



# Emerging Evidence Alert November 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 were published in October 2019 only.

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## Does an ageing workforce lead to reduced work ability?

The aim of a recent [longitudinal study](#) was to examine the perception of work ability among more than 1,600 employees aged 55 years and older. The study looked at the strong association between increased longevity and the contribution of older employees in an ageing workforce.

The evidence highlights that age is not a predictor of reduced work ability. Work ability depends on health and safety, promotion and preventive activities in the workplace.

The study also found that improving work ability in an ageing workforce leads to a decrease in the likelihood of early retirement, absenteeism, as well as increasing motivation and productiveness in employees of all ages.

Learn more about recruiting and retaining older workers' with Comcare's [Investing in Experience](#) resources.

## Research plan towards 2022

The [Comcare Research Plan Towards 2022](#) outlines five priority themes, including how we best adapt to Australia's changing workplaces, such as an ageing workforce. The plan outlines how Comcare will partner with industry and academia to conduct innovative research that helps drive better practice across the scheme. Learn more in our [promotional brochure](#).

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*

#### **Obstacles to returning to work with chronic pain: in-depth interviews with people who are off work due to chronic pain and employers**

**Background:** The global burden of chronic pain is growing with implications for both an ageing workforce and employers. Many obstacles are faced by people with chronic pain in finding employment and returning to work after a period of absence. Few studies have explored obstacles to return-to-work (RTW) from workers' and employers' perspectives. Here we explore views of both people in pain and employers about challenges to returning to work of people who are off work with chronic pain. **Methods:** We did individual semi-structured interviews with people who were off work (unemployed or off sick) with chronic pain recruited from National Health Service (NHS) pain services and employment services, and employers from small, medium, and large public or private sector organisations. We analysed data using the Framework method. **Results:** We interviewed 15 people off work with chronic pain and 10 employers. Obstacles to RTW for people with chronic pain spanned psychological, pain related, financial and economic, educational, and work-related domains. Employers were concerned about potential attitudinal obstacles, absence, ability of people with chronic pain to fulfil the job requirements, and the implications for workplace relationships. Views on disclosure of the pain condition were conflicting with more than half employers wanting early full disclosure and two-thirds of people with chronic pain declaring they would not disclose for fear of not getting a job or losing a job. Both employers and people with chronic pain thought that lack of confidence was an important obstacle. Changes to the job or work conditions (e.g. making reasonable adjustments, phased return, working from home or redeployment) were seen by both groups as facilitators. People with chronic pain wanted help in preparing to RTW, education for managers about pain and supportive working relationships. **Conclusions:** People with chronic pain and employers may think differently in terms of perceptions of obstacles to RTW. Views appeared disparate in relation to disclosure of pain and when this needs to occur. They appeared to have more in common regarding opinions about how to facilitate successful RTW. Increased understanding of both perspectives may be used to inform the development of improved RTW interventions.

**Grant et al. 2019.**

**BMC Musculoskeletal Disorders, vol. 20, no. 1.**

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**Keywords:** Chronic pain; Qualitative interview; Return to work

**Evidence Level:** 5A

**Link:** <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-019-2877-5>

#### **Horizontal return to work coordination was more common in RTW programs than the recommended vertical coordination. The Rapid-RTW cohort study.**

**Background:** In return-to-work (RTW) programs, coordinators are often provided in order to integrate services. However, models of coordinating services vary widely internationally, and across different programs, where one distinction is between vertical and horizontal integration (i.e. between levels/institutions, or within one service/level). The aim of this study was therefore to explore and describe if and how a coordinator was provided in RTW-programs, and whether the provision of a coordinator was associated with certain personal or intervention characteristics.

**Methods:** The study was designed as a cohort study following employees participating in a variety of Rapid-RTW-programs in Norway (n = 39). Employees (n = 494) answered a self-administered questionnaire, which was linked to register-data on diagnoses and sickness-absence. Employees who replied yes/no to the question "Did the program provide a person who tailored or coordinated your services?" were included in this analysis. Associations for being provided with a coordinator were tested in adjusted logistic regression models. **Results:** Sixty-nine percent of the employees reported having a coordinator. These coordinators were mainly responsible for coordinating treatment within own programs (i.e. horizontal coordination, 68%). As expected, rehabilitation programs more often provided a coordinator compared to treatment programs (OR 3.87 95% CI 2.42-6.24). The odds for being provided with a coordinator were reduced for each additional year of age of the employee (OR 0.97, 95% CI 0.96-0.99). More professions were involved in

programs that provided coordinators, also more contact with other stakeholders like leaders and social insurance services (NAV), but only contact with supervisor remained statistically significant in adjusted analysis (OR 1.69 95% CI 0.31-9.27). The programs with a coordinator more often provided adaptations at the workplace for the individual employee (OR 0.08 95% CI 0.01-0.60). However, these signs of vertical integration were only evident for a limited number of employees. Conclusion: In this study, seven of ten employees reported to have a coordinator, which was associated with more professions and stakeholder involvement in the RTW-process. Most of these coordinators did not coordinate vertically between the service levels and types of intervention arenas for sick listed employees (i.e. workplace, social security, and health care services), as recommended in earlier research.

**Skarpaas et al. 2019.**

**BMC Health Service Research, vol. 19, no. 1.**

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**Keywords:** Occupational rehabilitation; RTW coordination; RTW intervention; Rapid RTW- project; Return to work; Service integration; Sick leave

**Evidence Level:** 4B

**Link:** <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-4607-y>

### *Presenteeism & absenteeism*

**Perceived and content-related emotional demands at work and risk of long-term sickness absence in the Danish workforce: a cohort study of 26 410 Danish employees.**

**Objectives:** This study aimed to examine whether high emotional demands at work predict long-term sickness absence (LTSA) in the Danish workforce and whether associations differ by perceived and content-related emotional demands. **Methods:** We included 26 410 individuals from the Work Environment and Health in Denmark Study, a nationwide sample of the Danish workforce. Emotional demands at work were measured with two items: one assessing perceived emotional demands (asking how often respondents were emotionally affected by work) and one assessing content-related emotional demands (frequency of contact with individuals in difficult situations). LTSA was register based and defined as spells of  $\geq 6$  weeks. Respondents with LTSA during 2 years before baseline were excluded. Follow-up was 52 weeks. Using Cox regression, we estimated risk of LTSA per one-unit increase in emotional demands rated on a five-point scale. **Results:** During 22 466 person-years, we identified 1002 LTSA cases. Both perceived (HR 1.20, 95% CI 1.12 to 1.28) and content-related emotional demands (HR 1.07, 95% CI 1.01 to 1.13) predicted risk of LTSA after adjustment for confounders. Further adjustment for baseline depressive symptoms substantially attenuated associations for perceived (HR 1.08, 95% CI 1.01 to 1.16) but not content-related emotional demands (HR 1.05, 95% CI 1.00 to 1.11). Individuals working in occupations with above-average values of both exposures had an increased risk of LTSA (HR 1.32, 95% CI 1.14 to 1.52) compared with individuals in all other job groups. **Conclusions:** Perceived and content-related emotional demands at work predicted LTSA, also after adjustment for baseline depressive symptoms, supporting the interpretation that high emotional demands may be hazardous to employee's health.

**Framke et al. 2019.**

**Occupational and Environmental Medicine.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** content-related; emotional demands; perceived; sickness absence; workplace

**Evidence Level:** 4A

**Link:** <https://oem.bmj.com/content/early/2019/10/29/oemed-2019-106015.long>

**Work participation trajectories among 1,098,748 Finns: reasons for premature labour market exit and the incidence of sickness absence due to mental disorders and musculoskeletal diseases**

**Background:** Early exit from paid employment is a notable public health and societal challenge. Previous research has largely focused on the relationships among variables instead of the relationships among individuals with different work participation history. Person-oriented methods enable to identify latent groups of individuals who are likely to follow similar development in their work participation over time. We thus aimed to identify work participation trajectories during early and midlife careers and their social determinants using large nationally representative data comprising over 1 million initially employed

individuals and a 10-year follow-up for their work participation. A further aim was to determine the cumulative incidence of sickness absence due to key diagnostic groups, mental disorders and musculoskeletal diseases within the trajectories. Methods: Young (25-38 years at baseline, n = 495,663) and midlife (39-52 years at baseline, n = 603,085) Finnish people, all working in 2004, were followed up through 2013, with registers of the Social Insurance Institution, and the Statistics Finland. The registers provided data for work participation and its determinants, as well as for computing the cumulative incidence of sickness absence. Latent class growth analysis was used to identify trajectories. Results: Three distinctive trajectories were identified: temporary exit, permanent exit, and continuously employed people. As compared to the other trajectories, those belonging to the permanent exit trajectory were more likely men, manual workers and had a lower income. The cumulative incidence of sickness absence due to mental disorders was highest in the permanent exit trajectory group. For musculoskeletal diseases, the cumulative incidence of sickness absence increased in the permanent exit trajectory mainly in the older age groups. Conclusion: Distinct group-based trajectories of early work exit can be identified in a representative cohort of initially employed people. Focusing on the determinants of premature exit and early intervention to tackle increasing sickness absence may promote work participation particularly in the most vulnerable groups.

**Lallukka et al. 2019.**

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

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**Keywords:** Disability pension; Follow-up; Mental disorders; Musculoskeletal diseases; Person-oriented approach; Population-based; Register-based; Sickness absence

**Evidence Level:** 4B

**Link:** <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-019-7753-6>

**Self-reported health problems and obesity predict sickness absence during a 12-month follow-up: a prospective cohort study in 21 608 employees from different industries.**

Objectives: To study whether self-reported health problems predict sickness absence (SA) from work in employees from different industries. Methods: The results of a health risk appraisal (HRA) were combined with archival data of SA of 21 608 employees (59% female, 56% clerical). Exposure variables were self-reported health problems, labelled as 'work disability (WD) risk factors' in the HRA, presence of problems with occupational well-being and obesity. Age, socioeconomic grading and the number of SA days 12 months before the survey were treated as confounders. The outcome measure was accumulated SA days during 12-month follow-up. Data were analysed separately for males and females. A Hurdle model with negative binomial response was used to analyse zero-inflated count data of SA. Results: The HRA results predicted the number of accumulated SA days during the 12-month follow-up, regardless of occupational group and gender. The ratio of means of SA days varied between 2.7 and 4.0 among those with 'WD risk factors' and the reference category with no findings, depending on gender and occupational group. The lower limit of the 95% CI was at the lowest 2.0. In the Hurdle model, 'WD risk factors', SA days prior to the HRA and obesity were additive predictors for SA and/or the accumulated SA days in all occupational groups. Conclusion: Self-reported health problems and obesity predict a higher total count of SA days in an additive fashion. These findings have implications for both management and the healthcare system in the prevention of WD.

**Pihlajamaki et al. 2019.**

**BMJ Open, vol. 9, no. 10.**

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**Keywords:** Health surveillance; occupational health practice; risk assessment; sickness absence

**Evidence Level:** 4B

**Link:** <https://bmjopen.bmj.com/content/9/10/e025967.long>

**Multimorbidity is common among young workers and related to increased work absenteeism and presenteeism: results from the population-based Raine Study cohort.**

Objectives: This study aimed to determine the extent of both multimorbidity and work productivity loss among young adults with paid work and to analyze their association. Methods We included 604

participants from a follow-up of the Raine Study that comprised a cohort who were 22 years at the time (Gen2-22). Information on 36 health conditions, grouped into 10 condition categories, was collected through questionnaires and physical assessments (for body mass index only). Quarterly questionnaires about work productivity, including total absenteeism, sickness absenteeism, and total presenteeism, were distributed electronically over the subsequent 12 months. Descriptive statistics were used to determine the prevalence of health conditions, condition categories, multimorbidity, and work productivity. Zero-inflated negative binomial regression analyses were used to assess the association of multimorbidity with productivity loss. Results Multimorbidity prevalence was substantially higher in females (63%) compared to males (41%). Productivity loss increased as the number of condition categories increased. For example, total absenteeism was associated with an increase in the number of health condition categories in males [incidence rate ratio (IRR) 1.20, 95% confidence interval (CI) 1.05-1.36] and females (IRR 1.13, 95% CI 1.04-1.24). Similar results were found for sickness absenteeism and presenteeism. The highest burden of productivity loss was found for musculoskeletal disorders (42 444 hours/1000 workers/year), sleep problems (33 581 hours/1000 workers/year), mental and neurological conditions (15 650 hours/1000 workers/year), and 'other' medical conditions (22 519 hours/1000 workers/year). Conclusions Multimorbidity appears to be highly prevalent among young adults with paid work and is strongly related to work productivity loss. Therefore, young workers should be targeted in interventions aiming to reduce multimorbidity and its impact on work productivity.

**Troelstra et al. 2019.**

**Scandinavian Journal of Work and Environmental Health Status.**

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**Keywords:** Absenteeism; multimorbidity; presenteeism; Raine Study; sickness absence; sickness absence; work productivity; young adult; young worker

**Evidence Level:** 4B

**Link:** [http://www.sjweh.fi/show\\_abstract.php?abstract\\_id=3858](http://www.sjweh.fi/show_abstract.php?abstract_id=3858)

### *Work ability*

**Perceived work ability index of public service employees in relation to ageing and gender: A comparison in three European countries.**

Background: Increasing longevity raised the prospect of a workplace for ageing workers. Previous studies reveal that work ability decreases with age, even among the healthy, and decreased significantly with age among women. The aim of the study is to examine the perception of work ability of public sector employees aged 55 years and older and gender differences in three European countries. Methods: A prospective longitudinal study design and standardized "Work Ability Index" (WAI) were used. This study analysed the relationship between ageing, gender, and perceived work ability among 1653 employees aged 45.06±10.90 years (562 men and 1091 women) from Spain, Bosnia and Herzegovina and Monte Negro. The research was conducted in 2018. Results: Older employees had a better WAI than their younger colleagues (P<0.001). The lowest prevalence rate 20% of excellent WAI was between 35 and 44 years of age. The reduction of WAI in Bosnia and Herzegovina was huge 68%, compared with 30% in Monte Negro (more than 2 times) and 14% in Spain (almost 5 times more). Conclusion: Gender and age was not protector and predictor of excellent or reduced work ability. Work ability did not decrease with age among women and men, public sector employees. Work ability depends of health and safety, promotion and preventive activities at the workplace.

