



# Emerging Evidence Alert June 2020

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; Building 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 May 2020 only.

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**The power of a positive team culture**

As we navigate a new normal in Australian workplaces where home and working environments are often interchangeable, how do employers help their workforce maintain work-life balance?

According to [new research](#) from Michigan State University (USA), a positive team culture where people feel the support of their managers and colleagues (co-worker support) has a significant impact on work-life outcomes. Across two studies of over 5500 working adults, co-worker support had a positive impact on workplace culture and environment, which in-turn enhanced work-life balance, improved job satisfaction and reduced turnover.

This research suggests some practical examples for employers to enable these positive outcomes from co-worker support by providing more opportunities for social interaction and informal engagement with teams, to giving people the chance to develop support systems among their colleagues. This can include team building activities, however also extends to social interactions such as celebrations, exercise and informal gatherings.

The study also noted there are future opportunities for employers to better understand other factors that enhance work-life balance, including leadership development, organisational culture and management policies.

**NEW COVID-19 section and Comcare factsheet series**

Comcare has expanded the alert to include a **new section dedicated to COVID-19 research**. Some of the latest evidence-based research looks at the impact of COVID-19 on occupational status and those in flexible employment relationships. Also included is a study that identifies occupations at high-risk of seeing work-related COVID-19 transmission.

Comcare has also developed a series of COVID-19 factsheets that highlight ways to support mental health, including self-care, supporting others and staying connected with colleagues and loved ones.

Read more about Comcare’s [COVID-19 fact sheet series](#).

**For more information about the Coronavirus and work health and safety please visit:**

**Comcare website:** [Coronavirus](#)

**Safe Work Australia:** [Coronavirus \(COVID-19\): Advice for Employers](#)

**Department of Health:** [Coronavirus \(COVID-19\) health alert](#)

## 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

### Presenteeism and Absenteeism

#### **Factors related to presenteeism among South Korean workers exposed to workplace psychological adverse social behaviors**

Presenteeism negatively affects both individuals and society. This study identified factors of presenteeism among workers in South Korea, especially in relation to exposure to adverse social behaviors. Here, an adverse social behavior refers to any forms of workplace violence or intimidation. This study used the data from 23,164 full-time salaried employees, who participated in the fifth Korean Working Conditions Survey. This study attempted to predict presenteeism based on the exposure to adverse social behaviors and working conditions using logistic regression. Presenteeism was reported in 15.9% of the sample.

Presenteeism was significantly higher among workers with the following characteristics: females, aged 40 years or older; middle school graduates; over 40 working hours a week; shift workers; no job-related safety information received; exposure to adverse social behavior and discrimination; and those with a high demand for quantitative work, low job autonomy, high emotional demands, and high job stress. The workers exposed to adverse social behavior showed a higher prevalence of presenteeism (41.2%), and low job autonomy was the most significant predictor of presenteeism. The findings of this study suggest that allowing enough autonomy in job-related roles may help alleviate presenteeism among those who have experienced adverse social behavior at work.

**Yi et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Korean working conditions survey; South Korea; adverse social behavior; presenteeism; work.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/17/10/3472>

#### **Long-term sickness absence in a working population: development and validation of a risk prediction model in a large Dutch prospective cohort**

**Background:** Societal expenditures on work-disability benefits is high in most Western countries. As a precursor of long-term work restrictions, long-term sickness absence (LTSA) is under continuous attention of policy makers. Different healthcare professionals can play a role in identification of persons at risk of LTSA but are not well trained. A risk prediction model can support risk stratification to initiate preventative interventions. Unfortunately, current models lack generalizability or do not include a comprehensive set of potential predictors for LTSA. This study is set out to develop and validate a multivariable risk prediction model for LTSA in the coming year in a working population aged 45-64 years. **Methods:** Data from 11,221 working persons included in the prospective Study on Transitions in Employment, Ability and Motivation (STREAM) conducted in the Netherlands were used to develop a multivariable risk prediction model for LTSA lasting  $\geq 28$  accumulated working days in the coming year. Missing data were imputed using multiple imputation. A full statistical model including 27 pre-selected predictors was reduced to a practical model using backward stepwise elimination in a logistic regression analysis across all imputed datasets. Predictive performance of the final model was evaluated using the Area Under the Curve (AUC), calibration plots and the Hosmer-Lemeshow (H&L) test. External validation was performed in a second cohort of 5604 newly recruited working persons. **Results:** Eleven variables in the final model predicted LTSA: older age, female gender, lower level of education, poor self-rated physical health, low weekly physical activity, high self-rated physical job load, knowledge and skills not matching the job, high number of major life events in the previous year, poor self-rated work ability, high number of sickness absence days in the previous year and being self-employed. The model showed good discrimination (AUC 0.76 (interquartile range 0.75-0.76)) and good calibration in the external validation cohort (H&L test:  $p = 0.41$ ). **Conclusions:** This multivariable risk prediction model distinguishes well between older workers with high- and low-risk for LTSA in the coming year. Being easy to administer, it can support healthcare professionals in determining which persons should be targeted for tailored preventative interventions.

**Van der Burg et al. 2020.**

**BMC Public Health, vol. 20, no. 1.**

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**Keywords:** Calibration; development; discrimination; external validation; long-term sickness absence; prediction; prediction model; prevention; prospective cohort study; working persons.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08843-x>

### **Associations between the depressive symptoms, subjective cognitive function, and presenteeism of Japanese adult workers: a cross-sectional survey study**

**Background:** Presenteeism has attracted much attention in the research into mental health. However, how cognitive complaints and depressive symptoms affect presenteeism remains unknown. Therefore, this study examined the correlation between subjective cognitive impairment, depressive symptoms, and work limitations. **Methods:** We collected data from 477 adult workers in Japan. We evaluated subjective cognitive function using the Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA), depressive symptoms with the Patient Health Questionnaire 9 (PHQ-9), and work limitations with the Work Limitations Questionnaire 8 (WLQ-8). The relations between depressive symptoms, cognitive complaints, and work limitations were examined using Spearman's rank correlations and multiple regression analysis. It was hypothesized that cognitive complaints would mediate the effects of depressive symptoms on work productivity loss, which was tested using path analysis. **Results:** The results indicated that cognitive complaints were significantly correlated with work limitations and depressive symptoms. Multiple regression analysis, using the WLQ-8 productivity loss score as the dependent variable, revealed that COBRA and PHQ-9 scores were significant predictors of work productivity loss. We performed path analysis using PHQ-9, COBRA, and WLQ-8 productivity loss scores and created a path diagram, which revealed that the direct effects of both depressive symptoms and cognitive dysfunction on work productivity loss were statistically significant. Moreover, depressive symptoms indirectly affected work productivity loss through subjective cognitive impairment. There was no significant interaction effect between depressive symptoms and cognitive complaints. **Conclusions:** Our results suggest that work limitations may be predicted by not only depressive symptoms but also cognitive complaints. Moreover, subjective cognitive impairment may mediate the effect of depressive symptoms on presenteeism among adult workers.

**Toyoshima et al. 2020.**

**Biopsychosocial Medicine, vol. 14, no. 10.**

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**Keywords:** Cognitive complaints; bipolar disorder; rating assessment; cognitive dysfunction; depression; employment; occupational functioning.

**Evidence Level:** 4B

**Link:** <https://bpsmedicine.biomedcentral.com/articles/10.1186/s13030-020-00183-x>

### **Sickness absence and disability pension in relation to first childbirth and in nulliparous women according to occupational groups: a cohort study of 492,504 women in Sweden**

**Background:** Childbirth has been suggested to increase sickness absence (SA) and disability pension (DP). This may vary by occupation; however, knowledge in this field remains limited. We explored SA and DP in the years before and after childbirth among women in four occupational groups and those without occupation. **Methods:** We studied nulliparous women aged 18-39 years, living in Sweden on December 31, 2004 (n = 492,504). Women were categorized into five skill-level based occupational groups and three childbirth groups; no childbirths within 3 years (B0), first childbirth in 2005 with no childbirth within 3 years (B1), and first childbirth in 2005 with at least one more birth within 3 years (B1+). We compared crude and standardized annual mean SA (in spells > 14 days) and DP net days in the 3 years before and 3 years after first childbirth date. **Results:** Women in the highest skill level occupations and managers, had less mean SA/DP days during most study years than women in the lowest skill level occupations group. In B1 and B1+, absolute differences in mean SA/DP, particularly in SA, among occupational groups were highest during the year before childbirth. DP was most common in B0, regardless of group and year. **Conclusions:** We found that women's mean SA/DP days before and after first childbirth was higher with decreasing skill-level of the occupational group and these differences were most pronounced in the year before childbirth. DP was most common among women not giving birth, regardless of occupational group.

**Bjorkenstam et al. 2020.**

**BMC Public Health, vol. 20, no. 1.**

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**Keywords:** Child birth; disability pension; occupation; sick leave.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08730-5>

### **Associations of sickness absence for pain in the low back, neck and shoulders with wider propensity to pain**

**Objectives:** To explore the association of sickness absence ascribed to pain at specific anatomical sites with wider propensity to musculoskeletal pain. **Methods:** As part of the CUPID (Cultural and Psychosocial Influences on Disability) study, potential risk factors for sickness absence from musculoskeletal pain were determined for 11 922 participants from 45 occupational groups in 18 countries. After approximately 14 months, 9119 (78%) provided follow-up information about sickness in the past month because of musculoskeletal pain, including 8610 who were still in the same job. Associations with absence for pain at specific anatomical sites were assessed by logistic regression and summarised by ORs with 95% CIs. **Results:** 861 participants (10%) reported absence from work because of musculoskeletal pain during the month before follow-up. After allowance for potential confounders, risk of absence ascribed entirely to low back pain (n=235) increased with the number of anatomical sites other than low back that had been reported as painful in the year before baseline (ORs 1.6 to 1.7 for  $\geq 4$  vs 0 painful sites). Similarly, associations with wider propensity to pain were observed for absence attributed entirely to pain in the neck (ORs up to 2.0) and shoulders (ORs up to 3.4). **Conclusions:** Sickness absence for pain at specific anatomical sites is importantly associated with wider propensity to pain, the determinants of which extend beyond established risk factors such as somatising tendency and low mood. Better understanding of why some individuals are generally more prone to musculoskeletal pain might point to useful opportunities for prevention.

**Coggon et al. 2020.**

**Occupational and Environmental Medicine, vol. 77, no. 5.**

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**Keywords:** Epidemiology; longitudinal studies; musculoskeletal.

**Evidence Level:** 4A

**Link:** <https://oem.bmj.com/content/77/5/301.long>

### **Working Hours**

#### **Examining the effects of overtime work on subjective social status and social inclusion in the Chinese context**

Although researchers have argued that long work hours have been shown to threaten individual health, lead to work-family conflict, and reduce job performance, the effect of overtime work on social-related outcomes has received little attention. Based on the framework of relative deprivation, we attempt to address this important issue by exploring whether, why, and when individuals' overtime work influences their social attitudes. By using the data of 400 Chinese employees from the China Labor-Force Dynamics Survey (CLD), we found that overtime work was associated with a low level of subjective social status and social inclusion. In addition, we found that the time type of overtime work (work overtime on weekdays or on weekends and holidays) has a moderating effect on the relationship between overtime work and social inclusion. That is, employees who work overtime on weekdays are unlikely to have a sense of social inclusion. Furthermore, the negative relationship between overtime work and subjective social status was stronger at a low level of fairness rather than a high level of fairness. In contrast, the negative relationship between overtime work and social inclusion was stronger at a high level of fairness rather than a low level of fairness. These findings highlight the critical role of overtime work in social life and also provide novel insights into social intervention aimed at the happiness and harmony of a society.

