y-2: 27.5 (27.1-27.9), 16.6 (15.5-17.6) and 9.6 (8.9-10.4); Y-1: 29.2 (28.8-29.6), 31.4 (30.2-32.6) and 22.0 (21.2-22.9); Y+1: 30.2 (29.8-30.7), 11.2 (10.4-12.1) and 5.5 (5.0-6.1); Y+2: 31.7 (31.3-32.1), 15.3 (14.2-16.3) and 10.9 (10.3-11.6); Y+3: 32.3 (31.9-32.7), 18.1 (17.0-19.3) and 12.4 (11.7-13.0), respectively. These patterns were the same in all three cohorts. Conclusions: Women with more than one childbirth had fewer SA/DP days/year compared with women with one childbirth or with no births. Women who did not give birth had markedly more DP days than those giving birth, suggesting a health selection into childbirth.

Björkenstam et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Child delivery; Childbirth; Cohort study; Disability pension; Postpartum; Pregnancy; Sick leave.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/9/9/e031593.long>

Occupational class differences in long-term sickness absence due to breast cancer during 2005-2013: A population-based study among Finnish women.

Breast cancer is the most common cancer among women in Western countries with clear socioeconomic differences. Higher occupational class is associated with higher breast cancer incidence but with better survival from the disease, whereas lower occupational class is associated with higher risk of sickness absence. We are not aware of previous studies examining changes over time in occupational class differences in sickness absence due to breast cancer. This paper focuses on occupational class differences in the incidence and duration of sickness absence due to breast cancer over the period of 2005-2013. Age-adjusted occupational class differences in the cumulative incidence and duration of sickness absence due to breast cancer were calculated utilising a nationally representative 70% random sample of employed Finnish women aged 35-64 years (yearly N varying between 499,778 and 519,318). The results show that higher occupational class was associated with higher annual cumulative incidence of sickness absence due to breast cancer. Lower occupational class was associated with longer duration of absence. Occupational class differences in both cumulative incidence and duration of absence remained broadly stable. As a conclusion, these results suggest that measures should be targeted particularly to promotion of work capacity among employees with breast cancer in lower occupational classes.

Suur-Uski et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Breast cancer; Occupational class differences; Sickness absence; Trend.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/18/3477>

Risk factors for further sick leave among Japanese workers returning to work after an episode of major depressive disorder: a prospective follow-up study over 1 year.

Objectives: We aimed to investigate the risk factors for further sick leave episodes among Japanese workers returning to work after time off with a major depressive disorder. Design: A prospective study with 1 year of follow-up. Participants: We recruited 103 workers who had returned to work after taking sick leave with a major depressive disorder. Adjusted HRs with 95% CIs were calculated using Cox proportional hazard models to examine the risk of further sick leave. Results: In the adjusted analysis, we show that Social Adaptation Self-evaluation Scale scores (HR 0.95; $p=0.019$), 3-back correct response rate (N-back test) (HR 0.97; $p<0.001$) and benzodiazepine dosage (diazepam equivalent) (HR1.07; $p=0.014$) were associated with further episodes of sick leave. Conclusions: Poorer social and cognitive functioning, together with higher diazepam dosages, were associated with an increased likelihood of additional sick leave.

Hori et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Major depressive disorder; Cognitive function; Return to work; Sick leave; Social functioning.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/9/9/e029705.long>

Work ability

Work ability of military police officers.

Objective: To determine the prevalence of work ability (WA) and describe characteristics of the subgroup with poor WA among military police officers. Methods: A descriptive and cross-sectional study with 329 male military police officers engaged in street patrolling in Salvador, Bahia, Brazil, selected by proportionate stratified sampling. The Work Ability Index and a structured form were used to collect information about age, education, marital status, housing, salary, car ownership, work hours, rank (official or enlisted), drinking, smoking, frequency of vigorous physical activity, and obesity. Data were analyzed by uni and bivariate statistical techniques. Results: The work ability of the 329 military police officers was classified as poor (10.3%), moderate (28.9%), good (34.7%), and excellent (26.1%), with mean score of 37.8 and standard deviation of 7.3 points. Policemen with poor work ability, compared with those with moderate, good or excellent WA, presented higher proportions of individuals who did not own their residences ($p < 0.001$), with work hours above eight hours/day ($p < 0.026$), and obesity ($p < 0.001$). In the subgroup of the 26 policemen who concomitantly did not own their residences, worked more than eight 8 hours/day and were obese, the prevalence of poor work ability was 31.0%. The prevalence of poor WA was 31.0% among the 29 policemen who were simultaneously obese and did not own their residences and of 27.9% among the 43 policemen who were obese and work hours above eight hours/day. Conclusions: A high percentage of military police officers from Salvador presented poor or moderate work ability, which may hamper or compromise their policing activities. The prevalence of poor work ability was higher among the policemen who did not own their residences, worked more than 8 hours/day and were obese.

Barreto et al. 2019.

Revista de Saude Publica, vol. 53, no. 79.

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Keywords: Cross-Sectional Studies; Police; Safety; Work Capacity Evaluation; Working Conditions.

Evidence Level: 4B

Link: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89102019000100272&lng=en&nrm=iso&tlng=en

Monitoring work ability index during a two-year period among Portuguese municipality workers.

In Portugal, little is known about the work ability profiles of municipal workers and their changes during working life. In order to characterize and understand the changes in work ability among municipal workers, a prospective study was designed to begin in 2015 in the municipality of Sintra, in the surroundings of Lisbon, and to collect data every two years. The present paper aims at characterizing the changes in the work ability of those workers between 2015 and 2017 and to identify the main predictors. Data collection was based on a questionnaire that encompassed socio-demographic data, the Copenhagen Psychosocial Questionnaire II (COPSOQ II), the Nordic questionnaire adapted, and the Work Ability Index (WAI). In this two-year period, the work ability of municipal workers decreased and the main predictive factors were age, lower-back pain, negative health perception, the presence of burnout, and making manual efforts. Still, there were factors that act as positive predictors of an excellent work ability, such as having training in the previous two years, a good sense of community at work, and a favorable meaning of work. In summary, the intervention strategies in the work field should take into consideration the main predictors of work ability that are relevant for each organization.

Cotrim et al. 2019.

International Journal of Occupational Medicine and Environmental Health, vol. 16, no. 19.

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Keywords: COPSOQ II; WAI; Municipal workers; Predictive factors; Prospective study.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/19/3674>

Longitudinal associations between fatigue and perceived work ability in Cancer survivors.

Purpose: To examine the associations between changes of fatigue and changes of perceived work ability in cancer survivors. Furthermore, to examine the effects of physical job demands on these associations. **Methods:** Data from a feasibility study on a multidisciplinary intervention to enhance return to work in patients with cancer receiving chemotherapy was used. Fatigue (Multidimensional Fatigue Inventory) and perceived work ability (first item of the Work Ability Index) were assessed at baseline, and after 6, 12, and 18 months. Change scores (S1, S2, S3) from each assessment to the next were calculated, thus encompassing three separate time periods of 6 months. Regression analyses were used to quantify associations between change of perceived work ability and (model 1) change of general fatigue, and (model 2) change of mental and physical fatigue for each 6-month period separately. For model 2, interaction effects of perceived physical job demands were studied. **Results** A total of 89 participants were included for analysis, among which 84% with a diagnosis of breast cancer. On average, in model 1, a reduction of five points on general fatigue was associated with an improvement of one point in perceived work ability in all three 6-month periods. Model 2 showed, similarly, that change of physical fatigue (S1 and S2: $B = -0.225$; $p < .001$ and $B = -0.162$; $p = .012$) and change of mental fatigue (S3: $B = -0.177$; $p = .027$) were significantly inversely associated with change of perceived work ability. Interaction effects were not significant. **Conclusion:** The inverse, longitudinal association between fatigue and perceived work ability supports previous findings from cross-sectional studies and shows potential occupational impact of targeting fatigue in cancer rehabilitation.

Wolwers et al. 2019.

Journal of Occupational Rehabilitation, vol. 29, no. 3.

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Keywords: Cancer survivorship; Chemotherapy; Concentration; Fatigue; Perceived work ability.

Evidence Level: 5B

Link: <https://link.springer.com/article/10.1007%2Fs10926-018-9814-6>

Three out of ten working patients expect no clinical improvement of their ability to perform work-related knee-demanding activities after total knee arthroplasty: A multicenter study.

Purpose: Three out of ten patients do not return to work after total knee arthroplasty (TKA). Patient expectations are suggested to play a key role. What are patients' expectations regarding the ability to perform work-related knee-demanding activities 6 months after TKA compared to their preoperative status? **Methods** A multi-center cross-sectional study was performed among 292 working patients listed for TKA. The Work Osteoarthritis or joint-Replacement Questionnaire (WORQ, range 0-100, minimal important difference 13) was used to assess the preoperatively experienced and expected ability to perform work-related knee-demanding activities 6 months postoperatively. Differences between the preoperative and expected WORQ scores were tested and the most difficult knee-demanding work-related activities were described. **Results:** Two hundred thirty-six working patients (81%) completed the questionnaire. Patients' expected WORQ score (Median = 75, IQR 60-86) was significantly ($p < 0.01$) higher than their preoperative WORQ score (Median = 44, IQR 35-56). A clinical improvement in ability to perform work-related knee-demanding activities was expected by 72% of the patients, while 28% of the patients expected no clinical improvement or even worse ability to perform work-related knee-demanding activities 6 months after TKA. Of the patients, 34% expected severe difficulty in kneeling, 30% in crouching and 17% in clambering 6 months after TKA. **Conclusions:** Most patients have high expectations, especially regarding activities involving deep knee flexion. Remarkably, three out of ten patients expect no clinical improvement or even a worse ability to perform work-related knee-demanding activities 6 months postoperatively compared to their preoperative status. Therefore, addressing patients expectations seems useful in order to assure realistic expectations regarding work activities.

Van Zaanen et al. 2019.

Journal of Occupational Rehabilitation, vol. 29, no. 3.

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Keywords: Knee arthroplasty, total; Patient expectations; Treatment outcome; Vocational rehabilitation; Work ability.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007%2Fs10926-018-9823-5>

Workers' compensation

The quality of the sickness certificate. A case control study of patients with symptom and disease specific diagnoses in primary health care in Sweden.

Objective: To compare information in sickness certificates and rehabilitation activities for patients with symptom diagnoses vs patients with disease specific diagnoses. **Design:** Retrospective case control study 2013-2014. **Setting:** Primary health care, Sweden. **Subjects.** Patients with new onset sickness certificates with symptom diagnoses $n = 222$, and disease specific diagnoses (controls), $n = 222$. **Main outcome measures:** Main parameters assessed were: information about body function and activity limitation in certificates, duration of sick leave, certificate renewals by telephone, diagnostic investigations, health care utilisation, contacts between patients, rehabilitation coordinators, social insurance officers, employers and occurrence of rehabilitation plans. **Results:** Information about body function and activity limitation was sufficient according to guidelines in half of all certificates, less in patients with symptom diagnoses compared to controls

(44% vs. 56%, $p = 0.008$). Patients with symptom diagnoses had shorter sick leave than controls (116 vs. 151 days $p = 0.018$) and more certificates issued by telephone (23% vs. 15% $p = 0.038$). Furthermore, they underwent more diagnostic investigations (32% vs. 18%, $p < 0.001$) and the year preceding sick leave they had more visits to health care (82% vs. 68%, $p < 0.001$), but less follow-up (16% vs. 26%, $p < 0.008$). In both groups contacts related to rehabilitation and with employers were scarce. Conclusion: Certificates with symptom diagnoses compared to disease specific diagnoses could be used as markers for insufficient certificate quality and for patients with higher health care utilisation. Overall, the information in half of the certificates was insufficient and early contacts with employers and rehabilitation activities were in practice missing. KEY POINTS Symptom diagnoses are proposed as markers of sickness certification quality. We investigated this by comparing certificates with and without symptom diagnoses. Certificates with symptom diagnoses lacked information to a higher degree compared to certificates with disease specific diagnoses. Regardless of diagnoses, early contacts between patients, rehabilitation coordinators and social insurance officers were rare and contacts with employers were absent.

Starzmann et al. 2019.
Scandinavian Journal of Primary Health Care vol. 16, no. 9.

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Keywords: Sick leave certification; Diagnoses; General practice; Guideline adherence; Medically unexplained symptoms.

Evidence Level: 5B

Link: <https://www.tandfonline.com/doi/full/10.1080/02813432.2019.1639905>

Disability

Job satisfaction mediates the association between perceived disability and work productivity in migraine headache patients.

Migraine headache is the cause of an estimated 250,000,000 lost days from work or school every year and is often associated with decreased work productivity. The aim of this cross-sectional study was to assess the relationship between perceived disability, job satisfaction and work productivity in patients affected by chronic migraineurs. Participants were 98 consecutive adult outpatients admitted to the Regional Referral Headache Centre of the Sant'Andrea Hospital in Rome, Italy. Patients were administered the Italian Perceived Disability Scale, The Quality of Life Enjoyment and Satisfaction Questionnaire-Work Subscale and The Endicott Work Productivity Scale. Perceived disability is significantly associated with job satisfaction and work productivity. Job satisfaction is significantly related to work productivity and mediates the association between perceived disability and work productivity in patients affected by chronic migraineurs. Our results confirm that patients suffering from migraine headaches who have negative perceptions of their disability are less satisfied with their job, which in turn, decreases their work productivity.

Berardelli et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Health psychology; Job satisfaction; Migraine; Perceived disability; Work productivity.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/18/3341>

Physical and psychosocial work exposures as risk factors for disability retirement due to a shoulder lesion.

Objective: To assess the longitudinal associations of physical and psychosocial exposures with disability retirement due to a shoulder lesion. Methods: In a nationwide register-based study, we followed 1 135 654 wage earners aged 30-59 years for the occurrence of disability retirement due to a shoulder lesion. The occupational exposures were assessed with job exposure matrices. We used a competing risk regression model to estimate HRs and their 95% CIs and to test for the association between the exposures and the outcome. We also calculated the attributable fraction of disability retirement due to occupational exposures. Results: A total of 2472 persons had full disability retirement due to a shoulder lesion during the follow-up. Physically heavy work showed the strongest association with the outcome in both genders, in men with an HR of 2.90 (95% CI 2.37 to 3.55) and in women with an HR of 3.21 (95% CI 2.80 to 3.90). Of the specific physical exposures, working with hands above shoulder level was statistically significantly associated with disability retirement in men. When all physical exposures were taken into consideration, 46% and 41% of disability retirement due to a shoulder lesion were attributed to physical work load factors in men and women, respectively. In addition, 49% (men) and 35% (women) of disability retirement were attributed to psychosocial work-related factors. Conclusions: Our findings suggest that a considerable proportion of disability retirement due to a shoulder lesion could be prevented by reducing physical and psychosocial exposures at work to a low level.

Sirén et al. 2019.

Occupational and Environmental Medicine vol. 76, no. 11.

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Keywords: Epidemiology; Ergonomics; Longitudinal studies; Musculoskeletal; Physical work.

Evidence Level: 4B

Link: <https://oem.bmj.com/content/early/2019/09/17/oemed-2019-105974.long>

Do differences in work disability duration between men and women vary by province in Canada?

Purpose: Research has shown that there are important sex and gender-based differences in the work disability duration of men and women. This research is often limited to single jurisdictions, using different outcome measures, and therefore has limited generalisability of findings. This study examined if differences between work disability of men and women differed by province and by duration of work disability. Methods: Cohorts of injured workers in the Canadian provinces of British Columbia (BC), Manitoba (MB) and Ontario (ON) were analysed using workers' compensation data for work-related injuries occurring between 2007 and 2011. Work disability duration was measured using cumulative days in receipt of disability benefits paid during one-year post-injury. Poisson models with restricted cubic splines tested whether differences between men and women in the likelihood of transitioning off disability benefits varied by duration of work disability in each province, adjusting for confounders. Results: Men transitioned off disability benefits faster than women for claim durations of up to two to four months, after which women transitioned off disability benefits faster until ten months. Differences between men and women were consistent across all jurisdictions. For claims longer than ten months, men transitioned off work disability benefits faster than women in BC and ON, but there were no significant differences between men and women in MB. Conclusions: Differences in the work disability duration between men and women vary by province and duration of work disability. Claims management processes need to be sensitive to differences that men and women face and the timing of interventions.

Macpherson et al. 2019.

Journal of Occupational Rehabilitation, vol. 29, no. 3.

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Keywords: Gender; Occupational health; Rehabilitation; Return-to-work; Workers' compensation.

Evidence Level: 4A

Link: <https://link.springer.com/article/10.1007%2Fs10926-018-9819-1>

Employment and unemployment

Alcohol, tobacco and cannabis use are associated with job loss at follow-up: Findings from the CONSTANCES cohort.