**Pranjic et al. 2019.**

**Zdravstveno varstvo, vol. 58, no. 4.**

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**Keywords:** Ageing; gender; public sector employees; work ability

**Evidence Level:** 4B

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6778419/>

### *Disability*

**The use of the model of occupational self-efficacy for work retraining: A multiple case study.**

The South African labour law serves as a guide for employers to accommodate injured individuals in the work place. The aim of the study was to explore and describe the experiences of individuals with traumatic brain injury regarding returning to work through the use of the Model of Occupational Self-Efficacy (MOOSE). The study utilized a multiple case study research design, and 10 participants participated in the study. An analytical strategy of explanation building was used to analyse the data. Three themes emerged from the study, i.e., Theme 1: the model has its limitations (barriers), Theme 2: the model helps facilitate work integration (facilitators), and Theme 3: further enhancements to improve the model. The findings of this study indicated that the participant experiences of the MOOSE are a useful model to facilitate the return of individuals living with a TBI back to work. Coping skills and support groups were also viewed as being an important part of the vocational rehabilitation program.

**Soeker et al. 2019.**

**Occupational Therapy International.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Occupation; Self-efficacy; Work; Retraining

**Evidence Level:** 5B

**Link:** <https://www.hindawi.com/journals/oti/2019/3867816/>

## Enhancing Employer Capability

### *Wellness programs*

#### **Effectiveness of worksite-based dietary interventions on employees' obesity: a systematic review and meta-analysis**

**Background:** This study was designed to provide scientific evidence on the effectiveness of worksite-based dietary intervention to reduce obesity among overweight/obese employees. **Method:** Electronic search was performed using Ovid Medline, Embase, Cochrane Library, and CINAHL databases. The keywords used were "obesity," "nutrition therapy," and "worksite." The internal validity of the randomized controlled trials (RCTs) was assessed using the Cochrane's Risk of Bias. Meta-analysis of selected studies was performed using Review Manager 5.3. **Results:** A total of seven RCTs with 2,854 participants were identified. The effectiveness of dietary interventions was analyzed in terms of changes in weight, body mass index (BMI), total cholesterol, and blood pressure. The results showed that weight decreased with weighted mean difference (WMD) of -4.37 (95% confidence interval (CI): -6.54 to -2.20), but the effectiveness was statistically significant only in short-term programs < 6 months (P = 0.001). BMI also decreased with WMD of -1.26 (95% CI: -1.98 to -0.55), but the effectiveness was statistically significant only in short-term programs < 6 months (P = 0.001). Total cholesterol decreased with WMD of -5.57 (95% CI: -9.07 to -2.07) mg/dL, demonstrating significant effectiveness (P = 0.002). Both systolic (WMD: -4.90 mmHg) and diastolic (WMD: -2.88 mmHg) blood pressure decreased, demonstrating effectiveness, but with no statistical significance. **Conclusions:** The worksite-based dietary interventions for overweight/obese employees showed modest short-term effects. These interventions can be considered successful because weight loss was below approximately 5-10 kg of the initial body weight, which is the threshold for the management of obesity recommended by the Scottish Intercollegiate Guideline Network (SIGN).

**Park et al. 2019.**

**Nutrition Research and Practice, vol. 13, no. 5.**

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**Keywords:** Weight loss; health promotion; overweight; workplace

**Evidence Level:** 1A

**Link:** <https://e-nrp.org/DOIx.php?id=10.4162/nrp.2019.13.5.399>

#### **A new two square agility test for workplace health-reliability, validity and minimal detectable change**

**Purpose:** One promising strategy for workplace wellness programs is to emphasize functional mobility screening and coaching to promote suitable physical activity and reduce musculoskeletal risks. This study examined intra-rater reliability, test-retest reliability, concurrent validity, known-groups validity and minimal detectable change for a new Two Square Agility Test (TSAT) designed as a functional mobility

measure to promote workplace health. Participants and Methods: Two hundred forty eight non-disabled participants (ages 18-69) were measured for body size, physical activity and 3 trials of the Two Square Agility Test. 78 participants were tested a week later on the Two Square Agility Test and other functional mobility tests. Results: Intra-rater reliability was excellent (ICC=0.94) and test-retest reliability was good (ICC=0.87). Two Square Agility Test correlated moderately with Timed Up and Go ( $r=0.63$ ), Five Times Sit to Stand ( $r=0.62$ ), and Maximum Step Length ( $r= -0.54$ ), supporting its concurrent validity. Performances for Two Square Agility Test were better in males, younger age, higher physical activity, and non-obese groups. The minimal detectable change at a 95% confidence level (MDC95) was 1.37 s. Conclusion: Preliminary results supported reliability and validity of Two Square Agility Test as a functional mobility measure to promote workplace health.

**Wickstrom et al. 2019.**

**Journal of Physical Therapy Science, vol. 31, no. 10.**

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**Keywords:** Fitness; Functional mobility

**Evidence Level:** 5A

**Link:** [https://www.jstage.jst.go.jp/article/jpts/31/10/31\\_jpts-2019-106/\\_article](https://www.jstage.jst.go.jp/article/jpts/31/10/31_jpts-2019-106/_article)

### *Organisational issues*

#### **Organizational justice and illness reporting among Japanese employees with chronic diseases**

**Purpose:** This study examined the association between perceived organizational justice (i.e., procedural justice and interactional justice) and reporting of illness to one's company (illness reporting) among Japanese employees with chronic diseases. **Methods:** This online cross-sectional survey included 1,134 employees (aged 18-65 years) who required workplace support to combine work with disease treatment. Participants were classified into tertiles of perceived organizational justice (low, moderate, and high). Multiple logistic regression analyses were conducted to examine sex differences in the associations between perceived justice and illness reporting. **Results:** Males reporting perceived high levels of procedural and interactional justice had significantly higher odds of illness reporting than those with perceived low levels of procedural (odds ratio [OR] 2.62, 95% confidence interval [CI]: 1.47-4.66) and interactional justice (OR 4.34, 95% CI: 2.28-8.27). Females with perceived high levels of interactional justice had significantly higher odds of illness reporting than those with perceived low levels of interactional justice (OR 1.74, 95% CI: 1.08-2.80). There was no significant association between procedural justice and illness reporting among females. **Conclusion:** The findings indicate that high perceived organizational justice is positively associated with illness reporting among Japanese employees who require workplace support to combine work and disease treatment.

**Eguchi et al. 2019.**

**PLoS One, vol. 14, no. 10.**

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**Keywords:** Chronic disease; illness reporting; Organizational justice; Procedural justice; Interactional justice

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0223595>

#### **Organizational politics and workplace deviance in unionized settings: Mediating role of job stress and moderating role of resilience.**

**Background:** Politics and political behaviors are a vicious and bitter reality in an organization's life. Although under investigation for more than three decades, the literature lacks sufficient studies investigating culture-specific potential factors which have the potency to moderate the poisonous consequences of organizational politics. The aim of this study was to investigate the relationship of organizational politics and deviance in unionized settings with the moderating role of resilience in unionized employees in higher power distance culture. **Methods:** A cross-sectional design was followed for data collection. The population of this study was low-ranked employees having union identity and working in the largest power distribution company of Pakistan. Stratified sampling was applied, and eight strata's were considered on the basis of geographical distribution, a total of 400 questionnaires were distributed among the employees of eight circles, fifty from each. Smart PLS.3.2.0 was used to analyze data through Structural Equation Modeling



(SEM) under measurement and structural models. Conclusion: From a theoretical perspective, this study confirmed that employees tend to show interpersonal deviance when they experience organizational politics, but organizational politics does not promote organizational deviance. Under stress, the individual also shows a slightly higher level of interpersonal deviance as compared to organizational deviance. However, the moderating role of resilience has not been proved in this study. Research limitations and future directions have also been discussed.

**Bashir et al. 2019.**

**Psychology Research and Behavioral Management, vol. 12.**

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**Keywords:** interpersonal deviance; job stress; lower-level employees; organizational deviance; organizational politics; resilience

**Evidence Level:** 4B

**Link:** <https://www.dovepress.com/organizational-politics-and-workplace-deviance-in-unionized-settings-m-peer-reviewed-article-PRBM>

### *Job design*

#### **Methods in experimental work break research: A Scoping Review**

The number of studies on work breaks and the importance of this subject is growing rapidly, with research showing that work breaks increase employees' wellbeing and performance and workplace safety. However, comparing the results of work break research is difficult since the study designs and methods are heterogeneous and there is no standard theoretical model for work breaks. Based on a systematic literature search, this scoping review included a total of 93 studies on experimental work break research conducted over the last 30 years. This scoping review provides a first structured evaluation regarding the underlying theoretical framework, the variables investigated, and the measurement methods applied. Studies using a combination of measurement methods from the categories "self-report measures," "performance measures," and "physiological measures" are most common and to be preferred in work break research. This overview supplies important information for ergonomics researchers allowing them to design work break studies with a more structured and stronger theory-based approach. A standard theoretical model for work breaks is needed in order to further increase the comparability of studies in the field of experimental work break research in the future.

**Scholz et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

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**Keywords:** Experimental design; pause; performance measure; physiological measure; rest break; self-report measure; work break

**Evidence Level:** 6A

**Link:** <https://www.mdpi.com/1660-4601/16/20/3844>

### *Shift work*

#### **Feasibility and preliminary efficacy of an m-health intervention targeting physical activity, diet, and sleep quality in shift-workers.**

Poor health behaviors are prevalent in shift-workers, but few multiple health-behavior interventions consider their unique needs. This study aimed to (1) evaluate the feasibility and acceptability of an existing app-based intervention to improve physical activity, diet, and sleep quality in a shift-worker population, (2) estimate intervention effect in a four-week pilot randomized controlled trial (RCT) (ACTRN12618001785291). Shift-workers (18-65 years old) were randomized to intervention (n = 20) or wait-list (n = 20) groups. Outcomes included recruitment, engagement, attrition, usefulness ratings, System Usability Scale (SUS), qualitative interviews, and estimation of treatment effect (minutes of physical activity, diet quality, and sleep quality) using mixed model analysis. Recruitment took one week. App-use at week four was 55% (11/20), 85% (34/40) completed the four-week follow-up questionnaire, and 20% (4/20) of the intervention group completed the qualitative interview. The intervention was rated as slightly to moderately useful by 76.9% (10/13) of participants on a five-point scale. The SUS score was 62.7 (12.7) out of 100. Diet quality improved for the intervention (4.5 points; 95% confidence interval (CI) = 0.1, 8.9; p

= 0.047) vs. the wait-list group, but not physical activity or sleep quality. Qualitative interviews found that a more tailored intervention, more accessible information, and interactive features were desired. The intervention was feasible in terms of recruitment, but modifications to increase engagement are needed.

**Oftedal et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

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**Keywords:** Behavior change; exercise; health promotion; multiple lifestyle behaviors; nutrition; resistance training

**Evidence Level:** 2A

**Link:** <https://www.mdpi.com/1660-4601/16/20/3810>

### **Shift workers have higher blood pressure medicine use, but only when they are short sleepers: A longitudinal UK biobank study.**

Background: Some, but not all, studies report associations between shift work and hypertension, suggesting that particular subgroups may be at risk. We examined moderating effects of sleep duration and circadian preference on the relationship between shift work and new blood pressure (BP) medicine use at follow-up. Methods and Results: Baseline and 5-year follow-up data from the UK Biobank cohort (N=9200) were used to generate logistic regression models for shift workers and nonshift workers. The moderating effects of sleep duration (short  $\leq 6$  hours; adequate 7-8 hours; long  $\geq 9$  hours) and circadian preference (morning "larks;" intermediate; evening "owls") at baseline were examined with new BP medicine use at follow-up, adjusting for age, sex, race, education, employment, urban/rural, cardiovascular disease family history, depression, alcohol intake, physical activity, diet, smoking, and body mass index. The sample was predominately middle aged ( $55.3 \pm 7.4$ ), female (57.3%), and white (97.9%). Most reported adequate sleep duration (7-8 hours, 73.7%) and were intermediate type (65.3%); 8.0% were shift workers at baseline. Only 6.5% reported new BP medicine use at follow-up. Short sleep duration was a significant moderator of new BP medicine use in shift workers. Among short sleepers, shift workers had a 2.1-fold increased odds of new BP medicine use compared with nonshift workers (odds ratio=2.08, 95% CI=1.21-3.58, P=0.008). In those reporting adequate (odds ratio=0.82, 95% CI=0.54-1.25, P=0.35) and long sleep (odds ratio=0.64, 95% CI=0.11-3.54, P=0.60), this relationship was protective but nonsignificant. Interaction between circadian preference and shift work on BP medicine use was nonsignificant. Conclusions Shift workers with short sleep duration may be at risk for hypertension.