**Chen et al. 2020.**

**International Journal of Environmental Research and Public Health**, vol. 17, no. 9.

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**Keywords:** Fairness; overtime type; overtime work; social inclusion; subjective social status.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/17/9/3265>

## Building Employer Capability

### Wellness Programs

#### **Occupational health needs and predicted well-being in office workers undergoing web-based health promotion training: Cross-sectional study**

**Background:** Office workers face workplace-related health issues, including stress and back pain, resulting in considerable cost to businesses and health care systems. Workplace health promotion attempts to prevent these health issues, and the internet can be used to deliver workplace health promotion interventions to office workers. Data were provided by Fitbase GmbH, a German company, which specializes in workplace health promotion via the internet (Web-based health). The Web-based health intervention allowed workers to focus on different health categories by using information modules (reading health information) and/or completing practical exercises (guided, interactive health tutorials). **Objective:** This study aimed to identify the extent to which office workers have workplace-related health issues, assess whether office workers who differ in their health focus also differ in their improved well-being, and assess whether completing practical exercises is associated with improved well-being compared with reading information modules. **Methods:** Fitbase GmbH collected data for the period of February 2016 to May 2017 from health insurance employees undergoing Web-based health training in Hamburg, Germany. The data consisted of a needs assessment examining health issues faced by office workers, a wellness questionnaire regarding one's perception of the Web-based health intervention, and activity logs of information modules and practical exercises completed. Through logistic regression, we determined associations between improved well-being from Web-based health training and differences in a worker's health focus and a worker's preferred intervention method. **Results:** Nearly half of the office workers had chronic back pain (1532/3354) and felt tense or irritated (1680/3348). Over four-fifth (645/766) of the office workers indicated that the Web-based health training improved their well-being ( $P < .001$ ). Office workers who preferred practical exercises compared with information modules had 2.22 times greater odds of reporting improved well-being from the Web-based health intervention ( $P = .01$ ; 95% CI 1.20-4.11). Office workers with a focus on practical exercises for back health had higher odds of improved well-being compared with other health foci. Office workers focused on practical exercises for back pain had at least two times the odds of having their well-being improved from the Web-based health intervention compared with those focused on stress management ( $P < .001$ ), mindfulness ( $P = .02$ ), stress management/mindfulness ( $P = .005$ ), and eye health ( $P = .003$ ). No particular health focus was associated with improved well-being for the information modules. **Conclusions:** Office workers frequently report having back pain and stress. A focus on Web-based health training via practical exercises and practical exercises for back health predict an improvement in office workers' reported well-being.

**Tchir et al. 2020.**

**Journal of Medical Internet Research**, vol. 22, no. 5.

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**Keywords:** eHealth; health promotion; internet; occupational health; well-being; workplace.

**Evidence Level:** 4A

**Link:** <https://www.jmir.org/2020/5/e14093/>

#### **The association between men's health behaviors and interest in workplace health promotion**

**Background:** Predictors of men's health behaviors and interest in workplace health promotion are not well known. The aim of this study was to describe men's interest in workplace health promotion and associated health behaviors. **Method:** Male employees ( $N = 781$ ) at six workplaces in British Columbia, Canada, were invited to complete a survey of their health behaviors, demographics, and interest in health promotion

prior to implementation of a workplace health program. **Findings:** A total of 227 male employees (Mage = 43.6 years; SD = 12.1) completed the survey (response rate = 29%). Regarding health behaviors, 62.1% reported 150 weekly minutes of moderate-to-vigorous physical activity (MVPA), 29.3% consumed 5+ servings of fruit/vegetables per day, 56.8% reported 7+ hours sleep/night, 14.4% smoked, and 81.3% consumed alcohol. Men spent 50% of their workday sitting, and higher body mass index (BMI), higher income, and greater hours worked were related to greater hours sitting. Age was inversely related to MVPA. Alcohol consumption was lower among men who were older, had higher income, and worked fewer hours. Most men were interested in being physically active (85%), managing stress (85%), eating healthy (89%), and cancer screening (91%). Higher stage of change for physical activity ( $\beta = .20$ ,  $p = .003$ ) and fruit/vegetable consumption ( $\beta = .18$ ,  $p = .027$ ) were related to interest in these activities.

**Conclusions/Application to Practice:** Occupational health providers should consider worker demographics and could support interventions that target individuals with varying levels of health behaviors given the importance of meeting the needs of often sedentary workers.

**Seaton et al. 2020.**

**Workplace Health and Safety, vol. 68, no. 5.**

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**Keywords:** Gender; health behavior; health promotion; men's health; occupational health.

**Evidence Level:** 5A

**Link:** <https://journals.sagepub.com/doi/full/10.1177/2165079919885957>

### **Managers' perceptions of factors affecting employees' uptake of workplace health promotion (WHP) offers**

Managers are often charged with the responsibility of overseeing Workplace health promotion (WHP) for which significant amounts of resources are laid aside yearly. While there is increasing interest by employers to include WHP policies, studies show that WHP implementation and uptake by employees still need to be improved upon. Given that managers are part of organizational decision-making and implementation of new policies, they serve as the bridge between workers and management. The aim of this study is to investigate managers' perceptions of employees' WHP uptake as well as challenges encountered by managers in the execution of their WHP-related tasks. Method: This study is based on a qualitative method using semi-structured interviews. Participants in the study were managers at medium and large-scale private companies in Northcentral Sweden. To ensure that participating companies are comparable in terms of structure and policy, only companies within the private sector were eligible to participate. Furthermore, only one manager per company was interviewed. A total of nineteen managers participated and the data generated were analyzed using content analysis. Results: A total of three themes and nine subthemes emerged. The first theme deals with factors at the individual level, subthemes include awareness of WHP, work-life balance, and attitudes. The second theme comprises of factors related to the WHP offer, subthemes were design of the WHP, supportive collaborators and financing of WHP. The third theme deals with organizational factors, subthemes were the nature of the organization's operations, management as role models and resources and support for managers. Results show that most of the challenges encountered by managers in executing WHP were mostly at the organizational level. Conclusion: Addressing modifiable factors at the individual and organizational levels and those related to the WHP may improve WHP uptake among employees.

**Sigblad et al. 2020.**

**Frontiers of Public Health, vol. 8, no. 145.**

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**Keywords:** Employee; managers; organization; work-life balance; workplace health promotion.

**Evidence Level:** 5A

**Link:** <https://www.frontiersin.org/articles/10.3389/fpubh.2020.00145/full>



## Job Design

### High physical work demands and working life expectancy in Denmark

**Objective:** In most European countries, political reforms gradually increase the statutory retirement age to counter the economic costs of a growing elderly population. However, working to a high age may be difficult for people with hard physical labour. We aim to study the impact of high physical work demands on working life expectancy (WLE). **Methods:** We combined physical work demands assessed by job exposure matrix (JEM) and longitudinal high-quality national registers (outcome) in 1.6 million Danish workers to estimate WLE and years of sickness absence, unemployment and disability pension. The JEM value for physical work demand is a summarised score of eight ergonomic exposures for 317 occupations groups, sex and age. The WLE was estimated using a multistate proportional hazards model in a 4-year follow-up period. **Results:** Individuals with high physical work demands had a significantly lower WLE, than those with low physical work demands, with largest differences seen among women. At age 30 years, women with high physical work demands can expect 3.1 years less working, 11 months more of sickness absence and 16 months more of unemployment than low-exposed women. For 30-year-old men, the corresponding results were 2.0 years, 12 months and 8 months, respectively. **Conclusion:** Our findings show that high physical work demands are a marked risk factor for a shortened working life and increased years of sickness absence and unemployment. The results are important when selecting high-risk occupations, and expand the knowledge base for informed political decision making concerning statutory retirement age.

**Pedersen et al. 2020.**

**Occupational and Environmental Medicine.**

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

**Keywords:** Work demands; physical work; life expectancy; Denmark; retirement age.

**Evidence Level:** 4B

**Link:** <https://oem.bmj.com/content/early/2020/04/03/oemed-2019-106359.long>

## Work Ability

### Work ability and quality of life in patients with work-related musculoskeletal disorders

This study aimed to investigate level of work ability and quality of life (QOL) as well as the relationship between them among patients suffering from work-related musculoskeletal disorders (WMSDs) in Taiwan. A cross-sectional study design with continuous sampling and a questionnaire were used to obtain the research data. Controlling for personal characteristics, pain, psychological distress, and social support, multiple linear regressions were adopted to explore the relationship between work ability and overall QOL. Further analyses were also made to clarify the relationships between work ability and each domain of QOL. In total, 165 patients with WMSDs were recruited. Compared with general workers, the participants reported a lower level of work ability and overall QOL. Work ability was significantly associated with overall QOL when covariates were controlled. Among the four domains of QOL, work ability was significantly associated with both the physical and psychological domains. The conclusion was that work ability is a definite factor of QOL for patients with WMSDs; the essence of work ability may be beyond economic function or social support. Strategies to help workers with WMSDs enhance their work ability to fit their new or temporary jobs would be beneficial to their QOL.

**Chang et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 9.**

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**Keywords:** Musculoskeletal disorders; quality of life; work ability.

**Evidence Level:** 4A

**Link:** <https://www.mdpi.com/1660-4601/17/9/3310>

## Adapting to the Future of Work

### Technology

#### **The effects of technological developments on work and their implications for continuous vocational education and training: A systematic review**

Technology is changing the way organizations and their employees need to accomplish their work. Empirical evidence on this topic is scarce. The aim of this study is to provide an overview of the effects of technological developments on work characteristics and to derive the implications for work demands and continuous vocational education and training (CVET). The following research questions are answered: What are the effects of new technologies on work characteristics? What are the implications thereof for continuous vocational education and training? Technologies, defined as digital, electrical or mechanical tools that affect the accomplishment of work tasks, are considered in various disciplines, such as sociology or psychology. A theoretical framework based on theories from these disciplines (e.g., upskilling, task-based approach) was developed and statements on the relationships between technology and work characteristics, such as complexity, autonomy, or meaningfulness, were derived. A systematic literature review was conducted by searching databases from the fields of psychology, sociology, economics and educational science. Twenty-one studies met the inclusion criteria. Empirical evidence was extracted and its implications for work demands and CVET were derived by using a model that illustrates the components of learning environments. Evidence indicates an increase in complexity and mental work, especially while working with automated systems and robots. Manual work is reported to decrease on many occasions. Workload and workflow interruptions increase simultaneously with autonomy, especially with regard to digital communication devices. Role expectations and opportunities for development depend on how the profession and the technology relate to each other, especially when working with automated systems. The implications for the work demands necessary to deal with changes in work characteristics include knowledge about technology, openness toward change and technology, skills for self- and time management and for further professional and career development. Implications for the design of formal learning environments (i.e., the content, method, assessment, and guidance) include that the work demands mentioned must be part of the content of the trainings, the teachers/trainers must be equipped to promote those work demands, and that instruction models used for the learning environments must be flexible in their application.

**Beer et al. 2020.**

**Frontiers of Psychology, vol. 11, no. 918.**

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**Keywords:** Automation; continuous vocational education and training; systematic review; technology; work characteristics; work demands.