Background: Substance use is more prevalent among unemployed subjects compared to employed ones. However, quantifying the risk subsequent of job loss at short-term according to substance use remains underexplored as well as examining if this association persist across various sociodemographic and occupational positions previously linked to job loss. We examined this issue prospectively for alcohol, tobacco, cannabis use and their combination, among a large population-based sample of men and women, while taking into account age, gender, overall health status and depressive symptoms. Methods: From the French population-based CONSTANCES cohort, 18,879 working participants were included between 2012 and 2016. At baseline, alcohol use disorder risk according to the Alcohol Use Disorders Identification Test (mild, dangerous, problematic or dependence), tobacco (non-smoker, former smoker, 1-9, 10-19, >19 cigarettes/day) and cannabis use (never, not in past year, less than once a month, once a month or more) were assessed. Employment status at one-year (working versus not working) was the dependent variable. Logistic regressions provided Odds Ratios(OR(95%CI)) of job loss at one-year, adjusting for age, gender, self-reported health and depressive state (measured with the Center of Epidemiologic Studies Depression scale). Stratified analyses were performed for education, occupational grade, household income, job stress (measured with the Effort-Reward Imbalance), type of job contract, type of work time and history of unemployment. In sensitivity analyses, employment status over a three-year follow-up was used as dependent variable. Results: Alcohol, tobacco and cannabis use were associated with job loss, from the second to the highest category: 1.46(95%CI:1.23-1.73) to 1.92(95%CI:1.34-2.75), 1.26(95%CI:1.09-1.46) to 1.78(95%CI:1.26-2.54) and 1.45(95%CI:1.27-1.66) to 2.68(95%CI:2.10-3.42), respectively, and with dose-dependent relationships (all p for trend <0.001). When introduced simultaneously, associations remained significant for the three substances without any between-substance interactions. Associations remained significant across almost all stratifications and over a three-year follow-up as well as after adjustment for all the sociodemographic and occupational factors. Conclusions: Alcohol, tobacco and cannabis use were independently associated with job loss at short-term, with dose-dependent relationships. This knowledge will help refining information and prevention strategies. Importantly, even moderate levels of alcohol, tobacco or cannabis use are associated with job loss at short-term and all sociodemographic and occupational positions are potentially concerned

Airagnes et al. 2019.

PLoS One, vol. 14, no. 9.

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Keywords: Alcohol; Cannabis; Employed; Job loss; Tobacco; Unemployed.

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222361>

Enhancing Employer Capability

Organisational support

Links between organizational preparedness and employee action to seek support among a Japanese working population with chronic diseases.

Objectives: This study examined the association between workplace rules and training programs regarding combining employees' work and treatment for chronic diseases, and actions actually taken by employees to manage this issue. These workplace measures (rules and training programs) are consistent with the Japanese Guideline for Workplace Patient Coordination and Disease Treatment. **Methods:** In February 2018, we conducted an online, cross-sectional survey of 1134 employed individuals with chronic diseases who needed workplace support to combine work and disease treatment. All participants were aged 18-65 years and lived in Japan. We investigated associations between workplace rules and training programs (two items) and employee actions (eight items), using a questionnaire based on the guideline and logistic regression analysis. **Results:** In total, 76.5% of the participants said they had reported their chronic disease to their employer (manager, personnel department, or occupational physician). However, less than half (47.5%) had submitted a written report about their job to their doctor. Employees were more likely to take action in workplaces that had rules or training programs than in workplaces without such measures. More actions were taken among employees in workplaces with both rules and training programs than in those with either measure alone. **Conclusion:** It is important to establish rules to support employees with chronic diseases and provide training to improve awareness of these rules to encourage employees with chronic diseases to take action to access the support they need.

Eguchi et al. 2019.

Journal of Occupational Health vol. 61, no. 5.

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Keywords: Chronic disease; Employee retention; Organizational factor; Work participation.

Evidence Level: 4B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12057>

Job design

Work design for airport security officers: Effects of rest break schedules and adaptable automation.

This study investigated whether there is empirical support for the current EU regulation mandating breaks of at least 10 min after each period of 20 min continuously reviewing X-ray images in airport security screening. As a second goal, it examined whether providing more autonomy to airport security officers (in the form of spontaneous rest breaks and adaptable automation) would improve their performance and subjective state. Seventy-two student participants had to indicate the presence (or absence) of a threat item (either a gun or a knife) in a series of grey-scaled X-ray images of cabin baggage. Three work-rest schedules were examined: spontaneous breaks (i.e. participants could take breaks at any time), two 5-min breaks and two 10-min breaks during a 1-h testing session. Furthermore, half of the participants were assisted in their task by an adaptable support system offering three levels of automation: (1) no support, (2) cues indicating the presence of a potential threat item, and (3) cues indicating the exact location of a potential threat item. Results showed no performance differences between break regimes,

which suggests that there may be viable alternatives to the current EU regulations. It also emerged that providing participants with adaptable automation did not lead to better detection performance but resulted in a less positive response bias than participants without automatic support. Implications for current aviation security regulations are discussed.

Chavillaz et al. 2019.

Applied Ergonomics vol. 79.

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Keywords: Adaptable automation; Airport security; Performance; System reliability; Visual inspection.

Evidence Level: 5B

Link: <https://www.sciencedirect.com/science/article/pii/S000368701930064X?via%3Dihub>

Shift work

The effects of a 120-minute nap on sleepiness, fatigue, and performance during 16-hour night shifts: A pilot study.

Objective: To investigate sleepiness, fatigue, and performance following a 120-minute nap during simulated 16-hour night shifts based on subjective and objective assessments. **Methods:** Fourteen females participated in this crossover comparative study. Three experimental nap conditions were used: naps from 22:00 to 00:00 (22-NAP), 00:00 to 02:00 (00-NAP), and 02:00 to 04:00 (02-NAP), respectively. Measurement items were sleep parameters, sublingual temperature, a Visual Analog Scale for sleepiness and fatigue, a single-digit mental arithmetic task (for 10 minutes), and heart rate variability. Participants wore an ActiGraph to estimate their sleep state. **Results:** There was no difference in the sleep parameters at the time of naps among the three conditions. Immediately following a 120-minute nap, sleepiness and fatigue increased, and the number of calculations performed in the single-digit mental arithmetic task decreased in any of the conditions. In particular, immediately after the 02-NAP, fatigue and high-frequency power (HF) were higher than after the 22-NAP. In the early morning (from 05:00 to 09:00), in the 22-NAP, sleepiness and fatigue increased, and performance and sublingual temperature decreased more than in the 00-NAP and 02-NAP. Furthermore, the ratio of errors was significantly lower in the 00-NAP than in the 22-NAP in the early morning. **Conclusions:** A 120-minute nap taken from 22:00 to 02:00 may cause temporary sleepiness after waking, increase fatigue and reduce performance. Greater attention should be given to naps taken at a later time (ie, 02-NAP). In addition, taking a nap starting at 00:00 might decrease the risks of errors in the morning.

Oriyama et al. 2019.

Journal of Occupational Health vol. 61, no. 5.

User License: *Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)* (<https://creativecommons.org/licenses/by-nc/4.0/>)

Keywords: Fatigue; Nurse; Occupational stress; Shift work schedule; Wakefulness.

Evidence Level: 5B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12063>

Dietary interventions for night shift workers: A literature review.

Background: Night shift workers have greater risks of developing cardiometabolic diseases compared to day workers due to poor sleep quality and dietary habits, exacerbated by circadian misalignment. Assessing effects of dietary interventions on health outcomes among this group will highlight gaps for future research. **Methods:** A search of studies was conducted on PubMed,

Cochrane Library, Embase, Embase Classic, Ovid Emcare, and Google Scholar, from earliest to June 2019. The population-intervention-comparator-outcomes-study design format determined inclusion criteria. Results: 756 articles were retrieved; five met inclusion and exclusion criteria. Six-hundred-and-seventy night shift workers were from healthcare, industrial, and public safety industries. Dietary interventions included two longer-term nutrition programs and three shorter-term adjustments of meal composition, type, and timing. Outcome measures were varied but included weight and cardiometabolic health measures. Nutrition programs found no weight improvement at both six and 12 months; low-density lipoprotein (LDL)-cholesterol levels decreased at six months. Triglycerides peaked after meals at 7:30 pm; glucose and insulin area under the curve peaked after meals at 11:30 pm. Conclusions: Weight loss was not achieved in the studies reviewed but LDL-cholesterol improved. Future studies should investigate the effects of energy reduction and altering meal timing on cardiometabolic risk factors of night shift workers in randomised controlled trials, while assessing hunger, sleepiness, and performance.

Phoi et al. 2019.

Nutrients, vol. 11, no. 10.

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Keywords: Diet; Dietary intervention; Night shift; Review; Shift work.

Evidence Level: 6A

Link: <https://www.mdpi.com/2072-6643/11/10/2276>

The risk of night shift workers to the glucose blood levels, saliva, and dental caries.

Objective: This study aimed to provide the correlation of circadian rhythms of night shift workers with blood glucose levels, saliva, and dental caries. **Methods:** This study was conducted on night shift and nonshift workers to measure fasting blood glucose (FBG), 2-hour postprandial blood glucose (2-PP BG), saliva flow rate, pH saliva, and caries with the decay-missing-filled total (DMF-T) index. Data analysis was done using independent t-test and correlation test with Pearson correlation. **Results:** There were significant differences in night shift and nonshift workers in FBG ($p = 0.000$), 2-PP BG ($p = 0.000$), flow rate saliva ($p = 0.000$), and DMF-T index ($p = 0.001$). Correlation test showed positive correlation between FBG and pH saliva ($r = 0.42$, $p = 0.029$) and DMF-T index ($r = 0.521$, $p = 0.005$) of night shift workers. The 2-PP BG also showed positive correlation with pH saliva ($r = 0.493$, $p = 0.009$) and DMF-T index ($r = 0.743$, $p = 0.000$). The DMF-T index showed negative correlation with flow rate saliva ($r = -0.398$, $p = 0.04$). In the nonshift workers, correlation test showed a correlation between FBG and DMF-T index ($r = 0.384$, $p = 0.048$). The DMF-T index showed correlation with flow rate saliva ($r = 0.6$, $p = 0.001$). **Conclusion:** There is a circadian rhythm correlation between night shift workers to blood glucose levels, flow rate saliva, pH saliva, and dental caries.

Roesramadji et al. 2019.

European Journal of Dentistry, vol. 2019.

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Keywords: Circadian rhythm; Dental caries; Glucose blood levels; Night shift workers; Saliva.

Evidence Level: 5B

Link: <https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0039-1697211>

Management and leadership

The effects of training managers on management competencies to improve their management practices and work engagement of their subordinates: A single group pre- and post-test study.

Objectives: The aim of this study was to investigate the effect of a training program for managers on their management competencies and work engagement of their subordinate workers and to investigate the mediating effect of management competencies on the subordinate work environment. **Methods:** A training program, developed based on the UK Health and Safety Executive management competencies framework, was offered to managers in a finance company in Japan. Management competency was assessed at baseline and 1 month after the intervention. Work engagement was assessed at baseline and at a 1-year follow-up. Multilevel correlations between changes in components of management competency and changes in subordinate work engagement were analyzed. **Results:** Although 6 of 12 components of management competency increased significantly following the intervention, significant intervention effect on subordinate work engagement was not found. Among 12 components of management competency, the integrity of managers showed significant multilevel correlation with work engagement of their subordinates. Subgroup analyses revealed that this multilevel correlation increased when a manager and a subordinate differed in gender. **Conclusions:** The results of this study indicated that the training program developed in this study effectively improved the management competency of managers and that integrity of managers may facilitate work engagement of subordinate workers, especially when a manager and a subordinate are of different genders. Thus, a training program focused on improving the integrity of managers could enhance the work engagement of employees.

Adachi et al. 2019.

Journal of Occupational Health.

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Keywords: Management competency; Multilevel analysis; Training program for managers; Work engagement.

Evidence Level: 5B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12085>

When employees are emotionally exhausted due to abusive supervision. A conservation-of-resources perspective.

This study represents an important step towards understanding why supervisors behave abusively towards their subordinates. Building on the conservation of resources theory, this study investigates the impact of abusive supervision on counterproductive work behaviors (CWBs) from a stress perspective. Furthermore, job demands play a significant moderating effect, and emotional exhaustion has a mediating effect on the relationship between abusive supervision and CWBs. A time-lagged design was utilized to collect the data and a total of 350 supervisors-subordinates' dyads are collected from Chinese manufacturing firms. The findings indicate that subordinates' emotional exhaustion mediates the relationship between abusive supervision and CWBs only when subordinates are involved in a high frequency of job demands. Additionally, emotional exhaustion and abusive supervision were significantly moderated by job demands. However, the extant literature has provided that abusive supervision has detrimental effects on employees work behavior. The findings of this study provide new empirical and theoretical insights into the stress perspectives. Finally, implications for managers and related theories are discussed, along with the boundaries and future opportunities of this study.

Akram et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Abusive supervision; Conservation of resources theory; Counterproductive Work behavior; Emotional exhaustion; Job demands.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/16/18/3300>

Adapting to the Future of Work

Technology

Workaholism, intensive smartphone use, and the sleep-wake cycle: A multiple mediation analysis.

Recent contributions have reported sleep disorders as one of the health impairment outcomes of workaholism. A possible factor affecting the sleep-wake cycle might be the intensive use of smartphones. The current study aimed to explore the role of intensive smartphone use in the relationship between workaholism and the sleep-wake cycle. Two serial multiple mediation models were tested on a sample of 418 employees, who filled self-report questionnaires measuring workaholism, use of smartphones, sleep quality and daytime sleepiness, using conditional process analysis for testing direct and indirect effects. Results supported our hypotheses regarding two serial multiple mediation models-that intensive smartphone use and poor sleep quality mediated the relationship between workaholism and daytime sleepiness, and that smartphone use and daytime sleepiness mediated the relationship between workaholism and poor quality of sleep. Although the use of a cross-sectional design and the snowball technique for collecting data can be considered as possible limitations, the current study is one of the first to document the potential detrimental role of the intensive smartphone use on the workaholism-sleep disorders relationship.

Spagnoli et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Intensive smartphone use; Sleep-wake cycle; Workaholism.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/19/3517>

Work environment

Impacts of climate change on outdoor workers and their safety: some research priorities.

The literature on the potential impacts of climate change on the health of outdoor workers has received limited attention as a whole, and in sub-Saharan African countries in particular. Yet, substantial numbers of workers are experiencing the health effects of elevated temperature, in combination with changes in precipitation patterns, climate extremes and the effects of air pollution, which have a potential impact on their safety and wellbeing. With increased temperatures within urban settlements and frequent heat waves, there has been a sudden rise in the occurrence of heat-related illness leading to higher levels of mortality, as well as other adverse health impacts. This paper discusses the impacts of extreme heat exposure and health concerns among outdoor workers, and the resultant impacts on their productivity and occupational safety in tropical developing countries with a focus on Sub-Saharan Africa, where there is a dearth of such studies. Aside from the direct effects caused by extreme heat exposure, other indirect health hazards associated with increasing heat among this group includes exposures to hazardous chemicals and other vector-borne diseases. In addition, reduced work capacity in heat-exposed jobs will continue to rise and hinder economic and social development in such countries. There is an urgent need for further studies around the health and economic impacts of climate change in the workplace, especially in tropical developing countries, which may guide the implementation of the measures needed to address the problem.

Moda et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Adaptation strategy; Developing countries; Heat stress; Outdoor workers; Research.

Evidence Level: 6B

Link: <https://www.mdpi.com/1660-4601/16/18/3458>

A qualitative study on employees' experiences of a support model for systematic work environment management.

Background: The aim is to explore how an organisational work environment support model, the Stamina model, influences employees' work situations and the development of sustainable work systems. Methods: It was a qualitative study with semi-structured, focus-group interviews, including 45 employees from six work groups. Eighteen focus group interviews were conducted over a period of two years. Data were analysed with constant comparative method. Results: The core category, shifting focus from an individual to an organisational perspective of work, illustrated how communication and increased understanding of one's work tasks changed over time and contributed to deeper focus on the actual operation. These insights were implemented at different time points among the work groups during the two-year process. Conclusions: Our results indicate that working with the model engages employees in the work environment management, puts emphasis on reflections and discussions about the meaning and purpose of the operations and enables a shared platform for communication. These are important features that need to continue over time in order to create a sustainable work system. The Stamina model, thus seems to have the potential to promote productive and healthy work places.

Hellman et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Employee participation; Occupational health; Work environment.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/16/19/3551>

Ageing workforce

Challenges for the labor market: 2 complementary approaches to premature cessation of occupational activity.