**Riegel et al. 2019.**

**Journal of the American Heart Association, vol. 8, no. 20.**

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**Keywords:** Circadian rhythm; hypertension; risk factors; shift work schedule; sleep

**Evidence Level:** 4A

**Link:** [https://www.ahajournals.org/doi/full/10.1161/JAHA.119.013269?url\\_ver=Z39.88-2003&rfr\\_id=ori%3Arid%3Acrossref.org&rfr\\_dat=cr\\_pub%3Dpubmed](https://www.ahajournals.org/doi/full/10.1161/JAHA.119.013269?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub%3Dpubmed)

### *Public health*

#### **Effects of early retirement policy changes on working until retirement: Natural experiment**

Many European countries have implemented pension reforms to increase the statutory retirement age with the aim of increasing labor supply. However, not all older workers may be able or want to work to a very high age. Using a nation-wide register data of labor market transitions, we investigated in this natural experiment the effect of an unexpected change in the Dutch pension system on labor market behaviors of older workers. Specifically, we analyzed transitions in labor market positions over a 5-year period in two nation-wide Dutch cohorts of employees aged 60 years until they reached the retirement age (n = 23,703). We compared transitions between the group that was still entitled to receive early retirement benefits to a group that was no longer entitled to receive early retirement benefits. Results showed that the pension reform was effective in prolonging work participation until the statutory retirement age (82% vs. 61% at age 64), but also to a larger proportion of unemployment benefits in the 1950 cohort (2.0%-4.2%) compared to the 1949 cohort (1.4%-3.2%). Thus, while ambitious pension reforms can benefit labor supply,

the adverse effects should be considered, especially because other studies have shown a link between unemployment and poor health.

**Boot et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Netherlands; longitudinal; older workers; policy; retirement; transitions

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/16/20/3895>

## Adapting to the Future of Work

### *Technology*

#### **Changing stress mindset through stressjam: A virtual reality game using biofeedback.**

**Objective:** A range of recent studies suggest that overall mindset about stress is related to health, performance, and well-being. Therefore, an exploratory study was conducted to examine whether virtual reality (VR) with real-time biofeedback would have potential in training people in an engaging way to develop a new stress-is-enhancing mindset. **Materials and Methods:** The specific application to improve people's stress mindset that was used in this study is Stressjam. The application was tested on its attractiveness by 111 healthy participants, specifically on their personal involvement through the Personal Involvement Inventory and its usability through the System Usability Scale. In addition to the healthy participants, a group of 64 patients dealing with stress used Stressjam for at least three sessions. The Stress Mindset Measure was used to assess the stress mindset of both groups, at baseline and after finishing their session(s). **Results:** Stressjam appears to be an application that is user friendly with good user involvement. The healthy participants and the patient sample both had a more positive stress mindset after using the application than at baseline,  $t(111) = 4.38$ ,  $P < 0.001$ , and  $F(1,63) = 66.57$ ,  $P < 0.001$ , respectively. **Conclusion:** The results of this study give some indications that using VR with biofeedback might be useful in working toward a more positive stress mindset. As such, further research into applications such as Stressjam is warranted.

**Maarsingh et al. 2019.**

**Games for Health Journal, vol. 8, no. 5.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Game therapy; Heart rate variability; Stress reduction; Virtual reality

**Evidence Level:** 5A

**Link:** [https://www.liebertpub.com/doi/full/10.1089/g4h.2018.0145?url\\_ver=Z39.88-2003&rfr\\_id=ori:rid:crossref.org&rfr\\_dat=cr\\_pub%3dpubmed](https://www.liebertpub.com/doi/full/10.1089/g4h.2018.0145?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed)

### *Work environment*

#### **The impact of expatriates' cross-cultural adjustment on work stress and job involvement in the high-tech industry**

The personal traits of expatriates influence their work performance in a subsidiary. Nevertheless, organizations tend to hire candidates who are suitable from the technological dimension but ignore personal and family factors. Expatriates might not be familiar with a foreign place, and most organizations do not provide the so-called cultural adjustment training. The selected expatriates often accept the job without knowing the future prospects of their career, which can result in individual and family turmoil initially. Moreover, the unknown future career prospects and concern over when they will return to the parent company can affect expatriates' work. Cross-cultural competence refers to the ability of individuals to work effectively and live normally in different cultural contexts, and this ability requires expatriate employees to adopt adaptive thinking patterns and behaviors in the host country. To explore the effect of expatriates' cross-culture adjustment on their work stress and job involvement, this study therefore uses an empirical approach in which data are collected with a questionnaire survey and proposes specific suggestions, according to the results, to aid expatriates in their personal psychological adjustment. The results show that the challenges faced by expatriate employees are derived from assigned tasks, unknown

environments, language barriers, and cultural differences. Excessive pressure will impose ideological and psychological burdens upon the expatriates and even lead to physical symptoms, however, the appropriate amount of pressure can play a driving role and promote the smooth progress of the work. High-tech industry employees who can adapt to the customs and cultures of foreign countries have higher work participation and are more likely to find ways to alleviate work stress. It has also been found that the stronger the cross-cultural competence of employees, the better their adjustment to the host country and the higher their corresponding job performance.

**Chen et al. 2019.**

**Frontiers in Psychology, vol. 10.**

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**Keywords:** Cross-cultural adjustment; expatriate; job involvement; personal psychological adjustment; work stress

**Evidence Level:** 5B

**Link:** <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02228/full>

### **Quality of work life and organizational performance: Workers' feelings of contributing, or not, to the organization's productivity.**

This is a pioneering study on the relationship between quality of work life and the employee's perception of their contribution to organizational performance. It unveils the importance of subjective and behavioral components of quality of work life and their influence on the formation of the collaborator's individual desire to contribute to strengthening the organization's productivity. The results obtained indicate that for workers: feeling their supervisors' support through listening to their concerns and by sensing they take them on board; being integrated in a good work environment; and feeling respected both as professionals and as people; positively influence their feeling of contributing to organizational performance. The results are particularly relevant given the increased weight of services in the labor market, together with intensified automation and digitalization of collaborators' functions. The findings also contribute to the ongoing debate about the need for more work on the subjective and behavioral components of so-called smart and learning organizations, rather than focusing exclusively on remuneration as the factor stimulating organizational productivity based on the collaborator's contribution.

**Leitao et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

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**Keywords:** organizational performance; productivity; quality of work life

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/16/20/3803>

### *Ageing workforce*

#### **Challenges for the labor market: Two 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:** Polish 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.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Poland; chronic disease; early exit from work; early retirement; labor force; older workers

**Evidence Level:** 4B

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

### **Factors predicting voluntary and involuntary workforce transitions at mature ages: Evidence from HILDA in Australia**

The fast population ageing has generated and will continue to generate large social, economic and health challenges in the 21st century in Australia, and many other developed and developing countries. Population ageing is projected to lead to workforce shortages, welfare dependency, fiscal unsustainability, and a higher burden of chronic diseases on health care system. Promoting health and sustainable work capacity among mature age and older workers hence becomes the most important and critical way to address all these challenges. This paper used the pooled data from the longitudinal Household, Incomes and Labour Dynamics in Australia (HILDA) survey 2002-2011 data to investigate common and different factors predicting voluntary or involuntary workforce transitions among workers aged 45 to 64. Long term health conditions and preference to work less hours increased while having a working partner and proportion of paid years decreased both voluntary and involuntary work force transitions. Besides these four common factors, the voluntary and involuntary workforce transitions had very different underlying mechanisms. Our findings suggest that government policies aimed at promoting workforce participation at later life should be directed specifically to life-long health promotion and continuous employment as well as different factors driving voluntary and involuntary workforce transitions, such as life-long training, healthy lifestyles, work flexibility, ageing friendly workplace, and job security.

**Gong et al. 2019.**

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

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**Keywords:** Australia; involuntary; mature ages; predictors; voluntary; workforce transitions

**Evidence Level:** 4A

**Link:** <https://www.mdpi.com/1660-4601/16/19/3769>

### **Building a sustainable construction workforce**

The average U.S. construction worker is aged 42.6 years, and will not be eligible for full Social Security retirement benefits until age 67. Delayed retirement is largely driven by economic need, but construction workers face considerable challenges in remaining on the job. This study explores trade-specific age trends within the construction industry, and the experiences of building trade unions with aging membership. A mixed-methods approach used trade-specific age statistics from the Current Population Survey and key informant interviews with labor leaders, in order to identify union experiences and interventions. Mean and median ages for all subgroups in construction increased from 2003 to 2017. Immigrant construction workers were significantly younger than workers who were born in the U.S. (41 vs. 43,  $p < 0.001$ ). Union workers were older than non-union workers (42 vs. 39 in 2017,  $p < 0.001$ ); the age differential between self-employed and wage-and-salary workers was wide (49 vs. 40,  $p < 0.001$ ). Union leaders described barriers, such as age discrimination and the loss of previously available light tasks, as well as current and potential solutions through union contract language requiring the inclusion of older workers, or establishing limits for lifting. Other solutions included career pathways for training and safety, with their attendant limitations; mentoring/pairing opportunities with apprentices; and the potential opportunities and training needs for site management positions.

**Sokas et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 21.**

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**Keywords:** Aging workforce; career pathways; construction workers; labor unions; older workers; sustainable workforce; union interventions; work accommodations

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/16/21/4202>

### **Trends in working conditions and health across three cohorts of older workers in 1993, 2003 and 2013: a cross-sequential study**

**Background:** Over the past decades, the number of older workers has increased tremendously. This study examines trends from 1993 to 2013 in physical, cognitive and psychological functioning among three successive cohorts of Dutch older workers. The contribution of the changes in physical and psychosocial work demands and psychosocial work resources to change in functioning is examined. Insight in health of the older working population, and in potential explanatory variables, is relevant in order to reach sustainable employability. **Methods:** Data from three cohorts (observations in 1993, 2003 and 2013) of the Longitudinal Aging Study Amsterdam (LASA) were used. Individuals aged 55-65 with a paid job were included (N = 1307). Physical functioning was measured using the Timed Chair Stand Test, cognitive functioning by a Coding Task and psychological functioning by the positive affect scale from the CES-D. Working conditions were deduced from a general population job exposure matrix. Linear and logistic regression analyses were performed. **Results:** From 1993 to 2013, time needed to perform the Timed Chair Stand Test increased with 1.3 s (95%CI = 0.89-1.71), to a mean of 11.5 s. Coding Task scores increased with 1.7 points (95%CI = 0.81-2.59), to a mean of 31 points. The proportion of workers with low positive affect increased non-significantly from 15 to 20% (p = 0.088). Only the improvement in cognitive functioning was associated with the change in working conditions. The observed decrease of physically demanding jobs and increase of jobs with higher psychosocial resources explained 8% of the improvement. **Conclusions:** Changes in working conditions may not contribute to improved physical and psychological functioning, but do contribute to improved cognitive functioning to some extent. Further adjustment of physical work demands and psychosocial work resources may help to reach sustainable employability of older workers.

**Van der Noordt et al. 2019.**

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

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**Keywords:** Cognitive functioning; Cohorts; Older workers; Physical functioning; Psychological functioning; Working conditions

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7736-7>

## **Guiding and Supporting Mental Health and Wellbeing**

### *Mental health*

#### **The transition from university to work: what happens to mental health? A longitudinal study**

**Background:** When enrolled in university or college, students receive varying degrees of training in managing practical situations in the workplace. However, after graduation, the young professionals meet their responsibilities at work. The experience of the transition between education and work may connote a feeling of professional uncertainty and lack of coping, both of which are important factors related to young professionals' mental health. The gap between the two areas of knowledge is frequently described as 'practice shock'. Very few studies of mental health among students and young professional workers have used longitudinal designs. In the present study, we conducted a longitudinal investigation of change and stability in the levels of psychological distress among healthcare professionals, teachers, and social workers from the end of their study programs until 3 years into their subsequent professional lives. We also assessed the extent to which psychological distress at the end of the study program, sociodemographic characteristics, coping with the professional role, the psychosocial workplace environment, and experience of overall quality of life can predict psychological distress 3 years into their professional lives. **Methods:** Psychological distress was measured using the General Health Questionnaire 12 (GHQ-12). A total of 773

students/young professionals participated at both the end of their study programs and 3 years into their professional lives. Group differences were examined by the chi-squared test, independent samples t-test, and one-way analysis of variance. McNemar's test were applied to identify changes in the proportion of cases at the two time points. Linear and logistic regressions were employed to identify factors associated with GHQ-12 Likert scores and GHQ-12 case scores, respectively. Results: Psychological distress was significantly reduced at 3 years for health professionals. Among the social workers and teachers, the change in psychological distress was not significant during the same period. Higher current quality of life contributed to lower psychological distress. Conclusions: Our findings support assumptions about higher levels of mental health problems as students, with mental health improving as health professionals and social workers move into professional work.

**Geirdal et al. 2019.**

**BMC Psychology, vol. 7, no. 1.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Professions; Psychological distress; Psychosocial work environment

**Evidence Level:** 4A

**Link:** <https://bmcpyschology.biomedcentral.com/articles/10.1186/s40359-019-0340-x>

### **Status incongruence in human service occupations and implications for mild-to-severe depressive symptoms and register-based sickness absence: A prospective cohort study**

**Objective** This study aimed to investigate the hypothesis that negative status incongruence may contribute to explain higher risk of mental ill-health and sickness absence in human service occupations (HSO).