**Evidence Level:** 1A

**Link:** <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00918/full>

#### **The mediator roles of problematic internet use and perceived stress between health behaviors and work-life balance among internet users in Germany and China: Web-based cross-sectional study**

**Background:** Work-life balance is associated with health behaviors. In the face of digitalization, understanding this link requires a theory-based investigation of problematic internet use and perceived stress, which are so far unknown. **Objective:** On the basis of the compensatory carry-over action model, this study aimed to determine whether problematic internet use and perceived stress mediate the relationship between health behaviors and work-life balance in two groups of internet users from different environments (residents in Germany and China). We also investigated whether the place of residence was a moderator. **Methods:** An online questionnaire (N=877) was administered to residents from Germany (n=374) and China (n=503) in 3 languages (German, English, and Chinese). Moderated mediation analyses were run with health behaviors as the independent variable, work-life balance as the dependent variable, problematic internet use and perceived stress as the mediator variables, and place of residence as a potential moderator. **Results:** On a mean level, individuals in Germany reported less problematic internet

use and more health behaviors than individuals in China; however, they also had lower work-life balance and higher perceived stress. Results showed that health behaviors seem to be directly related to work-life balance in both groups. Among the residents of Germany, a partial mediation was revealed ( $\beta=.13$ ;  $P=.01$ ), whereas among the residents of China, a full mediation was found ( $\beta=.02$ ;  $P=.61$ ). The mediator role of perceived stress was compared with problematic internet use in all the serial models and the parallel model. Residence moderated the relationship between health behaviors and work-life balance: The interrelation between health behaviors and work-life balance was stronger in Germany ( $\beta=.19$ ;  $P<.001$ ) than in China ( $\beta=.11$ ;  $P=.01$ ) when controlling for other variables. **Conclusions:** The findings of this study are in line with the compensatory carry-over action model. To promote work-life balance, individuals should perform health behaviors to help overcome problematic internet use and perceived stress. Both problematic internet use and perceived stress mediated health behaviors and work-life balance partially in German study participants and fully in Chinese study participants.

**Gao et al. 2020.**

**Journal of Medical Internet Research, vol. 22, no. 5.**

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**Keywords:** Culture; exercise; healthy diet; healthy lifestyle; internet; work-life balance.

**Evidence Level:** 4B

**Link:** <https://www.jmir.org/2020/5/e16468/>

## Work Environment

### **Decent work, ILO's response to the globalization of working life: Basic concepts and global implementation with special reference to occupational health**

Twenty years ago, the International Labour Organization (ILO) launched a new strategy, the Decent Work Agenda, to ensure human-oriented development in the globalization of working life and to provide an effective response to the challenges of globalization. We searched for and analysed the origin of the Decent Work concept and identified the key principles in ILO policy documents, survey reports, and relevant United Nations' (UN) documents. We also analysed the implementation of the Decent Work Country Programmes (DWCPs) and examined the available external evaluation reports. Finally, we examined the objectives of the ILO Decent Work Agenda and the Decent Work targets in the UN 2030 Agenda for Sustainable Development in view of occupational health. In two thirds of the ILO's Member States, the Decent Work Agenda has been successfully introduced and so far fully or partly implemented in their DWCPs. The sustainability of the Decent Work approach was ensured through the UN 2030 Agenda, the ILO Global Commission Report on the Future of Work, and the ILO Centenary Declaration. However, objectives in line with the ILO Convention No. 161 on Occupational Health Services were not found in the DWCPs. Although successful in numerous aspects in terms of the achievement of the Decent Work objectives and the UN Sustainable Development Goals (SDGs), the Decent Work Agenda and the Decent Work Country Programmes need further development and inclusion of the necessary strategies, objectives, and actions for occupational health services, particularly in view of the high burden of work-related diseases and, for example, the present global pandemic. In many countries, national capabilities for participation and implementation of Decent Work Country Programmes need strengthening.

**Rantanen et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Decent Work; ILO; SDGs; globalization; occupational health.

**Evidence Level:** 6A

**Link:** <https://www.mdpi.com/1660-4601/17/10/3351>

## Aging Workforce

**Fostering work ability among menopausal women. Does any work-related psychosocial factor help?**

**Introduction:** Due to the aging workforce, it will become even more common for organizations to count, among their employees, women who are dealing with menopause. To date, no knowledge is available regarding the work ability among menopausal women. With this view, the aim of the present study was to identify work-related psychosocial factors associated with work ability in a sample of menopausal working women. **Methods:** A self-report questionnaire was administered to 1069 menopausal women employed as administrative officers in the Italian public sector. The study design was cross-sectional. **Results:** Work ability was found to be negatively associated with family-work conflict ( $\beta = -0.21$ ,  $p = 0.0001$ ) and positively associated with health-oriented organizational climate ( $\beta = 0.12$ ,  $p = 0.0001$ ), job autonomy ( $\beta = 0.08$ ,  $p = 0.006$ ), and skill discretion ( $\beta = 0.08$ ,  $p = 0.048$ ). Conversely, work ability did not show significant associations with job demands, flexible working hours, and social support. **Discussion:** From a practical point of view, our study identifies various areas of intervention that could foster job sustainability during menopause. In particular, our findings suggest that, to improve women's job sustainability across their entire work-life span, it may be crucial to develop organizational policies, training, and activities specifically dedicated to sustaining menopausal women's well-being.

**Viotti et al. 2020.**

**International Journal of Women's Health, vol. 12.**

**User License:**

**Keywords:** Aging workforce; menopause; women; work ability; work-related psychosocial factors.

**Evidence Level:** 4A

**Link:** <https://www.dovepress.com/fostering-work-ability-among-menopausal-women-does-any-work-related-ps-peer-reviewed-article-IJWH>

### **Workplace interventions that support older employees' health and work ability - a scoping review**

**Background:** The aim of this study was to examine workplace interventions that support older employees' health and work ability and the effect of these interventions. **Methods:** We used a scoping review, a type of a systematic literature review in which selected published academic articles and grey literature reports are included, to answer the following questions: 1) What kind of interventions have been made to support older employees' health? and 2) What effects do these interventions have on older employees' work ability? The scoping review framework proposed by Arksey and O'Malley and summarized by the Joanna Briggs Institute was used. Four key concepts comprised the basis for the research: health, intervention, older employee and work ability. A total of 8 articles were found to meet the inclusion and exclusion criteria. The study was limited to published academic articles between 2007 and 2019. Participant age varied between 37 and 74 years (overall average age 50-55) and workplaces comprised the intervention settings. **Results:** Three main intervention categories were discerned: health checks and counselling for employees on the individual level, interventions based on screenings, and improvements in work environment or organization. Positive behavioral change and lowered health risks can be achieved through health counselling, which increases work ability. Measurements and screenings comprise good ways to chart and follow-up on employees' work ability and health status. Supervisor training and support from supervisors were seen to have a positive effect on health outcomes and increased work ability.

**Conclusions:** To guarantee good results, employers should focus on employees' health and interventions should occur when employees are younger than the studied group. The small number of articles related to intervention studies for the age group studied here indicate that a knowledge gap exists. We maintain that workplaces that promote employees' health by strengthening older employees' vitality can encourage employees to have longer careers.

**Soderbacka et al. 2020.**

**BMC Health and Services Research, vol. 20, no. 1.**

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**Keywords:** Health; intervention; older employee; scoping review; work ability.

**Evidence Level:** 6A

**Link:** <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-05323-1>

### **Work factors facilitating working beyond state pension age: Prospective cohort study with register follow-up**

**Objectives:** The demographic changes in Europe underline the need for an extension of working lives. This study investigates the importance of physical work demands and psychosocial work factors for working beyond the state pension age (65 years). **Methods:** We combined data from three cohorts of the general working population in Denmark (DWECS 2005 and 2010, and DANES 2008), where actively employed workers aged 55-59 years replied to questionnaires about work environment and were followed until the age of 66 years in the Danish AMRun register of paid employment. Using logistic regression analyses, we calculated prevalence ratios (PR) and 95% confidence intervals (CI) for the association between physical and psychosocial work factors and working beyond state pension age, adjusted for age, sex, cohort, cohabiting, sector, income, vocational education, working hours, lifestyle, and previous sickness absence. **Results:** Of the 2884 workers aged 55-59 years, 1023 (35.5%) worked beyond the state pension age. Higher physical work demands was associated with a lower likelihood (PR 0.69, 95% CI 0.58-0.82) and a good psychosocial work environment was associated with higher likelihood (average of 7 items: PR 1.81, 95% CI 1.49-2.20) of working beyond state pension age. Stratified analyses did not change the overall pattern, ie, a good overall psychosocial work environment - as well as several specific psychosocial factors - increased the likelihood of working beyond state pension age, both for those with physically active and seated work. **Conclusion:** While high physical work demands was a barrier, a good psychosocial work environment seems to facilitate working beyond state pension age, also for those with physically active work.

**Anderson et al. 2020.**

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

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**Keywords:** Health; health; older worker; pension; pension age; physical workload; psychosocial; register; register follow-up; retirement; statutory retirement age; work factor.

**Evidence Level:** 4B

**Link:** [https://www.sjweh.fi/show\\_abstract.php?abstract\\_id=3904](https://www.sjweh.fi/show_abstract.php?abstract_id=3904)

### **When is work a cause of early retirement and are there any effective organizational measures to combat this? A population-based study of perceived work environment and work-related disorders among employees in Sweden**

**Background:** The ageing workforce has an impact on public health. The aim of this study was to evaluate work-related disorders, work tasks and measures associated with the possibility of working beyond 65 years of age or not. **Method:** The data comprised two sample surveys based on the Swedish population: the Survey of National Work-Related Health Disorders, and the National Work Environment Survey.

**Results:** A logistic regression analysis showed that an active systematic work environmental management in the workplace was a statistically significant association with whether individuals could work in their current occupation until 65 years of age (OR 1.7). The final multivariate model stated that whether individuals could work until 65 years was associated with bodily exhaustion after work, frequent feeling of the own work effort being insufficient at the end of the day, experience of the work as restricted and with a lack of freedom, working alone and at risk of unsafe or threatening situations, and generally feeling dissatisfied with the work tasks. Women-dominated workplaces were more highly associated with both male and female employees not being able to work until age 65 (OR 1.6). **Conclusion:** Deficiencies in the working environment seems to be a threat to the public health. An active systematic work environmental management in the workplace increases the possibility to extend the working life. Tools for managers, like the swAge-model, to easily perform active systematic work environmental controls could therefore be a possible way to decrease the risk of work injury as well as increase the possibility for a sustainable extended working life.

**Nilsson et al. 2020.**

**BMC Public Health, vol. 20, no. 1.**

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**Keywords:** Age management; age management, swAge; occupational health; older worker; public health, demography, retirement; sustainable working life; work environment.