Objectives: Current demographic trends, such as society aging, the spreading of chronic diseases, as well as early retirement choices, lead to the dwindling labor market population. Taking into consideration the foregoing tendencies and their consequences, the issue of the shrinking labor force resources seems to be the most important challenge for the labor market. In response to it, this paper identifies individual and institutional causes of withdrawal from the labor market and explores the views of Polish stakeholders on existing strategies for the occupational re-integration of persons with chronic diseases (PwCDs). Methods: Results of 2 European projects: "Participation to Healthy Workplaces and Inclusive Strategies in the Work Sector" (the PATHWAYS project) and "The Collaborative Research on Aging in Europe" (COURAGE in Europe) complemented each other. The cross-sectional population data and data from stakeholders' interviews were used. Results: The authors identified several causes which could encourage people to withdraw from the labor market before attaining the official retirement age at 3 different levels: individual, occupational, and institutional. Although research has shown that the macro-level situation is crucial to staying occupationally active, in Poland stakeholders have reported the lack of effective coordination in the implementation of policies for the occupational re-integration of PwCDs. Conclusions: A

decision to cease work prematurely reflects a combination of many different factors, such as individual determinates, work characteristics, personal convictions, and systemic solutions. The study demonstrated that, despite the awareness of the dwindling resources of labor force, the employment-related challenges faced by PwCDs as well as people who are close to the retirement age remain unaddressed.

Pilat et al. 2019.

International Journal of Occupational medicine and Environmental Health, vol. 32, no. 5.

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Keywords: Chronic disease; Early exit from work; Early retirement; Labor force; Older workers

Evidence Level: 5B

Link: <http://ijomeh.eu/Challenges-for-Polish-labour-market-two-complementary-approaches-to-premature-cessation,110805,0,2.html>

To leave or not to leave? A multi-sample study on individual, job-related, and organizational antecedents of employability and retirement intentions.

In view of the aging and dejuvenation of the working population and the expected shortages in employees' skills in the future, it is of utmost importance to focus on older workers' employability in order to prolong their working life until, or even beyond, their official retirement age. The primary aim of the current study was to examine the relationship between older workers' employability (self-)perceptions and their intention to continue working until their official retirement age. In addition, we studied the role of potential antecedents of their perceived employability at three different levels: training and education in current expertise area as well as in an adjacent expertise area (individual level factor), learning value of the job (job level factor), and organizational career management practices (organizational level factor). Data were collected by means of e-questionnaires that were distributed among two groups of Dutch older (45-plus) white collar workers. The samples consisted of 223 employees of an insurance company, and 325 university workers, respectively. Our research model was tested separately in each sample using Structural Equation Modeling. We controlled for effects of respondents' (self-)perceived health and (self-)perceived financial situation. Similar results were found for both samples. First, the relationship of perceived employability with the intention to continue working until one's retirement age was positive, whereas the relationship between a perceived good financial situation with the intention to continue working until one's retirement age was negative. Secondly, as regards the potential antecedents, results showed that the learning value of the job was positively related to perceived employability. In addition, an employee's perception of good health is a relevant correlate of perceived employability. So, whereas perceived employability contributes to the intention to continue working until one's retirement age, a good financial situation is a push factor to retire early. In order to promote the labor participation of older workers, this study indicates that organizations should focus on the learning possibilities that are inherent to one's job rather than on providing additional training or career management. Further research is needed to test the generalizability of our results to other samples.

Le Blanc et al. 2019.

Frontiers in Psychology, vol. 10.

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Keywords: Employability; Financial situation; Health; Learning value of the job; Older workers; Organizational career management practices; Retirement intentions; Training and education.

Evidence Level: 4B

Link: <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02057/full>

Psychosocial work demands and physical workload decrease with ageing in blue-collar and white-collar workers: a prospective study based on the SLOSH cohort.

Objectives: Psychosocial work demands and physical workload are important causes of ill health. The dramatic demographic changes in society make it important to understand if such factors change with ageing, but this is presently not known. The purpose of the present study was to investigate whether psychosocial work demands and physical workload change across 8 years of ageing, whether occupational groups show different trajectories of change and if such trajectories are reflected in sleep or fatigue. Methods: A cohort of 5377 participants (mean age: 47.6±11.6 (SD) years, 43.2% males, 40.2% blue-collar workers) was measured through self-report in five biannual waves across 8 years. Mixed model regression analyses was used to investigate change across ageing. Results: Psychosocial work demands decreased significantly across 8 years (Coeff: -0.016±0.001), with the strongest decrease in the high white-collar group (Coeff=-0.031±0.003) and the oldest group. Physical workload also decreased significantly (Coeff=-0.032±0.002), particularly in the blue-collar group (Coeff=-0.050±0.004) and in the oldest group. Fatigue decreased, and sleep problems increased with ageing, but with similar slopes in the occupational groups. All effect sizes were small, but extrapolation suggests substantial decreases across a working life career. Conclusions: The decrease in psychosocial work demands and physical workload suggests that the burden of work becomes somewhat lighter over 8 years. The mechanism could be 'pure' ageing and/or increased experience or related factors. The gradual improvement in the work situation should be considered in the discussion of the place of older individuals in the labour market, and of a suitable age for retirement. The results also mean that prospective studies of work and health need to consider the improvement in working life with ageing.

Åkerstedt et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Aging; Fatigue; Occupational group; Physical workload; Sleep; Stress; Work demands.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/9/9/e030918.long>

Understanding the occupational adaptation process and well-being of older adults in Magallanes (Chile): A qualitative study.

Background: Aging and longevity are important topics nowadays. Purpose: To describe how older adults perform the occupational adaptation process in the extreme region of Magallanes (Chile), and to identify the factors that might contribute to successful occupational adaptation and well-being. Method: Qualitative study, with a phenomenological interpretative approach. In-depth interviews were carried out with 16 older adults, with high or low levels of well-being, assessed with the Ryff Scale. An inductive content analysis according to Elo and Kyngäs was performed. Findings: Resilience, self-esteem and interdependence with significant others are key elements that promote well-being. Participants develop strategies to minimize the effects of environmental factors. The occupation's function in terms of socialization, use of time, and social participation is revealed as a conditioning factor of occupational adaptation. Implications: Interventions with older people to achieve a successful occupational adaptation process must take into consideration the commitment to meaningful activities.

Palma-Candia et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Adaptation; Aging; Life change events; Psychological.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/16/19/3640>

Networking of occupational health care units promotes reduction of permanent disability pensions among workers they care: A register-based study controlled by benchmarking with a 5-year follow-up.

Objectives: Early retirement due to disability is a problem in Finland. That causes pension costs that are heavy for the society. This study was designed to find out whether a quality network can support the reduction in incident disability pensions and promote a shift from full to partial disability pensions. **Methods:** The study population (N = 41 472 in 2016) consisted of municipal employees whose occupational health care (OHC) was provided by the members of the Finnish Occupational Health Quality Network (OQN). The comparison population consisted of all municipality employees whose OHC was provided by non-members of the OQN (N = 340 479 in 2016). The outcomes were measured by comparing the trends in incident disability pensions of full and partial permanent pension and full and partial provisional pension, partial/full pension indexes from 2011 to 2016 according to the principles of Benchmarking Controlled Trials. Linear regression models were used to explore the dynamics of different pension forms. Regression coefficients were calculated to show the average change per year. **Results:** The incidence of permanent disability pensions decreased faster in the study population (P for trend .03) and the study group showed a stronger shift from full to partial permanent pensions (P for trend <.001). **Conclusion:** Quality networking between OHC units including common goal setting, systematic quality improvement, and repeated quality measurements decreased new permanent disability pensions and increased partial permanent pensions. Such changes are important while thriving for increased work participation.

Kuronen et al. 2019.

Journal of Occupational Health, vol. 00.

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Keywords: Benchmarking; Disability pension; Networking; Outcome; Quality improvement.

Evidence Level: 4B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12087>

Strong labour market inequality of opportunities at the workplace for supporting a long and healthy work-life: the senior working life study.

Most European countries are gradually increasing the state pension age, but this may run counter to the capabilities and wishes of older workers. The objective of this study is to identify opportunities in the workplace for supporting a prolonged working life in different groups in the labour market. A representative sample of 11,200 employed workers ≥ 50 years responded to 15 questions in random order about opportunities at their workplace for supporting a prolonged working life. Respondents were stratified based on the Danish version of the International Standard Classification of Occupations (ISCO). Using frequency and logistic regression procedures combined with model-assisted weights based on national registers, results showed that the most common opportunities at the workplace were possibilities for more vacation, reduction of working hours, flexible working hours, access to treatment, further education and physical exercise. However, ISCO groups 5-9 (mainly physical work and shorter education) had in general poorer access to these opportunities than ISCO groups 1-4 (mainly seated work and longer education). Women had poorer access than men, and workers with reduced work ability had poorer access than those with full work ability. Thus, in contrast with actual needs, opportunities at the workplace were lower in occupations characterized by physical work and shorter education,

among women and among workers with reduced work ability. This inequality poses a threat to prolonging working life in vulnerable groups in the labour market.

Andersen et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Aging; Occupational health; Public health; Senior worker; Sustainable employment; Workplace.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/18/3264>

Exerting explanatory accounts of safety behavior of older construction workers within the theory of planned behavior.

Older construction workers are vulnerable to accident risks at work. Work behavior affects the occurrence of accidents at construction sites. This study aims to investigate the organizational and personal factors that underlie the safety behaviors of older construction workers considering their age-related characteristics. A cross-sectional questionnaire survey, which involves 260 older construction workers (aged 50 and over), was conducted, and an integrative old-construction-worker safety behavior model (OSBM) was established on the basis of the theory of planned behavior (TPB). Results showed that the OSBM provides a considerably good explanation of the safety behaviors of older construction workers. The explained variances for safety participation and compliance are 74.2% and 63.1%, respectively. Subjective norms and perceived behavioral control are two critical psychological drivers that proximally affect the safety behaviors of workers. Moreover, safety knowledge, management commitment, and aging expectation are the distal antecedents that significantly influence psychological drivers. This study proves the mediating role of psychological factors on predicting safety behaviors among older construction workers, thereby promoting an understanding of "how" and "why" their safety behaviors occur. Furthermore, the identified effects of several critical organizational and personal factors, particularly age-related factors, provide new insights into the safety behaviors of older construction workers.

Peng et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Older construction worker; Organizational and personal factors; Safety behavior; Theory of planned behavior.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/16/18/3342>

Impact of transition in work status and social participation on cognitive performance among elderly in India.

Introduction: Transition to the old age marks a change in work and social participation. Socio-economic and physical conditions arising from this change pose a risk for cognitive outcomes among the elderly. Gender shows different pathways to deal with the pattern of participation and to maintain cognitive health. In India, work participation in the old age is an outcome of financial deprivations and lack of support. At the same time, alterations in social interactions can induce stress and precipitate cognitive decline in old age. A dearth of studies in this domain motivates us to estimate the effect of change in work and social participation on cognitive performance of the elderly in the Indian context. Methods: The study has used the cross-sectional data on 5212 elderly from the World Health Organization's study on global ageing and adult health (Wave 1) (2007-08) in India. A composite score for cognition was generated. Interaction between gender, work status and social participation with respect to cognition was performed using multivariate

linear regression. A linear prediction of the cognitive scores across all levels of social participation was post-estimated thereafter. Results: The study found that the elderly who were 'presently working' and showed 'more' social participation had a higher mean score for cognitive performance than their counterparts. Results of regression did not indicate any gender interaction with work or social participation. Participation in social activities 'sometimes' by those who were 'retired' or 'presently working' showed a positive and significant co-efficient with cognition among respondents. The post-estimated values for cognition specified that 'retired' and 'presently working' elderly had higher cognition scores. In the age group of 60-69 years, cognition scores were higher for those who were 'retired' and did 'more' social participation as compared to the other elderly. Conclusion: Cognitive aging is attenuated by higher participation in work and social activities. Adequate financial schemes or the pension system can protect the elderly from developing further stress. Retirement at an appropriate age, along with a reasonable amount of social participation, is a boon for cognitive wellbeing. Hence, building more support can contain the detrimental effect of participation restriction on cognitive outcome among elderly.

Chanda et al. 2019.

BMC Geriatrics, vol. 19, no. 1.

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Keywords: Cognition; Depression; Elderly; Retirement; Social participation.

Evidence Level: 4B

Link: <https://bmgeriatr.biomedcentral.com/articles/10.1186/s12877-019-1261-5>

The influence of multi-morbidity on the work ability of ageing employees and the role of coping style.

Purpose: With an ageing workforce, employees are increasingly confronted with multi-morbidity. Especially physical and mental health problems often occur together. This study aims to (i) explore the effect of multi-morbidity on work ability of ageing employees, more specifically the effects of the number of health problems and the combination of physical and mental health problems, and to (ii) explore to what extent the effects of physical and mental health problems on work ability are explained by applying differing coping styles. Methods: A 1 year follow up study (2012-2013) was conducted among 7175 employees aged 45-64 years. Linear regression analyses were conducted to examine longitudinal relationships between multi-morbidity, coping styles and work ability. To determine whether coping styles mediate the effects of multi-morbidity on work ability, Sobel tests were conducted. Results A higher number of health problems was related to poorer work ability, but this negative effect stabilized from three health problems onwards. The combination of physical and mental health problem(s) was more strongly related to poorer work ability than only physical health problems. The negative relation between physical health problems and work ability was partly suppressed by active coping, while the negative relation between the combination of physical and mental health problem(s) on work ability was partly explained by avoidant coping. Conclusions: Ageing employees with multi-morbidity have a reduced work ability, especially when mental health problems are present. The greater negative effects of the combination of physical and mental health problems on work ability are partially due to unfavorable coping styles.

Kadijk et al. 2019.

Journal of Occupational Rehabilitation, vol. 29, no. 3.

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Keywords: Multi-morbidity; Work ability; Aging employees; Coping.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007%2Fs10926-018-9811-9>

Reciprocal associations between job strain and depression: A 2-year follow-up study from the Survey of Health, Ageing and Retirement in Europe.

Background: A growing number of people suffered from depression. This study examined the depression prevalence in workers across 10 European countries plus Israel and the reciprocal associations between job strain and depression. Methods: The study population consisted of 7,879 workers aged 50-63 years at baseline (2004) from the Survey of Health, Ageing, and Retirement in Europe (SHARE). Job demands (physical or psychosocial) and job control variables were derived from the Job Content Questionnaire (JCQ). Two 4-category job strains (physical and psychosocial) were obtained based on the cross-tabulation of these dichotomized demands and control variables. There were 4,284 depression-free, 3,259 high physical strain-free and 3,195 high psychosocial strain-free participants at baseline who were followed up for 2 years to detect incident depression, high physical job strain, or high psychosocial strain, respectively. The reciprocal associations between job strain and depression were analyzed by multivariate logistic regression and multivariate multilevel logistic regression adjusting for potential confounders. Results: The prevalence of depression varied from the lowest 12.5% in Germany to the highest 27.2% in France. Compared to individuals with low strain, a significantly higher risk of depression were found in individuals with high physical strain (OR = 1.39) and high psychosocial strain (OR = 1.55), after adjusting for potential confounders. Depression at baseline was not significantly associated with subsequent high job strain. Similar results were observed from multilevel models that took into consideration of the potential country-level influences. Conclusions: The prevalence of depression varies across countries in Europe. Avoiding high job strain may be an effective preventive strategy to prevent depression epidemic.

Qiao et al. 2019.

Brain and Behavior vol. 16, no. 9.

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Keywords: Depression; Job strain; Older workers.

Evidence Level: 4B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/brb3.1381>

Guiding and Supporting Mental Health and Wellbeing

Mental health

A collaboration between game developers and rehabilitation researchers to develop a web-based App for persons with physical disabilities: Case study.

Background: Individuals with a disability and their partners, who often provide care, are both at risk for depression and lower quality of life. Mobile health (mHealth) interventions are promising to address barriers to mental health care. Rehabilitation researchers and software development researchers must collaborate effectively with each other and with clinical and patient stakeholders to ensure successful mHealth development. Objective: This study aimed to aid researchers interested in mHealth software development by describing the collaborative process between a team of rehabilitation researchers, software development researchers, and stakeholders. Thus, we provide a framework (conceptual model) for other teams to replicate to build a Web-based mHealth app for individuals with physical disability. Methods: Rehabilitation researchers, software development researchers, and stakeholders (people with physical disabilities and clinicians) are involved in an iterative software development process. The overall process of developing an mHealth intervention includes initial development meetings and a co-design method called design

box, in which the needs and key elements of the app are discussed. On the basis of the objectives outlined, a prototype is developed and goes through scoping iterations with feedback from stakeholders and end users. The prototype is then tested by users to identify technical errors and gather feedback on usability and accessibility. Results: Illustrating the overall development process, we present a case study based on our experience developing an app (SupportGroove) for couples coping with spinal cord injury. Examples of how we addressed specific challenges are also included. For example, feedback from stakeholders resulted in development of app features for individuals with limited functional ability. Initial designs lacked accessibility design principles made visible by end users. Solutions included large text, single click, and minimal scrolling to facilitate menu navigation for individuals using eye gaze technology. Prototype testing allowed further refinement and demonstrated high usability and engagement with activities in the app. Qualitative feedback indicated high levels of satisfaction, accessibility, and confidence in potential utility. We also present key lessons learned about working in a collaborative interdisciplinary team. Conclusions: Health promises to help overcome barriers to mental health intervention access. However, the development of these interventions can be challenging because of the disparate and often siloed expertise required. By describing the mHealth software development process and illustrating it with a successful case study of rehabilitation researchers, software development researchers, and stakeholders collaborating effectively, our goal is to help other teams avoid challenges we faced and benefit from our lessons learned. Ultimately, good interdisciplinary collaboration will benefit individuals with disabilities and their families.