**Methods** Participants from the Swedish Longitudinal Occupational Survey of Health who responded to questionnaires in both 2014 and 2016 (N=11 814; 42% men, 58% women) were included. Status incongruence between register-based educational level and subjective social status was assessed. The association between employment in a HSO and status incongruence was estimated in linear regression analyses adjusted for age, income, work hours, sickness absence, childcare, and job qualification match. The prospective associations between status incongruence and mild-to-severe depressive symptoms and register-based sickness absence  $\geq 31$  days respectively were estimated with logistic regression analyses in models adjusted for age and outcomes at baseline. All analyses were stratified by gender. Results Employment in a HSO was associated with more negative status incongruence in both genders [standardized coefficient men 0.04, 95% confidence interval (CI) 0.02-0.07; women 0.06, 95% CI 0.04-0.09]. More negative status incongruence was furthermore associated with higher odds of mild-to-severe depressive symptoms (men OR 1.18, 95% CI 1.08-1.29; women OR 1.17, 95% CI 1.09-1.26) and sickness absence  $\geq 31$  days (men OR 1.40, 95% CI 1.23-1.59; women OR 1.17, 95% CI 1.07-1.28) two years later. Conclusion Status incongruence is somewhat higher among HSO than other occupations and associated with increased odds of depressive symptoms and sickness absence.

**Nyberg et al. 2019.**

**Scandinavian Journal of Work, Environment & Health.**

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**Keywords:** Status incongruence; Human service; Occupation; Depression; Sickness absence.

**Evidence Level:** 4B

**Link:** [http://www.sjweh.fi/show\\_abstract.php?abstract\\_id=3853](http://www.sjweh.fi/show_abstract.php?abstract_id=3853)

### **Occupational balance from the interpersonal perspective: A scoping review**

**Background:** Occupational balance is an important concept in occupational science but it has mostly been studied from an individual rather than an interpersonal perspective, i.e. the extent to which one individual's occupational balance affects and is affected by others. The aim of this review was to describe the extent to which occupational balance has been recently considered from an interpersonal perspective. **Methods:** A scoping review methodology was used. Articles published between 2014 and 2017 that met the following inclusion criteria were included: full articles reporting primary research; published in English; using "occupational balance", "balance in everyday life", or "life balance" in the abstract, key words, or title; having an occupational focus on balance; and providing relevant information in relation to the interpersonal perspective. **Results:** Nine articles were included. The interpersonal perspective was mostly

seen in relation to partners or families, showing the positive impact of support and the negative impact of meeting other's needs in mothers. One article addressed aspects related to organizations and attitudes at the workplace in parents with young children. Conclusion: The findings reveal the importance of considering the occupational balance of both the individual and those around him or her while also showing some of the complexity of occupational balance. The limited number of articles identified indicates that there is still a lack of research using an interpersonal perspective, suggesting that further examination of the interpersonal influence on occupational balance may be a fruitful avenue to pursue.

**Wagman et al. 2019.**

**Journal of Occupational Science, vol. 26, no. 4.**

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**Keywords:** Occupational science; Health promotion; Scoping review

**Evidence Level:** 6A

**Link:** <https://www.tandfonline.com/doi/full/10.1080/14427591.2018.1512007>

### **Impact of depressive symptoms on worklife expectancy: a longitudinal study on Danish employees**

**Objective:** Depressive symptoms are associated with sickness absence, work disability and unemployment, but little is known about worklife expectancy (WLE). This study investigates the impact of depressive symptoms on the WLE of a large sample of Danish employees. **Methods:** We used occupational health survey data of 11 967 Danish employees from 2010 and linked them with register data on salary and transfer payments from 2010 to 2015. Depressive symptoms were self-reported using the Major Depression Inventory. We used multistate data and a life table approach with Cox proportional hazard modelling to estimate the WLE of employees, expressed by time in work, unemployment and sickness absence. Separate analyses were conducted for sex and employees with a voluntary early retirement pension scheme. Using age as time axis, we used inverse probability weights to account for differences in educational level, sector, body mass index, smoking habits and loss of employment during sickness absence. **Results:** The WLE of employees reporting depressive symptoms was shorter compared with those not reporting depressive symptoms; that is, the expected time in unemployment and sickness absence was longer, while the expected time in work was shorter. The shorter WLE was most pronounced in women; for example, a 40-year-old woman with depressive symptoms can expect 3.3 years less in work, 0.8 years more in unemployment and 0.7 years more in sickness absence. Employees with a voluntary early retirement pension scheme showed an even lower WLE. **Conclusions:** Our study showed a meaningful impact of depressive symptoms on the WLE of Danish employees using a multistate framework.

**Pedersen et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Depression; Multi-state; Worklife expectancy

**Evidence Level:** 4B

**Link:** <https://oem.bmj.com/content/76/11/838.long>

### *Bullying and harassment*

#### **Association of workplace bullying and workplace vulnerability in the psychological distress of Chilean workers.**

Workplace bullying has been identified as a global problem because of its growing magnitude and the harmful effects in victims and organizations. Workplace vulnerability is a component of job precariousness that reflects insecurity, fear, and labor uncertainty. This paper aims to analyze the associations between the exposure to workplace vulnerability and psychological distress, and to explore the associations between exposure to workplace bullying and psychological distress, by sex. A cross-sectional and probabilistic survey was applied to a randomly-selected valid sample of 1995 salaried workers in three main metropolitan areas of Chile. Chi-square test and logistic regression models controlling for confounders were tested. Female workers were more exposed to workplace vulnerability and presented a higher prevalence of psychological distress. Among women who were vulnerable, one of three reported psychological distress (30.8%), which is higher than men (16.5%). Workers exposed to workplace vulnerability had a greater chance of workplace bullying, workers who perceived high workplace



vulnerability had a greater chance of psychological distress, and workers exposed to workplace violence had a greater likelihood of psychological distress in comparison to those who were not exposed. Increasing employment security can reduce the perception of job vulnerability and help prevent the existence of workplace bullying. Additionally, occupational health protection policies should prevent, protect from, and intervene in workplace bullying as a precursor to mental health problems in Chile.

**Ansoleaga et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Chile; psychological distress; workplace bullying; workplace vulnerability

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/16/20/4039>

### **Explaining active and passive types of counterproductive work behavior: the moderation effect of bullying, the dark triad and job control.**

**Objectives:** Drawing on the stressor-emotion model, the study aimed to identify some predictors of the active and passive types of counterproductive work behavior (CWB). Specifically, 1) the direct effect of bullying on CWB, 2) the 2-way interaction effects of the Dark Triad (DT) and job control (JC), as well as 3) the 3-way interaction effect (DT×JC) on the bullying-CWB link were investigated. **Methods:** Data were collected from 659 white- and blue-collar workers. The 2- and 3-way interactional effects were analyzed by means of PROCESS macros. **Results:** The analysis showed that high bullying was directly related to high active and passive types of CWB. The 2- and 3-way interactional effects were observed but only in relation to active (not passive) CWB. Bullying was associated with active CWB when the Dark Triad and job control were high. **Conclusions:** The study showed different ways of both types of CWB development. The findings provide further insight into processes leading to an increase in active and passive CWB.

**Baka, 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 21.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Dark Triad; bullying at workplace; counterproductive work behavior; job control; job stress; organizational behavior

**Evidence Level:** 4B

**Link:** <http://ijomeh.eu/Explaining-Active-and-Passive-types-of-Counterproductive-Work-Behavior-The-Moderation,110716,0,2.html>

### **Workplace bullies, not their victims, score high on the Dark Triad and Extraversion, and low on Agreeableness and Honesty-Humility.**

Most past research has focused mainly on the personality of the victims of bullying and not on the personality of workplace bullies. Some researchers have suggested that bullies and their victims may share bully-typifying personality traits. The aims of this study were to find out what characterizes the personalities of workplace bullies and their victims, and to investigate the relationship between the Dark Triad, HEXACO and workplace bullying. We tested three hypotheses. H1: Machiavellianism and Psychopathy, but not Narcissism, predict the use of bullying tactics (i.e., bullying perpetration). H2: (Low) Honesty-Humility, (low) Agreeableness and (high) Extraversion predict the use of bullying tactics. H3: Honesty-Humility moderates the association between Machiavellianism and the use of bullying tactics. Employees in southwestern Sweden (N = 172; 99 women) across various occupations and organizations were surveyed. Negative Acts Questionnaire-Perpetrators (NAQ-P) and Negative Acts Questionnaire-Revised (NAQ-R) were used to assess the use of bullying tactics and victimization. NAQ-P was correlated with NAQ-R ( $r = .27$ ), indicating some overlap between the use of bullying tactics and victimization. NAQ-P was correlated with Machiavellianism (.60), Psychopathy (.58), Narcissism (.54), Agreeableness (-.34), Honesty-Humility (-.29) and Extraversion (.28). The results of linear regressions confirmed H1, but only partially confirmed H2: Machiavellianism, Psychopathy, (low) Agreeableness and (high) Extraversion explained 32%, 25%, 27% and 19%, respectively, of the variation in the NAQ-P. Replicating past research, NAQ-R was correlated with Neuroticism (.27), Extraversion (-.22), Openness (-.19) and Conscientiousness (-.16). Neuroticism explained 25% and (low) Extraversion 17% of the variation in the NAQ-R. Confirming H3,

Honesty-Humility moderated the relationship between the NAQ-P and Machiavellianism. We conclude that bullies, but not their victims, are callous, manipulative, extravert and disagreeable, and that dishonest Machiavellians are the biggest bullies of all. In practice, the victims of workplace bullying need strong and supportive leadership to protect them from bullies with exploitative and manipulative personality profiles.

**Daderman et al. 2019.**

**Heliyon, vol. 5, no. 10.**

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**Keywords:** Dark Triad; Diagnostics; HEXACO; MiniPIP-6; NAQ-P; NAQ-R; Occupational health; Pathology; Psychology; Quality of life; SD3; The bullied and the bully; Workplace bullying

**Evidence Level:** 4B

**Link:** <https://www.sciencedirect.com/science/article/pii/S2405844019362693?via%3Dihub>

### *Occupational violence*

#### **Sleep problems and workplace violence: A systematic review and meta-analysis.**

**Background:** This systematic review with meta-analysis was carried out to study the relationship between workplace violence and sleep problems. **Methods:** The PRISMA statement was used to conduct a systematic search of the literature on PubMed/MEDLINE, Scopus, Sociological abstract, DOAJ, Web of Science, and Google Scholar databases. Of the original number of 749 studies, 34 were included in the systematic review, and 7 in the meta-analysis. **Results:** A total of 119,361 participants from 15 different countries took part in these studies which were published between 1999 and 2019. Significant heterogeneity was observed among the studies ( $I^2 = 96\%$ ). In a random-effects meta-analysis model, pooled odds ratio (OR) analysis revealed that there was a direct relationship between occupational exposure to violence and sleep problems (OR = 2.55; 95% CI = 1.77-3.66). According to the GRADE guidelines, the quality of evidence of the association was low. **Conclusions:** The findings of this study demonstrate that occupational exposure to physical, verbal, or sexual violence is associated with sleep problems. Further research on the relationship between violence and sleep is needed so that appropriate measures can be taken to prevent violence and improve sleep hygiene in the workplace.

**Magnavita et al. 2019.**

**Frontiers in Neuroscience, vol. 13.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Bullying; neurophysiology; psychological trauma; sleep disorders; sleep problems; sleep quality; stress; workplace violence

**Evidence Level:** 1A

**Link:** <https://www.frontiersin.org/articles/10.3389/fnins.2019.00997/full>

### *Workplace stress – risk factors*

#### **A study into psychosocial work stressors and health care productivity.**

**Background:** World Health Organization's Healthy Workplace Framework and Model has emphasized addressing psychosocial work stressors as one of the important avenues toward creating a conducive workplace. Management and interventions of these adverse stressors have been unremarkable; impairing work productivity. **Objective:** To explore the effect of psychosocial work stressors on health service productivity. **Methods:** Using Copenhagen Psychosocial Questionnaire II and Healthcare Productivity Survey, a cross-sectional study was conducted on 225 health and allied health professionals in the largest referral hospital in Brunei. Multiple linear regression was used to explore the relationship of each domain of work productivity to indicators of psychosocial work stressors. **Results:** Psychosocial work stressors explained more than 50% of the variance for health care productivity. Influence at work, role clarity, rewards and job satisfaction were among the factors with the highest contributions to this relationship. **Conclusion:** Crucial factors were identified and discussed, however, due to complexity of this relationship, international collaborations and efforts are required to ameliorate adverse effects of psychosocial stressors and improve health service productivity.

**Ibrahim et al. 2019.**

**The International Journal of Occupational and Environmental Medicine, vol. 10, no. 4.**

**User License:** *Commons Attribution -NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)*

**Keywords:** Efficiency; Job satisfaction; Occupational stress; Quality of health care; Reward

**Evidence Level:** 4A

**Link:** <https://www.theijoem.com/ijoem/index.php/ijoem/article/view/1610>

### **Challenge and hindrance appraisals of job demands: one man's meat, another man's poison?**

Background: Many job stress models assume that all workers experience a particular job demand in the same way - an assumption that may or may not be warranted and that has rarely been tested. Building on appraisal theory, we explore (a) how individuals appraise particular job demands (i.e., as a challenge or as a hindrance) and (b) how these appraisals affect the relationship between job demands and engagement/burnout. Design and Methods: A multi-occupation cross-sectional study was conducted among 527 Chinese workers (321 females, 60.9%; Mage = 32.74, SD = 6.70). The data were analyzed using hierarchical multiple regression analysis. Results: We found that the appraisal of job demands (time urgency, role conflict, and emotional demands) as a challenge moderated the associations between these demands and burnout/engagement. Generally, the results indicate that the presence of high job demands was associated with negative outcomes. However, these detrimental effects were weaker if workers appraised these characteristics as being high-challenge. Conclusions: This study extends research on job demands within the challenge-hindrance framework by focusing on the moderating effects of appraisals. Given the important role of appraisal, we conclude that researchers should include appraisal more systematically in their theorizing and research on the effects of job demands on well-being.