**Evidence Level:** 5B

**Link:** <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-020-08865-5>

## Guiding and Supporting Mental Health and Wellbeing

### Mental Health

#### **Occupational stress and employees complete mental health: A cross-cultural empirical study**

Given the shortcomings of previous research on occupational stress and mental health (e.g., predominantly in Western, educated, industrialized, rich and democratic (WEIRD) societies, based on the traditional mental health model and a lack of comparative studies), this study aimed to (a) examine the relationship between occupational stress and complete mental health among employees in Cabo Verde and China, and also explored the mediation and moderation roles of burnout and optimism in accounting for the empirical link. Mental health was defined as comprised of two distinguishable factors: positive and negative mental health. The Pearson correlation test, structural equation modeling (SEM) analysis, bootstrap analysis, hierarchical moderated regression and an independent t-test were used to analyze the data. The results indicated that, in both countries, occupational stress showed a negative relation to positive mental health and lower psychopathology symptoms-and job burnout mediated the relation between occupational stress and mental health. Optimism moderated the relation between occupational stress and burnout, but not the relation between occupational stress and complete mental health. The results are interpreted in light of the comparative framework.

**Fortes et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Cabo Verde; China; burnout; complete mental health; employee; occupational stress; optimism.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/17/10/3629>

#### **Instability of personality traits of teachers in risk conditions due to work-related stress**

The following study aims to verify whether psychosocial risk conditions determine a variation in personality traits. The sample consisted of 301 teachers, comprising 84 men (27.1%) and 217 women (72.9%). The Big Five Questionnaire (BFQ) was used to measure personality traits, while the Organizational and Psychosocial Risk Assessment (OPRA) questionnaire was used to measure psychosocial risk. The ANOVA results notice the change of BFQ traits. These are significant (Extraversion = 0.000; Agreeableness = 0.001; Neuroticism = 0.000; Openness = 0.017), with the exception of the Conscientiousness trait (Conscientiousness = 0.213). The research supports the approach of seeing personality as the result of the interaction between the individual and the environment; this position is also recognized by work-related stress literature. Stress conditions can lead to a change in the state of health and possibly determine the onset of work-related stress diseases. In the future, it would be useful to start a series of longitudinal studies to understand in greater detail the variability of personality traits due to changes in the Risk Index.

**Ruggieri et al. 2020.**

**Behavioral Science, vol. 10, no. 5.**

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**Keywords:** Big Five; pathology; personality; stress; work-related stress.

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/2076-328X/10/5/91>

#### **Occupational post-traumatic stress disorder: an updated systematic review**

**Background:** Although numerous studies on occupational post-traumatic stress disorder (PTSD) have been conducted prior to the 1950-2010 seminal systematic review by Skogstad et al., the prevalence, risk factors, and impact of this disorder following traumatic events in occupational settings remain unclear. This study aims to address this knowledge gap by reviewing the literature published after 2010. **Methods:** We reviewed literature from databases such as PubMed and Google Scholar using PRISMA guidelines to

identify studies that address occupational PTSD and examined the status (prevalence or incidence), the risk factors, and the health effects of PTSD among workers. **Results:** In total, 123 articles were identified, and finally, 31 (25.2%) articles were selected after excluding duplicates. Various occupational traumatic physical events were reported such as natural or manmade disaster, explosion, accident, handling refugee corpses, or bullying at work. Risk of PTSD was closely associated with working conditions, severity of injury, history of mental disorder, occurrence of psychiatric symptoms at the time of the event, personality, interpersonal relationships, etc. Workers with PTSD were likely to experience a deterioration of physical and psychological health and impairment of social and occupational functioning. **Conclusions:** Our review suggests that many workers remain highly vulnerable to occupational PTSD and its consequences.

**Lee et al. 2020.**

**BMC Public Health, vol. 20, no. 1.**

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**Keywords:** Literature review; risk factors; stress disorders, post-traumatic; workplace trauma.

**Evidence Level:** 1A

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08903-2>

## **Bullying and Harassment**

### **Exposure to bullying behaviours and support from co-workers and supervisors: a three-way interaction and the effect on health and well-being**

**Purpose:** Workplace bullying can be very stressful and it has detrimental effects on health and well-being which makes it an important area of study. Social support has traditionally been seen as important in moderating work-related stress. It was hypothesised that the negative association between exposure to bullying behaviours, and health and well-being is moderated by (a) perceived support from close co-workers and (b) perceived supportive leadership. In the study, we also investigated a three-way interaction between exposure to bullying behaviours, perceived support from close co-workers and perceived supportive leadership. This association has not been studied before and add new knowledge to the research field. **Methods:** We used a moderated moderation analysis of workplace bullying, co-worker support and supervisor support using cross-sectional data from a work environment survey with 1383 respondents (75% response rate). **Results:** The moderated moderation analysis confirmed the moderating effect of perceived co-worker support but not the moderating effect of perceived supervisor support. There was a three-way interaction, but not in the case of the lowest 12.6% of perceived supervisor support scores. **Conclusions:** These results indicate that the negative effect of workplace bullying on health and well-being is weaker if victims perceive that they have co-worker support, but this protective effect seems to be conditional on the perceived level of supervisor support. In other words, lack of supportive leadership may block the beneficial effect of perceived co-worker support.

**Blomberg et al. 2020.**

**International Archives of Occupational and Environmental Health, vol. 93, no. 4.**

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**Keywords:** Co-workers; health outcomes; leadership; moderation; social support; workplace bullying.

**Evidence Level:** 4A

**Link:** <https://link.springer.com/article/10.1007/s00420-019-01503-7>

### **Precarious employment and self-reported experiences of unwanted sexual attention and sexual harassment at work. An analysis of the European Working Conditions Survey**

Unwanted sexual attention (UWSA) and sexual harassment (SH) are prevalent experiences for women in working life and often accompanied by poor health. Despite increasing numbers especially of young people working in insecure and irregular employment settings, there is little empirical evidence if such precarious arrangements are associated with UWSA or SH. To investigate this, we used a representative sample of the European working population consisting of 63,966 employees in 33 countries who participated in the European Working Conditions Survey in 2010 or 2015. Precarious employment (PE) was assessed on the basis of seven indicators and a formative index derived from them: temporary employment, contractual duration < 1 year, schedule unpredictability, involuntary part-time, low information on occupational health and safety risks (OSH), low pay (wage < 60%), and multiple job-holding. We measured self-reported

experiences of workplace UWSA during the last month and SH during the last 12 months each using a single-item questionnaire. Multi-level Poisson regressions were used to estimate prevalence ratios for UWSA and SH according to PE adjusted for survey year, age, education, type of household, migration background, job tenure, weekly working hours, occupational position, working sector, company size, workplace gender ratio, and visiting customers or clients. 0.8% of men reported UWSA in the last month and 2.6% of the women. SH in the last year was reported by 0.4% of the men and 1.3% of the women. For both men and women, PE was significantly associated with elevated prevalence of UWSA and SH, in particular when reporting schedule unpredictability, multiple job-holding and low information on OSH. Our results suggest that precariously employed individuals may be more prone to experience unwanted sexual behaviour at the workplace compared with workers in non-precious settings.

**Reuter et al. 2020.**

**PLoS One, vol. 15, no. 5.**

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**Keywords:** Precarious employment; self-reported experience; unwanted sexual attention; sexual harassment; work.

**Evidence Level:** 4A

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233683>

### **Workplace violence and health in human service industries: a systematic review of prospective and longitudinal studies**

**Objectives:** To provide systematically evaluated evidence of prospective associations between exposure to physical, psychological and gender-based violence and health among healthcare, social care and education workers. **Methods:** The guidelines on Preferred Reporting Items for Systematic Reviews and Meta-Analyses were followed. Medline, Cinahl, Web of Science and PsycInfo were searched for population: human service workers; exposure: workplace violence; and study type: prospective or longitudinal in articles published 1990-August 2019. Quality assessment was performed based on a modified version of the Cochrane's 'Tool to Assess Risk of Bias in Cohort Studies'. **Results:** After deduplication, 3566 studies remained, of which 132 articles were selected for full-text screening and 28 were included in the systematic review. A majority of the studies focused on healthcare personnel, were from the Nordic countries and were assessed to have medium quality. Nine of 11 associations between physical violence and poor mental health were statistically significant, and 3 of 4 associations between physical violence and sickness absence. Ten of 13 associations between psychological violence and poor mental health were statistically significant and 6 of 6 associations between psychological violence and sickness absence. The only study on gender-based violence and health reported a statistically non-significant association. **Conclusion:** There is consistent evidence mainly in medium quality studies of prospective associations between psychological violence and poor mental health and sickness absence, and between physical violence and poor mental health in human service workers. More research using objective outcomes, improved exposure assessment and that focus on gender-based violence is needed.

**Nyberg et al. 2020.**

**Occupational and Environmental Medicine.**

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**Keywords:** Healthcare workers; longitudinal studies; mental health; sickness absence; violence.

**Evidence Level:** 1A

**Link:** <https://oem.bmj.com/content/early/2020/05/15/oemed-2020-106450.long>

### **Employment and Unemployment**

#### **Association between unemployment and the co-occurrence and clustering of common risky health behaviors: Findings from the Constances cohort**

**Background:** Unemployment is associated with a high prevalence of risky health behaviors. Mortality increases with the number of co-occurring risky behaviors but whether these behaviors co-occur with a greater than expected frequency (clustering) among unemployed people is not known. **Methods:**



Differences according to unemployment status in co-occurrence and clustering of smoking, alcohol abuse, low leisure-time physical activity and unhealthy diet (marked by low fruit and vegetable intake) were assessed in 65,630 salaried workers, aged 18 to 65, who were participants in Constances, a French population-based cohort. Among them, 4573 (7.0%) were unemployed without ( $n = 3160$ , 4.8%) or with ( $n = 1413$ , 2.1%) past experience of unemployment. **Results:** Compared to the employed, unemployed participants without or with past experience of unemployment were similarly overexposed to each risky behavior (sex and age adjusted odds-ratios ranging from 1.38 to 2.19) except for low physical activity, resulting in higher rates of co-occurrence of two, three and four behaviors (relative risk ratios, RRR 1.20 to 3.74). Association between behavior co-occurrence and unemployment did not vary across gender, partnership status or income category. Risky behavior clustering, i.e., higher than expected co-occurrence rates based on the prevalence of each behavior, was similar across unemployment status. The same observations can be made in employed participants with past experience of unemployment, although overexposure to risky behaviors (ORs 1.15 to 1.38) and increased rates of co-occurrence (ORs 1.19 to 1.58) were not as pronounced as in the unemployed. **Conclusions:** Co-occurrence of risky behaviors in currently and/or formerly unemployed workers is not worsened by behavior clustering. Engagement in each of these behaviors should be considered an engagement in distinct social practices, with consequences for preventive policies.

**Plessz et al. 2020.**

**PLoS One, vol. 15, no. 5.**

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**Keywords:** Unemployment; risky health behaviors; mortality.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232262>

## Psychosocial Issues – Risk Factors

### Work-related psychosocial risk factors and psychiatric disorders: A cross-sectional study in the French working population

**Purpose:** The study estimates the prevalence of probable psychiatric disorder in the working population, determines the proportion of people presenting a probable psychiatric disorder among people exposed to work-related psychosocial risk factors (PSRFs), and identifies which PSRF has the strongest association with having a probable psychiatric disorder. **Methods:** A cross-sectional study conducted in March 2018 involved a representative sample of the French working population. The General Health Questionnaire 28 (GHQ-28) was used to estimate the prevalence of probable psychiatric disorder and 44 items were gathered from theoretical models of PSRFs. We used multiple logistic regression to estimate the association of each PSRF with having a probable psychiatric disorder, adjusted on individual, health, and job confounders. **Results:** This study involved 3200 French participants. The proportion of probable psychiatric disorder was 22.2% [20.6; 24.0]. Ten PSRFs were significantly associated with it. The strongest association was for having problems handling professional and personal responsibilities (reported by 15% of the study population) (OR = 1.97 [1.52; 2.54]), with 45% pathological GHQ-28 scores (potential psychiatric cases) for people exposed to this PSRF versus 18% non-exposed. The next strongest association was lack of support of colleagues (reported by 28%) (OR = 1.63 [1.29; 2.06]). The third strongest association was feeling sometimes afraid when doing the job (reported by 63%) (OR = 1.53, [1.21; 1.93]). **Conclusions:** Our study identified 10 PSRFs associated with psychiatric disorder, with substantial exposure rate among the population. The results of our research could help develop recommendations to improve work environment.

