



ANZSOM

The Australian and New Zealand
Society of Occupational Medicine Inc

**GOOD WORK
SAFE WORKPLACES
HEALTHY WORKERS**

Occupational Health: ADDING VALUE

March 2022

Occupational health services enhance employee health,
workforce productivity, business performance and the economy

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Disclaimer

This report summarises the best available evidence at the time of writing; it does not constitute professional advice. Before relying on the material, users should make their own assessment as to its relevance for their purposes; and obtain appropriate competent professional advice relevant to their particular circumstance and legal and regulatory requirements.

Review

This report is subject to ongoing critique and review and will be formally reviewed in 2025.

Executive summary

This report highlights the importance and value of occupational health to workers, employers, insurers, governments, and the general population.

The last few years' legislative agenda has served to strengthen existing legislation and propose new workplace health and safety laws to minimise the adverse effects of work and workplaces on health. However, there is also a wider agenda – to promote health via work and workplaces, and to contribute to improved health outcomes for the general population. The value of occupational health services has also been brought into sharp focus by the recent pandemic, during which occupational health professionals have been able to provide specialist advice to employers, workers and governments.

This report describes the key elements of occupational health, including the types of health professionals and their roles, and analyses the evidence from the scientific and wider literature to demonstrate that there is a rounded business case for investment in occupational health services, based on wide-ranging and sometimes intangible factors.

Well-integrated, evidence-based workplace health initiatives are associated with improved employee health status and productivity in the workplace. Research suggests that investments in occupational health add value through reduced costs, associated with the prevention of ill health, improved productivity and a variety of other benefits. The business case for occupational health should reflect the three key factors that motivate employers to provide access to occupational health services:

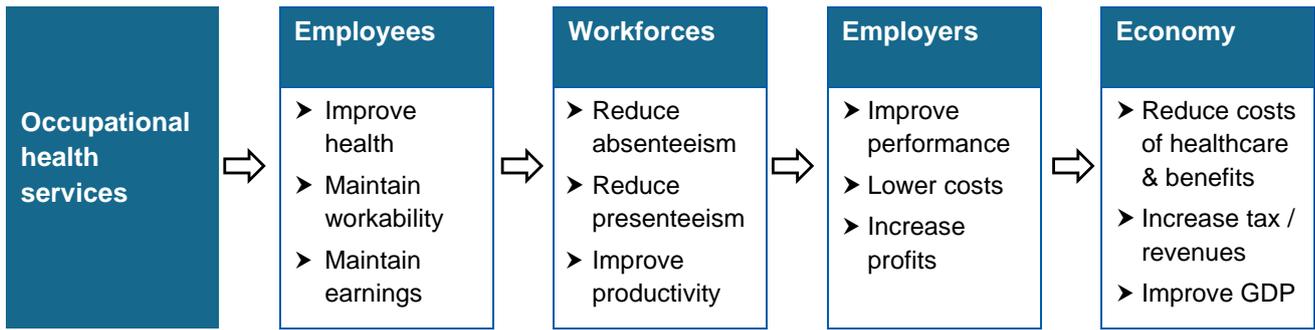
- Legal – to comply with health and safety laws and regulations
- Moral – it is the right / ethical / socially responsible thing to do
- Financial – to reduce costs or add value to the business

Occupational health professionals have unique training and expertise to understand the relationships between health and work and how to help injured, ill, disabled or ageing workers to remain productive and to remain at work. These uniquely competent professionals provide health services for employees and professional support to management.

Occupational health professionals help employers deliver a healthy workplace culture and properly organised and healthy work. This, along with managing employee health, contributes to the organisation's success. Providing access to occupational health also helps employers to demonstrate that they are caring and socially responsible; this can help to protect and enhance corporate image with customers, employees, investors, regulators and shareholders. Good employee health and wellbeing contributes to business performance, can enhance employee engagement and reduce avoidable business costs due to sickness absence and lost productivity. The evidence reveals that highly effective companies commit to a culture of health; good workplaces, employee engagement, wellbeing and productivity being inter-dependent of one another.

Work-related ill health and health problems related to unhealthy lifestyles are a significant burden for individuals, employers and the national economy. Therefore, protecting and promoting employee health is in the interests of individual workers, employers and the State. The health programs required will depend on the nature of the work and risks involved; off-the-shelf, one-size-fits-all solutions are best avoided. Bespoke services should be provided following suitable and sufficient needs and risk assessments to design, develop and deliver occupational health services that provide safe, quality care that are both effective and cost-effective. Several occupational health interventions have been shown to have short payback periods; such services delivering significant tangible and intangible benefits at several levels (Fig 1).

Figure 1: Key benefits provided by occupational health services



A Case Study

During June 2020, there was a second wave of COVID-19 cases developing in Victoria, Australia. This occurred from leakages of infection from the hotel quarantine program, with a maximal daily case count of 725. This wave was driven by both workplace and community transmission.

The Victorian Department of Health had one onsite occupational physician, who had been employed to provide advice to industry on how to open safely after the first COVID-19 wave in early 2020. Soon, this occupational physician was overwhelmed providing advice to the various public health teams. They were then tasked with building an occupational physician service quickly to meet this demand - within a fortnight another twenty occupational physician joined the Department of Health COVID-19 response team. The services provided by this team included:

- *Supporting the public health teams when managing outbreaks*
- *Undertaking risk assessment at worksites which had confirmed cases, to determine the number of close contacts and if the site needed to shut*
- *Supporting companies that were forced to shut due to onsite COVID-19 cases, and educating them how to re-open whilst taking a risk management approach*
- *Doing onsite visits of workplaces and sensitive settings as part of a risk assessment process*
- *Working with industry groups to assist to mitigate the risk of shutdowns*
- *Providing advice on how to undertake deep cleans, and the use of appropriate chemicals*
- *Providing advice to support major events to restart, whilst complying with COVID safe processes*

This involvement contributed to the success of various teams at the Department of Health, and the second wave was extinguished.

The Department of Health occupational physician team now provides these services on an ongoing basis.

1. Introduction

Key points

- Longer working lives increases the need for access to occupational health services
- A range of social, political, economic, technological and environmental factors create new and as yet unclear risks to employee health and wellbeing
- The COVID-19 pandemic has demonstrated employers' vulnerability to employee illness
- At the same time, many workers have no access to quality occupational health services and service providers have difficulty recruiting competent clinicians
- Measures should be taken to improve worker access to quality occupational health services
- Stakeholders should look beyond cost and assess the broad value of occupational health services

For several reasons, there has never been a greater need to make the business case for occupational health:

- Ageing workforces
- Emerging patterns of non-standard and precarious work
- Remote work, and changing patterns of work
- Emerging public health risks, including disease pandemics
- Lack of universal access by workers to quality occupational health services
- The prevalence and costs to business of sickness absence and occupational illnesses

Ageing workforces

The ageing of workforces is attributable to low birth rates and the increase in state pension ages. Ageing of the working population is associated with an increase in the prevalence of long-term health conditions and, as workers get older, they are more likely to have multiple long-term health conditions¹. Meanwhile, technical advances in healthcare have led to increased healthcare costs and health insurance premiums; costs which may be borne by employers in some countries.

In Australia, many of us plan to work longer and the majority expect to retire between 66-70 years of age (39.6%). The number expecting to retire between 71-75 years of age has also grown. This means that the number of older workers in our organisations is increasing, with one third of respondents saying at least half of their workforce is made up of workers above 55 years old².

New Zealand has among the highest rates of employees aged over 55 years of all OECD countries, which is expected to rise further in the coming years. Among OECD countries, New Zealand recorded the second highest employment rate of people aged 55-64 years in 2012 and 2013, and third highest of people aged 65-69 years in 2012³. In June 2014, 22% of workers in New Zealand were aged 55 years or over³. Government figures predict that this proportion will rise to 25% by 2020, with many likely to remain working beyond 65 years. Indeed, the proportion of the labour force aged 65 or over (currently 5%) is expected to increase to 13% by 2036³.

Emerging patterns of non-standard and precarious work

Fragmentation of the workforce is attributable to an increase in job contracts that differ from the traditional relationship of permanent, full-time and secure employment. The trend is for more 'gig work' that is either casual, seasonal, part-time, or is performed on fixed-term, temporary, self-employed or agency contracts⁴. Such work arrangements offer flexibility to employers and workers alike; however, workers have less formal or less effective protection such as access to occupational health support^{5,6}; concurrently, these precarious jobs are significantly associated with job stress⁷.