Terrill et al. 2019.

JMIR Rehabilitation and Assistive Technologies, vol. 6, no. 2.

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Keywords: Interdisciplinary health team; Internet; Rehabilitation; Software design; Spinal cord injury.

Evidence Level: 5A

Link: <https://rehab.imir.org/2019/2/e13511/>

Stakeholder perspectives on evidence for digital mental health interventions: Implications for accreditation systems.

Background: Digital mental health interventions can be effective for treating mental health problems, but uptake by consumers and clinicians is not optimal. The lack of an accreditation pathway for digital mental health interventions is a barrier to their uptake among clinicians and consumers. However, there are a number of factors that may contribute to whether a digital intervention is suitable for recommendation to the public. The aim of this study was to identify the types of evidence that would support the accreditation of digital interventions. Method: An expert workshop was convened, including researcher, clinician, consumer (people with lived experience of a mental health condition) and policymaker representatives. Results: Existing methods for assessing the evidence for digital mental health interventions were discussed by the stakeholders present at the workshop. Empirical evidence from randomised controlled trials was identified as a key component for evaluating digital interventions. However, information on the safety of users, data security, user ratings, and fidelity to clinical guidelines, along with data from routine care including adherence, engagement and clinical outcomes, were also identified as important considerations when evaluating an intervention. There are considerable challenges in weighing the evidence for a digital mental health intervention. Conclusion: Empirical evidence should be the cornerstone of any accreditation system to identify appropriate digital mental health interventions. However, robust accreditation systems should also account for program and user safety, user engagement and experience, and fidelity to clinical treatment guidelines.

Batterham et al. 2019.

Digital Health, vol. 5.

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Keywords: Internet interventions; Accreditation; Apps; Dissemination.

Evidence Level: 5A

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6755623/>

"Woulda, Coulda, Shoulda". Workers' proactivity in the association between emotional demands and mental health.

The present study aimed to explore the mediating role of hostile customer relations in the association between emotional dissonance and workers' mental health. Moreover, the moderating role of proactive personality as a buffer against hostile customer relations was assessed. Emotional demands become crucial within professions that involve a direct relationship with clients and, if poorly managed, can negatively affect workers' health and performance. Accordingly, data were collected on a sample of $n = 918$ mass-retail employees working for one of the leading Italian supermarket companies. Most participants were women (62.7%) with a mean age = 40.38 (SD = 7.68). The results of a moderated mediation analysis revealed that emotional dissonance was related to more hostile customer relations that, in turn, were associated with higher rates of mental health symptoms. Proactive personality emerged as a protecting factor that prevented the onset of conflicts with clients, particularly among workers experiencing high levels of emotional dissonance. The identification of resources enabling management of emotional demands could suggest suitable adaptive strategies for customer-facing roles, thus preventing the occurrence of adverse mental health symptoms.

Mazzetti et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Customer relations; emotional dissonance; Emotions; Mental health; Proactivity; Retail distribution sector.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/16/18/3309>

Bullying and harassment

You have to be twice as good and work twice as hard: a mixed-methods study of perceptions of sexual harassment, assault and women's leadership among female faculty at a research university in the USA.

Introduction: The purpose of this study was to examine the perceptions of institutional policies and practices for the prevention of and response to gender inequities as experienced by female faculty working in the health sciences at a US research university. **Methods:** Data from the institution's Faculty Campus Climate Survey ($n = 260$ female faculty) were coupled with qualitative interviews ($n = 14$) of females in leadership positions, exploring campus climate, and institutional policies and practices aimed at advancing women. **Results:** Two-thirds (59%) of the female faculty respondents indicated witnessing sexual harassment and 28% reported experiencing sexual harassment. Several organizational themes emerged to address this problem: culture, including cultural change, transparency, and accountability. **Conclusions:** The findings reveal the ways in which university culture mimics the larger societal context. At the same time, the distinct culture of higher education processes for recruitment, career advancement - specifically tenure and promotion - are identified as important factors that require modifications in support of reductions in gender inequalities.

Evans et al. 2019.

Global Health, Epidemiology and Genomics, vol. 4.

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Keywords: Gender; Leadership; Medicine; Public health.

Evidence Level: 5B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6728930/>

The JDCS model and blue-collar bullying: Decent working conditions for a healthy environment.

A Violence in the workplace and its health consequences still represent one of the main obstacles to obtaining decent working conditions. In particular, blue-collar workers run a greater risk of experiencing episodes of violence, also because of a lack of autonomy and fewer social interactions. According to the work environment hypothesis, factors such as high workload, lack of social support and lack of job control represent the antecedents of workplace bullying. Following the job demand-control-support model (JDCS), violence can be the symptom of a high-strain environment. Moreover, it is still unclear if workplace bullying can mediate the effects of work-related stress on workers' health outcomes. The aim of the present study is to analyse the relationship between the components of the JDCS and the health of the workers considering workplace bullying as a mediating variable. By a cross sectional study design, we tested the following theoretical hypotheses: first, JDCS components (conceptualized as stress) are supposed to significantly predict the level of workers' health. Second, workplace bullying is supposed to mediate the relationship between the JDCS components and the level of health. The sample consists of 400 blue-collars from three different Italian companies. Work-related stress, health outcomes and workplace bullying were measured by specific self-administered questionnaires and the relationships between the variables of interest were tested through a structural equation model (SEM) analysis. The results showed that while the direct relationship between the components of the JDCS and the level of psychological health is weaker (standardized path coefficients $SPC = 0.21$), the partial mediation hypothesis shows that workplace bullying mediate the relationship between JDCS components and health outcomes (χ^2/df ratio = 2.70; path from stress to workplace bullying $SPC = 0.78$; path from workplace bullying to general health $SPC = 0.51$; $p = 0.01$). The JDCS components (workload, lack of control, lack of support) are useful predictors for workplace bullying. On the other hand, bullying plays a mediating role between the stress experienced and the health consequences. The present study adds new insights into the relationship between violence seen as a form of social behavioural strain and the psychological health of workers. The theoretical and practical implications are discussed. Future research on blue-collars could use longitudinal designs in order to analyse the relationship between social environment, job design and strain reactions.

Finstad et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Blue-collars; Job strain; Psychological health; Work-related stress; Workplace bullying.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/18/3411>

Job demands as risk factors of exposure to bullying at work: The moderating role of team-level conflict management climate.

Conflict management climate is an important organizational resource that is theorized to prevent interpersonal frustration from escalating into harsh interpersonal conflicts and even workplace bullying. The present study investigates whether team-level perceptions of conflict management climate moderate the relationship between previously investigated psychosocial predictors of

workplace bullying (i.e., role conflicts, workload, cognitive demands) and perceived exposure to bullying behaviors in the workplace. We collected data from crews on ferries operating on the Norwegian coastline consisting of 462 employees across 147 teams. As hypothesized, multilevel analyses showed positive main effects of role conflict and cognitive demands (but not workload) on exposure to bullying behaviors. Also, the hypothesized moderation effect of team-level conflict management climate on the relationship between individual-level job demands and exposure to bullying behaviors was significant for role conflict and cognitive demands, but not for workload. Specifically, the positive relationships between the two job demands and exposure to bullying behaviors were stronger for employees working in teams with a weak (vs. a strong) conflict management climate. These findings contribute to the bullying research field by showing that conflict management climate may buffer the impact of stressors on bullying behaviors, most likely by preventing interpersonal frustration from escalating into bullying situations.

Zahlquist et al. 2019.

Frontiers in Psychology, vol. 10.

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Keywords: Cognitive demands; Conflict management climate; Role conflict; Workload; Workplace bullying.

Evidence Level: 4B

Link: <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02017/full>

Workplace stress – risk factors

Stress at intellectual work and cardiovascular diseases in women at non-mobility working age.

Introduction: Stress at the workplace reduces efficiency, as well as increasing accidents and absences, which may cause various diseases, including cardiovascular diseases. The aim of the study is an analysis of the prevalence and causes of stress in intellectual work, and its correlation with the prevalence of cardiovascular diseases in women at non-mobility working age. Methods: The study was conducted in 2016-2017 in a group of 300 women aged 45-60 in non-manual employment. A questionnaire for subjective job evaluation was used. Logistic regression models for the occurrence of CVDs versus frequency of occurrence of individual causes of work stress among the respondents were estimated. Results: Women at non-mobility working age with non-manual employment are especially exposed to stress, half of them experience high level of stress at work, most often caused by social contacts and lack of rewards and support. Cardiovascular diseases were found in 26.5% of the women studied who were also significantly higher exposed to the occurrence of health hazards due to exposure to harmful factors, or due to an accident at work, changes in the workplace, the need to compete with others, and the need to perform the task despite the lack of appropriate material resources, compared with women without such diseases. Conclusions: The study revealed a high prevalence of occupational stress in non-manual employment, indicated its main causes that correlated with the prevalence of cardiovascular diseases. Actions are needed to reduce the level of stress in the work of women at non-mobility working age, to maintain their work ability and quality of life.

Rackiewicz et al. 2019.

Annals of Agricultural and Environmental Medicine, vol. 26, no. 3.

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Keywords: Cardiovascular diseases; Non-mobility working age; Stress at work.

Evidence Level: 4B

Link: <http://www.aem.pl/Stress-at-intellectual-work-and-cardiovascular-diseases-in-women-at-non-mobility,105142,0,2.html>

Multicohort study of change in job strain, poor mental health and incident cardiometabolic disease.

Objectives: Several recent large-scale studies have indicated a prospective association between job strain and coronary heart disease, stroke and diabetes. Job strain is also associated with poorer mental health, a risk factor for cardiometabolic disease. This study investigates the prospective relationships between change in job strain, poor mental health and cardiometabolic disease, and whether poor mental health is a potential mediator of the relationship between job strain and cardiometabolic disease. **Methods:** We used data from five cohort studies from Australia, Finland, Sweden and UK, including 47 757 men and women. Data on job strain across two measurements 1-5 years apart (time 1 (T1)-time 2 (T2)) were used to define increase or decrease in job strain. Poor mental health (symptoms in the top 25% of the distribution of the scales) at T2 was considered a potential mediator in relation to incident cardiometabolic disease, including cardiovascular disease and diabetes, following T2 for a mean of 5-18 years. **Results:** An increase in job strain was associated with poor mental health (HR 1.56, 95% CI 1.38 to 1.76), and a decrease in job strain was associated with lower risk in women (HR 0.70, 95% CI 0.60-0.84). However, no clear association was observed between poor mental health and incident cardiometabolic disease (HR 1.08, 95% CI 0.96-1.23), nor between increase (HR 1.01, 95% CI 0.90-1.14) and decrease (HR 1.08, 95% CI 0.96-1.22) in job strain and cardiometabolic disease. **Conclusions:** The results did not support that change in job strain is a risk factor for cardiometabolic disease and yielded no support for poor mental health as a mediator.

Magnusson Hanson et al. 2019.

Occupational and Environmental Medicine.

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(<https://creativecommons.org/licenses/by-nc/4.0/>)

Keywords: Cardiovascular; Diabetes mellitus; Mental health; Meta-analysis; Stress.

Evidence Level: 4B

Link: <https://oem.bmj.com/content/early/2019/09/05/oemed-2018-105595.long>

Cross-sectional survey on the relationship between occupational stress, hormone levels, and the sleep quality of oilfield workers in Xinjiang, China.

The impact of psychosocial factors on health has received increased attention. This study employed a multi-stage hierarchical cluster sampling method and a cross-sectional survey was conducted from March to August 2017. By studying 2116 oilfield workers based in Karamay, Xinjiang, the relationship between occupational stress, blood hormone levels, and sleep was analyzed. Occupational stress was measured using the internationally accepted Occupational Stress Inventory Revised Edition (OSI-R) questionnaire and sleep disorders were measured using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. The study found that the sleep quality of respondents was not high and the incidence of sleep disorders was 36.67%. The higher the level of occupational stress, the higher the incidence of sleep disorders. Irregular shifts can affect sleep quality and individuals with high-level professional titles experience a higher incidence of sleep disorders than those with low-level titles. The total score of the PSQI was different among the low, medium, and high stress groups. The higher the level of stress, the higher the scores of subjective sleep quality, sleep disorder, and daytime dysfunction. The scores of the PSQI, subjective sleep quality, sleep time, sleep disturbance, and daytime dysfunction in the high-stress group were higher than those in the low stress group. A case-control study found that the concentration of glucocorticoids in the sleep disorder positive group was lower than that in the sleep disorder negative group. The results of the regression analysis showed that glucocorticoid is a protective factor for sleep disorders (OR = 0.989, 95% CI: 0.983-0.995), suggesting that the higher the level of

glycosaminoglycan, the less likely the subject is to have sleep disorders. For example, in the case of high occupational stress, the interaction between low and moderate occupational stress levels and glucocorticoids is a protective factor for sleep disorders.

Li et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Glucocorticoid; Occupational stress; Oilfield workers; Sleep quality.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/18/3316>

Occupational stress among field epidemiologists in field epidemiology training programs from the public health sector.

Despite the high-demand work environment for field epidemiologists in field epidemiology training programs, little is known about their occupational stress. To identify occupational stress and its related factors, the occupational stress among trainees in field epidemiology training programs in Southeast Asia and Western Pacific regions from 2016 to 2018 was examined using six subscales: Role Overload, Role Insufficiency, Role Ambiguity, Role Boundary, Responsibility, and Physical Environment. Furthermore, the data on the year of training and type of training program as well as the level of burnout, which affects stress-coping strategies, were collected. Fisher's exact tests and logistic regression models were used to examine associations between occupational stress, burnout, the number of years of training, and the type of training program. Sixty-two trainees participated, and there were no significant associations between burnout, the year of training, and type of training program. A burden of occupational stress in Role Overload and Physical Environment was reported by 56% and 53% of respondents, respectively. The trainees affiliated with a university program were less likely to have a burden of occupational stress in Responsibility and Physical Environment. It is concerning that more than half of trainees in the programs experienced occupational stress in Role Overload and Physical Environment. Additional efforts to design improved training programs to reduce occupational stress are warranted.

Ryu et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Burnout; Field epidemiologist; Occupational stress; Trainee; Training.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/16/18/3427>

Association between work stress and risk of suicidal ideation: A cohort study among Korean employees examining gender and age differences.

Objective: The aim of this study was to identify work stress associated with the development of suicidal ideation with a focus on gender and age differences among Korean employees. **Methods:** The data of 95 356 healthy employees aged >18 years who had undergone at least two comprehensive health examinations at Kangbuk Samsung Hospital Health Screening Center, South Korea, were analyzed. Risk of suicidal ideation was assessed using a self-reported questionnaire examining suicidal ideation during the past year. Work stress was measured using the Korean Occupational Stress Scale-Short Form. A Cox proportional hazards model was used to examine relationship between work stress and suicidal ideation. Considering gender and age differences in the association between work stress and suicidal ideation, the data were stratified by gender and age groups. **Results** During 289 706 person-years of follow-up, suicide ideation was identified in 3 460 participants. For male workers, high job demands and lack of reward were associated with the

risk of suicidal ideation in young adults and midlife decade group. Job insecurity was associated with the risk of suicidal ideation in midlife decade and middle-aged and older adulthood. Organizational injustice was associated with the risk of suicidal ideation in middle-aged and older adulthood. Discomfort in an organizational climate was associated with the development of suicidal ideation in all age groups. For female workers, organizational injustice and discomfort in an organizational climate were associated with the risk of suicidal ideation in early adulthood. Conclusion: The results suggested that certain work stressors are risk factors of suicidal ideation. Gender and age differences in components of work stress associated with suicidal ideation were also observed.

Kim et al. 2019.

Scandinavian Journal of Work, Environment and Health, Online first.

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Keywords: Age; Employees; Gender; Suicidal ideation; Work stress.

Evidence Level: 4B

Link: http://www.sjweh.fi/show_abstract.php?abstract_id=3852

Workplace stress – assessment and management

The mediating effect of workplace spirituality on the relation between job stress and job satisfaction of cancer survivors returning to work.