**Chevance et al. 2020.**

**PLoS One, vol. 15, no. 5.**

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**Keywords:** Psychosocial risk factors; French; working population; work-related.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233472>

### The interplay among age and employment status on the perceptions of psychosocial risk factors at work

While the role of individual differences in shaping primary appraisals of psychosocial working conditions has been well investigated, less is known about how objective characteristics of the employee profile (e.g., age) are associated with different perceptions of psychosocial risk factors. Moreover, previous research on the link between employment status (i.e., work contract) and such perceptions has provided mixed results, leading to contradictory conclusions. The present study was conducted on a nationally representative sample of the Italian employed workforce surveyed with computer-assisted telephone interviewing (CATI) methodology. The principal aim of the study is to bridge this gap in the extant literature by investigating the interplay between two key characteristics of the employee profile (i.e., age and work contract) in shaping employees' perceptions of psychosocial risk factors. Given the disparate literature scenario on the interplay between age and employment status in shaping primary appraisals of psychosocial stressors, we formulated and compared multiple competitive informative hypotheses. Consistent with the principles of the conservation of resources (COR) theory, we found that older contingent employees reported a higher level of psychosocial risk than their permanent peers who, in turn, were more vulnerable than middle-aged and younger workers (regardless of their employment status). These results highlight the importance of simultaneously assessing multiple objective variables of the employee profile (i.e., age and employment status) which may act to shape subjective perceptions of psychosocial risk factors for work-related stress. Given our findings, employers and policy makers should consider older contingent employees as one of the workforce sub-populations most vulnerable to negative work environments.

**Ghezzi et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Bayes factor; Bayesian informative hypotheses; age; aging; contingent work; employment status; psychosocial risk factors at work; work contract; work-related stress.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/17/10/3611>

### **Psychosocial work exposures of the job strain model and cardiovascular mortality in France: results from the STRESSJEM prospective study**

**Objectives:** The study aims to explore the prospective associations of the psychosocial work exposures of the job strain model with cardiovascular mortality, including mortality for ischemic heart diseases (IHD) and stroke, using various time-varying exposure measures in the French working population of employees.

**Methods:** The study was based on a cohort of 798 547 men and 697 785 women for which job history data from 1976 to 2002 were linked to mortality data and causes of death from the national death registry. Psychosocial work exposures from the validated job strain model questionnaire were assessed using a job-exposure matrix (JEM). Three time-varying measures of exposure were studied: current, cumulative, and recency-weighted cumulative exposure. Cox proportional hazards models were used to examine the associations between psychosocial work exposures and cardiovascular mortality. **Results:** Within the 1976-2002 period, there were 19 264 cardiovascular deaths among men and 6181 among women. Low decision latitude, low social support, job strain, iso-strain, passive job, and high strain were associated with cardiovascular mortality. Most of these associations were also observed for IHD and stroke mortality. The comparison between the different exposure measures suggested that current exposure may be more important than cumulative (or past) exposure. The population fractions of cardiovascular mortality attributable to job strain were 5.64% for men and 6.44% for women. **Conclusions:** Psychosocial work exposures of the job strain model may play a role in cardiovascular mortality. The estimated burden of cardiovascular mortality associated with these exposures underlines the need for preventive policies oriented toward the psychosocial work environment.

**Niedhammer et al. 2020.**

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

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**Keywords:** Work exposure; psychosocial; job strain; cardiovascular mortality.

**Evidence Level:** 4B

**Link:** [https://www.sjweh.fi/show\\_abstract.php?abstract\\_id=3902](https://www.sjweh.fi/show_abstract.php?abstract_id=3902)

## Psychosocial Issues – Assessment and Management

### **Decreasing employees' work stress by a participatory, organizational level work stress prevention approach: a multiple-case study in primary education**

**Background:** Work stress is an important problem among employees in education in the Netherlands. The present study aims to investigate the effects of a participatory organizational level work stress prevention approach to reduce (quantitative) job demands, increase resources (i.e. autonomy, supervisor and coworker support) and to reduce work stress and increase job satisfaction of employees in primary education. **Methods:** This study makes use of a multiple case study research design. The stress prevention approach is implemented at 5 primary schools and questionnaires were filled out by 119 employees of the 5 schools at baseline and 1 year later, measuring job demands, resources, work stress, job satisfaction and implementation factors. **Results:** Multilevel analyses showed a significant decrease in job demands and a significant increase in job satisfaction between baseline and follow up. In addition, employees that were more satisfied with the communication about the intervention showed more improvements in autonomy and job satisfaction. However, employees reporting an increased dialogue in work stress between employees and management showed a smaller decrease in job demands. **Conclusion:** The study shows a decrease in job demands and an increase in job satisfaction in the schools that implemented a stress prevention approach. Results of the study underline the importance of communication about the intervention as part of the implementation process, impacting the effectiveness of the intervention to improve autonomy and job satisfaction.

**Roozeboom et al. 2020.**

**BMC Public Health, vol. 20, no. 1.**

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**Keywords:** Job satisfaction; organizational level intervention; primary education; work stress.

**Evidence Level:** 5B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08698-2>

## Burnout

### **The association between coworker support and work-family interference: A test of work environment and burnout as mediators**

Coworker support has been hypothesized to enhance work-life outcomes. However, the mechanisms underlying this association are unclear. Two studies examined how coworker support predicted work-life outcomes through positive work environment and burnout. It was hypothesized that coworker support enhances work environment, and that better work environment is associated with less burnout; in turn, reduced burnout is associated with less negative work-life interference. In two large studies of working adults (total N = 5,666), we found support for our model - coworker support predicted work-family outcomes and this association was mediated by more positive work environments and reduced burnout. Study 2 was a short-term lagged confirmation of the model. Results are discussed in the context of efforts to improve workplace climate, reduce turnover, and improve workers' job satisfaction.

**Norling et al. 2020.**

**Frontiers of Psychology, vol. 11, no. 819.**

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**Keywords:** Burnout; coworker support; mediation; turnover; work environment; work-family interference.

**Evidence Level:** 4A

**Link:** <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00819/full>

## Enabling Healthy and Safe Workplaces

### Health and Wellbeing

#### **Job strain as a risk factor for peripheral artery disease: A multi-cohort study**

**Background:** Job strain is implicated in many atherosclerotic diseases, but its role in peripheral artery disease (PAD) is unclear. We investigated the association of job strain with hospital records of PAD, using individual-level data from 11 prospective cohort studies from Finland, Sweden, Denmark, and the United Kingdom. **Methods and Results:** Job strain (high demands and low control at work) was self-reported at baseline (1985-2008). PAD records were ascertained from national hospitalization data. We used Cox regression to examine the associations of job strain with PAD in each study, and combined the study-specific estimates in random effects meta-analyses. We used  $\tau^2$ ,  $I^2$ , and subgroup analyses to examine heterogeneity. Of the 139 132 participants with no previous hospitalization with PAD, 32 489 (23.4%) reported job strain at baseline. During 1 718 132 person-years at risk (mean follow-up 12.8 years), 667 individuals had a hospital record of PAD (3.88 per 10 000 person-years). Job strain was associated with a 1.41-fold (95% CI, 1.11-1.80) increased average risk of hospitalization with PAD. The study-specific estimates were moderately heterogeneous ( $\tau^2=0.0427$ ,  $I^2$ : 26.9%). Despite variation in their magnitude, the estimates were consistent in both sexes, across the socioeconomic hierarchy and by baseline smoking status. Additional adjustment for baseline diabetes mellitus did not change the direction or magnitude of the observed associations. **Conclusion:** Job strain was associated with small but consistent increase in the risk of hospitalization with PAD, with the relative risks on par with those for coronary heart disease and ischemic stroke.

**Heikkila et al. 2020.**

**Journal of American Heart Association, vol. 9, no. 9.**

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**Keywords:** Epidemiology; job strain; meta-analysis; peripheral artery disease; risk factors.

**Evidence Level:** 4A

**Link:** <https://www.ahajournals.org/doi/10.1161/JAHA.119.013538>

#### **Gratitude at work: Prospective cohort study of a web-based, single-exposure well-being intervention for health care workers**

**Background:** Emotional exhaustion (EE) in health care workers is common and consequentially linked to lower quality of care. Effective interventions to address EE are urgently needed. **Objective:** This randomized single-exposure trial examined the efficacy of a gratitude letter-writing intervention for improving health care workers' well-being. **Methods:** A total of 1575 health care workers were randomly assigned to one of two gratitude letter-writing prompts (self- vs other focused) to assess differential efficacy. Assessments of EE, subjective happiness, work-life balance, and tool engagement were collected at baseline and 1-week post intervention. Participants received their EE score at baseline and quartile benchmarking scores. Paired-samples t tests, independent t tests, and correlations explored the efficacy of the intervention. Linguistic Inquiry and Word Count software assessed the linguistic content of the gratitude letters and associations with well-being. **Results:** Participants in both conditions showed significant improvements in EE, happiness, and work-life balance between the intervention and 1-week follow-up ( $P<.001$ ). The self-focused (vs other) instruction conditions did not differentially predict improvement in any of the measures ( $P=.91$ ). Tool engagement was high, and participants reporting higher motivation to improve their EE had higher EE at baseline ( $P<.001$ ) and were more likely to improve EE a week later ( $P=.03$ ). Linguistic analyses revealed that participants high on EE at baseline used more negative emotion words in their letters ( $P=.005$ ). Reduction in EE at the 1-week follow-up was predicted at the level

of a trend by using fewer first-person ( $P=.06$ ) and positive emotion words ( $P=.09$ ). No baseline differences were found between those who completed the follow-up assessment and those who did not ( $P>.05$ ).

**Conclusions:** This single-exposure gratitude letter-writing intervention appears to be a promising low-cost, brief, and meaningful tool to improve the well-being of health care workers.

**Adair et al. 2020.**

**Journal of Medical Internet Research, vol. 22, no. 5.**

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**Keywords:** Burnout; emotions; health care; mental health; positive psychology.