Remote work

Remote working is a challenge for employers and employees⁸; especially following the COVID-19 pandemic as home or hybrid working has become the new norm. Many high-profile internet companies have stated their intention to permit employees to work from home indefinitely⁵. Working from home blurs the boundary between home and work; employees often like the increased flexibility but it can create an 'always-on' work culture⁹. There is a lack of high-quality scientific studies examining the effects of telework on health⁷. Within the grey literature, a European survey reported that more than 20% of teleworkers reported working during their free time, compared with 6% of those who worked only at their employer's premises⁵. In another survey the biggest challenges were inability to switch-off outside of work hours (87%); prolonged sitting/looking at a screen (58%) and poor sleep quality (42%)¹⁰.

Emerging public health risks

The COVID-19 pandemic should prompt governments and employers to be better prepared for the next emerging health risks and/or risks of disaster and to build into their resilience plans measures to protect and promote employee health. Sectors that employed workers in high people contact roles were particularly affected by the COVID-19 pandemic⁵; in Australia and New Zealand, decimating the hospitality industry. There is opportunity to learn from the pandemic; however, so far, studies evaluating the impact of COVID-19 policies have not been of sufficient rigour to constitute policy-actionable evidence¹¹. Among employers worldwide, the combination of a pandemic and a rapidly changing economy has elevated the importance of employee wellbeing¹². Climate change is another public health risk and greening of the economy will bring about significant changes to the world of work¹³.

Occupational health services

There is a drought of access to dedicated occupational health services in Australasia. The exact proportion of workers able to access occupational health services is unclear from available research, but specialist occupational physicians number in the low hundreds; compared to over 100,000 medical practitioners in Australia¹⁴. In New Zealand, there are around 65 occupational physicians amongst 30,000 doctors nationally¹⁵. Most occupational health services are run on a private basis: out of the reach of small and medium-sized enterprises.

Occupational health services are cost-effective if there is an effective skills mix; people work to their distinctive competencies and perform work that is evidence-based and adds value. That said, employers should look beyond cost to assess value and look upon occupational health services as an investment to be leveraged rather than a cost to be justified¹⁶.

Recent research indicates that increasingly occupational health professionals are having to prove their value to customers and make the business case for their services^{17,18}. In the USA, about two-thirds of occupational health nurses have been asked to demonstrate value or justify a service; while more than three-quarters perceived the need regardless of whether they had been asked¹⁸. In the UK, occupational health professionals surveyed consider cost benefit analyses of their services to be a very important area for future research¹⁸.

SafeWork Australia's *Business case for Safe Healthy and Productive Work* notes that “work health and safety implications of many operating and financing decisions are often overlooked because critical interdependencies between ‘safe and healthy work’ and the four P’s of planning, procurement, production and performance (including productivity) are poorly understood”¹⁹.

References

1. Barnett K, Mercer SW, Norbury M, et al. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet* 2012; 380: 37-43.
2. Australian Human Resources Institute. *Employing and retaining older workers*. Australian Human Resources Institute. April 2021. Available from: <https://humanrights.gov.au/our-work/age-discrimination/publications/employing-and-retaining-older-workers-2021>.
3. New Zealand Work Research Institute. *Understanding the needs of New Zealand's ageing workforce*. New Zealand Work Research Institute. August 2015. Available from: https://workresearch.aut.ac.nz/__data/assets/pdf_file/0005/378932/2015-Understanding-Ageing-Workforce-report,-FOW.pdf.
4. European Observatory for Working Life. *Fragmentation of the labour force*. Dublin. European Foundation for the Improvement of Living and Working Conditions. 2017.
5. Eurofound. *Living and working in Europe 2020*. Luxembourg. Publications Office of the European Union. 2021.
6. Felknor SA, Streit JMK, Chosewood LC, et al. How will the future of work shape the OSH professional of the future? A workshop summary. *Int J Environ Res Public Health* 2020; 17: 7154.
7. Bhattacharya A, Ray T. Precarious work, job stress, and health-related quality of life. *Am J Ind Med* 2021; 64: 310-319.
8. Tindle A, Adams, L, Kearney I, et al. *Understanding the provision of occupational health and work-related musculoskeletal services*. London. Department for Work and Pensions. 2020.
9. Lunde LK, Fløvik L, Christensen JO, et al. The relationship between telework from home and employee health: a systematic review. *BMC Public Health* 2022; 22: 47.
10. Hampson E, Jacob A. *Mental health and employers. Refreshing the case for investment*. London. Deloitte. 2020.
11. Haber NA, Clarke-Deelder E, Feller A, et al. Problems with evidence assessment in COVID-19 health policy impact evaluation: a systematic review of study design and evidence strength. *BMJ Open* 2022; 12: e053820.
12. AON. *Working Well. 2021 Global Wellbeing Survey*. London. AON. 2021.
13. Institute for Work & Health. *Fragmentation in the future of work: Nine trends that may shape the future of work and what they mean for vulnerable workers*. Toronto. Institute for Work & Health. 2021.
14. Department of Health. Medical doctors and specialists in Australia. <https://www.health.gov.au/health-topics/doctors-and-specialists/in-australia>.
15. Medical Council of New Zealand. Register of doctors. <https://www.mcnz.org.nz/registration/register-of-doctors/>.
16. Special Committee on Health, Productivity, and Disability Management, American College of Occupational and Environmental Medicine. Healthy workforce/healthy economy: The role of health, productivity, and disability management in addressing the nation's health care crisis. Why an emphasis on the health of the workforce is vital to the health of the economy. *J Occup Environ Med*, 2009; 51: 114-9.
17. Mastroianni K. AAOHN member opinions on demonstrating value: a closer look at the findings. *Workplace Health Saf* 2018; 66: 241-251.
18. Lalloo D, Demou E, Smedley J, et al. Current research priorities for UK occupational physicians and occupational health researchers: a modified Delphi study. *Occup Environ Med* 2018; 75: 830-836.
19. Safe Work Australia, Safety Institute of Australia and CPA Australia. *The business case for safe, healthy and productive work. Implications for resource allocation: Procurement, Contracting and infrastructure decisions*. Macquarie Lighthouse Press. November 2014. Available from: <https://www.safeworkaustralia.gov.au/system/files/documents/1702/business-case-for-safe-healthy-productive-work.docx>.

2. Work, health, productivity, and wellbeing

Key points

- Sickness absence and presenteeism are significant burdens for organisations and society
- Occupational illnesses significantly exceed occupational injuries in both number and cost to individuals, employers and society
- Employee health and wellbeing contributes to successful business performance
- Highly effective companies commit to a culture of health
- Wellbeing strategies must extend beyond health to encompass the work environment, culture and interpersonal relationships
- Most employers surveyed believe that investment in occupational safety and health pays off
- The main benefit of occupational safety and health interventions is avoided sick leave
- Ergonomic interventions are the most profitable and have short payback periods of up to two years

The interaction between work and health

Trained occupational health professionals have expert knowledge regarding the interaction between work and health including:

- The effects of health on ability to work (safely); and
- The effects of work on health

The effects of health on work consider any health condition that an employee has or might develop, and which might affect their fitness for certain jobs either because of increased risk from exposure; or if they present a risk to others from performing safety critical work. Ill health may mean that a person's ability to work becomes impaired requiring workplace adjustments. People are more likely to develop at least one long-term health condition as they get older¹ and this can lead to sickness absenteeism and/or presenteeism (people attending work when they are not at their most productive).

The effects of work on health arise from employee exposures to biological, chemical, mechanical, physical and psychological hazards at work. These can lead to work-related ill health that can be:

- Caused wholly by work (occupational disease)
- Caused partly by work
- Aggravated by work (work-aggravated disease)

Some conditions such as stress are often multifactorial, where there may be coincidental stressors at home and at work. Conditions such as asthma can arise from exposure to a known cause of asthma at work; in others, non-specific exposures i.e., cold air might aggravate an employee's asthma. The investigation of a potential case of occupational disease requires the expertise of a competent occupational health specialist with input from other medical specialists such as chest physicians or dermatologists with expertise in occupational lungs and skin diseases respectively.

Work-related injury and illness in Australia and New Zealand

Australia

According to the Australian Bureau of Statistics Work-Related Injuries Survey, in 2017-18 more than 560,000 people had a work-related injury or disease regardless of whether any compensation claim was made¹.

- 39% did not require any time off work
- 6.4% took part of a day or shift off work
- 25% took 1-4 days off work
- 25% took 5 or more days off work
- The remaining 3.6% had not returned to work since the work-related injury or illness occurred

Of those who experienced a work-related injury or illness in 2017-18, the most frequently cited causes were 'lifting, pushing, pulling or bending' (an estimated 135,900 people), 'hitting or being hit or cut by an object or vehicle' (102,400 people), and 'slips or falls on the same level' (87,000 people). The injuries/illness occurred most commonly at the workplace (92%), followed by travelling on business (3.0%), on lunchtime or break activities (2.2%), and travelling to and from work (1.2%)².