This study aimed to investigate the mediating effect of workplace spirituality in the relation between job stress and job satisfaction as well as the level of job stress, job satisfaction, and workplace spirituality of cancer survivors returning to work. A total of 126 cancer survivors who returned to work more than six months prior to the research participated in this study. Participants were recruited through snowball sampling; they were visiting the outpatient clinic at two general hospitals located in a metropolitan city and their clinical stage was stage 0 or stage 1. The collected data were analyzed using SPSS 22.0. Job stress, workplace spirituality, and job satisfaction had a negative correlation, whereas workplace spirituality and job satisfaction had a positive correlation. The Sobel test was performed to verify the significance of the mediating effect size of workplace adaptation, the results confirmed a partial mediating effect of workplace spirituality on the relation between job stress and job satisfaction ($Z = -4.72$, $p < 0.001$). This study confirmed the mediating effect of workplace spirituality in the relation between job stress and job satisfaction. A systematic program needs to be developed to enhance workplace spirituality, a spiritual approach, to relieve job stress and increase job satisfaction.

Jin et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Cancer survivors; Job satisfaction; Job stress; Quality of working life; Workplace spirituality.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/19/3510>

Influence of occupational stress and coping style on periodontitis among Japanese workers: A cross-sectional study.

The aim of this cross-sectional study was to evaluate the association between the influence of occupational stress and coping style on periodontitis among Japanese workers. The study sample included 738 workers (age range: 19-65 years) at a manufacturing company in Kagawa Prefecture, Japan. To analyze occupational stress and coping style, all participants answered a self-report questionnaire composed of items on their work environment and oral health behavior. Oral

examinations were performed by calibrated dentists. Among all workers, 492 (66.7%) workers were diagnosed with periodontitis, and 50 (6.8%) were diagnosed with a high stress-low coping condition. Significant differences ($p < 0.05$) were observed between the periodontitis and non-periodontitis groups in terms of age, gender, body mass index, smoking status, daily alcohol drinking, monthly overtime work, worker type, and stress-coping style. Logistic regression analysis showed that a high stress-low coping condition was associated with an increased risk of periodontitis (odds ratio: 2.79, 95% confidence interval: 1.05-7.43, $p = 0.039$). These findings suggest that a high stress-low coping condition is associated with periodontitis among the 19-65 years of age group of Japanese workers.

Islam et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Coping; Japanese workers; Occupational stress; Periodontitis.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/19/3540>

Unequal associations between educational attainment and occupational stress across racial and ethnic groups.

Background: Although other mechanisms are also involved, at least one reason high educational attainment (EA) is associated with better health is lower employment stress in individuals with high EA. Minorities' Diminished Returns, however, refer to the smaller protective health effects of EA for racial- and ethnic-minority individuals, particularly African Americans (AAs) and Hispanics, as compared to Whites. We are, however, not aware of many studies that have explored differential associations between EA and work-related stress across racial and ethnic groups. Aims: We aimed to compare racial and ethnic groups for the association between EA and occupational stress in a national sample of American adults. Methods: The National Health Interview Survey (NHIS 2015), a cross-sectional survey, included 15,726 employed adults. Educational attainment was the dependent variable. Occupational stress was the outcome. Race and ethnicity were the moderators. Age, gender, number of jobs, and years in the job were the covariates. Results: Overall, higher EA was associated with lower levels of occupational stress. Race and ethnicity both interacted with EA, suggesting that the association between high EA and reduced occupational stress is systemically smaller for AAs and Hispanics than it is for Whites. Conclusions: In the United States, race and ethnicity limit the health gains that follow EA. While EA helps individuals avoid environmental risk factors, such as occupational stress, this is more valid for non-Hispanic Whites than AAs and Hispanics. The result is additional physical and mental health risks in highly educated AAs and Hispanics. The results are important, given racial and ethnic minorities are the largest growing section of the US population. We should not assume that EA is similarly protective across all racial and ethnic groups. In this context, EA may increase, rather than reduce, health disparities.

Assari et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Education; Employment; Ethnicity; Occupational stress; Population groups; Race; Socioeconomic position; Socioeconomic status; Stress; Work.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/19/3539>

Impact of rational emotive occupational health coaching on work-related stress management among staff of Nigeria police force.

Background: Empirical studies indicated that job-related stress is threatening the well-being of Nigerian public workers. The objective of this investigation was to examine the impact of REOHC for improving work-stress management among Staff of Nigeria Police Force in southeast Nigeria. Methods: This is a pretest-posttest control group design study with follow-up. A total of 63 Nigerian police officers (randomized into one of 2 groups: n= 32 for treatment group, n= 31 for waitlist control group) completed the study. Two self-report questionnaire measuring organizational and operational stressors associated with police general well-being were used as outcome measures. The intervention group received a 12-week REBC manual intervention. The intervention and waitlisted groups were evaluated at 3-time points: Time1, Time2, and Time3. Statistical analyses were achieved using repeated-measures ANOVA. Results: Results showed that there was no significant difference between the REOHC group and waiting-list control group in initial work-related stress management among staff of Nigerian Police Force. REOHC program had a significant effect on work-related stress management among staff of Nigerian Police Force when compared to their counterparts in the waiting-list control group. Conclusions: Therefore, REOHC program is a time-effective treatment approach for improving work-stress management among Staff of Nigeria Police Force in southeast Nigeria.

Nwokeoma et al. 2019.

Medicine, vol. 98, no. 37.

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Keywords: Coaching; Occupational health; Police force; Work-related stress management.

Evidence Level: 5B

Link: <https://insights.ovid.com/crossref?an=00005792-201909130-00002>

Supporting those who provide support: work-related resources and secondary traumatic stress among victim advocates.

Background: Victim advocates are at risk of developing secondary traumatic stress (STS), which can result from witnessing or listening to accounts of traumatic events. This study investigated the relationship between victim status, years of experience, hours of direct contact with victims, and availability of workplace supports in the development of STS. Results: Of the 142 victim advocates, 134 were women. Regression analyses revealed that the only significant predictor of STS was the number of direct hours of victim services provided. Conclusion: The findings from this study found that women have high rates of STS and that more workplace support needs to be implemented.

Benuto et al. 2019.

Safety and Health at Work, vol. 10, no. 3.

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Keywords: Traumatic stress; Victim advocates; Workplace resources.

Evidence Level: 5A

Link: <https://www.sciencedirect.com/science/article/pii/S2093791118302130?via%3Dihub>

Burnout

A comparative study of burnout, stress, and resilience among emotional workers.

Objective: To investigate associations between stress, resilience, and burnout in three emotional job sectors. Methods: We conducted a multi-group comparative study using structural equation modeling and latent mean analysis. In total, 806 participants (403 call center consultants, 270

mental health workers, and 133 school counselors) completed self-administered questionnaires including the Perceived Stress Scale, Korean version of the Connor-Davidson Resilience Scale, and Maslach Burnout Inventory General Survey. Results: Stress had significant direct effects on resilience and burnout, and resilience had significant direct effects on burnout in all groups. Resilience partially mediated these relationships among call center consultants and school counselors. Stress and burnout were highest in call center consultants, followed, in order, by mental health workers and school counselors. Resilience was highest in school counselors, followed, in order, by mental health workers and call center consultants. The effect size of the latent mean difference was highest for burnout, followed, in order, by resilience and stress. Conclusion: Our findings suggest that stress caused by emotional labor can contribute to burnout. Interventions targeted at different sectors are needed to reduce burnout.

Lee et al. 2019.

Psychiatry Investigation, vol.16, no.9.

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Keywords: Burnout; Mental health; Resilience; School; Stress.

Evidence Level: 4B

Link: <http://psychiatryinvestigation.org/journal/view.php?doi=10.30773/pi.2019.07.10>

Psychosocial issues

Exposure to organisational injustice and serious psychological distress: longitudinal analysis of details of exposure from a private Japanese company.

Objectives: Studies have shown that organisational injustice (OIJ) is associated with mental disorders. However, there is little research regarding details on OIJ exposure. We examined the effect of OIJ on serious psychological distress (SPD) by considering the exposure frequency, the exposure duration and the OIJ-free period after the disappearance of exposure. Methods: We used a prospective cohort design. OIJ exposure was assessed three times with 1-year intervals between assessments, and the subjects were grouped according to the exposure histories. The outcome assessment for SPD by scores of 13 or higher on the K6 questionnaire was carried out 3 years after the baseline scores were obtained. Participants were all full-time regular employees of one office of a manufacturing company in Japan. Participants who were being treated for mental disorders, those with SPD and those with missing data on the K6 questionnaire in the baseline survey were excluded from the prospective cohort. Self-reported questionnaire data from 1087 employees who participated in all surveys and answered all questions were analysed. Logistic regression analysis was used to explore the effect of OIJ on SPD. Results: SPD developed in 35 participants. Frequent OIJ exposure was associated with a higher risk for SPD (p for trend=0.002). Of the 1087 participants, 319 (29.3%) experienced a change in OIJ exposure at least once, and 8.6% of subjects experienced such a change twice. These changes in OIJ exposure were more strongly related to SPD than was the frequency of OIJ exposure. Conclusion: OIJ was associated with SPD onset particularly when the workers were more frequently exposed to it. Moreover, frequent changes in the OIJ exposure were associated with a higher risk for SPD. Because OIJ exposure can change in a relatively short time, considering exposure histories may provide useful information for preventing mental disorders.

Hayashi et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Organisational injustice; Psychological distress; Psychosocial factor; Repeated measure.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/9/9/e029556.long>

Enabling Healthy and Safe Workplaces

WH&S

Alcohol and other drug use among Belgian workers and job-related consequences.

Objectives: This study aimed to obtain prevalence data on use of alcohol and other drugs (AOD) among Belgian workers, and to explore the associations between self-reported AOD use and job-related effects as experienced by workers, and the level of workers' well-being, respectively.

Methods: In this cross-sectional study (2016), 5367 workers filled out a questionnaire including validated instruments such as the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C). Job-related effects were defined as: being late at work, absenteeism, loss of productivity, injuries, conflicts with co-workers and sanctions by employers. Descriptive and multiple logistic regression analyses were performed. **Results:** Based on AUDIT-C, 39.1% of last year drinkers had an indication of problem drinking. The odds of experienced job-related effects was 3.6 (CI 2.86 to 4.60) times larger than the odds among workers without this indication. This ratio decreased to 3.2 (CI 2.52 to 4.11), controlling for language, gender, family context, level of education and sector. Respondents who used illicit drugs more frequently (>once a month) also had an increased risk for experienced job-related effects (OR 5.8; CI 2.87 to 11.84). Having a low level of well-being increased the risk for job-related effects due to psychoactive medication (OR 2.3, CI 1.10 to 4.91). **Discussion:** In this study, self-reported AOD use was associated with short-term job-related effects. This suggests that an AOD policy in different sectors is needed with respect for the organisational culture. Its focus should lie on prevention and early detection of AOD problems, and on the mental health of workers. Attention is required for the non-medical use of prescription drugs.

Lambrechts et al. 2019.

Occupational and Environmental Medicine vol. 76, no. 9.

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(<https://creativecommons.org/licenses/by-nc/4.0/>)

Keywords: Alcohol and other drug use; Job related effects; Prevention; Well-being.

Evidence Level: 4B

Link: <https://oem.bmj.com/content/76/9/652.long>

Do various respirator models fit the workers in the Norwegian smelting industry?

Background: Respirator fit testing is a method to assess if the respirator provides an adequate face seal for the worker. **Methods:** Workers from four Norwegian smelters were invited to participate in the study, and 701 respirator fit tests were performed on 127 workers. Fourteen respirator models were included: one FFABE1P3 and 11 FFP3 respirator models produced in one size and two silicone half masks with P3 filters available in three sizes. The workers performed a quantitative fit test according to Health and Safety Executive 282/28 with 5-6 different respirator models, and they rated the respirators based on comfort. Predictors of overall fit factors were explored. **Results:** The pass rate for all fit tests was 62%, 56% for women, and 63% for men. The silicone respirators had the highest percentage of passed tests (92-100%). The pass rate for the FFP3 models varied from 19-89%, whereas the FFABE1P3 respirator had a pass rate of 36%. Five workers did not pass with any respirators, and 14 passed with all the respirators tested. Only 63% passed the test with the respirator they normally used. The mean comfort score on the scale from 1 to 5 was 3.2. The respirator model was the strongest predictor of the overall fit factor. The other predictors (age, sex, and comfort score) did not improve the fit of the model. **Conclusion:** There were large differences in how well the different respirator models fitted the Norwegian smelter workers. The results can be useful when choosing which respirators to include in respirator fit testing programs in similar populations.

Foereland et al. 2019.

Safety and Health at Work, vol. 10, no. 3.

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Keywords: Fit factor; Predictors of fit; Quantitative respirator fit test; Respiratory protective equipment; Smelting industry.

Evidence Level: 5B

Link: <https://www.sciencedirect.com/science/article/pii/S2093791118304864?via%3Dihub>

Outcomes for facilitators of workplace environment improvement applying a participatory approach.

Objectives: The purpose of this study was to determine changes in awareness, behavior, and relationships among facilitators who were involved in facilitating the conduct of the participatory workplace improvement program and to examine the facilitators' outcomes as a result of their active involvement in the program. The outcome components were also examined in relationship to their associations with various factors. Methods: An anonymous self-administered questionnaire survey was conducted for 83 facilitators. Exploratory factor analysis was applied to determine the facilitators' outcomes. The relationship between those elements which influenced the outcomes was taken into account by means of hierarchical multiple regression analysis. Results: The outcomes for facilitators consisted of four sub-concepts: "knowing practical ways and strategies to ensure full participation," "building confidence and self-development," "improving safety and health-risk sensitivity," and "gaining better-than-expected results based on developing relationships with workers." According to the results of hierarchical multiple regression analysis, facilitators' outcomes were significantly associated with the realization of creativity, sense of solution for safety and health issues, and facilitators' involvement. Conclusions: It is suggested that the role of a facilitator dynamically changes through a participatory workplace improvement program as a key person in the workplace. Supporting acting facilitators' initiatives in the process of workplace improvement programs, as well as promoting the active involvement of workers and managers were considered useful for effective implementation of workplace improvement programs.

Yoshikawa et al. 2019.

Journal of Occupational Health vol.61, no.5.

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Keywords: Facilitators; Outcomes; Participatory approach; Workplace improvement.

Evidence Level: 5B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12065>

Design strategies for biocontainment units to reduce risk during doffing of high-level personal protective equipment.

Background: Few data exist to guide the physical design of biocontainment units, particularly the doffing area. This can impact the contamination risk of healthcare workers (HCWs) during doffing of personal protective equipment (PPE). Methods: In phase I of our study, we analyzed simulations of a standard patient care task with 56 trained HCWs focusing on doffing of high-level PPE. In phase II, using a rapid cycle improvement approach, we tested different balance aids and redesigned doffing area layouts with 38 students. In phase III, we tested 1 redesigned layout with an additional 10 trained HCWs. We assessed the effectiveness of design changes on improving the HCW performance (measured by occurrence and number of risky behaviors) and reducing the physical and cognitive load by comparing the results from phase I and phase III. Results: The

physical load was highest when participants were removing their shoe covers without any balance aid; the use of a chair required the lowest physical effort, followed by horizontal and vertical grab bars. In the revised design (phase III), the overall performance of participants improved. There was a significant decrease in the number of HCW risky behaviors ($P = .004$); 5 risky behaviors were eliminated and 2 others increased. There was a significant decrease in physical load when removing disposable shoe covers ($P = .04$), and participants reported a similar workload in the redesigned doffing layout ($P = .43$). Conclusions: Through optimizing the design and layout of the doffing space, we reduced risky behaviors of HCWs during doffing of high-level PPE.

Wong et al. 2019.

Clinical Infectious Diseases, vol. 69, no. 3.

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Keywords: Biocontainment unit design; Design improvements; Doffing personal protective equipment; Ebola; Occupational health.

Evidence Level: 5B

Link: https://academic.oup.com/cid/article/69/Supplement_3/S241/5568520

Evidence of workplace interventions - A systematic review of systematic reviews.

Work environment factors are highly correlated with employees' health and well-being. Our aim was to sum up current evidence of health promotion interventions in the workplace, focusing on interventions for the prevention of musculoskeletal disorders, psychological and behavioral disorders as well as interventions for older employees and economic evaluations. We conducted a comprehensive literature search including systematic reviews published from April 2012 to October 2017 in electronic databases and search engines, websites of relevant organizations and institutions. It consisted of simple and specific terms and word combinations related to workplace health promotion based on the search strategy of a previous review. After full-text screening, 74 references met the eligibility criteria. Using the same search strategy, there was a higher proportion of relevant high-quality studies as compared with the earlier review. The heterogeneity of health promotion interventions regarding intervention components, settings and study populations still limits the comparability of studies. Future studies should also address the societal and insurer perspective, including costs to the worker such as lost income and lost time at work of family members due to caregiving activities. To this end, more high-quality evidence is needed.