**Evidence Level:** 4A

**Link:** <https://www.jmir.org/2020/5/e15562/>

### **Gender differences and occupational factors for the risk of obesity in the Italian working population**

**Background:** Obesity is a multifactorial condition and a major risk factor associated with several non-communicable diseases, such as cardiovascular disease, and with a higher risk of premature death and disability. Sex-specific factors have key roles and must be taken into consideration in studying occupational factors associated with the risk of obesity. The aim of this study was to investigate gender differences in body mass index (BMI) in a large cohort representative of Italian workers and, correlating this index with several demographic and occupational variables, to verify sex- and work-dependent differences in the risk of obesity. **Methods:** We utilized data from INSuLa, a cross-sectional, nationally representative survey of the Italian worker population conducted in 2013 by the Italian Workers' Compensation Authority to investigate health and safety at work. Analyses were run on a sample of 8000 Italian workers, aged from 16 to 64 years. Logistic regression models were employed to assess gender differences in the relation between occupational characteristics and BMI. We adjusted for age, education, variables related to health protection at work, and chronic conditions and diseases. **Results:** There were several significant differences in the BMI between males and females, linked to some occupational factors. For instance, female shift workers were 1.32 times (95% CI 1.11-1.57) more likely to be overweight or obese than normal-weight workers, and this association was maintained when controlling for confounders. The likelihood of overweight or obesity among women who worked 1-2 night shifts per week was significantly higher - 1.5-1.6 times - than those on day shifts. **Conclusions:** Gender-specific differences in occupational factors associated with the risk of obesity are useful with a view to characterizing this risk and helping identify workplace-targeted intervention strategies.

**Tecco et al. 2020.**

**BMC Public Health, vol. 20, no. 1.**

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**Keywords:** Body mass index; occupational sectors; overweight; Sex differences; work shift; work-related aspects.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08817-z>

### **The impact of optimized daylight and views on the sleep duration and cognitive performance of office workers**

A growing awareness has recently emerged on the health benefits of exposure to daylight and views. Daylight exposure is linked to circadian rhythm regulation, which can have significant impacts on sleep quality and cognitive function. Views of nature have also been shown to impact emotional affect and performance. This study explores the impact of optimized daylight and views on the sleep and cognitive performance of office workers. Thirty knowledge workers spent one week working in each of two office environments with identical layouts, furnishings, and orientations; however, one was outfitted with electrochromic glass and the other with traditional blinds, producing lighting conditions of 40.6 and 316 equivalent melanopic lux, respectively. Participants in the optimized daylight and views condition slept 37 min longer as measured by wrist-worn actigraphs and scored 42% higher on cognitive simulations designed to test their higher order decision-making performance. Both sleep and cognitive function were impacted after one day in the space, yet the impacts became more significant over the course of the week. The positive effect of optimized daylight and views on cognitive function was comparable for almost all

participants, while increases in sleep duration were significantly greater for those with the lowest baseline sleep duration. This study stresses the significance of designing with daylight in order to optimize the sleep quality and performance of office workers.

**Boubekri et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 9.**

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**Keywords:** Cognitive function; daylight; health building; productivity; sleep; views.

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/17/9/3219>

## **Work Health and Safety**

### **The impact of alcohol hangover on simulated driving performance during a 'Commute to Work' - Zero and residual alcohol effects compared**

Driving is increasing across the world and road traffic accidents are a major cause of serious injuries and fatalities. The link between alcohol consumption and impaired driving has long been established and has led to legislation in many countries, with enforcement of legal limits based on blood alcohol concentration levels. Alcohol hangover research is an emerging field with a range of laboratory and naturalistic studies now clearly demonstrating the significant impairments that can result from hangover, even when alcohol levels are measured at or close to zero the day following a social drinking occasion. Driving is a commonplace activity but requires competency with a range of complex and potentially demanding tasks. Driving impaired can have serious consequences, including death and serious injury. There have been only limited alcohol hangover driving studies. The studies presented examined the consequences of alcohol hangover with a driving simulator contrasting a group with zero residual alcohol (N = 26) next day and another with residual alcohol (N = 26) assessed with breathalyzer in the morning before undertaking a 20 min commute to work. All participants completed a morning drive after a night without alcohol consumption and another after a night of social drinking. The driving scenarios were relatively demanding including traffic and pedestrians, traffic lights and other potential hazards in a mixed rural and urban journey. Subjective hangover and workload were assessed in addition to a range of driving performance variables, including divided attention, steering control and driving violations. Analyses contrasted driving in the no alcohol condition with the residual alcohol condition. The combined groups data (N = 52) was contrasted with the zero and residual alcohol groups. Significant contrasts were found for a range of driving measures, including divided attention, vehicle control, and driving violations as well as perceived workload. The pattern of impairment was broadly similar across both groups, indicating that whether or not residual alcohol was present, consistent driving impairment was seen. The relatively high number of significant variables may reflect the increased cognitive demand of the 20 min commute drive including busy and complex urban environments. This was also reflected in the significant increase in perceived workload recorded across the 6 dimensions of the National Aeronautics and Space Administration Task Load Index (NASA-TLX). Associations between subjective measures and driving performance with hangover suggested a potential lack of awareness of impairment, though were limited in number. The overall findings indicate that the levels of impairment seen reflect those seen with alcohol impaired driving, even when breath alcohol is zero.

**Alford et al. 2020.**

**Journal of Clinical Medicine, vol. 9, no. 5.**

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**Keywords:** Alcohol; awareness of impairment; driving; hangover; residual alcohol.

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/2077-0383/9/5/1435>

### **Individual fit testing of hearing-protection devices based on microphones in real ears among workers in industries with high-noise-level manufacturing**

Hearing-protection devices (HPDs) are particularly important in protecting the hearing of workers. The aim of this study was to prevent hearing damage in workplaces in Taiwan. It was conducted to determine the

actual sound attenuation of the personal attenuation rating (PAR) values when wearing HPDs via measurements from field microphones in workers' real ears (F-MIRE). Across 105 measurement trials for the Classic™ roll-down foam earplug HPDs worn by the workers, there were 23 cases of ineffective protection (including caution and fail); the proportion was 20% (including the first measurement and re-wear of HPDs after education and training). In addition, re-education and training in how to wear the HPDs was provided, improving wearing skills. A total of 29 testees wearing the Classic™ roll-down foam earplug HPDs failed to meet the pass standard for the first PAR test, and 6 of them improved and subsequently passed the PAR test. The improvement rate was 20%. These 23 testees switched to another HPD, namely Kneading-Free Push-Ins™ earplugs. From this group, 16 effective sound attenuation values were obtained, with an improvement rate of 70%. However, seven testees failed to pass the PAR test, and after education, training, and replacement of HPDs with different types, they still could not pass the PAR test. At that time, even if the UltraFit™ pre-molded earplugs were adopted again for wear and replacement, they were still unable to pass the PAR test. This HPD was eventually replaced with the PELTOR X4A Earmuff HPD and then tested again, with these HPDs finally passing the PAR test. In Taiwan, the use of fit testing has been increasing but it is not a common practice, and few studies on hearing-protection fit testing have been conducted in this country. The goal of this study was to gain more insight into the current hearing protection situation, including field attenuation of HPDs obtained by workers, the effects of training on improving the attenuation of HPDs after F-MIRE measurements, and the awareness of hearing health and motivation on the use of HPDs in a high-noise-level environment.

**Chiu et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 9.**

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**Keywords:** Field microphone in real ear (F-MIRE); hearing-protection device (HPD); noise exposure; personal attenuation rating (PAR); pre-workforce education.

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/17/9/3242>

## Risk Assessment

### **The usefulness of pre-employment and pre-deployment psychological screening for disaster relief workers: a systematic review**

**Background:** Individuals who conduct disaster relief work overseas are exposed to a variety of traumatic events that can cause distress and trigger psychological illnesses. Identification of which disaster relief workers may be at risk of experiencing psychological distress or mental health disorders is frequently carried out through pre-employment or pre-deployment psychological screening. The primary objective of our review was to assess the evidence for pre-employment and pre-deployment psychological screening of relief workers who work in disaster situations. We aimed to identify specific pre-employment and pre-deployment characteristics that predict impaired wellbeing of an individual following engaging in disaster-related work. **Methods:** A combined list of search terms was composed relating to disaster-related occupations, screening methods, psychological disorders, and study design. The databases used were PsycINFO, MEDLINE, EMBASE, and GlobalHealth. We included studies that used cross-sectional or longitudinal study designs; were published in the English language in peer-reviewed academic journals; reported on the association between pre-employment and pre-deployment features and post-deployment psychological disorders or distress; considered any occupational groups responding to a specified, discrete crisis; and used at least one validated measure of distress or disorder. We extracted data on the author; year of publication; disaster description; country of study; study design; population sample; disorder(s) outcome and the measures used; and results. **Results:** Sixty-two, high-quality studies were included in the review. Forty-one potential predictors were identified. Of these, only volunteer status and previous history of mental illness and life stressors emerged as reliable predictors of distress or disorder. **Conclusion:** The results suggest that whilst it is attractive to screen for pre-employment and pre-deployment indicators of resilience, the evidence base for doing so is weak. At best, this sort of screening can only weakly suggest vulnerability and at worst may result in discrimination. Until better evidence about its usefulness becomes available, employers should exercise caution over its use.

**Opie et al. 2020.**

**BMC Psychiatry, vol. 20, no. 1.**

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**Keywords:** Disaster relief workers; predictors; psychological disorder; psychological distress; resilience factors.

**Evidence Level:** 1A

**Link:** <https://bmcp psychiatry.biomedcentral.com/articles/10.1186/s12888-020-02593-1>

## Ergonomics

### **Wearable stretch sensors for human movement monitoring and fall detection in ergonomics**

Wearable sensors are beneficial for continuous health monitoring, movement analysis, rehabilitation, evaluation of human performance, and for fall detection. Wearable stretch sensors are increasingly being used for human movement monitoring. Additionally, falls are one of the leading causes of both fatal and nonfatal injuries in the workplace. The use of wearable technology in the workplace could be a successful solution for human movement monitoring and fall detection, especially for high fall-risk occupations. This paper provides an in-depth review of different wearable stretch sensors and summarizes the need for wearable technology in the field of ergonomics and the current wearable devices used for fall detection. Additionally, the paper proposes the use of soft-robotic-stretch (SRS) sensors for human movement monitoring and fall detection. This paper also recapitulates the findings of a series of five published manuscripts from ongoing research that are published as Parts I to V of "Closing the Wearable Gap" journal articles that discuss the design and development of a foot and ankle wearable device using SRS sensors that can be used for fall detection. The use of SRS sensors in fall detection, its current limitations, and challenges for adoption in human factors and ergonomics are also discussed.

**Chander et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Fall prevention; human factors; motion analysis; occupational falls.; wearable devices.

**Evidence Level:** 6A

**Link:** <https://www.mdpi.com/1660-4601/17/10/3554>

## Chronic Health Issues

### **Influence of changing working conditions on exit from paid employment among workers with a chronic disease**

**Objectives:** To investigate the relation between changes in working conditions and exit from paid employment among workers with a chronic disease. **Methods:** Six waves from the longitudinal Study on Transitions in Employment, Ability and Motivation (2010-2016), enriched with tax-based employment information from Statistics Netherlands (2011-2017), were available for 4820 chronically ill workers aged 45-63 years (mean 55.3 years, SD 5.1). A change in working conditions (physical workload, psychological job demands, job autonomy, emotional job demands and social support) was defined as an increase or decrease between two consecutive waves of at least one SD. Discrete-time survival models with repeated measurements were used to estimate the relative risk (RR) of a change in working conditions on exiting paid employment in the following year compared with no change and consecutive favourable working conditions. **Results:** A favourable change in physical workload lowered the risk to exit paid employment (RR 0.46, 95% CI 0.22 to 0.94). An adverse change in psychosocial working conditions, especially a decrease in social support (RR 2.07, 95% CI 1.52 to 2.81), increased the likelihood to exit paid employment. In contrast, a favourable change in psychological job demands increased the risk to exit paid employment (RR 1.57, 95% CI 1.09 to 2.24). Multiple adverse changes increased the risk to exit paid employment up to six times (RR 6.06, 95% CI 2.83 to 12.98). **Conclusions:** Changes in working conditions among workers with chronic diseases influence exit from paid employment. Ensuring that working conditions can be adapted to the needs of workers with a chronic disease may help to extend working life.