**Li et al. 2019.**

#### **Anxiety Stress and Coping.**

**User License:** *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)*

**Keywords:** Job demands; burnout; challenge appraisals; engagement; hindrance appraisals

**Evidence Level:** 4B

**Link:** <https://www.tandfonline.com/doi/full/10.1080/10615806.2019.1673133>

### **Work-related stress, physio-pathological mechanisms, and the influence of environmental genetic factors**

Work-related stress is a growing health problem in modern society. The stress response is characterized by numerous neurochemicals, neuroendocrine and immune modifications that involve various neurological systems and circuits, and regulation of the gene expression of the different receptors. In this regard, a lot of research has focused the attention on the role played by the environment in influencing gene expression, which in turn can control the stress response. In particular, genetic factors can moderate the sensitivities of specific types of neural cells or circuits mediating the imprinting of the environment on different biological systems. In this current review, we wish to analyze systematic reviews and recent experimental research on the physio-pathological mechanisms that underline stress-related responses. In particular, we analyze the relationship between genetic and epigenetic factors in the stress response.

**Cannizzaro et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Environment; genetic factors; stress; work-related stress

**Evidence Level:** 6B

**Link:** <https://www.mdpi.com/1660-4601/16/20/4031>

### **Sleep problems are a strong predictor of stress-related metabolic changes in police officers. A prospective study**

Objective: Previous studies have shown that workers chronically exposed to occupational stress have an increased risk of metabolic syndrome (MetS) and sleep problems (SPs). The purpose of this study was to verify whether SPs mediate the relationship between stress and MetS. Method:

A 5-year prospective cohort study included 242 police officers from a rapid response unit engaged exclusively in maintaining law and order. Perceived stress levels were measured repeatedly with the demand-control-support and the effort-reward-imbalance questionnaires; insomnia symptoms were assessed with the Pittsburgh Sleep Quality Index; excessive daytime sleepiness was measured using the Epworth Sleepiness Scale. MetS and its components were evaluated at baseline and at follow-up. Results:

During 5-year follow-up period, 26 new cases of MetS were identified. Both occupational stress and SPs were significantly related to incident cases of MetS. Insomnia symptoms showed a highly significant association with MetS (aOR 11.038; CI95% 2.867-42.493). Mediation analysis confirmed that SPs mediate the relationship between stress and MetS. A reciprocal relationship was found between job stress and SPs. Work-related stress was a significant predictor of insomnia symptoms, short sleep duration, sleep dissatisfaction, and sleepiness. Compared to the reference group, police officers with SPs at baseline had significantly higher odds of reporting high stress at follow-up. Conclusion: SPs play a mediating role in the relationship between occupational stress and MetS. Prevention of MetS must include the control of stress factors and an increase in the resilience of workers, but correct sleep hygiene is also an essential factor.

**Garbarino et al. 2019.**

**PLoS One, vol. 14, no. 10.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Sleep problems; Stress; Metabolic changes; Police officers

**Evidence Level:** 4A

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0224259>

### **Effort-reward imbalance and job strain: A composite indicator approach**

The Job Demand-Control-Support (JDC-S) and Effort-Reward Imbalance (ERI) models dominate psychosocial work environment research and practice, with their independent and collective contributions to employee health having been extensively demonstrated. Psychosocial risk assessment in the humanitarian aid sector is in its infancy, and there is a need to identify appropriate psychosocial work environment models to inform approaches to assessment. The aim of this study is to examine the efficacy of these models separately and in combination to identify psychological distress in humanitarian aid workers. Cross-sectional survey data were obtained from 283 humanitarian aid workers. Logistic regression analyses investigated the separate and combined ability of the models to identify psychological distress. More than half of the participant sample reported psychological distress, and one third reported high ERI and high job strain. When tested separately, each model was associated with a significantly elevated likelihood of psychological distress. When tested in combination, the two models offered a superior estimation of the likelihood of psychological distress than achieved by one model in isolation. Psychosocial risk assessment in the humanitarian aid sector encompassing the characteristics of both these leading psychosocial work environment models captures the breadth of relevant generic psychosocial work characteristics. These initial findings require corroboration through longitudinal research involving sector-representative samples.

**Jachens et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Effort-Reward Imbalance model; Job-Demand-Control model; humanitarian aid worker; job strain; psychological distress; psychosocial risk assessment; work stress

**Evidence Level:** 4A

**Link:** <https://www.mdpi.com/1660-4601/16/21/4169>

### **The relationship between organisational stressors and mental wellbeing within police officers: a systematic review**

Background: Occupational stressors in police work increase the risk for officer mental health morbidities. Officers' poor mental wellbeing is harmful to the individual, can affect professionalism, organisational effectiveness, and public safety. While the impact of operational stressors on officers' mental wellbeing is well documented, no review has systematically investigated organisational stressor impacts. This study aimed to conduct a systematic review to assess the relationship between organisational stressors and police officer mental wellbeing. Methods: Systematic review conducted following PRISMA and Cochrane Collaboration guidelines. Literature search was undertaken from 1990 to May 2017 on four databases (EBSCOHOST Medline/SocINDEX/PsycINFO/OVID Embase) and grey literature. Included articles were critically appraised and assessed for risk of bias. Narrative and evidence syntheses were performed by specific mental health outcomes. Results: In total, 3571 results were returned, and 15 studies met the inclusion criteria. All included studies were published in English between 1995 and 2016, had cross-

sectional study designs, spanned across four continents and covered 15,150 officers. Strong evidence of significant associations was identified for organisational stressors and the outcomes of: occupational stress, psychiatric symptoms/psychological distress, emotional exhaustion and personal accomplishment. The organisational stressors most often demonstrating consistently significant associations with mental health outcomes included lack of support, demand, job pressure, administrative/organisational pressure and long working-hours. Conclusions: This review is the first to systematically examine organisational stressors and mental health in police officers. Organisational stressors that can be targeted by interventions and policy changes to secure officer wellbeing, a healthy work environment, and benefits to the organisation and the public are identified.

**Purba et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Mental health; Officer; Organisational stressor; Police; Wellbeing

**Evidence Level:** 1A

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7609-0>

### *Workplace stress – assessment and management*

#### **Stress-activity mapping: Physiological responses during general duty police encounters.**

Policing is a highly stressful and dangerous profession that involves a complex set of environmental, psychosocial, and health risks. The current study examined autonomic stress responses experienced by 64 police officers, during general duty calls for service (CFS) and interactions with the public. Advancing previous research, this study utilized GPS and detailed operational police records as objective evidence of specific activities throughout a CFS. These data were then used to map officers' heart rate to both the phase of a call (e.g., dispatch, enroute) and incident factors (e.g., call priority, use-of-force). Furthermore, physical movement (i.e., location and inertia) was tracked and assisted in differentiating whether cardiovascular reactivity was due to physical or psychological stress. Officer characteristics, including years of service and training profiles, were examined to conduct a preliminary exploration of whether experience and relevant operational skills training impacted cardiovascular reactivity. Study results provide foundational evidence that CFS factors, specifically the phase of the call (i.e., arrival on scene, encountering a subject) and incident factors (i.e., call priority, weapons, arrest, use-of-force), influence physiological stress responses, which may be associated with short-term performance impairments and long-term health outcomes. Implications of research findings for operational policing, police training, and health research are discussed.

**Baldwin et al. 2019.**

**Frontiers in Psychology, vol. 10.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** heart rate; occupational stress; physiological reactivity; police; use-of-force

**Evidence Level:** 5A

**Link:** <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02216/full>

### *Burnout*

#### **The ambivalent appraisal of job demands and the moderating role of job control and social support for burnout and job satisfaction**

Within an extended challenge–hindrance framework, it is assumed that job demands are subjectively appraised both as challenges (that is, as working conditions that are associated with potential personal gains) and hindrances (as working conditions associated with constrains) at the same time. In accordance with transactional stress theory, the association between demand intensity and work-related attitudes (work satisfaction) and psychological strain (burnout) is expected to be mediated by individual appraisal. Moreover, because curvilinear relationships between demand and challenge and hindrance appraisals are assumed, and appraisal is expected to be moderated by job control and social support, we tested complex nonlinear moderated mediation models for four types of job demands (task difficulty, time pressure, interruptions, and responsibility). Based on cross-sectional data of a heterogeneous sample of employees, we confirmed simultaneous challenge and hindrance appraisals. Challenge components are positively

associated and hindrance components are negatively associated with favorable outcomes (higher work satisfaction and lower burnout). Challenge appraisals are found to be more relevant for work satisfaction, while hindrance appraisals are more relevant for burnout. The relationship between demand intensity and challenge appraisal is confirmed as curvilinear, whereas hindrance appraisals are approximately linearly related to demand intensity. The relationship between demand intensity and outcome variables is partly mediated by challenge and hindrance appraisal, and significant interaction effects suggest that the appraisal process is moderated by job control and social support

**Gerich et al. 2019.**

**Social Indicators Research.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Challenge stressors; Hindrance stressors; Stressor appraisal; Job control; Social support

**Evidence Level:** 6B

**Link:** <https://link.springer.com/article/10.1007/s11205-019-02195-9>

### **Concurrent and lagged effects of psychosocial job stressors on symptoms of burnout.**

**Purpose:** Burnout is a mental condition described as being a result of long-term stressors commonly related to psychosocial factors at work. The aim of the present study was to investigate longitudinal relationships between job demands, decision authority, effort and reward, and symptoms of burnout, as well as the joint effects of job demands and decision authority, and of effort and reward. **Methods:** The data came from a four-wave longitudinal cohort study of Swedish health care workers. Longitudinal associations were analysed using mixed effects regression models with random intercept. **Results:** The concurrent analysis showed that demand and decision authority, as well as effort and reward, were associated with symptoms of burnout over time. Evidence of the lagged effects of workplace factors on burnout symptoms was limited to reward. No clear effect modification was found. **Conclusion:** An increase in unfavourable working conditions implied increasing scores on the burnout measure over time. The concurrent effects of job demands, decision authority, effort and reward on symptoms of burnout were seen. The evidence of lagged effects was limited to the low-reward condition. Regularly monitoring these work environment conditions at workplaces can help identify risk situations for burnout and thus be useful in the prevention of work-related mental illness. Lastly, a new approach to defining the risk groups was proposed, which is consistent across different populations and time points.

**Hadzibajramovic et al. 2019.**

**International Archives of Occupational and Environmental Health, vol. 92, no. 7.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Criterion-based approach; Decision authority; Effort–reward imbalance; Interaction; Job demands; Longitudinal analysis; Psychosocial work environment

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007%2Fs00420-019-01437-0>

### **Exploring proactive behaviors of employees in the prevention of burnout**

Extensive evidence indicates that burnout can have detrimental consequences for individuals as well as organizations; therefore, there is a great need for burnout prevention. While burnout prevention interventions initiated by the employer have previously been studied, the proactive behaviors employees deploy themselves to prevent burnout have received less research attention. The purpose of this exploratory qualitative interview study was to enhance our understanding of the self-initiated actions employees undertake to prevent burnout, using the model of proactive motivation and conservation of resources theory as theoretical frameworks. Findings indicated that most participants reported to engage in specific kinds of proactive burnout prevention behaviors. The reported self-initiated proactive actions were aimed at maintaining and/or increasing resources and/or reducing demands in the work, home, and personal domain. The study contributes to the literature by linking the proactive motivation process to the prevention of burnout and by focusing on both work and non-work factors. Results of this study can be used in further research into the (effectiveness of) employees' proactive burnout prevention behaviors and serve as a starting point for developing interventions aimed at enhancing proactive burnout prevention.

**Otto et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Burnout prevention; conservation of resources; proactive behavior

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/16/20/3849>

## **Enabling Healthy and Safe Workplaces**

### *WH&S*

#### **Injury rate and risk factors among small-scale gold miners in Ghana.**

**Background:** To determine the potential risk factors for injury, estimate the annual injury rate and examine the safety perceptions, and use of personal protective equipment among small-scale gold miners in Ghana. **Methods:** A cross-sectional survey was carried out with 494 small-scale gold miners from four major mining districts in Ghana. A household-based approach was used to obtain a representative sample of miners. The study was conducted from June 2015 to August 2016. A systematic sampling technique was used to select households and recruit respondents to interview. Miners were asked about any mining related injury that they had sustained in the past year. A logistics regression model was employed to examine the association between risk factors and injury. Data were analyzed with STATA version 14.0. **Results:** The annual incidence rate of mining-related injury was 289 per 1000 workers. Injuries were mainly caused by machinery/tools 66(46.1%), followed by slip/falls 46(32.2%). The major risk factor for injury was underground work (adjusted odds ratio for injury 3.19; 95% CI = 1.42-7.20) compared with surface work. Higher education levels were protective, with adjusted odds ratios of 0.48 (95% CI = 0.24-0.99) for middle school education and 0.38 (95% CI 0.17-0.83) for secondary school compared with no schooling. Only 15(3.0%) of miners reported to have had safety training in the past year and 105(21.3%) indicated that there were safety regulations at their work place. A moderate number of workers reported using work boots 178(36.0%) and hand gloves 134(27.1%), but less than 10% of workers used other personal protective equipment. **Conclusion:** The annual injury incidence rate among small-scale gold miners is high. Potential targets for improving safety include increasing safety training, increasing use of personal protective equipment, and better understanding potential changes that can be made in the machinery and tools used in small-scale mining, which were associated with almost half of all injuries.