Of the estimated 560,000 experiencing a work-related injury or illness in 2017-18, 53% (299,000) received some form of financial assistance. About two-thirds (67%) of employees with paid leave entitlements received financial assistance, compared with 29% of those without paid leave entitlements³. In total, of those who received financial assistance:

- 52% received workers' compensation
- 45% did not apply for workers' compensation
- 3% applied for but did not get workers' compensation

Serious claims are defined as those claims in which the injury or disease resulted in the employee taking five or more days off work but do not include compensated deaths. In 2017-2018, there were 107,335 serious claims for workers' compensation, which translated to 9.1% serious claims per 1,000 employees in Australia and 5.5 serious claims per million hours worked². Males accounted for 63% of all serious claims, and 58% of total hours worked. Among males, the highest incidence rate of claims occurred in the agriculture, forestry and fishing industry, at 18.3 serious claims per 1,000 employees. For female employees, the highest incidence rate of claims also occurred in the agriculture, forestry and fishing industry at 12.6 serious claims per 1,000 employees.

Of all occupation groups, labourers had the highest incidence rate of claim, at 24.1 serious claims per 1,000 employees. This was followed by machinery operators and drivers (20.3 claims per 1,000 employees), and community and personal service workers (14.1 claims per 1,000 employees). Labourers had the highest frequency rate and total number of serious claims overall.

For disease related claims, community and personal service workers had the highest frequency rate and total of number of serious claims. Sales workers, managers, and clerical and administrative workers had the lowest rate and total number of serious claims overall.

In 2017-18, 89% of serious claims were for injury and musculoskeletal disorders². The remaining serious claims were for diseases, including mental health conditions (7.5% of total serious claims), digestive system disease (1.9%) and nervous systems and sense organ disease (1.0%).

Overall, 41% of claims were for traumatic joint/ligament and muscle/tendon injury, followed by wounds, lacerations, amputations and internal organ damage (16%) and musculoskeletal and connective tissue diseases (14%). Fractures accounted for 11% of serious claims.

Labourers (25,055 serious claims) and community and personal service workers (16,560) serious claims accounted for the highest number of injuries and musculoskeletal disorders. Community and personal service workers (2,335) and professionals (2,245 serious claims) accounted for the highest number of disease-related serious claims.

New Zealand

In New Zealand each year there are around 100 injury claims per 100,000 full-time employees (This dropped to 89 in 2020 due to COVID-19 lockdowns).

With the Accident Compensation Corporation (ACC), if an employee has a work-related accident, the employer has to pay “first week compensation” equivalent to 80% of the employees’ earnings and cannot make the employee take the time as sick leave or as annual leave⁴.

The most claims were with the youngest (15- to 24-year-olds) and oldest (over 75-year-olds, but there are only a small proportion of workers in this age group)⁵.

Despite making up 16% of the population, only 12% of new claims are lodged by Māori and make up only 15% of weekly compensation costs. Māori experience more serious injuries, are less likely to be referred for some treatments and have poorer long-term outcomes⁶.

In 2019, there were 238,100 work-related injury claims made to the ACC (This dropped to 217,500 in 2020 due to COVID-19 lockdowns). Of those, 37,000 required entitlement payments for loss of earnings, lump sums, serious rehabilitation and death benefits. Most of these were musculoskeletal injuries.

Industries with the highest incidence of claims were trade workers, agriculture forestry and fishing⁷. Industries with the highest numbers of injuries resulting in more than a week away from work were manufacturing, construction, and health care and social assistance⁸.

The most common types of accidents resulting in more than a week away from work were musculoskeletal stress while lifting, carrying or putting down objects and falls⁷. There were 72 fatal claims in 2019 and 66 in 2020⁹.

In New Zealand, a worker is 15 times more likely to die from work-related disease than a workplace accident. This is because illness is often caused by long-term exposures to hazards rather than an acute injury¹⁰. Of the work-related deaths due to work related disease, 50 % are caused by cancers (lung, mesothelioma, breast). There are an estimated 5,000 to 6,000 hospitalizations and 750 to 90 deaths per year due to work related ill health¹¹. Of the work-related hospitalisations due to work related disease, 1/3 are caused by cancer and 2/3 are caused by lung and heart problems including asbestos related disease¹².

Health and productivity losses

Health problems among the working population have a significant detrimental impact on business performance through diminished productivity and on societal costs such as healthcare. In the UK, some 12.7 million working-age people live with a long-term health condition; 7.6 million of those having a disability which affects their daily activities¹³. In Australia in 2017-8, 47% of working-age Australians with chronic conditions were aged 45-64¹⁴.

Estimating the costs associated with poor health is challenging; a new systematic review of economic evaluations and validation studies of 42 instruments for measuring productivity loss confirmed the findings from earlier reviews. Not all instruments assess both absenteeism and presenteeism costs; the latter being especially problematic¹⁵. Additionally, most tools do not capture societal costs¹⁶.

The World Health Organization has estimated conservatively that globally 2.7% of deaths and disability are attributable to work¹⁷. These place heavy financial burdens on individuals, employers, governments and society¹⁸. Even refined methods to calculate the burden underestimate the costs because some work-related illnesses are omitted and cost estimates are only derived from lost productivity; omitting other costs such as healthcare, early retirement and presenteeism^{19,20}. The true societal and economic burden of work injuries and diseases remains unknown²¹; but it is estimated to be 3.9% of global GDP and 3.3% of European GDP¹⁸. These estimates are comparable with previous estimates for Australia (4.8%) and Singapore (3.2%) but higher than estimates for the USA (1.8%) and Great Britain (1%)²¹. Indirect costs are the largest part of the economic burden, followed by direct costs and then intangible costs²¹. Intangible costs comprise between 20% and 50% of the total²¹.

In Australia in 2017-18, \$1.8 billion was spent through workers' compensation agencies for work-related injuries and diseases²². In 2016-17, a median time of 5.3 weeks of work was lost for serious claims in the injury and musculoskeletal disorder group, and 10.2 weeks for diseases²³. Median compensation paid in 2016-17 was \$7,100. Of all types of injuries and diseases, mental health conditions resulted in the highest median time off work (17.3 weeks) and the highest median compensation paid (\$30,800). Injuries to the nerve and spinal cord had the next highest median time off work (10.8 weeks).

In New Zealand in 2020 alone, for ACC work-related claims, there were 189,604 new claims and 280,665 active claims which cost NZD\$872,717,529, mostly in the construction and manufacturing industries⁶. The broader social and economic impacts of New Zealand's worker fatalities are estimated at NZ\$15–21 billion per annum (2%–4% of gross domestic product)²⁴.

Historically, New Zealand's work-related fatal injury (WRFI) record has been poor compared with other Organisation for Economic Co-operation and Development (OECD) countries, being twice as high as Australia's and four times that of the UK¹⁰.

The burden of sickness absence

Sickness absence is divided broadly into two categories:

- Short-term sickness absence; and
- Long-term sickness absence

depending, somewhat arbitrarily, on whether one episode of absence has lasted for a specific duration; commonly more than 14 calendar days. Both affect workplace productivity; however, the increased prevalence of long-term health conditions among the ageing workforce makes long-term sickness absence a growing issue. This increases the need for the effective occupational health management of workers with ill health and/or disability¹⁶.

In the UK, an estimated 118.6 million working days (3.6 days per worker) were lost due to sickness absence in 2020²⁵; increases in absence attributable to COVID-19 being offset by measures such as furloughing and homeworking²⁵. The commonest reasons were minor illness (26.1%), other various illnesses (17.1%), musculoskeletal problems (15.4%) and mental health problems (11.6%)²⁵. Employers' surveys report similar findings^{26,27} and that mental health problems were reported more frequently during the pandemic²⁷. Depending on how absence is covered it is reported that absence may account for 2-16% of payroll²⁸. Because of their frequency and longer duration, musculoskeletal disorders account for the greatest employer healthcare expenditure in countries such as the USA²⁹. In Australia, there are no recent estimates of the cost of sickness absence available; in New Zealand, the estimated cost in 2021 was \$1.85b³⁰.

The burden of presenteeism

Presenteeism is defined variously but most commonly refers to people who continue to work while feeling unwell and who are not functioning at their full capacity²⁹. There is growing evidence that presenteeism costs exceed absenteeism costs³¹. However, there are difficulties and uncertainties in measuring presenteeism and its costs^{18,31,32} since many jobs do not have easily measurable outputs; and methods for measuring productivity vary between instruments^{19,34}. Self-reported data suggests that 40% of European workers work while ill for at least one day in the course of a year²⁹. In the USA it is estimated that 540 million workdays are lost annually to presenteeism³⁵ the highest presenteeism costs arising from common ailments such as allergies, migraines and headaches¹⁹. In the UK it is estimated that poor mental health alone costs UK employers up to £45 billion each year; comprised of absence costs of ~ £7bn; presenteeism costs of £27-29 billion; and turnover costs of ~ £9bn³⁶. Mental Health-related absenteeism and presenteeism in Australia is estimated to cost \$13-17b per annum³⁷.