**Schram et al. 2020.**



## **Occupational and Environmental Medicine.**

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**Keywords:** Occupational health practice; physical work; workload.

**Evidence Level:** 4B

**Link:** <https://oem.bmj.com/content/early/2020/05/21/oemed-2019-106383.long>

## **Occupational Exposure**

### **Assessment of occupational exposure to stainless steel welding fumes - A human biomonitoring study**

The aim of the study was to determine the concentration of hexavalent and trivalent chromium, nickel, manganese, and iron in welding fumes (WFs) and to evaluate the significant association between the concentration of metals in the biological material of welders. The studies were conducted in welders (n = 67) and controls (n = 52). Stainless steel WFs were continuously collected in the workers' breathing zone during a shift. The serum and urine concentrations of Cr and Ni were determined by ICP-MS. The content of Mn in the whole blood was determined using ET-AAS. The content of Cr in the erythrocytes was determined using ICP-MS. The Cr concentration in the welders' urine positively correlated with a work environment concentration of Cr (R = 0.59, p < 0.0001), Cr(VI) (R = 0.58, p < 0.0001), and Cr(III) (R = 0.64, p < 0.0001) in the inhalable fraction. The Ni concentration in the welders' urine positively correlated with the Ni concentration in the inhalable and respirable fraction (R = 0.34, p < 0.005 and R = 0.44, p < 0.002). The correlation between the Mn concentration in the work environment air and the Mn concentration in the welders' whole blood (R = 0.46, p < 0.0001) was observed.

**Stanislawska et al. 2020.**

**Toxicology Letters, vol. 329.**

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**Keywords:** Biomonitoring; hexavalent chromium; manganese; nickel; stainless steel; trivalent chromium; welding.

**Evidence Level:** 5a

**Link:** <https://www.sciencedirect.com/science/article/pii/S0378427420301284?via%3Dihub>

### **Risk of kidney injury among construction workers exposed to heat stress: A longitudinal study from Saudi Arabia**

Saudi Arabia (SA) is one of the hottest countries in the world. This study was conducted to assess the impact of summer heat stress in Southeastern SA on short-term kidney injury (KI) among building construction workers and to identify relevant risk factors. Measurements of urinary albumin-creatinine ratio (ACR), height, weight, hydration, symptoms, daily work and behavioral factors were collected in June and September of 2016 from a cohort of construction workers (n = 65) in Al-Ahsa Province, SA. KI was defined as ACR ≥30 mg/g. Multivariate linear regression analysis was used to assess factors related to cross-summer changes in ACR. A significant increase in ACR occurred among most workers over the study period; incidence of KI was 18%. Risk factors associated with an increased ACR included dehydration, short sleep, and obesity. The findings suggest that exposure to summer heat may lead to the development of KI among construction workers in this region. Adequate hydration and promotion of healthy habits among workers may help reduce the risk of KI. A reduction in work hours may be the most effective intervention because this action can reduce heat exposure and improve sleep quality.

**Al-Bouwarthan et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 11.**

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**Keywords:** Albuminuria; climate change; construction workers; dehydration; heat stress; kidney injury; long working hours; sleep; urine color.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/17/11/3775>

### **Occupational exposure to *Brucella* spp.: A systematic review and meta-analysis**

Brucellosis is a neglected zoonotic disease of remarkable importance worldwide. The focus of this systematic review was to investigate occupational brucellosis and to identify the main infection risks for each group exposed to the pathogen. Seven databases were used to identify papers related to occupational brucellosis: CABI, Cochrane, Pubmed, Scielo, Science Direct, Scopus and Web of Science. The search resulted in 6123 studies, of which 63 were selected using the quality assessment tools guided from National Institutes of Health (NIH) and Case Report Guidelines (CARE). Five different job-related groups were considered greatly exposed to the disease: rural workers, abattoir workers, veterinarians and veterinary assistants, laboratory workers and hunters. The main risk factors and exposure sources involved in the occupational infection observed from the analysis of the articles were direct contact with animal fluids, failure to comply with the use of personal protective equipment, accidental exposure to live attenuated anti-brucellosis vaccines and non-compliance with biosafety standards. *Brucella* species frequently isolated from job-related infection were *Brucella melitensis*, *Brucella abortus*, *Brucella suis* and *Brucella canis*. In addition, a meta-analysis was performed using the case-control studies and demonstrated that animal breeders, laboratory workers and abattoir workers have 3.47 [95% confidence interval (CI); 1.47-8.19] times more chance to become infected with *Brucella* spp. than others individuals that have no contact with the possible sources of infection. This systematic review improved the understanding of the epidemiology of brucellosis as an occupational disease. Rural workers, abattoir workers, veterinarians, laboratory workers and hunters were the groups more exposed to occupational *Brucella* spp. infection. Moreover, it was observed that the lack of knowledge about brucellosis among frequently exposed professionals, in addition to some behaviors, such as negligence in the use of individual and collective protective measures, increases the probability of infection.

**Periera et al. 2020.**

**PLoS neglected tropical diseases, vol. 14, no. 5.**

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**Keywords:** *Brucella* Spp; Brucellosis; occupational exposure.

**Evidence Level:** 1A

**Link:** <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0008164>

### **Occupational noise exposure and its association with incident hyperglycaemia: a retrospective cohort study**

Noise pollution is reported to be associated with diabetes, but few studies have elucidated the associations between noise frequency characteristics. We aimed to evaluate the relationships between different noise frequency components and incident hyperglycaemia. An industry-based cohort of 905 volunteers was enrolled and followed up to 2012. Octave-band frequencies of workstation noise and individual noise levels were measured in 2012 to classify subjects' exposures retrospectively. We applied Cox regression models to estimate the relative risk (RR) of hyperglycaemia. An increased RR for hyperglycaemia of 1.80 (95% confidence interval [CI]: 1.04, 3.10) was found among subjects exposed to  $\geq 85$  A-weighted decibels (dBA) compared with those exposed to  $< 70$  dBA. The high-exposure groups at frequencies of 31.5, 63, 125, 250, 500, 1000, and 2000 Hz had a significantly higher risk of hyperglycaemia (all p values  $< 0.050$ ) than the low-exposure groups. A 5-dB increase in noise frequencies at 31.5, 63, 125, 250, 500 Hz, and 1000 Hz was associated with an elevated risk of hyperglycaemia (all p values  $< 0.050$ ), with the highest value of 1.27 (95% CI: 1.10, 1.47) at 31.5 Hz (p = 0.001). Occupational noise exposure may be associated with an increased incidence of hyperglycaemia, with the highest risk observed at 31.5 Hz.

**Chang et al. 2020.**

**Scientific Reports, vol. 10, no. 1.**

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**Keywords:** Occupational noise; occupational exposure; incident hyperglycaemia

**Evidence Level:**

**Link:** <https://www.nature.com/articles/s41598-020-65646-1>

### **Increased risk of gastric cancer in workers with occupational dust exposure**

**Background/aims:** Workers who are exposed to dust in the workplace tend to show a higher incidence of gastric cancer. Nevertheless, scientific evidence to support an association between dust exposure and the

risk of gastric cancer is inadequate. This study aimed to investigate whether or not occupational dust exposure influences the risk of gastric cancer. **Methods:** We collected the electronic data from the Pneumoconiosis Health Examination (PHE) program, provided by the Ministry of Employment and Labor and the Korea Workers' Compensation and Welfare Service from 2002 to 2017. The PHE database was linked to the National Health Insurances databases. The age-standardized incidence ratio (SIR) and 95% confidence intervals (CIs) of the risk of gastric cancers were evaluated in workers with occupational dust exposure, and the results were compared to those in the general population. **Results:** From 2004 to 2015, 1,543 cases of gastric cancer were observed in the male participants, as compared with 1,174 of expected cases, which yielded an SIR of 1.314 (95% CI, 1.249 to 1.380). Under dust exposure, the risk of gastric cancer was increased 23.9% in the male participants (95% CI, 19.9 to 27.5), and the degree of impairment of lung function was inversely related to the risk of gastric cancer. **Conclusions:** Workers with occupational dust exposure were at higher risk of developing gastric cancer than the general population. Thus, future efforts for the prevention of gastric cancer are necessary for dust exposed workers.

**Kang et al. 2020.**

**Korean Journal of Internal Medicine.**

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**Keywords:** Incidence; occupation dust; stomach neoplasms.

**Evidence Level:** 5A

**Link:** <http://kjim.org/journal/view.php?doi=10.3904/kjim.2019.421>

## Sedentary Practices

### **Occupational, transport, leisure-time, and overall sedentary behaviors and their associations with the risk of cardiovascular disease among high-tech company employees**

This study examined the associations of overall and domain-specific (i.e., occupational, transport, and leisure-time) sedentary behaviors with cardiovascular disease (CVD) risk factors among high-tech company employees in Taiwan. A total of 363 participants employed at high-tech companies (mean age  $\pm$  standard deviation: 37.4  $\pm$  7.2 years) completed a questionnaire administered by email regarding their overall, occupational, transport, and leisure-time sedentary behaviors. Self-reported data of height and weight, blood pressure, blood sugar, and total cholesterol levels were also collected in 2018. An adjusted binary logistic regression model was employed in the analysis. After adjusting for sociodemographic variables, high-tech company employees who used a computer (or Internet) for more than 2 h per day during their leisure time were more likely to have CVD risk factors (odds ratio: 1.80; 95% confidence interval: 1.08-3.00). No significant associations with CVD risk factors were detected for total sedentary time, occupational sitting, television viewing time, and transport-related sitting. Despite the nature of cross-sectional design in this study, our findings may have considerable implications for intervention designers and policymakers of Taiwan. Developing effective strategies for limiting leisure-time computer use should be considered for the prevention of CVD among high-tech company employees.

**Liu et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Cardiovascular disease; high-tech company; occupational health; sedentary.

**Evidence Level:** 4A

**Link:** <https://www.mdpi.com/1660-4601/17/10/3353>

### **Reducing sitting at work: process evaluation of the SMARt Work (Stand More At Work) intervention**

**Background:** Office-based workers accumulate high amounts of sitting time. Stand More At Work (SMARt Work) aimed to reduce occupational sitting time and a cluster randomised controlled trial demonstrated it was successful in achieving this aim. The purpose of this paper is to present the process evaluation of the SMARt Work intervention. **Methods:** Questionnaire data were collected from intervention participants at 6 months (n = 58) and 12 months (n = 55). Questionnaires sought feedback on the different components of the intervention (education, height-adjustable desk, Darma cushion, behaviour feedback, progress chats

(coaching) with research team, action planning/goal setting diary) and experiences of evaluation measures. Control participants (n = 37) were asked via questionnaire at 12-month follow-up about the impact of the study on their behaviour and any lifestyle changes made during the study. Participants from both arms were invited to focus groups to gain a deeper understanding of their experiences on completion of 12-month follow-up. **Results:** Focus group and questionnaire data showed a positive attitude towards the height-adjustable workstation with a high proportion of participants using it every day (62%). Most participants (92%) felt the education seminar increased their awareness of the health consequences of too much sitting and motivated them to change their behaviour. Receiving feedback on their sitting time and support from the research team also encouraged behaviour change. The Darma cushion and action planning/goal setting diary were seen to be less helpful for behaviour change. Benefits experienced included fewer aches and pains, improved cognitive functioning, increased productivity, more energy and positive feelings about general health. **Conclusions:** Key elements of the programme identified as facilitating behaviour change were the educational seminar, the height-adjustable workstation, behavioural feedback and regular contact with research staff through regular progress chats.