**Nakua et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Gold; Mining; Personal protective equipment, injury; Safety; Small-scale

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7560-0>

### *Risk Assessment*

#### **Occupational accident-precursors data collection and analysis according to Human Factors Analysis and Classification System (HFACS) taxonomy.**

Data were collected in an automotive production plant during a campaign of observations performed by safety experts. A period of one week of observations was done during which safety experts monitored the working activity of an assembly line. All accident-precursors identified were reported in a format and immediately analysed and classified according to HFACS. Each collected element was classified in 3 categories as: unsafe acts (related to human behaviour), unsafe condition (related to the working condition and working organisation) and near miss (a situation that involved workers without physical consequence for them). Then each element was classified according to the four levels of HFACS: individual factor (violation or error), environmental factor, supervision and organisational factor. This step was supported by short interview with workers and/or supervisors involved to better identify the characterising factors of the event. This survey allowed the identification and classification of 100 accident-precursors that could be used in the company where they have been collected and, more in general, in manufacturing companies, to identify behaviours and areas of improvement for health and safety based on more recurrent factors that characterised the observed events, according to the methodology described in Baldissone et al. [1].

**Baldissone et al. 2019.**

**Data Brief, vol. 26.**

**User License:** *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)*

**Keywords:** Accident prevention; Accident-precursors; HFACS; Unsafe acts; Unsafe conditions

**Evidence Level:** 5B

**Link:** <https://www.sciencedirect.com/science/article/pii/S2352340919308340?via%3Dihub>

#### **Physical workload and bodily fatigue after work: cross-sectional study among 5000 workers**

Background: Persistent bodily fatigue after working days may indicate an imbalance between work demands and capacity of the workers. This study aimed to investigate associations between physical exposures at work and bodily fatigue after work. Methods: Danish workers with physical work (N=5377) answered questions about various physical exposures during work and bodily fatigue after work in the 2010 round of the Danish Work Environment Cohort Study. Associations were modeled using binary logistic regression controlled for various confounders. Results: Mean age among the younger (<50 years) and older (≥50 years) workers was 36 and 56 years, respectively. Younger and older workers exposed to various physical exposures (e.g. 'bending/twisting the back') for more than a quarter of the workday were more fatigued after work. An exposure-response relationship was observed between the number of physical exposures and bodily fatigue, with odds ratios (OR) for fatigue in the body among younger workers being 1.01 (95%CI 0.63-1.63), 1.59 (95%CI 1.01-2.50), 2.37 (95%CI 1.54-3.66) and 2.84 (95%CI 1.85-5.36) for 1, 2, 3 and ≥4 types of combined physical exposures, respectively. Correspondingly, for older workers, ORs were 1.95 (95%CI 1.09-3.51), 4.06 (95%CI 2.32-7.12), 4.10 (95%CI 2.28-7.37) and 4.90 (95%CI 2.72-8.82) for 1, 2, 3 and ≥4 exposures, respectively. Conclusion: While some of the single factor exposures were associated with increased bodily fatigue, the most marked associations were found when summing the number of different exposures. These results indicate that workplaces should focus on the sum of combined physical exposures rather than focusing solely on single exposures.

**Blafoss et al. 2019.**

**European Journal of Public Health, vol. 29, no. 5.**

**User License:** *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)*

**Keywords:** Physical workload; Body fatigue; Work; Physical exposure

**Evidence Level:** 4A

**Link:** <https://academic.oup.com/eurpub/article/29/5/837/5456844>

### *Health and Wellbeing*

#### **Traffic police officers' experience of post-crash care to road traffic injury victims: a qualitative study in Tanzania".**



Background: Recently, road traffic injuries (RTIs) have become a major health problem affecting health systems in many low- and middle-income countries. Regardless of whether an ambulance is available for evacuation, police officers have been shown to arrive at the crash scene first, becoming, in effect, the first responders to RTI victims. Therefore, the study aimed to explore the experiences of traffic police officers in regard to the provision of care to RTI victims in the prehospital environment, including the role of traffic police upon arriving at the crash scene, the challenges they face, and their opinions about how to improve care to RTI victims. Method: The study used a qualitative approach in which data were obtained from 10 individual interviews and three focus group discussions. There were 41 participants, 27 of them were male and 14 were female. About half (48.7%) of the study participants were aged between 30 to 39 years. Qualitative content analysis was used to analyse all the materials. Results: Three themes emerged from the analysis. The theme "Maintain safety while saving injured victims' lives and facilitating access to a health facility" was comprised of safety, sorting, initial help, and assisting access to hospital care. "Overwhelmed working with limited resources and support" included limited care and transport resources, police fatigue, and little or no support. "Improving supportive system and empowering frontline personnel" included the need for an emergency care system, availability of resources and an emergency medical support system, and training for police and drivers regarding victims' first-aid care, and road safety. Conclusion: The study findings characterize an environment in which the police first responders have no knowledge or skills and no equipment and supplies to provide care to RTI victims at the scene before rushing them to definitive care. The results suggest a favorable climate for training and equipping officers so that they can deliver competent post-crash care at the scene while emergency medical services are yet to be established. However, more research will be needed to determine the efficacy of such training and its acceptability in the Tanzanian context.

**Lukumay et al. 2019.**

**BMC Emergency Medicine, vol. 19, no. 1.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Post-crash care experience; Qualitative method; Road traffic injury; Traffic police

**Evidence Level:** 5B

**Link:** <https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-019-0274-x>

### **'There you enjoy life, here you work': Brazilian and Dominican immigrants' views on work and health in the U.S.**

Structural inequalities in the U.S. work environment place most immigrants in low paying, high-risk jobs. Understanding how work experiences and influence the health of different immigrant populations is essential to address disparities. This article explores how Brazilian and Dominican immigrants feel about their experiences working in the U.S. and how the relationship between work and culture might impact their health. In partnership with the Dominican Development Center and the Brazilian Worker Center, we held five cultural conversations (CCs) with Brazilians (n = 48) and five with Dominicans (n = 40). CCs are participatory, unstructured groups facilitated by representatives from or embedded in the community. Brazilian immigrants focused on physical health and the American Dream while Dominicans immigrants emphasized concerns about the influence of work on mental health. Dominicans' longer tenure in the U.S. and differences in how Brazilians and Dominicans are racialized in the region might account for the variation in perspectives between groups. Future studies should further investigate the relationship between health and how immigrants' work lives are shaped by culture, race and immigrant status.

**Brinkerhoff et al. 2019.**

**International Journal of Environmental Research and Public Health, vol. 16, no. 20.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Brazilian; Dominican; health; immigrants; work

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/16/20/4025>

### **Trajectories of effort-reward imbalance in Swedish workers: Differences in demographic and work-related factors and associations with health**

The aim of the study was to identify trajectories of effort-reward imbalance (ERI), to examine these with respect to demographic (age, gender, socio-economic position) and work-related (employment contract, work hours, shift work, sector) factors, and to investigate associations with different health indicators (self-rated health, depressive symptoms, migraine, sickness absence). The study used four waves of data (N = 6702), collected biennially within the Swedish Longitudinal Occupational Survey of Health (SLOSH). Using latent class growth modelling, we identified four trajectories: a stable low imbalance trajectory, which comprised 90% of all participants, and three change trajectories including a decreasing trajectory (4% of the participants), an inverted U-shaped trajectory and an increasing imbalance trajectory, both in 3% of the participants. Results indicate that a sizeable proportion of Swedish employees' experience imbalance between efforts and rewards at work. The most favourable trajectory comprised relatively more men and was characterised by better work-related characteristics than the less favourable ERI trajectories. All change trajectories were dominated by women and employees in the public sector. Health developments followed ERI trajectories, such that less favourable trajectories associated with impaired health and more favourable trajectories associated with better health. Sickness absence increased among all ERI trajectories, most so for the decreasing and increasing ERI trajectory.

**Leineweber et al. 2019.**

**Work and Stress.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Effort-reward imbalance, longitudinal, health, Sweden, trajectories, work stress

**Evidence Level:** 4B

**Link:** <https://tandfonline.com/doi/full/10.1080/02678373.2019.1666434>

### **Associations between occupational factors and self-rated health in the national Brazilian working population**

**Background:** The literature remains seldom on the topic of self-rated health (SRH) among the national working populations of emerging countries. The objectives of the study were to examine the associations of occupational factors with SRH in a national representative sample of the working population in Brazil.

**Methods:** This study relied on a cross-sectional sample of 36,442 workers, 16,992 women and 19,450 men. SRH was the studied health outcome. Sixteen occupational factors related to four topics were studied:

employment characteristics, working time/hours, psychosocial work factors and physical and chemical work exposures. The associations between occupational factors and SRH were studied using logistic regression models with adjustment for sociodemographic characteristics (age, ethnicity and marital status). The analyses were performed for each gender separately and using weights. Results: The prevalence of poor SRH was 26.71%, this prevalence being higher among women (29.77%) than among men (24.23%).

The following risk factors for poor SRH were found among men and women: working as a self-employed worker, clerk/service worker, manual worker, part-time ( $\leq 20$  h/week), exposure to work stress, exposure to high physical activity and exposure to sun. The risk factors for poor SRH among women only were: working as a domestic worker and exposure to noise, and among men, working in the agriculture sector.

**Conclusions:** Our study suggested that occupational factors related to both physical and psychosocial work environment may be associated with SRH in the working population in Brazil. Improving working conditions may be beneficial for health at work in Brazil.

**Oenning et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Occupational exposures, working conditions; Self-rated health; Self-reported health; Workers; Working population

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7746-5>

### *Physical activity*

**Implementation strategies, and barriers and facilitators for implementation of physical activity at work: a scoping review**

Background: Inactivity and sedentary lifestyle have led experts to recommend an increase in structured, workplace-based physical activity (PA) initiatives. Previous studies on workplace-based PA have only shown moderate and short-term effects. This has been attributed to the lack of clear implementation strategies and understanding of factors that may hinder or enable uptake of PA. To ensure long-term, sustainable outcomes, there is a need for a better understanding of implementation strategies, and barriers and facilitators to workplace-based PA. Method: A scoping review of studies investigating implementation approaches and factors affecting uptake of workplace-based PA was conducted. Qualitative and quantitative articles published in MEDLINE, Embase, Scopus, or PsycINFO between 2008 and 2018 evaluating the implementation of PA were included. Data on study characteristics, evaluation, and implementation methods applied were systematically extracted. Two reviewers extracted, coded, and organised factors affecting uptake using the Theoretical Domains Framework (TDF). Results: After dual, blinded screening of titles and abstracts, 16 articles reporting on eight studies were included in the review. Several different methods of implementation were applied, including information meeting, kick-off events, and "change agents" as the most common. A total of 109 factors influencing implementation were identified, consisting of 57 barriers and 52 facilitators. Barriers most often related to the TDF domains Environmental Context and Resources (n = 34, 36.2%), Social influences (n = 13, 13.8%), and Social/Professional Role and Identity (n = 8, 8.5%). Likewise, facilitators most often related to the TDF domains Social influences (n = 17, 19.5%), Environmental Context and Resources (n = 16, 18.4%), and Social/Professional Role and Identity (n = 9, 10.3%). Conclusion: Our review has highlighted the multilevel factors affecting the uptake of workplace-based PA and underpins the complexities in implementation of such initiatives. The published literature predominantly provides details from the employees' perspectives on factors that need to be addressed and a lack of attention to these factors will cause them to hamper uptake of PA. The analysis of barriers and facilitators provides a theoretical foundation to guide future intervention design. However, further research is needed to fully understand the success or failure of implementation processes.

**Garne-Dalgaard et al. 2019.**

**Chiropractic and Manipulative Therapies, vol. 27, no. 48.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Barriers; Facilitators; Implementation; Physical activity; Scoping review; Theoretical Domains Framework; Workplaces

**Evidence Level:** 6A

**Link:** <https://chiromt.biomedcentral.com/articles/10.1186/s12998-019-0268-5>

### **Signage interventions for stair climbing at work: More than 700,000 reasons for caution**

Increased stair climbing reduces cardiovascular disease risk. While signage interventions for workplace stair climbing offer a low-cost tool to improve population health, inconsistent effects of intervention occur. Pedestrian movement within the built environment has major effects on stair use, independent of any health initiative. This paper used pooled data from UK and Spanish workplaces to test the effects of signage interventions when pedestrian movement was controlled for in analyses. Automated counters measured stair and elevator usage at the ground floor throughout the working day. Signage interventions employed previously successful campaigns. In the UK, minute-by-minute stair/elevator choices measured effects of momentary pedestrian traffic at the choice-point (n = 426,605). In Spain, aggregated pedestrian traffic every 30 min measured effects for 'busyness' of the building (n = 293,300). Intervention effects on stair descent (3 of 4 analyses) were more frequent than effects on stair climbing, the behavior with proven health benefits (1 of 4 analyses). Any intervention effects were of small magnitude relative to the influence of pedestrian movement. Failure to control for pedestrian movement compromises any estimate for signage effectiveness. These pooled data provide limited evidence that signage interventions for stair climbing at work will enhance population health.

**Puig-Ribera et al. 2019.**

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

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**Keywords:** Stair climbing, stair descent, point-of-choice prompts, workplace, pedestrian movement, lifestyle physical activity

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/16/19/3782>

### *Occupational exposure*

#### **Estimation of heat stress and maximum acceptable work time based on physiological and environmental response in hot-dry climate: A case study in traditional bakers.**

Background: Heat stress is common among workers in hot-dry areas. To take preventive strategies for the protection of workers against heat stress, it is important to choose a suitable index that can accurately explain environmental parameters relative to physiological responses. Objective: To evaluate heat stress and maximum acceptable work time (MAWT) based on physiological and environmental response in hot-dry climate among traditional bakers. Methods: The current study was carried out on 30 traditional bakers of 3 different bread baking systems in Ahvaz, Iran. Environmental and physiological parameters were measured simultaneously for a work shift. The work-rest time was also determined based on the relative heart rate (RHR) and the wet-bulb globe temperature (WBGT) index. Results: The average WBGT index was estimated to be higher than the standard limit for all baking stations. Despite the higher-than-the-recommended-limit WBGT index, there was no significant relationship between the WBGT index and physiological parameters. The results indicated a significant ( $p < 0.05$ ) difference between the percentages of work-rest time estimated using the WBGT and RHR index. Conclusions: Based on the results of environmental and physiological monitoring of this study as well as the limitations of the use of the WBGT index, it seems that using WBGT as a standard index would not suit heat stress management in hot-dry climates. A revision of this standard to adapt to hot climatic conditions should be in order.