Pieper et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Absenteeism; Evidence; Health care costs; Health promotion; Occupational; Workplace.

Evidence Level: 1A

Link: <https://www.mdpi.com/1660-4601/16/19/3553>

Risk assessment

Screening of workers with presumed occupational methanol poisoning: the applicability of a national active occupational disease surveillance system.

Background: Methyl alcohol poisoning in mobile phone-manufacturing factories during 2015-2016 was caused by methyl alcohol use for cleaning in computerized numerical control (CNC) processes. To determine whether there were health complications in other workers involved in similar processes, the Occupational Safety and Health Research Institute conducted a survey. Methods: We established a national active surveillance system by collaborating with the Ministry of Employment and Labor and National Health Insurance Service. Employment and national health

insurance data were used. Overall, 12,048 employees of major domestic mobile phone companies and CNC process dispatch workers were surveyed from 2016 to 2017. We investigated methyl alcohol poisoning by using the national health insurance data. Questionnaires were used to investigate diseases due to methyl alcohol poisoning. Results: Overall, 24.9% of dispatched workers were employed in at least five companies, and 23.9% of dispatched workers had missing employment insurance history data. The prevalence of blindness including visual impairment, optic neuritis, visual disturbances, and alcohol toxicity in the study participants was higher than that reported in the national health insurance database (0.02%, 0.07%, 0.23%, and 0.03% versus 0.01%, 0.07%, 0.13%, and 0.01%, respectively, in 2015). Moreover, 430 suspicious workers were identified; 415 of these provided an address and phone number, of whom 48 responded (response rate, 11.6%). Among the 48 workers, 10 had diseases at the time of the survey, of whom 3 workers were believed to have diseases related to methyl alcohol exposure. Conclusion: This study revealed that active surveillance data can be used to assess health problems related to methyl alcohol poisoning in CNC processes and dispatch workers.

Eom et al. 2019.

Safety and Health at Work, vol. 10, no. 3.

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Keywords: Dispatched workers; Methyl alcohol; Mobile phone; National Health Insurance Service; Occupational Safety and Health Research Institute; Occupational disease surveillance system; Visual disturbance.

Evidence Level: 4B

Link: <https://www.sciencedirect.com/science/article/pii/S2093791119301660?via%3Dihub>

Clinical correlates of workplace injury occurrence and recurrence in adults.

Objectives: To examine the morbidities associated with workplace injury and to explore how clinical variables modify the risk of injury recurrence. **Methods:** A case-control study was designed using Florida's statewide inpatient, outpatient, and emergency visits data obtained from the Healthcare Cost and Utilization Project. We included adults who were admitted for a workplace injury (WPI) or injury at other places (IOP), and a matched population of random controls without WPI/IOP. The associations between WPI and clinical morbidities were assessed by univariate and multivariable regression, ranking predictors by information gain, area under the receiver operating characteristic (AUROC), and odds ratios. We analyzed WPI recurrence using survival methods (Kaplan-Meier, Cox regression, survival decision trees) and developed prediction models via regularized logistic regression, random forest, and AdTree. Performance was assessed by 10-fold cross-validation comparing AUROC, sensitivity, specificity, and Harrell's c-index. Results: A total of 80,712 WPI, 161,424 IOP, and 161,424 control patients were included; 485 distinct clinical diagnostic and 160 procedure codes were analyzed after filtering. Acute bronchitis and bronchiolitis, sprains and strains of shoulder and upper arm, ankle and foot, or other and unspecified parts of back, accidents caused by cutting and piercing instruments or objects, and overexertion and strenuous movements were identified as important consequences of WPI. The prediction models of injury recurrence identified several key factors, such as insurance type and prior injury events, although none of the models exhibited high predictive performance (best AUROC = 0.60, best c-index = 0.62). Conclusions: WPI is associated to diverse serious physical comorbidity burden. There are demographic, social and clinical comorbidity components associated to the risk of WPI recurrence, although their predictive value is moderate, which warrants future investigation in other information source domains, e.g. deepening into the environmental and societal sphere.

Chen et al. 2019.

PLoS One, vol. 14, no. 9.

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Keywords: Workplace injury; Occurrence; Reoccurrence; Morbidities

Evidence Level: 5A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222603>

Injury epidemiology of workers by age, sex and industrial classification using the medical claim data of National Health Insurance in South Korea, 2012-2015: a population-based retrospective study.

Objectives: This study aimed to evaluate the risk of inpatient hospitalisation for all-cause injuries, according to age, sex and industrial classification (IC) in South Korea. **Design:** A population-based retrospective study. **Participants:** Data from the National Health Insurance Database on medical claims for the entire population of South Korean workers aged 25-59 years from January 2012 to December 2015 were retrieved. We observed 30 900 712 person-years (63.1%) in male workers and 18 105 272 person-years (36.9%) in female workers. **Outcome measures:** The inpatient hospitalisation for all-cause injury was defined as admission for which the principal diagnosis included S00-T98 in the Korean version of International Classification of Diseases-10 codes. **Results:** Of 788 575 hospitalisations for all-cause injuries from 2012 to 2015, there were 565 107 cases in male workers (1 828.8 per 100 000 person-years) and 223 468 cases in female workers (1 234.3 per 100 000 person-years). The top five ICs with hospitalisation rate ratios (HRR) for all-cause injuries in both sexes compared with the financial intermediation IC included agriculture, hunting and forestry (HRR (95% CI); male: 2.09 (1.98 to 2.20); female: 1.53 (1.40 to 1.67)); mining and quarrying (male: 2.05 (1.92 to 2.19); female: 1.54 (1.27 to 1.87)) and fishing (male: 1.68 (1.57 to 1.80); female: 1.71 (1.51 to 1.93)). A U-shaped relationship occurred between age and risk for injuries in males; however, only a linear relationship was shown in females, regardless of IC. **Conclusions:** The risk of injuries varied by IC. The workers in agriculture, hunting, forestry, mining, quarrying and fishing were more vulnerable to injuries. The risk for injuries were higher among men and the age effect on this risk differed by sex. Thus, policy makers need to consider specific measures for prevention of injuries according to age, sex and IC.

Lim et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Industrial classification; Injury; Medical claim data; Occupational injury.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/9/9/e029413.long>

Health and wellbeing

Quality of sleep, health and well-being in a population-based study.

Objective: To estimate the prevalence of poor self-rated sleep and to identify the population subgroups most susceptible to the problem. **Methods:** This is a cross-sectional, population-based study developed with data from the Health Survey conducted in the city of Campinas (ISACamp 2014/2015). Data from a sample of 1,998 individuals aged 20 years or older were analyzed. The self-rated quality of sleep was analyzed according to socio-demographic characteristics, morbidities, health behaviors and feeling of well-being. The association of sleep quality with different complaints and characteristics of sleep was also analyzed. Adjusted prevalence ratios were estimated using Poisson multiple regression model allowing for the sample weights. **Results:** Prevalence of poor self-rated sleep was 29.1% and showed to be significantly higher in women, in individuals aged from 40 to 50 years, migrants, without occupation, physically inactive in leisure

context, with common mental disorder (PR = 1.59), with greater number of health problems (PR = 2.33), poor self-rated health (PR = 1.61), and life dissatisfaction. Poor sleep was strongly associated with reports of difficulty in initiating sleep (PR = 4.17), in maintaining sleep (PR = 4.40) and with never or almost never feeling well when waking up (PR = 4.52). Conclusions: The results identify the population subgroups with poor quality of sleep that deserve greater attention. It also highlights the need to consider, in addition to the presence of comorbidities, mental health and the feeling of well-being in the care of patients with sleep problems and in the interventions planned for promoting healthy sleep.

Barros et al. 2019.

Revista de Saude Publica, vol. 53, no. 82.

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Keywords: Health; Quality of sleep; Socio-demographic characteristics; Well-being.

Evidence Level: 4B

Link: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89102019000100274&lng=en&nrm=iso&tlng=en

Six shades of grey: Identifying drinking culture and potentially risky drinking behaviour in the grey zone between work and leisure. The WIRUS culture study.

Objectives: The aim of this study was to explore drinking culture and drinking situations that employers and employees encounter in the grey zone between work and leisure, and identify what might affect employees' risky drinking behaviour. **Methods:** We used eight focus groups to interview 61 core company informants from eight Norwegian companies (private and public sector) participating in the WIRUS - Workplace-based interventions preventing risky alcohol use and sick leave - project. The informants represented employers and employees with a diversity of roles at multiple organisational levels. The transcribed interviews were analysed by applying a phenomenological hermeneutical approach. **Results:** The analysis revealed six dimensions of drinking culture representing potentially risky drinking behaviour in situations that fall in the grey zone between work and leisure: (1) "Who invited me?" (Degree of obligation towards inviter), (2) "Do I have to participate?" (Degree of participation volunteerism), (3) "To drink or not to drink?" (Degree of drinking volunteerism), (4) "Work talk or small talk?" (Degree of work-related conversation), (5) "Are there any drinking rules to follow?" (Degree of regulation), and (6) "The influence of being away from home" (degree of distance to home). **Conclusions:** The findings reveal that employers and employees' experience of drinking culture can be categorised as six different "shades of grey". The grey zone is shaded from light to dark grey, indicating how risky the informants perceive the grey zone to be. The findings may be useful when designing workplace health promotion programmes and alcohol regulations in the workplace.

Sagvaag et al. 2019.

Journal of Public Health Research, vol. 8, no. 2.

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Keywords: Culture; drinking regulations; occupational health; work participation; work-related drinking.

Evidence Level: 5B

Link: <https://jphres.org/index.php/jphres/article/view/1585>

Dietary patterns of bank employees and their association with socioeconomic, behavioral and labor factors.

This paper aimed to evaluate food consumption of bank employees and its association with socioeconomic, behavioral and labor factors. This is a cross-sectional study with 515 bank

employees. To evaluate food consumption, a semi-quantitative food frequency questionnaire was used. The analysis of main components with Varimax rotation was used to determine the dietary patterns. Three dietary patterns were identified: "vegetables, fruits, cereals and tubers", "sweets and snacks" and "traditional and protein". We found that individuals who did not consume sweeteners were more likely to adhere to the "vegetables, fruits, cereals and tubers" pattern and were less likely to adhere to the "sweets and snacks" and "traditional and protein" patterns. Bank employees who rarely ate in restaurants were three times more likely to adhere to the "sweets and snacks" pattern. However, those who used to consume industrialized seasoning and those who reported receiving low social support were, respectively, 2.3 and 1.5 times more likely to adhere to the "traditional and protein" pattern. We can conclude that food consumption of bank employees is not related to the sociodemographic conditions of these individuals, and behavior and perception of social support received is associated with these dietary patterns.

Cattafesta et al. 2019.

Ciencia & Saude Coletiva, vol. 24, no. 10.

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Keywords: Bank employees; Behavioral factors; Dietary patterns; Labor factors; Socioeconomic factors.

Evidence Level: 4B

Link: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232019001003909&lng=en&nrm=iso&tlng=en

Physical activity

Effect of a pedometer-based walking challenge on increasing physical activity levels amongst hospital workers.

Background: More than 50% of Qatari adults are physically inactive. The workplace is an excellent environment to implement cost-effective, efficient behavioural physical activity (PA) interventions to increase PA. This study evaluated whether a pedometer-based walking challenge would increase PA levels amongst hospital workers. Methods: A pedometer-based workplace walking intervention was implemented in April-August 2017. Amongst 800 recruited full-time hospital workers, a cross-sectional sample of 212 workers completed the online questionnaires Quality of Life Questionnaire, International Physical Activity Questionnaire (IPAQ), and Workforce Sitting Questionnaire. A sub-sample of participants (n = 54) wore a pedometer for 3 months. They recorded their daily step count through an online web platform linked to the pedometer. Another cross-sectional sample (n = 194) in the same target population completed online questionnaires at post intervention. Results: The IPAQ assessed physical activity at post-intervention was higher compared to pre-intervention. In a sub-sample (n = 54) that provided pedometer data, workers' step count during intervention was significantly higher (9270) from pre-intervention (7890) (p = 0.048). Conclusions: Although self-reported PA was higher post-intervention, the subsample showed objectively assessed physical activity did not exceed the threshold recommended for optimal health. Therefore, encouraging participation and maintaining motivation amongst workers in a work-based PA programme is challenging.

Al-Mohannadi et al. 2019.

Archives of Public Health, vol. 77, no. 40.

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Keywords: Health promotion; Hospital staff; Physical activity; Quality of life; Step count; Workplace.

Evidence Level: 4B

Link: <https://archpublichealth.biomedcentral.com/articles/10.1186/s13690-019-0368-7>

Effects of interval training on quality of life and cardiometabolic risk markers in older adults: a randomized controlled trial.

Purpose: To explore the effects of 10 weeks of progressive vigorous interval training as a single intervention on health-related quality of life (HRQoL) and cardiometabolic risk markers in centrally obese 70-year-old individuals. **Methods:** A randomized controlled trial (ClinicalTrials.gov registration no. NCT03450655) including seventy-seven community-dwelling 70-year-old men and women with central obesity defined as > 1 kg visceral adipose tissue for women and > 2 kg for men. Participants randomized to the intervention group were offered a 10-week progressive vigorous interval training program performed three times per week. Control subjects were asked to maintain their daily living and routines throughout the trial. All participants in both groups had received tailored lifestyle recommendations focused on diet and physical activity at one occasion within 12 months prior to trial initiation. Prespecified outcome measures included: changes in HRQoL using the Short Form Health Survey Questionnaire (SF-36), blood pressure; resting heart rate (HR) and blood lipids. All analyses were conducted on an intention-to-treat basis. **Results:** The intervention resulted in significant effects on the SF-36 mental component summary (MCS) score and the mental health (MH) subscale ($P < 0.05$ for both), when compared to the control group. Specifically, the intervention group increased their MCS score by 6.3 points (95% confidence interval [CI] = 0.3-12.3) and their MH score by 6.0 points (95% CI = 1.7-10.4) compared to the control group. Moreover, significant effects were seen on resting HR, total cholesterol and LDL-cholesterol ($P < 0.05$ for all). **Conclusions:** It was shown that 10 weeks of vigorous interval training as a single intervention was sufficient to improve mental aspects of HRQoL in older individuals with central obesity, which is a critical aspect of healthy ageing. Positive effects were seen also on cardiometabolic risk markers.

Ballin et al. 2019.

Clinical Interventions in Aging, vol. 14.

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(<https://creativecommons.org/licenses/by-nc/4.0/>)

Keywords: Ageing; Blood lipids; Exercise; Perceived health.

Evidence Level: 2B

Link: <https://www.dovepress.com/effects-of-interval-training-on-quality-of-life-and-cardiometabolic-ri-peer-reviewed-article-CIA>

Health economic assessment of a scenario to promote bicycling as active transport in Stockholm, Sweden.

Objectives: To conduct a health economic evaluation of a proposed investment in urban bicycle infrastructure in Stockholm County, Sweden. **Design:** A cost-effectiveness analysis is undertaken from a healthcare perspective. Investment costs over a 50-year life cycle are offset by averted healthcare costs and compared with estimated long-term impacts on morbidity, quantified in disability-adjusted life years (DALYs). The results are re-calculated under different assumptions to model the effects of uncertainty. **Setting:** The Municipality of Stockholm (population 2.27 million) committed funds for bicycle path infrastructure with the aim of achieving a 15% increase in the number of bicycle commuters by 2030. This work is based on a previously constructed scenario, in which individual registry data on home and work address and a transport model allocation to different modes of transport identified 111 487 individuals with the physical capacity to bicycle to work within 30 min but that currently drive a car to work. **Results:** Morbidity impacts and healthcare costs attributed to increased physical activity, change in air pollution exposure and accident risk are quantified under the scenario. The largest reduction in healthcare costs is

attributed to increased physical activity and the second largest to reduced air pollution exposure among the population of Greater Stockholm. The expected net benefit from the investment is 8.7% of the 2017 Stockholm County healthcare budget, and 3.7% after discounting. The economic evaluation estimates that the intervention is cost-effective and each DALY averted gives a surplus of €9933. The results remained robust under varied assumptions pertaining to reduced numbers of additional bicycle commuters. Conclusion: Investing in urban infrastructure to increase bicycling as active transport is cost-effective from a healthcare sector perspective.

Kriit et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Commuting; DALY; Health economic evaluation; Health impacts; Transport mode shift.

Evidence Level: 5B

Link: <https://bmjopen.bmj.com/content/9/9/e030466.long>

Move - It: A cluster randomised digital worksite exercise intervention in China: Outcome and process evaluation.