Wellbeing

Wellbeing (or wellness) is a people and performance strategy; 82% of surveyed global organisations believed that wellbeing is important to their company³⁸. A body of literature argues there is a connection between employee wellbeing and outcomes as diverse as job satisfaction, employee engagement, retention and improved business performance, etc³⁹⁻⁴². A large US Gallup survey identified reciprocal causality between wellbeing (career, social, financial, physical, and community) and employee engagement, workplace turnover, and health outcomes, etc; albeit wellbeing was a stronger predictor of employee engagement than the reverse⁴². This highlights that wellbeing is multi-factorial and not solely dependent on health – career satisfaction and reward being among the key influences.

An individual's subjective wellbeing at work is influenced by characteristics of the job and workplace and tends to be higher when employees have autonomy over how they do their job, variety in their work, clarity over what is expected of them, opportunities to use their skills, effective supervision, higher pay and clear career prospects⁴³. Among the indicators most associated with poor health and wellbeing are atypical or variable working hours, disruptive interruptions, exposure to restructuring, environmental hazards and job insecurity⁴⁴. Consequently, wellbeing strategies must extend beyond health and treatment of illness or injury to encompass prevention, the working environment and social determinants such as culture, values and interpersonal relationships^{38,45}. While there is little high-quality research there is a clear case for employers to invest in employee wellbeing on the basis of likely performance benefits⁴³. Many employer organisations recognise the benefits to be gained by employers taking a strategic, proactive approach to wellbeing to boost employee engagement and productivity. Employers who run health and wellbeing programs do so because they want to:

- Improve their employee value proposition.
- Improve work performance and productivity
- Reduce costs associated with absenteeism, presenteeism and disability
- Reduce healthcare or insurance costs
- Improve the culture of the organisation and retain existing employees
- Improve the organisation's image, attract talented employees and fulfil corporate social responsibility obligations^{38,40}

Leading companies that connect health and productivity strategies to business objectives report employee health improvements, lower costs, reduced work loss and higher productivity. These are also linked to significant competitive and financial advantages, including higher revenues per employee and total shareholder return⁴⁵. It should be acknowledged that the employers who introduce such programs are likely to be the type of enlightened employers who utilise a range of practices that affect productivity and competitiveness; and those organisations that are already profitable may be more likely to afford such programs.

References

1. Australian Bureau of Statistics. Work-related injuries. <https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/work-related-injuries/latest-release>.
2. Safe Work Australia. Australian workers' compensation statistics 2017-18. <https://www.safeworkaustralia.gov.au/doc/australian-workers-compensation-statistics-2017-18>.
3. Australian Bureau of Statistics. Work-related injuries. <https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/work-related-injuries/jul2017-jun2018>.
4. Employment New Zealand. Sick leave and ACC payments. <https://www.employment.govt.nz/leave-and-holidays/sick-leave/sick-leave-and-acc-payments/>.
5. Stats NZ Tauranga Aotearoa. Injuries. <https://www.stats.govt.nz/topics/injuries>.
6. Accident Compensation Corporation. Work injury statistics. <https://www.acc.co.nz/newsroom/media-resources/work-injury-statistics/>.
7. Worksafe New Zealand. Injury, illness and serious harm. https://data.worksafe.govt.nz/graph/summary/injuries_serious_harm.
8. Worksafe New Zealand. Injuries resulting in more than a week away from work. https://data.worksafe.govt.nz/graph/summary/injuries_week_away.
9. Stats NZ Tauranga Aotearoa. Injury statistics - work-related claims: 2020. <https://www.stats.govt.nz/information-releases/injury-statistics-work-related-claims-2020>.
10. Worksafe New Zealand. Work-related health estimates. August 2019. Available from: <https://data-centre-public.s3.ap-southeast-2.amazonaws.com/ZZ1W4ndKyxDv9yNbAPGNU7aa7erC3YWKhxUXI5hk.pdf>.
11. Worksafe New Zealand. Work-related health. https://data.worksafe.govt.nz/editorial/work_related_health.
12. Worksafe New Zealand. Work-related health data. <https://data-centre-public.s3.ap-southeast-2.amazonaws.com/xrGzjvTkC60THEbLlg6GRIUZkSaKlwP0Vle1xxP.pdf>.
13. HM Government. *Health is everyone's Business. Government response to the consultation on proposals to reduce ill-health related job loss*. London. HM Government. 2021.
14. Australian Institute of Health and Welfare. Health expenditure Australia 2017-18. <https://www.aihw.gov.au/reports/health-welfare-expenditure/health-expenditure-australia-2017-18/contents/data-visualisation>.
15. Hubens K, Krol M, Coast J, et al. Measurement instruments of productivity loss of paid and unpaid work: a systematic review and assessment of suitability for health economic evaluations from a societal perspective. *Value Health* 2021; 24: 1686-1699.
16. Meng L, Wolff MB, Mattick KA, et al. Strategies for worksite health interventions to employees with elevated risk of chronic diseases. *Saf Health Work* 2017; 8: 117-129.
17. Wolf J, Prüss-Ustün A, Ivanov I, et al. *Preventing disease through a healthier and safer workplace*. Geneva: World Health Organisation, 2018.
18. Tompa E, Mofidi A, van den Heuvel S, et al. The value of occupational safety and health and the societal costs of work-related injuries and diseases. Bilbao. European Agency for Safety and Health at Work. 2019.
19. Kigozi J, Jowett S, Lewis M, et al. The estimation and inclusion of presenteeism costs in applied economic evaluation: a systematic review. *Value Heal* 2017; 20: 496-506.
20. Elsler D, Takala J, Remes J. *An international comparison of the cost of work-related accidents and illnesses*. Bilbao: European Agency for Safety and Health at Work, 2017.
21. Tompa E, Mofidi A, van den Heuvel S, et al. Economic burden of work injuries and diseases: a framework and application in five European Union countries. *BMC Public Health* 2021; 21: 49.
22. Australian Institute of Health and Welfare. Health expenditure Australia 2019-20. <https://www.aihw.gov.au/reports/health-welfare-expenditure/health-expenditure-australia-2019-20>.
23. Safe Work Australia. Australian workers' compensation statistics 2016-17. <https://www.safeworkaustralia.gov.au/doc/australian-workers-compensation-statistics-2016-17>.
24. Lilley R, Samaranaya A, Weiss H. International comparison of international labour organisation published occupational fatal injury rates: how does New Zealand compare internationally? Wellington: Independent Taskforce on Workplace Health and Safety 2013.
25. Office for National Statistics. *Sickness absence in the labour market 2020*. Newport. ONS. Newport. 2021.
26. Chartered Institute of Personnel Development. *Health and wellbeing at work 2021: survey report*. London. CIPD. London. 2021.
27. MAKE. Health and wellbeing 2021: the importance of mental health. London. MAKE. 2021.
28. Bevan S, Hayday S. *Costing Sickness Absence in the UK*. Brighton. Institute for Employment Studies. 2001.
29. Zaidel CS, Ethiraj RK, Berenji M, et al. Health care expenditures and length of disability across medical conditions. *J Occup Environ Med* 2018; 60: 631-636.
30. Southern Cross Health Insurance, Business NZ. *Workplace Wellness Report 2021*. Available from: <https://www.businessnz.org.nz/resources/surveys-and-statistics/wellness-in-the-workplace-survey/Southern-Cross-Health-Insurance-BusinessNZ-Workplace-Wellness-Report-2021.pdf>.
31. Kinman G. Sickness presenteeism at work: prevalence, costs and management. *Br Med Bull* 2019; 129: 69-78.
32. Allen D, Hines EW, Pazdernik V, et al. Four-year review of presenteeism data among employees of a large United States health care system: a retrospective prevalence study. *Hum Resour Health* 2018; 16: 59.
33. Rezagholi M, Bantekas A. Making economic social decisions for improving occupational health - a predictive cost-benefit analysis. *Occup Med Health Aff*, 2015; 3: 225.
34. Uegaki K, de Bruijne MC, van der Beek AJ, et al. Economic evaluations of occupational health interventions from a company's perspective: a systematic review of methods to estimate the cost of health-related productivity loss. *J Occup Rehabil* 2011; 21: 90-9.
35. Integrated Benefits Institute. Poor health costs US employers \$575 billion and 1.5 billion days of lost productivity. Oakland. IBI. 2020.
36. Hampson E, Jacob A. *Mental health and employers. Refreshing the case for investment*. London. Deloitte. 2020.
37. Productivity Commission. Mental Health Inquiry Report, Volume 1, No. 95, 30 June 2020. Available from: <https://www.pc.gov.au/inquiries/completed/mental-health/report>.
38. AON. *Working Well: 2021 Global Wellbeing Survey*. London. AON 2021.
39. Walters D, Johnstone R, Bluff E, et al. Improving compliance with occupational safety and health regulations: an overarching review – Literature review. Bilbao. European Agency for Safety and Health at Work. 2021.