**Afshari et al. 2019.**

**The International Journal of Occupational and Environmental Medicine, vol. 10, no. 4.**

**User License:** *Commons Attribution -NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)*

**Keywords:** Heart rate; Heat stress disorders; Occupational stress; Rest; Temperature; Work; Workplace

**Evidence Level:** 4B

**Link:** <https://www.theijoem.com/ijoem/index.php/ijoem/article/view/1582>

#### **Determining the endocrine disruption potential of industrial chemicals using an integrative approach: Public databases, in vitro exposure, and modeling receptor interactions.**

Environmental and occupational exposure to industrial chemicals has been linked to toxic and carcinogenic effects in animal models and human studies. However, current toxicology testing does not thoroughly explore the endocrine disrupting effects of industrial chemicals, which may have low dose effects not predicted when determining the limit of toxicity. The objective of this study was to evaluate the endocrine disrupting potential of a broad range of chemicals used in the petrochemical sector. Therefore, 139 chemicals were classified for reproductive toxicity based on the United Nations Globally Harmonized System for hazard classification. These chemicals were evaluated in PubMed for reported endocrine disrupting activity, and their endocrine disrupting potential was estimated by identifying chemicals with active nuclear receptor endpoints publicly available databases. Evaluation of ToxCast data suggested that these chemicals preferentially alter the activity of the estrogen receptor (ER). Four chemicals were prioritized for in vitro testing using the ER-positive, immortalized human uterine Ishikawa cell line and a range of concentrations below the reported limit of toxicity in humans. We found that 2,6-di-tert-butyl-p-cresol (BHT) and diethanolamine (DEA) repressed the basal expression of estrogen-responsive genes PGR, NPPC, and GREB1 in Ishikawa cells, while tetrachloroethylene (PCE) and 2,2'-methyliminodiethanol (MDEA) induced the expression of these genes. Furthermore, low-dose combinations of PCE and MDEA produced additive effects. All four chemicals interfered with estradiol-mediated induction of PGR, NPPC, and GREB1. Molecular docking demonstrated that these chemicals could bind to the ligand binding site of ER $\alpha$ , suggesting the potential for direct stimulatory or inhibitory effects. We found that these chemicals altered rates of proliferation and regulated the expression of cell proliferation associated genes. These findings demonstrate previously unappreciated endocrine disrupting effects and underscore the importance of testing the endocrine disrupting potential of chemicals in the future to better understand their potential to impact public health.

**Alofe et al. 2019.**

**Environment International, vol. 131.**

**User License:** Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

**Keywords:** Endocrine disrupting chemical (EDC); Environmental chemical; Estrogen receptor; Risk assessment; Uterus

**Evidence Level:** 6A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0160412018326722?via%3Dihub>

### **Occupation as a proxy for job exposures? Routine data analysis using the example of rehabilitation**

**Aim:** Job exposures are associated with health-related outcomes including sick leave and reduction in earning capacity. Rehabilitation of persons in working age aims primarily to secure or restore work capacity. Information concerning job exposures is, however, not directly available in routine data of healthcare payers. Since exposures relate to specific occupations and the current occupation is part of routine data, job exposures may be determined indirectly via job-exposure matrices (JEM). The aim of the study is to describe the possibilities and challenges of the representation of job exposures by the occupation according to routine data using the example of rehabilitation. **Methods:** The Scientific Use File 'SUFSDLV15B' of the German Pension Insurance was analysed. We used data from n=1 242 171 persons in work with at least one completed medical rehabilitation between 2008 and 2015 (dataset 1). The occupation is coded according to KldB 88 or KldB 2010 (German Classification of Occupations). In addition, data from a nationwide survey with 2530 rehabilitation patients was available (dataset 2). Job exposures are operationalized by the Job Exposure Index via JEM. The relationship to the return-to-work prognosis at the end of rehabilitation (dataset 1) and to patient reported outcome measures (dataset 2) is described. **Results:** Information concerning the occupation is available for about 91% of rehabilitation measures of employed patients for the year prior to rehabilitation. At high levels of job exposures, the proportion of persons with a predicted working capacity in the last job of fewer than 3 h per day increased by a factor of 4 compared to low-level job exposures (23.5 vs. 6.1%). On the other hand, there is a low association only to reduced working capacity in the general labour market (2.9 vs. 2.4%). High-level job exposures are associated with self-reported, work-related impairments. **Conclusion:** The Job Exposure Index may offer a valid approach to depict occupation-related exposures. The index can be used in the analysis of routine data of the pension insurance and other social security funds, as well as in the linkage of individual assessment data with routine data containing the occupation, without any additional data collection effort. Due to its construction based on job classifications, it will not replace the assessment of individual burdens.

**Brunger et al. 2019.**

**Gesundheitswesen.**

**User License:** Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

**Keywords:** Job exposures; Rehabilitation; Job exposure index; Occupational exposure

**Evidence Level:** 4B

**Link:** <https://www.thieme-connect.com/products/ejournals/abstract/10.1055/a-0965-6777>

### **Evaluation of heat stress and cumulative incidence of acute kidney injury in sugarcane workers in Guatemala.**

**Objective:** Agricultural workers worldwide exposed to heat stress could be at the risk of kidney injury, which could lead to chronic kidney disease of an unknown origin (CKDu). Hydration has been promoted as a key measure to reduce kidney injury. In the presence of a hydration intervention, the incidence of acute kidney injury (AKI) was calculated in a sugarcane worker population in Guatemala and several risk factors were evaluated. **Methods:** We measured kidney function at the beginning and end of the work shift at three time points in 517 sugarcane workers. We defined AKI as an increase in serum creatinine of 26.5  $\mu\text{mol/L}$  or 50% or more from the pre-shift value. Associations between AKI and risk factors were examined, including interactions with hydration status. **Results:** The prevalence of dehydration post-shift ( $> 1.020$  specific gravity) was 11% in February, 9% in March, and 6% in April. Cumulative incidence of AKI was 53% in February, 54% in March, and 51% in April. AKI was associated with increasing post-shift specific gravity, a dehydration marker, (OR 1.24, 95% CI 1.02-1.52) and with lower electrolyte solution intake (OR 0.94, 95% CI 0.89-0.99). **Conclusion:** Dehydration and insufficient electrolyte consumption are risk factors for AKI.

However even well-hydrated sugarcane workers routinely experience AKI. While hydration is important and protective, there is a need to understand other contributors to risk of AKI and identify prevention strategies with these workers.

**Butler-Dawson et al. 2019.**

**International Archives of Occupational and Environmental Health, vol. 92, no. 7.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Agricultural workers; Hydration; Kidney injury

**Evidence Level:** 5B

**Link:** <https://link.springer.com/article/10.1007%2Fs00420-019-01426-3>

### **UK postal delivery workers' occupational sun safety: Using behavior change theories to identify intervention pathways**

Postal delivery workers have substantial sun exposure. In the United Kingdom (UK) a high proportion of workers possesses a sun sensitive skin type. This population is at elevated risk for skin cancer, yet uptake of sun safety practices is low. Studies are needed to identify the underlying factors that contribute to the uptake of occupational sun safety practices that may be targeted during behavior change interventions. This study integrated the Theory of Planned Behavior (TPB) and the Transtheoretical Model's stages of change (SoC) as guiding frameworks to identify underlying beliefs that influence UK postal delivery workers' uptake of occupational sun safety practices. Thirty-four workers participated in semi-structured interviews that used the SoC to establish current receptiveness to and adoption of two sun safety practices (using sunscreen of at least sun protection factor (SPF) 30 on exposed skin and wearing a wide-brimmed hat when working outdoors in the summer). Beliefs underlying current practices were elicited in accordance with the TPB and stratified by the SoC. For sunscreen use and wearing a wide-brimmed hat, 64% and 3% of participants were in the action or maintenance SoC, respectively. Behavioral and control beliefs differed by SoC, with those in the earlier stages more likely than those in the latter stages to report negative attitudes to, and difficulty enacting, sun safety practices. Normative beliefs concerning the views of colleagues and employers towards sunscreen were relatively consistent across the SoC. This study highlights the need for tailored and targeted behavior change interventions. The SoC-stratified accounts of the influence of TPB components on behavior provide a basis for bespoke interventions that reflect inter-individual and inter-practice differences in their working mechanisms.

**Houdmont et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Theory of Planned Behavior; Transtheoretical Model; postal delivery workers; solar radiation; stage of change; sun safety

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/16/19/3712>

### **Tinnitus and self-perceived hearing handicap in firefighters: A cross-sectional study**

Firefighters are susceptible to auditory dysfunction due to long-term exposure to noise from sirens, air horns, equipment, and tools used in forcible entry, ventilation, and extrication. In addition, they are exposed to ototoxic chemicals, particularly, during overhaul operations. Studies indicate that 40% of firefighters have hearing loss in the noise-sensitive frequencies of 4 and 6 kHz. Noise-induced hearing loss (NIHL) is often accompanied by tinnitus, which is characterized by ringing noise in the ears. The presence of phantom sounds can adversely affect the performance of firefighters. However, there has been limited research conducted on the prevalence of tinnitus in firefighters. We enrolled firefighters from Michigan, with at least 5 years of continuous service. The hearing handicap inventory for adults (HHIA) was used to determine the difficulty in hearing perceived by the firefighters and the tinnitus functional index (TFI) was used to determine the severity of tinnitus. Self-perceived hearing handicap was reported by 36% of the participants, while tinnitus was reported by 48% of the participants. The TFI survey indicated that 31% perceived tinnitus as a problem. More importantly, self-perceived hearing handicap was significantly associated with the incidence of tinnitus in firefighters, suggesting a potential link between occupational exposure to ototraumatic agents and tinnitus in firefighters.

**Jamesdaniel et al. 2019.**

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

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Environmental exposures; firefighters; hearing loss; lead; noise; ototoxicity; tinnitus

**Evidence Level:** 4A

**Link:** <https://www.mdpi.com/1660-4601/16/20/3958>

### **Nationwide epidemiological study for estimating the effect of extreme outdoor temperature on occupational injuries in Italy**

**Background:** Despite the relevance for occupational safety policies, the health effects of temperature on occupational injuries have been scarcely investigated. A nationwide epidemiological study was carried out to estimate the risk of injuries for workers exposed to extreme temperature and identify economic sectors and jobs most at risk. **Methods:** The daily time series of work-related injuries in the industrial and services sector from the Italian national workers' compensation authority (INAIL) were collected for each of the 8090 Italian municipalities in the period 2006-2010. Daily air temperatures with a 1 × 1 km resolution derived from satellite land surface temperature data using mixed regression models were included. Distributed lag non-linear models (DLNM) were used to estimate the association between daily mean air temperature and injuries at municipal level. A meta-analysis was then carried out to retrieve national estimates. The relative risk (RR) and attributable cases of work-related injuries for an increase in mean temperature above the 75th percentile (heat) and for a decrease below the 25th percentile (cold) were estimated. Effect modification by gender, age, firm size, economic sector and job type were also assessed. **Results:** The study considered 2,277,432 occupational injuries occurred in Italy in the period 2006-2010. There were significant effects for both heat and cold temperatures. The overall relative risks (RR) of occupational injury for heat and cold were 1.17 (95% CI: 1.14-1.21) and 1.23 (95% CI: 1.17-1.30), respectively. The number of occupational injuries attributable to temperatures above and below the thresholds was estimated to be 5211 per year. A higher risk of injury on hot days was found among males and young (age 15-34) workers occupied in small-medium size firms, while the opposite was observed on cold days. Construction workers showed the highest risk of injuries on hot days while fishing, transport, electricity, gas and water distribution workers did it on cold days. **Conclusions:** Prevention of the occupational exposure to extreme temperatures is a concern for occupational health and safety policies, and will become a critical issue in future years considering climate change. Epidemiological studies may help identify vulnerable jobs, activities and workers in order to define prevention plans and training to reduce occupational exposure to extreme temperature and the risk of work-related injuries.

**Marinaccio et al. 2019.**

**Environment International, vol. 133.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Case-crossover study; Climate change; Cold impacts; Extreme outdoor air temperature; Heat impacts; Occupational injuries

**Evidence Level:** 4B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0160412019318410?via%3Dihub>

### **Human heat stress risk prediction in the Brazilian semi-arid region based on the wet-bulb globe temperature**

**Objective:** the aim of this study is to map thermal stress risks for human health at the São Francisco River Basin (SFRB) in the Semi-arid region, for climatic scenarios RCP 4.5 and 8.5. **Methods:** The heat stress conditions were defined by the Wet Bulb Globe Temperature (WBGT) indicator and by the average number of annual days in which the WBGT values exceeded the 90th percentile of the reference period. The WBGT was estimated for the climate scenarios RCP 4.5 (intermediate) and 8.5 (pessimistic) for the period 2011-2090 comparing to the period of reference (1961-2005). **Results:** The projections show that for the pessimistic scenario practically all municipalities of the SFRB region can reach values of WBGT that indicate a high risk for heat stress in the period 2071-2099. For this same scenario and period, the municipalities of the Lower and Under-average regions may present values of WBGT above the 90th percentile of the reference period in more than 90% of the days/year. **Conclusions:** These results show that, if the emission

of greenhouse gases continues in the present proportions, some municipalities of the SFRB region may present a high risk for heat stress affecting the work capacity and the practice of physical exercises.