We evaluate the outcomes and processes of a video and web-based worksite exercise intervention for sedentary office workers in China, in a 2-arm cluster-randomised wait-list control trial (n = 282: intervention (INT) n = 196 and wait-list control (WLC) n = 86). Eligible clusters were two sites of a major organisation in China randomly allocated to each group (INT: Guangzhou; WLC: Beijing); eligible participants were site employees (n = 690). A theoretically informed digital workplace intervention (Move-It) involving a 10 min Qigong exercise session (video demonstration via website) was delivered twice a day at set break times during the working day for 12 consecutive weeks. Individual-level outcomes were assessed. Participants' physical activity increased significantly from baseline to post-intervention similarly in both the intervention and the control group. There was a significantly smaller increase in weekday sitting hours in intervention than controls (by 4.66 h/week), and work performance increased only in the control group. Process evaluation (including six focus groups) was conducted using the RE-AIM (reach, effectiveness, adoption, implementation and maintenance) framework. The intervention had wide reach and was successfully marketed to all employees with good uptake. The participatory approach increased perceived organisational support and enhanced adoption. The intervention was implemented broadly as planned. Qigong worksite exercise intervention can be successfully delivered to sedentary office workers in China using video and web-based platforms. It may increase physical activity and does not adversely affect perceived work performance. The study highlights the complexity of conducting health promotion research in real-world organisational settings.

Blake et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: Digital; Exercise; Health promotion; Physical activity; Sedentary; Worksite.

Evidence Level: 2B

Link: <https://www.mdpi.com/1660-4601/16/18/3451>

Job demand-control-support model as related to objectively measured physical activity and sedentary time in working women and men.

A physically active lifestyle incurs health benefits and physically active individuals show reduced reactivity to psychosocial stressors. However, the findings are inconclusive and are based on self-reported physical activity and sedentary time. The present study aimed at studying the associations between psychological stressors (job demand, control, support, JD-C-S) and

objectively measured physical activity (PA) on various intensities from sedentary (SED) to vigorous physical activity. The participants were 314 employees from a cross-sectional study. PA data were collected with the accelerometer ActiGraph GT3X (Pensacola, FL, USA), SED data with the inclinometer activPAL (PAL Technologies Ltd., Glasgow, Scotland, UK), and psychosocial stressors with a web questionnaire. Results showed that vigorous-intensity PA was negatively associated with demand (β -0.15, $p < 0.05$), even when adjusted for the covariates. SED was negatively associated to support (β -0.13, $p < 0.05$). Stress significantly moderated relations between support and sedentary time (β -0.12, $p < 0.05$). Moderate PA (MVPA) was negatively associated with demand, but only when controlling for overtime (β -0.13, $p < 0.05$). MVPA was also negatively associated with control (β -0.15, $p < 0.05$) but not when work engagement was included in the model. Being more physically active and spending less time sedentary may help to handle job situations with high demand and low support.

Larsson et al. 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 18.

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Keywords: ActiGraph; ActivPAL; Job demand-control-support model; Physical activity; Questionnaire; Sedentary time; Workplace.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/16/18/3370>

Occupational exposure

Aerobic capacity, lactate concentration, and work assessment during maximum exercise at sea level and high altitude in miners exposed to chronic intermittent hypobaric hypoxia (3,800 m).

We previously showed that arterial oxygen content during maximum exercise remains constant at high altitude (HA) in miners exposed to chronic intermittent hypobaric hypoxia (CIHH).

Nevertheless, information about VO_2 , lactate concentration [Lac], and work efficiency are absent in this CIHH miner population. Our aim was to determine aerobic capacity, [Lac], and work efficiency at sea level (SL) and HA during maximum exercise in miners acclimatized to CIHH at 3,800 m. Eight volunteer miners acclimatized to CIHH at HA (> 4 years) performed an exercise test at SL and HA. The test was performed on the 4th day at HA or SL and consisted of three phases: Rest (5 min); Exercise test, where the load was increased by 50 W every 3 min until exhaustion; and a Recovery period of 30 min. During the procedure VO_2 , transcutaneous arterial saturation (SpO₂, %), and HR (bpm) were assessed at each step by a pulse oximeter and venous blood samples were taken to measure [Lac] and hemoglobin concentration. No differences in VO_2 and [Lac] in SL vs. HA were observed in this CIHH miner population. By contrast, a higher HR and lower SpO₂ were observed at SL compared with HA. During maximum exercise, a reduction in VO_2 and [Lac] was observed without differences in intensity (W) and HR. A decrease in [Lac] was observed at maximum effort (250 W) and recovery at HA vs. SL. These findings are related to an increased work efficiency assessment such as gross and net efficiency. This study is the first to show that miners exposed to CIHH maintain their work capacity (intensity) with a fall in oxygen consumption and a decrease in plasmatic lactate concentration at maximal effort at HA. These findings indicate that work efficiency at HA is enhanced.

Moraga et al. 2019.

Frontiers in Physiology, vol. 10.

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Keywords: Aerobic capacity; Chronic hypobaric intermittent hypoxia; Lactate concentration; Miners workers; Work assessment.

Evidence Level: 5B

Link: <https://www.frontiersin.org/articles/10.3389/fphys.2019.01149/full>

Harmonization of biosafety and biosecurity standards for high-containment facilities in low- and middle-income countries: An approach from the perspective of occupational safety and health.

Following the global-level Ebola virus disease (EVD) outbreak during 2014-2016, international collaboration with multiorganizational participation has rapidly increased. Given the greater priorities for research and development (R&D) outcomes despite the quantitative and qualitative lack of high-containment laboratory facilities in low- and middle-income countries (LMICs), where biological targets for investigation are located near their natural habitats, occupational readiness for health workers' safety has not been well-addressed, where limited global expert human resources are being deployed to high-containment laboratories including biosafety level 4 (BSL-4) facilities for case management and medical investigations. Pursuing scientific and managerial success to make laboratories efficient and productive, most laboratory safety policies have focused on the functionality of technical skills or performance, procedural methodologies, and supervision over the employees to collaborate in LMICs. The experts dispatched from advanced countries bring a long list of scientific tasks with high-tech devices, supplies, and training programs to introduce their collaboration with local partners in LMICs. However, the dispatched experts would subsequently realize their list becomes endless to establish their basic functions required in high-containment laboratories to ensure qualified scientific outcomes in LMICs. Under such circumstances where dual or multiple policies and standards accommodated pose dilemmas for operational procedures to ensure biosafety and biosecurity, all the frontline experts from both LMICs and advanced countries may be exposed to significant risks of life-threatening infection of highly pathogenic agents like EVD, without any pragmatic measures or road maps to establish valued international collaboration, pursuing its sustainability. Given the fact mentioned above, we conducted a quick review of the key biosafety and biosecurity management documents, relevant policy analyses, and research to understand the current status and, if any, measures to dissolve critical dilemmas mentioned above. As a result, we found that occupational safety and health (OSH) aspects had not been sufficiently addressed, particularly in the context of international BSL-4 collaboration in LMICs. Moreover, consideration of OSH can be one of the key drivers to make such collaborative interventions more pragmatic, safer to reorient, harness disease-based vertical approaches, and harmonize policies of biosafety and biosecurity, particularly for collaborations organized in resource-limited settings.

Maehira et al. 2019.

Frontiers in Public Health, vol. 7, no. 249.

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Keywords: Biosafety and biosecurity; Dilemmas; International research and development collaboration; Low- and middle-income countries; Multiple safety standards; Occupational safety and health.

Evidence Level: 6B

Link: <https://www.frontiersin.org/articles/10.3389/fpubh.2019.00249/full>

Deaths in Australia from work-related heat stress, 2000-2015.

The infrequency of deaths from work-related heat stress may be due to self-pacing, whereby workers adjust their work rate in response to thermal discomfort. Thirteen cases attributed after coronial investigation to work-related heat stress were studied to evaluate the causal contribution of environmental and personal risk factors. Meteorological records and coronial records were examined to estimate environmental and metabolic heat loads and to identify any personal risk factors likely to have contributed to death. Seven deaths occurred in workers within one week of hiring, demonstrating not only the importance of acclimatisation but also the likelihood of

compromised self-pacing in recently-hired workers. Personal risk factors identified included intercurrent illness, cardiovascular disease and obesity. Four deaths occurred following indoor work, where the probable critical risk parameter was low air velocity. Cerebral and pulmonary oedema were reported in some autopsy reports, and uncal herniation was found in one case. Modified work rates and close supervision are essential in recently-hired workers. The risk of death from raised intracranial pressure suggests the need for specific remediation of cerebral oedema in hyperthermic individuals.

Gun 2019.

International Journal of Environmental Research and Public Health, vol. 16, no. 19.

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Keywords: Acclimatisation; Cerebral oedema; Heat stroke; Hyperthermia; Occupation; Self-pacing.

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/16/19/3601>

Occupational exposure to inhaled nanoparticles: Are young workers being left in the dust?

Objectives: Occupational exposure to inhaled nanoparticles (NPs) represents a significant concern for worker health. Adolescent workers may face unique risks for exposure and resulting health effects when compared with adult workers. **Methods:** This manuscript discusses key differences in risks for occupational exposures to inhaled NPs and resulting health effects between young workers and adult workers via an examination of both physiological and occupational setting factors. **Results:** Previous studies document how adolescents often face distinct and unique exposure scenarios to occupational hazards when compared to adults. Moreover, they also face different and unpredictable health effects because biological functions such as detoxification pathways and neurological mechanisms are still developing well into late adolescence. Early exposure also increases the chances of developing long-latency disease earlier in life. Taken together, adolescents' rapid growth and development encompasses highly dynamic and complex processes. An aggravating factor is that these processes do not necessarily fall in line with legal classifications of adulthood, nor with occupational exposure limits created for adult workers. **Conclusions:** The differences in exposures and health consequences from NPs on young workers are insufficiently understood. Research is needed to better understand what adolescent-specific mitigation strategies may be most suitable to address these risk factors.

Graczyk et al. 2019.

Journal of Occupational Health vol. 61, no. 5.

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Keywords: Adolescent; Airborne particles; Inhaled exposure; Vulnerable workers.

Evidence Level: 6B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12056>

Relevance of heat stress and dehydration to chronic kidney disease (CKDu) in Sri Lanka.

Chronic kidney disease in the absence of hypertension and diabetes is a growing problem among agricultural laborers in tropical and subtropical regions. It is unclear if heat stress and dehydration are risk factors for this form of chronic kidney disease (CKDu). To investigate this relationship, agricultural workers in four villages (n = 261) in North Central Province, Sri Lanka completed the US National Institute for Occupational Safety and Health (NIOSH) health hazard evaluation of heat stress, translated into Sinhalese (July 2017). We constructed a heat stress/dehydration index based on the frequency of 16 symptoms (range 0-32; reliability, 0.84). Workers provided a urine sample for dipstick assessment of urine albumin-creatinine ratio (ACR) and refractometer analysis of urine concentration. Of 261 respondents, 41 participants reported diabetes or chronic kidney

disease. They scored higher on the heat stress-dehydration index (10.78 vs. 8.03, $p < .01$) and were more likely to have ACR > 30 (85.4% vs. 69.4%, $p < .05$). Among 216 non-pregnant agricultural workers without diabetes or kidney disease (mean age, 46.6; 37% male), villagers in the high-CKDu prevalence area were more likely to show signs of dehydration (for example, greater urine concentration, 1.015 vs. 1.012, $p < .05$, among males); however, the heat stress-dehydration index overall was not associated with ACR or urine concentration. Because an elevated ACR (proteinuria) is not a reliable marker of early CKDu, additional studies are needed to assess the association between heat stress-dehydration symptoms and risk of CKDu.

Jayasejara et al. 2019

Preventative Medical Reports.

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Keywords: Agriculture; Chronic kidney disease; Dehydration; Heat stress; Sri Lanka.

Evidence Level: 5B

Link: <https://www.sciencedirect.com/science/article/pii/S2211335519301020?via%3Dihub>

The potential for renal injury elicited by physical work in the heat.

An epidemic of chronic kidney disease (CKD) is occurring in laborers who undertake physical work in hot conditions. Rodent data indicate that heat exposure causes kidney injury, and when this injury is regularly repeated it can elicit CKD. Studies in humans demonstrate that a single bout of exercise in the heat increases biomarkers of acute kidney injury (AKI). Elevations in AKI biomarkers in this context likely reflect an increased susceptibility of the kidneys to AKI. Data largely derived from animal models indicate that the mechanism(s) by which exercise in the heat may increase the risk of AKI is multifactorial. For instance, heat-related reductions in renal blood flow may provoke heterogeneous intrarenal blood flow. This can promote localized ischemia, hypoxemia and ATP depletion in renal tubular cells, which could be exacerbated by increased sodium reabsorption. Heightened fructokinase pathway activity likely exacerbates ATP depletion occurring secondary to intrarenal fructose production and hyperuricemia. Collectively, these responses can promote inflammation and oxidative stress, thereby increasing the risk of AKI. Equivalent mechanistic evidence in humans is lacking. Such an understanding could inform the development of countermeasures to safeguard the renal health of laborers who regularly engage in physical work in hot environments.

Schlader et al. 2019.

Nutrients, vol. 11, no. 9.

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Keywords: Acute kidney injury; Chronic kidney disease; Dehydration; Exercise; Heat stress.

Evidence Level: 6A

Link: <https://www.mdpi.com/2072-6643/11/9/2087>

Dermatitis among workers in Ontario: results from the Occupational Disease Surveillance System.

Objectives: Dermatitis is the most common occupational skin disease, and further evidence is needed regarding preventable risk factors. The Occupational Disease Surveillance System (ODSS) derived from administrative data was used to investigate dermatitis risk among industry and occupation groups in Ontario. **Methods:** ODSS cohort members were identified from Workplace Safety and Insurance Board (WSIB) accepted lost time claims. A case was defined as having ≥ 2 dermatitis physician billing claims during a 12-month period within 3 years of cohort entry. A 3-year look-back period prior to cohort entry was used to exclude prevalent cases without a WSIB claim. Workers were followed for 3 years or until dermatitis diagnosis, age 65 years, emigration, death or end of follow-up (31 December 2016), whichever occurred first. Age-adjusted and sex-

adjusted Cox proportional hazard models estimated HRs and 95% CIs. The risk of dermatitis was explored using a job exposure matrix that identifies exposure to asthmagens, many of which also cause contact dermatitis. Results: Among 597 401 workers, 23 843 cases of new-onset dermatitis were identified. Expected elevated risks were observed among several groups including furniture and fixture industries, food and beverage preparation and chemicals, petroleum, rubber, plastic and related materials processing occupations and workers exposed to metal working fluids and organic solvents. Decreased risk was observed among farmers, nurses and construction industries, and occupations exposed to latex and indoor cleaning products. Conclusions: ODSS can contribute to occupational dermatitis surveillance in Ontario by identifying occupational groups at risk of dermatitis that can then be prioritised for prevention activities.

Shakik et al. 2019.

Occupational and Environmental Medicine vol. 76, no. 9.

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Keywords: Ontario; Dermatitis; Occupational disease; Occupational exposure; Surveillance.

Evidence Level: 4A

Link: <https://oem.bmj.com/content/76/9/625.long>

Musculoskeletal health

Exposure-response relationship and doubling risk doses - A systematic review of occupational workload and osteoarthritis of the hip.

In this review, we critically evaluated the evidence of exposure-response relationships between occupational workload and the risk of hip osteoarthritis. The existing evidence was evaluated in order for us to extrapolate possible doubling risk doses for hip osteoarthritis. Comprehensive searches for epidemiological studies of hip osteoarthritis and occupational workload were performed in literature databases (PubMed, EMBASE, Cochrane Work and Google Scholar) and recent reviews up to February 2019. In total, 85 papers met the preliminary inclusion criteria, and 10 studies indicating an exposure-response relationship between occupational workload and hip osteoarthritis were identified. All studies were assessed on the basis of their study design, defined quality scores and relevant confounders considered. An exposure-response relationship between heavy lifting and the risk of hip osteoarthritis is consistently observed among the male populations but not among the female populations. We quantified the doubling risk doses in two studies in which both an exposure-response relationship and cumulative exposure doses were stated. These two studies provided the highest quality level of all studies published to date. The estimated doubling risk doses in these two studies lie between 14,761 and 18,550 tons (daily lifting 2.2-2.8 tons, 220 days/year for 30 years). These results can be used for workplace interventions to prevent hip osteoarthritis.

Sun et al. 2019.

International Journal of Occupational medicine and Environmental Health, vol. 16, no. 19.

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Keywords: Coxarthrosis; Dose-response relationship; Doubling risk dose; Exposure-response relationship; Occupational risk; Osteoarthritis of the hip; Risk quantification; Systematic review; Workload.