40. Chari R, Chang CC; SauterSL, et al. Expanding the paradigm of occupational safety and health, *J Occup Environ Med* 2018; 60: 589-593.
41. Buck. *Working well. A global survey of workforce wellbeing strategies*. New York. Buck Global. 2018.
42. Harter JK, Agrawal S. *Causal relationships among wellbeing elements and life, work, and health outcomes*. Washington. Gallup Inc. 2012.
43. Bryson A, Forth J, Stokes L. *"Does Worker Wellbeing Affect Workplace Performance?"* London. Department for Business Innovation & Skills. 2014.
44. Ardito C, d'Errico A, Leombruni R, et al. *Health and well-being at work. A report based on the fifth European Working Conditions Survey*. Dublin. Eurofound. 2013.
45. National Business Group on Health/Towers Watson. *Pathway to Health and Productivity 2011/2012 Staying@Work™ Survey Report*. New York. Towers Watson. 2012.

3. Occupational health services

Key points

- Several occupational health interventions have been shown to be cost-effective and have short payback periods
- The cost-effectiveness of occupational health interventions depends on suitable and sufficient risk assessments to identify those to be included in the programs (and the use of valid and easily applied procedures)
- Occupational health disability case management interventions that include early contact with workers on sick leave and specific agreements around work modifications result in faster returns to work and are cost saving
- Expert/skilled consideration is necessary to design and deliver effective and cost-effective services
- Evidence supports restricting post-offer health assessments to only job-specific examinations
- Health surveillance can detect some cases of occupational disease early and lead to improved long-term clinical outcomes
- Occupational health services help to improve employee health, increase workforce productivity, organisational performance and the national economy
- The range of services offered by an occupational health professional or service will depend on the type of organisation supported and any particular hazards and risk at work
- Data regarding worker access to occupational health services is unreliable, due to small sample size and varying definitions of occupational health
- Further research is needed to estimate reliably worker access to occupational health services
- Measures need to be taken to close the widening coverage gap

What is an occupational health service?

Members include occupational health nurses, occupational physicians, occupational hygienists, physiotherapists, psychologists, and others. Occupational health services contribute to the effective management of the health of workers and workplaces, supporting employers to meet their legal responsibilities to:

- Provide healthy workplaces and work
- Protect people from developing work-related ill health
- Provide health surveillance
- Adjust work for people with health problems or a disability.

Occupational health services can support employers to:

- Provide healthy workplaces and work to protect people from harm
- Provide early intervention to help prevent people being absent for health reasons
- Improve opportunities for people to recover from illness while at work
- Use the workplace to promote individual health and wellbeing
- Enhance employee wellbeing and engagement

Occupational health nurses

Occupational health nurses promote safety and wellness and administer health and safety programs and services to workers in a workplace environment. Their practice focuses on promotion and restoration of health, prevention of illness and injury, and protection from work-related and environmental hazards, including.

- Monitoring the health status of worker populations
- Coordinating and delivering services and programs
- Providing health education and disease management programs, such as smoking cessation, exercise/fitness, nutrition and weight control, stress management, control of chronic illnesses and effective use of medical services.

Occupational physicians

Occupational physicians are specialist trained doctors who deal with the effects of health on work and work on health. Occupational physicians visit workplaces and assess a range of work-related health issues. They can help people stay at work or return to work following an accident or illness. They combine clinical medical practice with influencing individual and organisational behaviour. They work independently or as part of multi-disciplinary teams.

The Fellowship of the Australasian Faculty of Occupational and Environmental Medicine (AFOEM) is a vocational registration in occupational and environmental medicine and this is the highest qualification in Australasia. Scope of practice of these specialist physicians includes:

- Conducting pre-employment and fitness for work assessments
- Advising regarding workplace risks and hazards
- Managing and advising regarding rehabilitation following injury/illness
- Advising regarding injury and illness prevention
- Advising regarding wellness and psychological factors
- Advising on complex cases
- Providing environmental medicine advice
- Advising regarding Industrial and national health policy

Occupational hygienists

Occupational hygienists help employers and workers to understand workplace risks and to minimize or eliminate them. They check work environments and processes for health and safety hazards related to chemicals (dust, gases, vapours), physical agents (heat, noise), biological agents (moulds) and other hazards. Their practice includes:

- Observing, monitoring and testing processes, procedures and operating conditions at workplaces
- Assessing potential worker exposure to physical, chemical, biological and other hazards agents by collecting and analysing samples to determine risk to human health
- Helping to evaluate the effectiveness of control strategies implemented to protect against workplace exposures and hazards (personal protective equipment, ventilation systems)

Occupational therapists

Occupational therapists provide therapy and support to people with limited ability to carry out activities because of illness, injury or disability. They are also involved in the design and implementation of workplace rehabilitation.

Physiotherapists

Physiotherapists can help people affected by injury, illness or disability through exercise, manual therapy, education and advice.

Psychologists

The biopsychosocial model of illness is well-recognised. Occupational psychologists can assist individuals to return to work, to rehabilitate, or to come to terms with injury or illness. Organisational psychologists have a role to play in the analysis of workplace systems; providing advice on organisational structures and practices.

Examples of occupational health services for employees

Who	What we do	Outcome
Person offered a job	Health assessment	Workers who can perform their job safely considering any health issues or disabilities they may have for e.g., drivers, healthcare workers, pilots, etc. Meeting statutory regulations or industry guidelines.
		People with a disability or a health condition can perform the offered work effectively through suitable work and / or workplace adjustments, if reasonably practicable.
Employees exposed to hazards at work e.g., chemicals, noise radiation, etc.	Education and training	Employees who understand health hazards and risks and personal measures to protect their health.
	Health surveillance	Early identification of any health changes to ensure the cause is investigated and improvements made in the workplace to prevent progression to disease and permanent ill health – in that worker and co-workers.
Employees exposed to infection risks	Immunisation and medicines	At risk groups of employees e.g., business travellers, healthcare workers, etc. are better protected against exposure to infectious diseases.
Employees with a work-related health concern	Consultation	Employees are supported to address work-related health concerns e.g., stress at work or to cope with work when they have stresses outside of work.
		Management of worker's compensation processes; liaison with relevant insurance agencies.
Employees with a health condition	Health assessment	Maintained employment and earnings through workplace adjustments; or suitable alternate work where a worker cannot perform their normal job, either temporarily or on a permanent basis.
Employees on long term sick leave	Case management	Earliest return of functional capacity and return to work by working with the employee's doctors and employers e.g., by offering changes to the job and /or work schedule.
	Health assessment	Ill health retirement when that is in the employee's best interest and if they meet the medical criteria within the pension fund rules.
All employees	Health promotion	Employees who are in optimal health through leading healthier lifestyles.

Occupational health services for employers

Occupational health professionals work with a range of colleagues in the organisation, and workers representatives in their efforts to protect and promote employee health by ensuring that employer health programs align with the organisation's values and needs.

What we do	Key business partners	Outcome
Health risk assessment	Health & safety, occupational hygienists	Required statutory and appropriate employer health surveillance programs implemented properly
Health needs assessment	HRs	Health programs are designed and resourced to address the main lifestyle health risks; top causes of sickness absence, etc.
Professional advice	Managers, HR	Advice and support for matters relating to health and work
Policy development	HR, Legal	Policies, practices and cultures that maintain and promote employee health and compliance with relevant health and safety legislation; improve engagement and reduce staff turnover
Change management	Managers, HR, toxicologists	Assess significant changes e.g., in shift patterns; the development or introduction of a new chemical, etc
Business continuity planning	HR, health & safety	Ensure contingency plans are in place to deal with health risks e.g., emergency medical response for disasters, pandemics, etc.

Worker access to occupational health services

The International Labour Organization adopted Occupational Health Services Convention 161 in 1985; this required signatory countries to develop adequate and appropriate occupational health services for all workers in all undertakings³; it was ratified by 35 countries, but not by the UK, Ireland, Australia, or New Zealand. Worldwide, there are gaps in occupational health capacity (a lack of qualified professionals) and coverage; with only one in four of the worlds' workers being able to access occupational health services⁴. Coverage is low in emerging economies with large working populations; and high (above 75%) in countries such as Croatia, Finland, France, Italy, Japan, Macedonia, and the Netherlands⁴. The same survey reported 45% access for Australia and Germany and about 37% for Ireland and the USA. There is very little other data available for Australia and New Zealand.