**Oliveira et al. 2019.**

**Anais da Academia Brasileira de Ciências, vol. 91, no. 3.**

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**Keywords:** Heat stress; Risk; Prediction; Human health

**Evidence Level:** 6B

**Link:** [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0001-37652019000500808&lng=en&nrm=iso&tlng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0001-37652019000500808&lng=en&nrm=iso&tlng=en)

### *Musculoskeletal Health*

#### **Evaluation criteria for the assessment of occupational diseases of the lumbar spine - how reliable are they?**

**Background:** In 2005, the German Association of Occupational Accident Insurance Funds (DGUV) defined radiological evaluation criteria for the assessment of degenerative occupational diseases of the lumbar spine. These include the measurement of intervertebral osteochondrosis and classification of vertebral osteosclerosis, antero-lateral and posterior spondylosis, and spondyloarthritis via plain radiography. The measures currently remain in daily use for determining worker compensation among those with occupational diseases. Here, we aimed to evaluate the inter- and intra-observer reliability of these evaluation criteria. **Methods:** We enrolled 100 patients with occupational degenerative diseases of the lumbar spine. Native antero-posterior and lateral radiographs of these patients were evaluated according to DGUV recommendations by 4 observers with different levels of clinical training. Evaluations were again conducted after 2 months to assess the intra-observer reliability. **Results:** The measurement of intervertebral osteochondrosis showed good inter-observer reliability (ICC: 0.755) and excellent intra-observer reliability (ICC: 0.827). The classification of vertebral osteosclerosis exhibited moderate kappa values for inter-observer reliability (K: 0.426) and intra-observer reliability (K: 0.441); the remaining 3 criteria showed poor inter- and intra-observer reliabilities. **Conclusion:** The measurement of intervertebral osteochondrosis and classification of vertebral osteosclerosis showed adequate inter- and intra-observer reliability in the assessment of occupational diseases of the lumbar spine, whereas the classification of antero-lateral and posterior spondylosis and spondyloarthritis stage exhibited insufficient reliability. Hence, we recommend the revision of the DGUV recommendations for the evaluation of occupational diseases of the lumbar spine.

**Ulmar et al. 2019.**

**BMC Musculoskeletal Disorders, vol. 20, no. 1.**

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**Keywords:** Hurxthal; Intervertebral disc height on plain x-rays; Intervertebral osteochondrosis; Occupational disease of the lumbar spine; Vertebral osteosclerosis; Worker compensation

**Evidence Level:** 4B

**Link:** <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-019-2878-4>

#### **Psychosocial areas of worklife and chronic low back pain: a systematic review and meta-analysis.**

**Background:** The aim of this review was to synthesize the evidence on the potential relationship between psychosocial work factors from the Areas of Worklife (AW) model (workload, job control, social support, reward, fairness, and values) and chronic low back pain (CLBP; unspecific pain in the lumbar region lasting 3 months or longer). **Methods:** We conducted a systematic literature search of studies in Medline, PsycINFO, Web of Science, and CINAHL (1987 to 2018). Three authors independently assessed eligibility and quality of studies. In this meta-analysis, we pooled studies' effect sizes using a random-effects model approach and report sample size weighted mean Odds Ratios (ORs). **Results:** Data from 18 studies (N = 19,572) was included in the analyses. We found no studies investigating associations between fairness or values and CLBP. CLBP was significantly positively related to workload (OR = 1.32) and significantly negatively related to overall job control (OR = 0.81), decision authority (OR = 0.72), and two measures of social support (ORs = 0.75 to 0.78), even in prospective studies. Skill discretion and reward did not significantly relate to CLBP. Moderation analyses revealed several variables (e.g., exposure time, mean age



and sex) affecting these relationships. Conclusions: Our results support employees' workload, job control, and social support as predictors of CLBP. In this line, these work factors should be considered when developing programs to prevent chronic low back pain. Future studies should apply measures of CLBP that are more precise, and investigate the full areas of work life (AW) factors in combination.

**Buruck et al. 2019.**

**BMC Musculoskeletal Disorders, vol. 20, no. 1.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Areas of work life; Chronic low back pain; Job control; Social support; Workload

**Evidence Level:** 1A

**Link:** <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-019-2826-3>

### **Usefulness of a job-exposure matrix 'MADE' as a decision tool for compensation of work-related musculoskeletal disorders**

We aimed to assess the predictivity of the biomechanical job-exposure matrix 'MADE' using compensation data from the National Health Insurance for work-related disorders. Data were obtained from 2013 to 2015, area under curves (AUC), sensitivity, specificity and predictive values were calculated using compensation results as reference. We collected 163 128 cases data. AUC ranged from 0.64 for shoulders disorder to 0.82 for knee disorders. If two thresholds were considered, 28.7% of the sample fit under or over those. The matrix showed a fair predictivity. Such matrix cannot replace expertise but might be a tool used for improving compensation process.

**Fadel et al. 2019.**

**European Journal of Public Health, vol. 29, no. 5.**

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**Keywords:** Job exposure; MADE; Decision tool; Work related; Musculoskeletal disorders

**Evidence Level:** 4B

**Link:** <https://academic.oup.com/eurpub/article/29/5/868/5284657>

### **The APHIRM toolkit: an evidence-based system for workplace MSD risk management**

Musculoskeletal disorders (MSDs) continue as one of the largest occupational health and safety problems worldwide. One reason for this situation is that current workplace risk management practices fail to meet some important evidence-based requirements for effective reduction of MSD risk. In particular: they largely fail to address risk arising from psychosocial hazards; do not allow sufficient participation by workers; and often fail to control risk at its sources. To address these deficiencies, A Participative Hazard Identification and Risk Management (APHIRM) toolkit has been formulated in accordance with both a framework developed by the World Health Organisation and implementation science principles. It comprises a set of online tools that include automated data analysis and reporting modules, and procedures to guide users through the five stages of the conventional risk management cycle. Importantly, it assesses both hazard and risk levels for groups of people doing a particular job, focusing on the job overall rather than only on tasks deemed to be hazardous. Its intended users are workplace managers and consultants responsible for occupational health and safety, with active participation from workers also. Resultant risk control interventions are customized to address the main physical and psychosocial hazards identified for the target job, and repetitions of the risk management cycle enables ongoing evaluation of outcomes in terms of both hazard and risk levels.

**Oakman et al. 2019.**

**BMC Musculoskeletal Disorder, vol. 20, no. 1.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Hazards; Musculoskeletal disorders; Psychosocial; Risk management; Toolkit

**Evidence Level:** 6A

**Link:** <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-019-2828-1>

### *Chronic Health Issues*

**Prevalence and predicting factors of chronic pain among workers of petrochemical and petroleum refinery plants.**

**Background:** Taking into account the differences in job requirements and conditions, it is expected that workers in some occupations are more susceptible to pain than others. **Objectives:** To examine the prevalence of chronic pain among workers of several petrochemical and petroleum refinery plants. We also examined the predictive role of psycho-familial variables (depression, work-family conflict and job stress) in causing chronic pain when controlling for demographic and occupational factors. **Methods:** This cross-sectional study was carried out among 674 workers. Those with chronic pain were identified by affirmative answers to screening questions based on the ICD-11 criteria. **Results:** There were 162 (24.0%; 95% CI 20.8% to 27.3%) workers meeting the ICD-11 criteria for chronic pain. Headache was the most frequently reported pain (29.9%). We found a significantly ( $p=0.03$ ) higher prevalence of pain among the middle age than in other age groups. Chronic pain more frequently affected divorced/widowed workers ( $p<0.001$ ), and those with more work experience ( $p=0.04$ ). Workers with chronic pain reported significantly higher levels of depression ( $p<0.001$ ), job stress ( $p=0.007$ ), and work-family conflict ( $p<0.001$ ). After controlling for demographic and occupational factors, depression ( $p<0.001$ ) and work-family conflict ( $p=0.003$ ) were found to be independent predictors of chronic pain among studied workers. **Conclusion:** Workers who experience higher levels of depression, work-family conflict and job stress might be more prone to chronic pain. The majority of these factors are modifiable, and the problem may thus be solved by establishing appropriate screening programs, and availability of proper services and education.

**Shaygan et al. 2019.**

**The International Journal of Occupational and Environmental Medicine, vol. 11, no. 1.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Chronic pain; Depression; Family; Occupational stress; Prevalence; Work place; Workers

**Evidence Level:** 4B

**Link:** <https://www.theijoem.com/ijoem/index.php/ijoem/article/view/1632>

### **Fibromyalgia in the workplace: risk factors for sick leave are related to professional context rather than fibromyalgia characteristics- a French national survey of 955 patients.**

**Background:** Work and workplace factors are important in fibromyalgia management. We investigated factors associated with sick leave in professionally active women living with fibromyalgia. **Methods:** A questionnaire for fibromyalgia patients in employment was developed by pain and occupational physicians and patients' organizations. Women in full-time work, screened for fibromyalgia with the FiRST questionnaire, were recruited for a national online survey. Sick leave over the preceding year was analyzed. **Results:** In 5 months, we recruited 955 women, with a mean of 37 days of sick leave in the previous year: no sick leave (36%), up to 1 month (38%), 1 to 2 months (14%), more than 2 months (12%). In the groups displayed no differences in demographic characteristics, fibromyalgia symptoms, functional severity and psychological distress were observed. However, they differed in workplace characteristics, commute time, stress and difficulties at work, repetitive work, noisy conditions, career progression problems and lack of recognition, which were strong independent risk factors for longer sick leave. Sedentary positions, an extended sitting position, heavy loads, exposure to thermal disturbances and the use of vibrating tools did not increase the risk of sick leave. **Conclusions:** Women with fibromyalgia frequently take sick leave, the risk factors for which are related to the workplace rather than fibromyalgia characteristics. **Perspective:** This is the first study to assess the impact of occupational and clinical factors on sick leave in women living with fibromyalgia. Risk factors were found to be related to the workplace rather than fibromyalgia and personal characteristics. Workplace interventions should be developed for women with fibromyalgia.

**Laroche et al. 2019.**

**BMC Rheumatology, vol. 3, no. 33.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Fibromyalgia; Online survey; Sick leave; Workplace

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1186/s41927-019-0089-0>

## *Asbestosis and mesothelioma*

### **Are the knowledge of non-malignant asbestos-related diseases and lung function impairment differentially associated with psychological well-being? A cross-sectional study in formerly asbestos-exposed workers in Germany.**

**Objectives:** The knowledge of past asbestos exposure may lead to chronic psychological strain. In addition, the information about an increased cancer risk can place a psychological burden on individuals triggering mental health symptoms of depression or anxiety. This applies in particular to individuals with non-malignant asbestos-related disease (ARD) such as lung fibrosis and pleural thickening with or without lung function impairment. ARDs with or without lung function impairment may develop even years after exposure cessation. Therefore, the aim of the present study was to test for our cohort whether non-malignant ARD and lung function impairment have differential effects on mental health and psychological strain. **Design:** Cross-sectional study.

**Participants:** Overall, 612 male participants (mean age=66.2 years, SD=9.5) attending a surveillance programme for ARDs received routine examinations including lung function testing (24% refused to fill in the psychological questionnaire) at a German university hospital study centre from August 2008 to August 2013. **Outcome measures:** Using multiple hierarchical regression analysis, ARD diagnosis and lung function impairment were used to predict psychological health as measured with validated questionnaires for depression and anxiety. Psychological strain was operationalised by intrusive thoughts and specific fear of cancer. **Results:** The strongest predictor for mental health was obstructive functional impairment (eg, anxiety:  $\beta=0.22$ ,  $p<0.001$ ). Psychological strain was predicted by the presence of a non-malignant ARD (eg, intrusive thoughts:  $\beta=0.17$ ,  $p=0.003$ ). **Conclusions:** The presence of mental health symptoms is associated with ventilation disturbances, whereas the knowledge of an already initiated morphological change-caused by asbestos exposure-is primarily associated with psychological strain. Specifically, the affected individuals are more prone to intrusive thoughts and specific fear of asbestos-related cancer. As an implication, physicians should be sensitised about possible consequences of risk communication and functional impairment to counteract excessive fear or anxiety.

**Lang et al. 2019.**

**BMJ Open, vol. 9, no. 10.**

**User License:** *Creative Commons Attribution (CC BY 4.0)*

**Keywords:** Asbestos-related diseases; lung function; mental health; psychological strain

**Evidence Level:** 4A

**Link:** <https://bmjopen.bmj.com/content/9/10/e030094.long>

### **Investigating the association between occupational exposure to asbestos and ovarian carcinoma: results from a pilot study in Germany**

**Background:** The aim of this pilot study was to assess the feasibility of a large-scale epidemiologic investigation elucidating the quantitative association between occupational exposure to asbestos and ovarian cancer in former German asbestos workers. **Methods:** Between December 2017 and May 2018, a random sample of one thousand insured woman registered at the health service of a German trade association as formerly occupationally exposed to asbestos were invited to participate in a pilot study. Participation included a phone interview using a standardised questionnaire. The feasibility of the project was evaluated using a priori defined criteria. They included response, number of cases, eligibility of the questionnaire data for exact estimation of asbestos fibre-years, and availability of relevant medical documentation (imaging procedures, medical reports, and histologic materials). **Results:** The response (17%) was clearly below the intended number of 60%. With six tumour suspects, of which two could be confirmed by medical documents, the number of cases was within the expected range of two to eleven cases. Exact asbestos fibre-year estimations could be performed for 29% of all interviewees, but only for one suspected case. Medical documentation could be collected for only few participants, while no histology reports could be obtained for all cases. Thus, only the feasibility criterion of the expected number of cases was fulfilled. **Conclusion:** The results of the pilot study indicate that the planned project is feasible only to a very limited extent. For further planning of the study, measures to improve recruitment of participants are necessary.

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