**Biddle et al. 2020.**

**Trials, vol. 21, no. 1.**

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**Keywords:** Behaviour change; sedentary behaviour; sit-stand; workplace.

**Evidence Level:** 5A

**Link:** <https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-020-04300-7>

### **Accelerometer-measured diurnal patterns of sedentary behavior among Japanese workers: A descriptive epidemiological study**

Increased sedentary behavior (SB) can adversely affect health. Understanding time-dependent patterns of SB and its correlates can inform targeted approaches for prevention. This study examined diurnal patterns of SB and its sociodemographic associations among Japanese workers. The proportion of sedentary time (% of wear time) and the number of breaks in SB (times/sedentary hour) of 405 workers (aged 40-64 years) were assessed using an accelerometer. SB patterns and sociodemographic associations between each time period (morning, afternoon, evening) on workdays and nonworkdays were examined in a series of multivariate regression analyses, adjusting for other sociodemographic associations. On both workdays and nonworkdays, the proportion of sedentary time was lowest in the morning and increased towards evening (b = 12.95, 95% CI: 11.28 to 14.62; b = 14.31, 95% CI: 12.73 to 15.88), with opposite trend for breaks. Being male was consistently correlated with SB. Other sociodemographic correlates differed depending on time-of-day and day-of-the-week. For instance, desk-based workstyles and urban residential area were associated with SB during workday mornings and afternoons, being single was related to mornings and evenings, workdays and nonworkdays. Initiatives to address SB should focus not only on work-related but time-of-day contexts, especially for at-risk subgroups during each period.

**Kurosawa et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 11.**

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**Keywords:** Accelerometer; daily patterns; sitting time; sociodemographic correlates.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/17/11/3814>

## **Physical Activity**

### **A persuasive mHealth behavioral change intervention for promoting physical activity in the workplace: feasibility randomized controlled trial**

**Background:** Employees in an office setting are more likely to remain physically inactive. Physical inactivity has become one of the major barriers to overcoming the risk factors for anxiety, depression, coronary heart disease, certain cancers, and type 2 diabetes. Currently, there is a gap in mobile health (mHealth) apps to promote physical activity (PA) for workers in the workplace. Studies on behavior change theories have concluded that health apps generally lack the use of theoretical constructs. **Objective:** The objective of this

study was to study the feasibility of a persuasive app aimed at encouraging PA among employees and to understand the motivational aspects behind the implementation of mHealth apps among office workers. **Methods:** A 4-week study using a mixed methods (quantitative and qualitative) design was conducted with office-based employees in cities in 4 countries: Oulu, Finland; Carlow, Ireland; London, United Kingdom; and Dhaka, Bangladesh. Of the 220 invited participants (experimental group, n=115; control group, n=105), 84 participated (experimental group, n=56; control group, n=28), consisting of working-age volunteers working in an office setting. Participants used 2 different interventions: The experimental group used an mHealth app for PA motivation, and the control group used a paper diary. The purpose was to motivate employees to engage in healthier behavior regarding the promotion of PA in the workplace. A user-centered design process was followed to design, develop, and evaluate the mHealth app, incorporating self-determination theory (SDT) and using game elements. The paper diary had no specific theory-driven approach, design technique, nor game elements. **Results:** Compliance with app usage remained relatively low, with 27 participants (experimental group, n=20; control group, n=7) completing the study. The results support the original hypothesis that the mHealth app would help increase PA (ie, promoting daily walking in the workplace) in comparison to a paper diary (P=.033). The mHealth app supported 2 of the basic SDT psychological needs, namely autonomy (P=.004) and competence (P=.014), but not the needs of relatedness (P=.535). **Conclusions:** The SDT-based mHealth application motivated employees to increase their PA in the workplace. However, compliance with app usage remained low. Future research should further develop the app based on user feedback and test it in a larger sample.

**Haque et al. 2020.**

**JMIR Formative Research, vol. 4, no. 5.**

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**Keywords:** SDT; UCD; game elements; mHealth behavioral change intervention; persuasive app; physical activity.

**Evidence Level:** 2B

**Link:** <https://formative.jmir.org/2020/5/e15083/>

## Musculoskeletal Health

### **Musculoskeletal symptoms among stone, sand and gravel mine workers and associations with sociodemographic and job-related factors**

Stone, sand and gravel mining (SSGM) constitutes the vast majority of mining operations in the United States. Despite musculoskeletal disorders being one of the most common occupational health problems across several industries, limited research has examined the extent of reported musculoskeletal symptoms or disorders among actively employed SSGM workers. To address this knowledge gap, cross sectional data were collected from 459 SSGM workers in the Midwestern United States to determine the prevalence of musculoskeletal symptoms. Sociodemographic and job-related factors were examined to identify possible risk factors in SSGM. Musculoskeletal symptoms of the low back (57%), neck (38%), shoulder (38%) and knee (39%) were highly prevalent among SSGM employees. The results, among other findings, showed that working more than 60 h a week increased the likelihood of musculoskeletal symptoms at the low back (OR: 4.7 95% CI: 1.9-11.5), neck (OR: 5.1, 95% CI: 2.2-11.8) and knee (OR: 4.5, 95% CI: 2.0-10.3). Working as a mechanic/maintenance worker increased the likelihood of low back (OR: 2.1, 95% CI: 1.1-4.2) and knee (OR: 2.2, 95% CI: 1.1-4.6) musculoskeletal symptoms. Intervention measures aimed at improving ergonomic hazard identification for various job tasks as well as administrative controls limiting hours worked may help reduce the burden of musculoskeletal problems in the SSGM industry.

**Balogun et al. 2020.**

**International Journal of Environmental Research and Public Health, vol. 17, no. 10.**

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**Keywords:** Ergonomics; job demands; mining; musculoskeletal disorders; musculoskeletal symptoms.

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/17/10/3512>

## Covid 19

### **Flexible employment relationships and careers in times of the COVID-19 pandemic**

The COVID-19 pandemic represents a crisis that affects several aspects of people's lives around the globe. Most of the affected countries took several measures, like lockdowns, business shutdowns, hygiene regulations, social distancing, school and university closings, or mobility tracking as a means of slowing down the distribution of COVID-19. These measures are expected to show short-term and long-term effects on people's working lives. However, most media reports focused on the effects of the COVID-19 pandemic on changes in work arrangements (e.g., short-time work, flexible location and hours) for workers in a regular employment relationship. We here focus on workers in flexible employment relationships (e.g. temporary agency work and other forms of subcontracted labor, as well as new forms of working, such as in the gig economy). Specifically, we will discuss (a) how the work and careers of individuals in flexible employment relationships might get affected by the COVID-19 pandemic; (b) outline ideas how to examine period effects of the COVID-19 pandemic on the work and careers of those individuals, and (c) outline how the pandemic can contribute to the ramification of flexible employment relationships.

**Spurk et al. 2020.**

**Journal of Vocational Behavior, vol. 119.**

**Keywords:** COVID-19; careers; change; crisis; flexible work arrangements; gig work; period effect.

**Evidence Level:** 6A

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7204672/>

### **Examining boundaries to understand the impact of COVID-19 on vocational behaviors**

The COVID-19 has posed an unprecedented challenge to the global workforce. To better understand the impact of the pandemic on work and careers, I call for research taking a closer look at the boundaries in the career context. Specifically, both the micro (boundaries that demarcate role domains) and macro (national borders) boundaries should be considered. The pandemic changes the existing boundaries and challenges the "usual" practices; while it blurs the micro, cross-domain boundaries, it strengthens the macro, cross-country boundaries. I propose that the changes in the micro and macro boundaries are one of the important mechanisms in how COVID-19 affects many individuals' vocational behaviors and career outcomes. In this essay, I explain why we should pay more attention to the boundaries to learn about the impact of COVID-19 on vocational and career behaviors. I conclude with a discussion of several directions for future research.

**Cho et al. 2020.**

**Journal of Vocational Behavior, vol. 119.**

**Keywords:** Border control; pandemic; remote work; travel restrictions; working-from-home.

**Evidence Level:** 6A

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7205716/>

### **The potential impact of the Covid-19 pandemic on occupational status, work from home, and occupational mobility**

The economic and social shock presented by the Covid-19 pandemic is likely to reshape perceptions of individuals and organizations about work and occupations and result in both micro and macro shifts in the world of work. In this essay we focus on three occupationally-related domains that may be impacted by the pandemic. First, perceptions of the value and status of different occupations may change, resulting in both changes of occupational supply and demand (macro changes) and changes in the perceived calling and meaningfulness of different occupations (micro changes). Second, the great "work from home experiment" may change occupational perspectives on working from home. Organizations and researchers may be able to better understand which occupational and individual characteristics are associated with work-from-home effectiveness and better designate occupational groups and individuals to working (or not working) from home. Third, we discuss the increased segmentation of the labor market which allocate workers to "good jobs" and "bad jobs" and the contribution of occupational segmentation to inequality.

**Kramer et al. 2020.**

**Journal of Vocational Behavior.**

**Keywords:** COVID-19; occupational status; work from home; occupational mobility.

**Evidence Level:** 6A

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7205621/>

**Work-related COVID-19 transmission in six Asian countries/areas: A follow-up study**

**Objective:** There is limited evidence of work-related transmission in the emerging coronaviral pandemic. We aimed to identify high-risk occupations for early coronavirus disease 2019 (COVID-19) local transmission. **Methods:** In this observational study, we extracted confirmed COVID-19 cases from governmental investigation reports in Hong Kong, Japan, Singapore, Taiwan, Thailand, and Vietnam. We followed each country/area for 40 days after its first locally transmitted case, and excluded all imported cases. We defined a possible work-related case as a worker with evidence of close contact with another confirmed case due to work, or an unknown contact history but likely to be infected in the working environment (e.g. an airport taxi driver). We calculated the case number for each occupation, and illustrated the temporal distribution of all possible work-related cases and healthcare worker (HCW) cases. The temporal distribution was further defined as early outbreak (the earliest 10 days of the following period) and late outbreak (11th to 40th days of the following period). **Results:** We identified 103 possible work-related cases (14.9%) among a total of 690 local transmissions. The five occupation groups with the most cases were healthcare workers (HCWs) (22%), drivers and transport workers (18%), services and sales workers (18%), cleaning and domestic workers (9%) and public safety workers (7%). Possible work-related transmission played a substantial role in early outbreak (47.7% of early cases). Occupations at risk varied from early outbreak (predominantly services and sales workers, drivers, construction laborers, and religious professionals) to late outbreak (predominantly HCWs, drivers, cleaning and domestic workers, police officers, and religious professionals). **Conclusions:** Work-related transmission is considerable in early COVID-19 outbreaks, and the elevated risk of infection was not limited to HCW. Implementing preventive/surveillance strategies for high-risk working populations is warranted.

**Lan et al. 2020.**

**PLoS One, vol. 15, no. 5.**

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**Keywords:** COVID-19; work-related transmission; occupations; risk.

**Evidence Level:** 5B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233588>