References

1. Council for Work and Health. *Planning the future: Delivering a vision of good work and health in the UK for the next 5-20 years and the professional resources to deliver it*. London. Council for Work and Health. 2014.
2. All Party Parliamentary Group on Occupational Safety and Health. *Occupational medical workforce crisis. The need for action*. London. All Party Parliamentary Group on Occupational Safety and Health. 2016.
3. International Labour Organization. Occupational Health Services Convention, 1985 (No. 161). Geneva. International Labour Office. 1985
4. Rantanen J, Lehtinen S, Valenti A, et al. A global survey on occupational health services in selected international commission on occupational health (ICOH) member countries. *BMC Public Health* 2017; 17 :787.

Appendix 1. Making the business case for occupational health

Key points

- Legal, moral and financial imperatives encourage employers to provide access to occupational health services
- Both companies and/or directors can be prosecuted for breaches of health and safety law and face significant fines and potentially imprisonment
- Litigation risks company reputation which can threaten business
- Key outcomes for employers include legal compliance, improved employee health and wellbeing, reduced sickness absence and increased productivity
- The business case should reflect value in the broadest sense and not focus simply on financial value
- A value proposition should communicate occupational health's points of difference and how they add value to the employer's business

Since employee health contributes to the profitability, productivity, and safety outcomes of organisations there is a strong business case to integrate preventative health care into business planning¹. However, many organisations require persuading through business cases i.e., data-driven arguments to secure management commitment and approval for investment in an intervention or service². Employers may need to be convinced that occupational health services significantly reduce work-related illnesses and improve health so as to lower associated costs such as sickness absence and lost productivity. Evidence suggests that cost-benefit messages are not getting through to employers and that cost-benefit messages need to be more accessible⁴. However, organisations that value employee health and wellbeing gain through improvements to their profile as well as to their bottom line; factors which are important but difficult to quantify. Nevertheless, highly effective companies articulate a “culture of health” and emphasise the importance of employee health and its impact on the business by including employee health and wellbeing in their goals and values statements and by ensuring leadership and co-worker support^{4,5}. For some organisations this is a formal element of their corporate social responsibility programs.

Employers' reasons for investing in occupational health

The business case for occupational health should present stakeholders with compelling and transparent reasons to invest in occupational health services and demonstrate that the investment delivers benefits at organisational and individual levels. However, employers' reasons for providing access to occupational health services are not confined to financial reasons and include reasons such as:

- Legal obligations (health and safety at work, disability and reasonable adjustments)
- Moral duty of care to employees
- Assisting recruitment and retention
- Employee expectations
- Reduce sickness absence
- Maximise productivity
- Improve employee health and wellbeing⁶⁻⁸

In the context of health and safety at work and/or wellbeing initiatives additional reasons include brand image/reputation, customer satisfaction, business conduct, to secure contracts and employee performance, morale, engagement and motivation⁹⁻¹². In turn, these influence productivity and company performance.

Attributing exact costs and benefits to occupational health services can be quite difficult, not least because the costs are immediate while benefits usually accrue over time. Also, some of the benefits, e.g., increased employee motivation or improved company image, may be difficult to quantify in monetary terms. Hence, the business case should reflect all of the key drivers¹³. This report considers the business case in terms of the broad 'value' including legal, moral and financial imperatives. At the same time, it recognises that demonstrating economic value is problematic especially concerning the indirect costs of health-related productivity¹⁴.

References

1. Street TD, Lacey SJ. Accounting for employee health: The productivity cost of leading health risks. *Health Promot J Austr* 2019; 30: 228-37.
2. Lee G. A Systematic review of occupational health and safety business cases. *Workplace Health Saf* 2018; 66: 95-104.
3. Crawford JO, Graveling R, Davis A, et al. *Work-related musculoskeletal disorders: from research to practice. What can be learnt?* Bilboa. European Agency for Safety and Health at Work. 2020.
4. National Business Group on Health/Towers Watson. *Pathway to Health and Productivity 2011/2012 Staying@Work™ Survey Report*. New York. Towers Watson. 2012.
5. Payne J, Cluff L, Lang J, et al. Elements of a workplace culture of health, perceived organizational support for health, and lifestyle risk. *Am J Health Promot*. 2018; 32: 1555-1567
6. Burton J. *WHO Healthy Workplace Framework and Model: Background Document and Supporting Literature and Practices*. Geneva. WHO. 2010.
7. Tu T, Maguire K, Shanmugarasa T. *Sickness absence and health in the workplace: Understanding employer behaviour and practice: an interim summary report*. London. DWP/DHSC. 2019.
8. Tindle A, Adams, L, Kearney I, et al. *Understanding the provision of occupational health and work-related musculoskeletal services*. London. Department for Work and Pensions. 2020.
9. ILO. *Supporting companies' occupational safety and health performance: A guide for employers and business membership organizations on OSH advocacy and services*. Geneva. ILO. 2019.
10. Deloitte. *Employee well-being survey: identifying the path to success*. Deloitte & Touche. 2021.
11. AON. *Working Well: 2021 Global Wellbeing Survey*. London. AON 2021.
12. Buck. *Working well. A global survey of workforce wellbeing strategies*. New York. Buck Global. 2018.
13. Verbeek J, Pulliainen M, Kankaanpää E. A systematic review of occupational safety and health business cases. *Scand J Work Environ Health* 2009; 35: 403–412.
14. Uegaki K, de Bruijne MC, van der Beek AJ, et al. Economic evaluations of occupational health interventions from a company's perspective: A systematic review of methods to estimate the cost of health-related productivity loss. *J Occup Rehabil* 2011; 21: 90-9.
15. Mastroianni K. AAOHN member opinions on demonstrating value: a closer look at the findings. *Workplace Health Saf* 2018; 66: 241-251.

Appendix 2. Occupational safety and health: the evidence

Key points

- Most employers surveyed believe that investment in occupational safety and health pays off
- The main benefit of occupational safety and health interventions is avoided sick leave
- Ergonomic interventions are the most profitable and have short payback periods of up to two years

There is low to moderate evidence that health and safety legislation and inspections improve occupational safety and health performance^{1,2}. However, regulation alone is not effective in reducing non-fatal and fatal injuries especially in hazardous workplaces; company-oriented interventions being required to reduce injuries in the longer term². This is particularly noticeable in the case of work-related musculoskeletal disorders; despite legislation requiring employers to control workplace risks, there is limited evidence that this is happening³. Yet, work-related injuries and ill health are a significant cost for employers and substantial economic savings can be made by better investment in occupational safety and health measures⁴. Research identifies specific interventions⁴ that are cost-effective; however, for many organisations financial reasons are not the only reasons why organisations invest in occupational safety and health^{3,4}.

A systematic review published by the European Agency for Safety and Health at Work (EU-OSHA) identified reviews and studies that evaluated the cost-effectiveness / cost–benefit ratio of interventions aimed at improving the health or safety of workers⁵. The reviewers discovered that all case studies which met the inclusion criteria were included in three other reviews of business case studies / economic evaluations of occupational safety and health interventions^{6,7,8}; many of them in more than one review. Therefore, they examined the literature mainly through existing reviews. The reviews reported flaws in study design, lack of assumption soundness, insufficient provisions for uncertainty, poor application of economic evaluation (depreciation, etc.), overall poor research quality, heterogeneity of studies, the lack of a common methodological framework and other factors i.e., publication bias; concluding that it wasn't feasible to draw sound conclusions. Subsequent reviewers have expressed similar concerns; especially regarding the failure to assess important and relevant costs such as the indirect costs of productivity loss, absenteeism and presenteeism; areas in which the greatest savings may be made^{9,10}.

The EU-OSHA report also developed and included 13 case studies of health and safety interventions in European small and medium-sized enterprises⁵. These identified that most economic costs and benefits related either to absenteeism or to improved productivity. Most of the case studies (11/13) demonstrated profitability after 5 years; and all interventions were profitable after 7–10 years. Interventions involving training and organisational change were more profitable than interventions based on technical changes e.g., new equipment. Of the reviews identified by EU-OSHA one reported that around three-quarters of interventions were profitable, and the payback period was less than six months; the main benefit being avoided sickness absence⁷. Another included review found evidence to support the economic benefits of ergonomic programs and other interventions to prevent musculoskeletal disorders in:

- Manufacturing and warehousing (strong evidence)
- Health care, transportation, and administrative and support services (moderate evidence)⁶.

The third included review mainly assessed quality and concluded that the overall methodological quality of the economic evaluations was poor; only 44% of studies met more than 50% of the quality criteria⁸. This conclusion was substantiated by another review which concluded that workplace-based intervention studies which undertake economic analyses were 'a mixed bag' in terms of methodological approaches and quality¹¹.