Evidence Level: 1A

Link: <https://www.mdpi.com/1660-4601/16/19/3681>

Integrated prevention and management of non-communicable diseases, including musculoskeletal health: a systematic policy analysis among OECD countries.

Introduction: Development and implementation of appropriate health policy is essential to address the rising global burden of non-communicable diseases (NCDs). The aim of this study was to evaluate existing health policies for integrated prevention/management of NCDs among Member States of the Organisation for Economic Co-operation and Development (OECD). We sought to describe policies' aims and strategies to achieve those aims, and evaluate extent of integration of musculoskeletal conditions as a leading cause of global morbidity. Methods: Policies submitted by OECD Member States in response to a World Health Organization (WHO) NCD Capacity Survey were extracted from the WHO document clearing-house and analysed following a standard protocol. Policies were eligible for inclusion when they described an integrated approach to prevention/management of NCDs. Internal validity was evaluated using a standard instrument (sum score: 0-14; higher scores indicate better quality). Quantitative data were expressed as frequencies, while text data were content-analysed and meta-synthesised using standardised methods. Results: After removal of duplicates and screening, 44 policies from 30 OECD Member States were included. Three key themes emerged to describe the general aims of included policies: system strengthening approaches; improved service delivery; and better population health. Whereas the policies of most countries covered cancer (83.3%), cardiovascular disease (76.6%), diabetes/endocrine disorders (76.6%), respiratory conditions (63.3%) and mental health conditions (63.3%), only half the countries included musculoskeletal health and pain (50.0%) as explicit foci. General strategies were outlined in 42 (95.5%) policies-all were relevant to musculoskeletal health in 12 policies, some relevant in 27 policies and none relevant in three policies. Three key themes described the strategies: general principles for people-centred NCD prevention/management; enhanced service delivery; and system strengthening approaches. Internal validity sum scores ranged from 0 to 13; mean: 7.6 (95% CI 6.5 to 8.7). Conclusion: Relative to other NCDs, musculoskeletal health did not feature as prominently, although many general prevention/management strategies were relevant to musculoskeletal health improvement.

Briggs et al. 2019.

BMJ Global Health, vol. 4, no. 5.

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Keywords: Global; Health system; Integrated care; Musculoskeletal; Non-communicable; Policy.

Evidence Level: 5A

Link: <https://gh.bmj.com/content/4/5/e001806>

Priority approaches of occupational safety and health activities for preventing low back pain among caregivers.

Objectives: The incidence of occupational low back pain (LBP) is high among caregivers. The use of care equipment and training about care methods could prevent LBP among caregivers. However, in care facilities in Japan, these measures are not adequately employed. Moreover, the care facilities have faced issues regarding poor staffing in recent years. The present study investigated the relationship between LBP and occupational safety and health activities (OSHAs) for preventing LBP among caregivers and aimed to validate the priority approaches of OSHA. Methods: This cross-sectional study was conducted in care facilities for the elderly in Japan. Questionnaires for administrators and caregivers were distributed to 1,000 facilities and 5,000 caregivers, respectively. Questionnaires completed by 612 facilities and 2,712 caregivers were analyzed. Results: No direct association was observed between severe LBP and OSHA, but indirect association was done. A significant relationship was noted between severe LBP and the care methods. Direct factors causing severe LBP were lifting a resident using human power and taking an unsuitable posture. These care methods were associated with the following OSHAs: promoting

the use of care equipment, training about care methods, and consultation regarding the use of care equipment and employing an appropriate care method with the person in charge. Conclusions: These OSHAs decreased lifting a resident using human power and taking an unsuitable posture, which are the primary risk factors of LBP. Therefore, these OSHAs should be implemented as priority approaches to prevent LBP among caregivers in care facilities for the elderly.

Iwakiri et al. 2019.

Journal of Occupational Health vol. 61, no. 5.

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Keywords: Care equipment; Caregiver; Low back pain; Occupational safety and health activities.

Evidence Level: 4B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/1348-9585.12055>

Manual handling

Influencing lumbar posture through real-time biofeedback and its effects on the kinematics and kinetics of a repetitive lifting task.

Background: Repetitive, flexed lumbar postures are a risk factor associated with low back injuries. Young, novice workers involved in manual handling also appear at increased risk of injury. The evidence for the effectiveness of postural biofeedback as an intervention approach is lacking, particularly for repetitive, fatiguing tasks. Research Question: How does real-time lumbosacral (LS) postural biofeedback modify the kinematics and kinetics of repetitive lifting and the risk of low back injury? Methods: Thirty-four participants were randomly allocated to two groups: biofeedback (BF) and non-biofeedback (NBF). Participants repetitively lifted a 13 kg box at 10 lifts per minute for up to 20 min. Real-time biofeedback of LS posture occurred when flexion exceeded 80% maximum. Three-dimensional motion analysis and ground reaction forces enabled estimates of joint kinematics and kinetics. Rating of perceived exertion (RPE) was measured throughout. Results: The BF group adopted significantly less peak lumbosacral flexion (LSF) over the 20 min when compared to the NBF group, which resulted in a significant reduction in LS passive resistance forces. This was accompanied by increased peak hip and knee joint angular velocities in the BF group. Lower limb moments did not significantly differ between groups. Feedback provided to participants diminished beyond 10 min and subjective perceptions of physical exertion were lower in the BF group. Significance: Biofeedback of lumbosacral posture enabled participants to make changes in LSF that appear beneficial in reducing the risk of low back injury during repetitive lifting. Accompanying behavioural adaptations did not negatively impact on physical exertion or lower limb joint moments. Biofeedback of LS posture offers a potential preventative and treatment adjunct to educate handlers about their lifting posture. This could be particularly important for young, inexperienced workers employed in repetitive manual handling who appear at increased risk of back injury.

Boocock et al. 2019.

Gait and Posture.

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Keywords: Biofeedback; Biomechanics/spine; Low back/lumbar spine; Manual handling; Repetitive lifting.

Evidence Level: 5A

Link: <https://www.sciencedirect.com/science/article/pii/S0966636218302698?via%3Dihub>

Associations of objectively measured forward bending at work with low-back pain intensity: a 2-year follow-up of construction and healthcare workers.

Objectives: This study aimed to determine possible associations between objectively measured forward bending at work (FBW) and low-back pain intensity (LBPI) among Norwegian construction and healthcare workers. **Methods:** One-hundred and twenty-five workers wore two accelerometers for 3-4 consecutive days, during work and leisure to establish duration of $\geq 30^\circ$ and $\geq 60^\circ$ forward bending. The participating workers reported LBPI (0-3) at the time of objective measurements and after 6, 12, 18 and 24 months. We investigated associations using linear mixed models with significance level $p \leq 0.05$ and presented results per 100 min. **Results:** The duration of $\geq 30^\circ$ and $\geq 60^\circ$ FBW was not associated with average LBPI during follow-up, neither for the total sample nor stratified on work sector. Furthermore, analyses on all workers and on construction workers only found no significant association between $\geq 30^\circ$ or $\geq 60^\circ$ FBW and change in LBPI over the 2-year follow-up. For healthcare workers we found a consistent significant association between the duration of $\geq 30^\circ$ FBW at baseline and the change in LBPI during follow-up, but this was not found for $\geq 60^\circ$ FBW. **Conclusions:** This study suggests that objectively measured duration of FBW in minutes is not associated with average levels of, or change in LBPI in construction workers over a 2-year period. In healthcare workers, exposure to $\geq 30^\circ$ FBW was associated with change in LBPI, while we did not find this for $\geq 60^\circ$ FBW. Results may indicate that the associations between FBW and LBP vary depending on type of work tasks, gender or sector-specific factors.

Lunde et al. 2019.

Occupational and Environmental Medicine vol. 76, no. 9.

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Keywords: Construction work; Healthcare work; Low-back pain; Objective measures; Prospective design.

Evidence Level: 4B

Link: <https://oem.bmj.com/content/76/9/660.long>

Is age more than manual material handling associated with lumbar vertebral body and disc changes? A cross-sectional multicentre MRI study.

Objective: Conflicting evidence exists to what extent manual material handling (MMH) causes lumbar disc disease, lack of evidence exist that this effect takes place especially at L5-S1 level, where the greatest moment occurs. The aim was to assess if lumbar vertebral body and disc changes are more common in people whose job involves significant MMH and, if so, to evaluate if lumbar vertebral body and disc changes are more prevalent in the lower part of the lumbar spine (L4-L5 and L5-S1). **Design:** Observational, cross-sectional, with quasi-random recruitment. **Setting:** Outpatient radiology units of three large hospitals in northern (Bologna and Brescia) and southern (Bari) Italy. **Participants:** 183 consecutive adult subjects (89 males, 94 females) aged 20-70 years referred by the general practitioner or a specialist for MRI of the lumbar spine. **Outcome measures:** Neuroradiologists (blind to clinical assessment) evaluated the prevalence of intervertebral disc and vertebral body changes in standardised MRI examinations. History of personal and family musculoskeletal diseases and injuries, current and previous MMH at work and during leisure time were assessed by interview and self-administered questionnaire. **Results:** Participants were classified according their occupational exposure to MMH. No association was found between MMH and vertebral body and intervertebral disc changes, whereas age over 45 years was consistently associated with more disc extension beyond the interspace changes, Pfirrmann changes, osteophytes and Modic changes: the association was statistically significant at

the conventional 5% level. Conclusion: Age, and not MMH, seems to primarily affect the presence of intervertebral disc changes; prospective studies are needed to better explore the relationship between MMH and the possible presence (and level) of lumbar vertebral body and/or disc changes.

Violante et al. 2019.

BMJ Open, vol. 9, no. 9.

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Keywords: Biomechanics; DEBIT; Disc degeneration; Lumbar spine; Magnetic resonance imaging; Manual material handling; Modic changes; Osteophytes; Pfirmann; Spondylolisthesis.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/9/9/e029657.long>

Chronic health issues

Psychosocial working conditions, trajectories of disability, and the mediating role of cognitive decline and chronic diseases: A population-based cohort study.

Background: Unfavorable psychosocial working conditions have been associated with cognitive decline and chronic diseases, both of which may subsequently accelerate functional dependence. This study aimed to investigate the association between job demand-control-support combinations and trajectories of disability in later life and to further explore the role of cognitive decline and the co-occurrence of chronic diseases in mediating this association. Methods: In this cohort study, 2,937 community dwellers aged 60+ years (mean age 73 ± 10.6 ; 62.9% female) residing in the Kungsholmen District of Stockholm, Sweden, participated in the baseline survey (2001-2004) and were followed up to 12 years. Lifelong occupational history was obtained through a standardized interview; job demands, job control, and social support at work in the longest-held occupation were graded with a psychosocial job-exposure matrix. Job control, demands, and social support were dichotomized using the median values from the matrix, respectively, to further generate demand-control-support combinations. Disability was measured by summing the number of impaired basic and instrumental activities of daily living. Global cognitive function was assessed by Mini-Mental State Examination. Chronic conditions were ascertained by clinical examinations, medical history, and patient clinical records; the total number of chronic diseases was summed. Data were analyzed using linear mixed-effects models and mediation analysis. Age, sex, education, alcohol consumption, smoking, leisure activity engagement, early-life socioeconomic status, occupational characteristic and physical demands, and baseline cognitive function and number of chronic diseases were adjusted for in the analyses. Compared with active jobs (high control/high demands; $n = 1,807$), high strain (low control/high demands; $n = 328$), low strain (high control/low demands; $n = 495$), and passive jobs (low control/low demands; $n = 307$) were all associated with a faster rate of disability progression ($\beta = 0.07$, 95% CI 0.02-0.13, $p = 0.01$; $\beta = 0.10$, 95% CI 0.06-0.15, $p < 0.001$; $\beta = 0.11$, 95% CI 0.05-0.18, $p < 0.001$). The association between high strain and disability progression was only shown in people with low social support at work ($\beta = 0.13$, 95% CI 0.07-0.19, $p < 0.001$), but not in those with high social support ($\beta = 0.004$, 95% CI -0.09 to 0.10, $p = 0.93$). Moreover, we estimated that the association between demand-control status and disability trajectories was mediated 38.5% by cognitive decline and 18.4% by accumulation of chronic diseases during the follow-up period. The limitations of this study include unmeasured confounding, self-reported work experience, and the reliance on a psychosocial job-exposure matrix that does not consider variabilities in individuals' perception on working conditions or job characteristics within occupations. Conclusions: Our findings suggest that negative psychosocial working conditions during working life may accelerate disability progression in later life. Notably, social support at work may buffer the detrimental effect of high strain on

disability progression. Cognitive decline and chronic-disease accumulation, and especially the former, partially mediate the association of psychosocial working conditions with trajectories of disability. Further studies are required to explore more mechanisms that underlie the association between psychosocial working conditions and disability trajectories.

Pan et al. 2019.

PLoS Medicine, vol. 16, no. 9.

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Keywords: Chronic diseases; Cognitive decline; Psychosocial working conditions; Trajectories of disability.

Evidence Level: 4A

Link: <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002899>

Asbestosis and mesothelioma

Malignant mesothelioma in construction workers: the Apulia regional mesothelioma register, Southern Italy.

Objective: Asbestos was widely used in construction in both a friable and a compact form until the 1990s, before its use was banned. Today, many of these materials are still in situ and represent a source of risk for construction workers. The objective of the study was to analyse the cases of mesothelioma arising among construction workers registered in the Apulia regional register of mesothelioma. Results: For the period 1993-2018, there were 178 male cases, and 10.2% of the cases were present in the regional register. The average age at diagnosis was 64.7 years. The site was pleural in 96.06% of cases, with a diagnosis of certainty in 86.5% of the total cases and 61.8% of cases with epithelial histology. The average latency is 43.9 years. In 75.2% of cases, the exposure began between 1941 and 1970, with an average duration of 24.3 years. The age at the start of exposure in 68.5% of cases is between 8 and 20 years. The ORs were 2.5 (C.I. 95% 1.01-6.17) for the epithelioid histotype and the high duration of exposure. The data underline the need for prevention and information on all activities involving construction workers in which asbestos-containing materials are still used.

Vimercati et al. 2019.

BMC Research Notes, vol. 12, no. 1.

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Keywords: Asbestos; Compensation; Construction; Malignant mesothelioma; Mesothelioma register; Work-related cancer; Workers.

Evidence Level: 4B

Link: <https://bmcreresnotes.biomedcentral.com/articles/10.1186/s13104-019-4675-4>

Ergonomics

Effectiveness of lumbar supports in low back functionality and disability in assembly-line workers.

Low back pain (LBP) is a common problem in manufacturing workers. Several strategies have been proposed in order to reduce the pain and/or improve functionality. Among them, lumbar supports are a common solution prescribed for lumbar pain relief. Most of the studies in the literature only consider subjective sensations of the workers for evaluation assessment. This study applies biomechanical tests (a flexion-relaxation test and a functional movement evaluation test) to analyse the effectiveness of flexible lumbar supports in functionality and disability versus placebo intervention, consisting of kinesiotape placed on the low back without any stress. 28 workers participated in the study, randomised in control and intervention groups with a two months' intervention. None of the biomechanical tests showed statistical differences in between-groups

pre-post changes. No benefits of wearing a flexible lumbar support during the workday have been found in these assembly-line workers versus placebo intervention.

Bataller-Cervero et al. 2019.

Industrial Health vol. 57, no. 5.

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Keywords: Flexible lumbar belt; Flexion-relaxation phenomenon; Functionality; Lumbar pain; Manufacturing workers.

Evidence Level: 2B

Link: https://www.jstage.jst.go.jp/article/indhealth/57/5/57_2018-0179/_article

Design and development of an ergonomic trolley-lifter for sheet metal handling task: a preliminary study.

Background: There have been some concerns related to manual handling of large items in industry. Manual handling operations of large sheet metal may expose workers to risks related to efficiency as well as occupational safety and health. Large sheet metals are difficult to move and burdensome to lift/transfer, and handling the sharp sheet edges may result in contact stress and/or cut injuries on the workers. Methods: Through observation, interview, and immersive simulation activities, a few problems related to current handling of sheet metals were identified. A sheet metal trolley-lifter was then designed and fabricated to address these issues. A pilot study on the use of the developed trolley-lifter for handling sheet metals was conducted to compare between the new and traditional handling methods. Results: The pilot study of the trolley-lifter showed promising results in terms of improving the cycle time, workforce utilisation, and working postures compared with the traditional handling method. Conclusion: The trolley-lifter offers an alternative solution to automation and a mechanised assistive device by providing a simple mechanism to assist the handling of sheet metals effectively and safely.

Radin Umar et al. 2019.

Safety and Health at Work, vol. 10, no. 3.

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Keywords: Design; Ergonomics; Intervention; Material handling; Sheet metal.

Evidence Level: 5B

Link: <https://www.sciencedirect.com/science/article/pii/S2093791117304365?via%3Dihub>