Of all occupational safety and health interventions ergonomic interventions are most common in the literature and are the most profitable, in terms of improved health or efficiency^{5,6,7}. They also have short payback periods of up to two years because of the low cost of interventions i.e., training, simple equipment and changes to work organisation and the high prevalence of musculoskeletal disorders⁵.

A survey in 16 countries asked companies to subjectively rate qualitative and quantitative costs and monetary benefits of occupational safety and health¹². The strongest impact occurred in production, transport and warehousing. Most employers (75%) considered that additional investment in occupational safety and health would lead to company costs remaining the same or decreasing over the long term. Expenditure on occupational safety and health is an investment that "pays off" for companies according to the interviewed companies - added value generated by increased employee motivation and satisfaction and better corporate image; and cost savings through the prevention of disruptions.

References

1. Andersen JH, Malmros P, Ebbeloej NE, et al. Systematic literature review on the effects of occupational safety and health (OSH) interventions at the workplace. *Scand J Work Environ Health* 2019; 45: 103-113.
2. van der Molen HF, Basnet P, Hoonakker PLT, et al. Interventions to prevent injuries in construction workers. *Cochrane Database of Systematic Reviews* 2018; 2: CD006251.
3. Crawford JO, Davis A. Work-related musculoskeletal disorders: why are they still so prevalent? Evidence from a literature review. Bilbao. European Agency for Safety and Health at Work. 2020.
4. Walters D, Johnstone R, Bluff E, et al. Improving compliance with occupational safety and health regulations: an overarching review – Literature review. Bilbao. European Agency for Safety and Health at Work. 2021.
5. Targoutzidis A, Koukoulaki T, Schmitz-Felten E, et al. *The business case for safety and health at work: Cost-benefit analyses of interventions in small and medium-sized enterprises*. Luxembourg. Publications Office of the European Union. 2014.
6. Tompa E, Dolinschi R, de Oliveira C, et al. *A systematic review of OHS interventions with economic evaluations*. Toronto. Institute for Work & Health. 2007.
7. Verbeek J, Pulliainen M, Kankaanpää E. A systematic review of occupational safety and health business cases. *Scand J Work Environ Health* 2009; 35: 403–412.
8. Uegaki K, de Bruijne MC, Lambeek L, et al. Economic evaluations of occupational health interventions from a corporate perspective – a systematic review of methodological quality. *Scand J Work Environ Health* 2010; 36: 273–288.
9. Grimani A, Bergström G, Casallas MIR, et al. Economic evaluation of occupational safety and health interventions from the employer perspective: a systematic review. *J Occup Environ Med* 2018; 60: 147-166.
10. Steel J, Godderis L, Luyten J. Productivity estimation in economic evaluations of occupational health and safety interventions: a systematic review. *Scand J Work Environ Health* 2018; 44: 458-474.
11. Tompa E, Verbeek J, van Tulder M, et al. Developing guidelines for good practice in the economic evaluation of occupational safety and health interventions. *Scand J Work Environ Health* 2010; 36: 313–318.
12. Bräunig D, Kohstall T. *Calculating the international return on prevention for companies: costs and benefits of investments in occupational safety and health*. Geneva. International Social Security Association. 2012.

Appendix 3. Workplace health promotion: the evidence

Key points

- The workplace can be an effective setting for health promotion and prevention
- While health promotion programs may only have a small positive effect, they are low cost
- Results of studies should not be taken at face value or generalised beyond the specific context of the study
- There is need for longer-term and better-quality workplace studies that use objective outcomes and/or quality assured questionnaires
- More research is needed to determine the ideal interventions for specific employee groups
- Employers should invest in health interventions that are evidence based, customized for target populations and known to be effective
- Occupational health professionals can design, implement and evaluate health promotion programs and strategies to meet the needs of the organisation and offer value
- Work organisation / environment interventions may produce more sustainable employee health benefits than interventions focused on individual behaviours

Why workplace health promotion?

Workplace health promotion programs often focus on modifiable risk factors for disease such as diet, physical activity, alcohol and tobacco use. Increasingly, employers offer such programs to improve employee health and with expectations for increased productivity, and, where they are responsible for co-funding it, reduced health care costs¹⁻³. Workplace health promotion programs were made popular in the USA by the Affordable Care Act 2009 which allowed insurers to charge lower premiums to workers participating in such programs^{1,4}. However, the popularity and commercial interest in workplace health promotion is not backed by good quality evidence for efficacy, effectiveness or cost effectiveness²⁻⁴. Since most economic evaluations were performed in the USA; the results are not necessarily generalizable to countries that provide publicly-funded health care⁵. For example, a systematic review of 11 randomized controlled trials established that, in Europe, there was a positive economic impact of most of the workplace wellbeing programs⁶.

Commercialisation of wellness

The intangible benefits of workplace health promotion in terms of making employees feel valued and the consequent impact on engagement and productivity risk becoming overshadowed. There is some concern that 'the term wellness has been highjacked by commercial entrepreneurs'⁷. Understandably so, since market analysts estimate the global corporate wellness market to be worth about US\$57 billion in 2020; being projected to be worth between US\$83 to 87 billion by 2026^{8,9}. Public Health England commissioned a survey to examine the impact of workplace health programs among employers and providers in England¹⁰. The majority of submissions were from providers of wellbeing interventions; respondents that would be disinclined to report negative findings. Of equal concern, rigorous methods of data collection or evaluation were not being used to evaluate effectiveness¹⁰.

Poor quality primary studies

Presented with the literature reporting return on investment many people will assume that the economic benefit of workplace health promotion is indisputable. However, most studies are of low to moderate-quality, often lack sufficient description of interventions and valid control groups; and suffer from selection and attrition bias, small sample sizes and short follow-up^{2,4,11-16}. Systematic reviews have identified a risk of various biases sometimes in more than two-thirds of studies^{12,17}. The propensity to report positive outcomes is inversely-related to study quality; observational studies are more likely to report positive effects compared to randomized controlled trials^{13,18} and high-quality trials report smaller effects than low-quality trials¹⁹. Recent systematic reviews have reported that only around one in four studies are of high quality²⁰⁻²². These limitations, the heterogeneity of interventions studied²² and reliance on estimates to calculate long-term costs and benefits²³ make it difficult to summarise the main outcomes and limit the extent to which the findings can be trusted¹⁶.

Variable quality systematic reviews

Randomized controlled trials with low risk of bias are the most trustworthy source of evidence for systematic reviews of health interventions because they protect against confounding and other biases²⁴. Sometimes non-randomized studies can provide valuable information; insofar as complementary evidence²⁴; or where the question of interest cannot be answered by randomized trials²⁵.

Systematic reviews investigating workplace health promotion do not always meet the Cochrane Collaboration quality criteria for systematic reviews^{11,14} and so, often reach different conclusions depending on the methodologies for selecting and grading the quality of studies. Meta-analyses too produce mixed results for benefits relative to costs^{3,4}. Two recent systematic reviews of systematic reviews of workplace health promotion interventions reported that only 22%¹⁴ and 39%²⁶ of included reviews were of high quality. Those that report positive effects usually have caveats to alert readers to the small number and/or low quality of included studies²⁷.

The diverse and often dubious evidence base for the effectiveness and return on investment from workplace health promotion programs requires careful consideration because the quality of economic evaluation studies is generally low. Unfortunately, published research is often taken as fact and reported favourably and extensively by others without any attempt to appraise its quality. There are some well-known reports or narrative reviews that merely cite prior research without fully appraising the quality of individual studies are omitted. Two such reports are critiqued in the boxes below. They are not included in the evidence base for this report.

CRITIQUE OF COMMONLY CITED REPORTS

***Building the Case for Wellness.* London. PricewaterhouseCoopers. 2008.**

This report was commissioned by the UK Department for Work and Pensions; whose Health Work and Wellbeing Unit provided 55 UK case studies. PwC noted that few case studies attempted to estimate return on investment (ROI). Of the seven that did, ROI (as benefit-cost ratio) was wide ranging (1:1 to 34:1) and studies were heterogeneous with regard to follow-up duration and interventions studied (ergonomic improvements or support, influenza immunisation, physiotherapy, health and safety awareness and physical wellbeing).

The report continues to be cited in conference presentations e.g., Utility Week 2018; and websites e.g., for the self-employed and small business and commercial providers of training e.g., for high-performance and corporate yoga. One training organisation's website cites the report as follows 'A review of seven wellbeing programs suggested the average benefit-cost ratio was £4.17 for every £1 spent'. In fact, that figure was not an average, but one of seven examples; albeit used in the executive summary to illustrate how return on expenditure worked. More importantly, this non-peer reviewed case study related to 'perceived costs and benefits' of an ergonomics intervention (redesigning and then introducing new manual handling training). However, that ratio is commonly attributed to workplace wellbeing interventions; without any understanding of how that figure was derived.

'The Harvard Study' Baicker K, Cutler D, Song Z. Workplace wellness programs can generate savings. *Health Aff (Millwood)* 2010; 29: 304–311.

Like the PwC report, this study is reported widely in the grey literature; as a meta-analysis, it is also cited extensively in the biomedical literature. At the time of writing this report there were 915 Semantic Scholar citations, 537 Crossref citations and 828 Mendeley readers.

The report was and inappropriately continues to be cited as providing evidence that 'every dollar spent on workplace wellbeing programs saves about \$3.27 in medical costs and about \$2.73 in absenteeism costs'; even though the authors emphasised that their 'findings may not be generalisable' because of factors such as publication bias. The data has been misappropriated further; being attributed by at least one organisation to savings made by occupational health services. Subsequent researchers criticised the study for methodological weaknesses i.e., including programs that operated in the 1980s and selection bias (more favourable participants in reviewed studies)^{1,7,28,29}. Other issues include that only 9/22 studies had randomized controls; costs were assumed for 7/22 studies; they excluded other available studies choosing only one example of a study for each intervention; and 40% of interventions included self-help – a cheap intervention that will produce a high ROI.

The Harvard Study authors have since conducted a large multi-site cluster-randomized trial. This found no significant differences in health care spending or absenteeism at 18 months⁴ and 3 years³⁰ follow-up; the authors concluding that 'these findings may temper expectations about the financial ROI that wellness programs can deliver in the short term'⁴. The only improvement was in some self-reported health behaviours (physical activity and weight management). The authors acknowledged that most prior studies were based on observational designs that had methodological shortcomings such as potential selection bias and that randomized studies are likely more reliable⁴. Writing an article in *The Washington Post* in June 2021, Baicker and Song made it clear 'if the goal [of workplace wellness programs] is to save money by reducing health-care costs and absenteeism, or to improve chronic physical health conditions, the evidence so far is underwhelming'.

Return on investment

Employers are usually interested to understand whether their workplace health promotion investments are cost saving i.e., the financial benefits exceed investment costs generating a positive ROI³¹. Researchers continue to caution employers to be realistic about the outcomes they should expect³²; the ability of workplace wellness programs to generate ROI being debated increasingly³³. A review of empirical research indicates that whilst most studies observed short-term improvements in some healthy behaviours; they more rarely achieved ROI, savings and reduced costs from absenteeism and presenteeism³⁴. At best, the economic value of worksite health promotion remains uncertain²¹; and it must be recognised that high-quality studies, of which there are fewer, are more likely to demonstrate negative ROI^{21,35}. A 2019 review of 37 European research studies rated nine studies as strong, 15 as moderate and 15 as weak; only six satisfied the minimum standard for health economic evaluations²¹. Effects on health outcomes were small and uncertain – only 9/21 cost–benefit analyses, 10/23 cost–effectiveness and 2/8 cost–utility analyses produced encouraging results²¹. A review of 51 workplace health promotion studies reported that ROI became increasingly positive as methodological quality fell; with ROIs of -0.22 for randomized controlled trials; +1.12 for quasi-experimental studies; 1.61 for non-experimental studies; and + 2.15 for modelled studies³⁵.

As with the multi-site cluster-randomized trial performed by researchers from Harvard^{3,30}, a large 30-month randomized controlled trial published in 2019 (the Illinois Workplace Wellness Study) reported null effects of workplace wellness interventions on total medical expenditures, employee productivity, or self-reported health status after more than two years³⁶. The researchers also analysed the data as if the study were an observational trial. This approach could have demonstrated an association between participation and reduced healthcare spending consistent with earlier research from low-quality studies; whereas the higher quality analysis demonstrated that interventions ‘appeared to cause none of those things’³⁶. The authors concluded that 84% of medical expenditure and absenteeism estimates from the prior literature could be ruled out - including the ROIs in the Harvard meta-analysis - selection bias being the likely reason³⁶.

Cost-effectiveness and effectiveness

The lack of a uniform methodology as well as the low quality of studies make it difficult to quantify the economic benefit of workplace health promotion¹¹. Rather than trying to demonstrate ROI; it would be more realistic to consider cost-effectiveness i.e., whether interventions provide good value for money¹⁰. Such focus might help to ensure the best value for health promotion expenditure¹⁰; especially since no individual intervention emerges as a ‘gold standard’³⁷. Cost-effectiveness and effectiveness depend not only on the intervention but also on those who participate in workplace health promotion; and specifically, whether participants are either personally motivated or incentivised to make a change³⁷. In the Illinois Workplace Wellness Study employees who volunteered to take part already had healthier behaviours and lower healthcare spending than non-participants prior to the intervention; suggesting that those who stand to benefit most decline to participate³⁶. Others too report that employees in better health and physically active at baseline have a greater likelihood of success; and that it is challenging to achieving successful results among employees at high risk of poor health outcomes³⁸.

Meta-analyses have noted that even though limited health behaviour improvements e.g., fruit consumption, can be found among participants with high compliance; the effects are small^{15,19}, such that overall, workplace health promotion interventions are rarely effective¹⁵; however, it is difficult to draw firm conclusions because of the poor quality of the evidence base¹⁹. Possibly, workplace health promotion may be more effective and cost-effective if targeted toward and recruiting those employees at higher risk for developing long-term health conditions³⁹. As yet, the evidence is that health-promoting implementation strategies may make little to no difference⁴⁰.

There are further challenges when trying to calculate cost-effectiveness. Studies that assess the impact of health promotion on performance may rely on cross-sectional studies and self-rated assessments; these

tend to demonstrate an association between interventions and improved performance; whereas objective ratings and longitudinal studies report no significant differences in employee well-being and organisational performance⁴¹. Additional research is necessary to evaluate the efficiency and cost-effectiveness of workplace health promotion interventions⁴¹.

Which workplace health promotion programs work?

Most of the evidence is derived from heterogeneous studies performed in the USA; only about half as many being conducted in Europe⁴³. Most studies address physical activity, followed by interventions to promote mental health and stress management⁴³. Overall, there is not enough evidence from the scientific literature to recommend any specific interventions or programs¹⁴; however, there is continued desire from stakeholders for workplace health promotion. Therefore, it is appropriate to consider the evidence for what works (will achieve positive health outcomes) from systematic reviews. These reach different conclusions; as demonstrated by the number of references supporting each statement in the following lists for different types of programs and interventions.

Mental health interventions

As with other interventions studies are generally of low quality²⁸; evidence for the effectiveness of different interventions depending on the quality of the underlying research²⁴. A range of health promotion interventions have been reported to be effective in reducing symptoms of depression and anxiety; however, the effect is small⁷⁷ and rarely reaches statistical significance¹⁴. Considering the variability in the interventions available and small number of studies examining any one intervention it is challenging to draw conclusions⁷⁸ and neither possible, nor judicious, to provide 'generalised' results⁷⁹. Some programs have better evidence to demonstrate effectiveness i.e.; those incorporating multicomponent interventions (mental health and/or physical health and/or psychosocial interventions)^{80,81}.

For cognitive behavioural therapy (CBT) there is:

- Moderate-quality evidence for improved job satisfaction⁸²
- Moderate-quality evidence of no effect on employee turnover⁸²
- Moderate-quality evidence for reduced presenteeism among those at risk of developing mental health symptoms⁵²
- Low-quality evidence of no effect on absenteeism and productivity^{52,82}
- Low-quality evidence of effectiveness in improving mental wellbeing in those at risk of developing mental health symptoms⁵²

For stress management training there is:

- Low to moderate-quality evidence of a positive effect on job stress^{52,82}
- Low-quality evidence of no effect on sickness absence^{11,52,82}
- Low-quality evidence of no effect on mental wellbeing, mental health symptoms and productivity^{52,82}
- Moderate-quality evidence for improving job satisfaction and quality of life among employees at risk of developing common mental disorders⁵²

Considering the lack of effect of CBT and stress management training across most outcomes for the general workforce, NICE only recommends CBT and stress management as options for employees with poor mental health⁵².

There is preliminary evidence that eHealth-delivered CBT and stress management training may reduce mental health and stress symptoms, at least in the short-term⁸³. eHealth and mHealth interventions can be

more cost-effective and reach a wider audience⁸⁴; however, products must be chosen carefully since they vary in quality and many lack evidence⁸³.

Physical activity

Workplace physical activity and/or sedentary behaviour programs can increase employee exercise levels to a limited^{11,13,44} or moderate extent⁴⁵; interventions with less rigorous design being more likely to report a positive effect⁴⁶. Further studies are recommended because of heterogeneity and short duration of studies⁴⁴ and low to very-low certainty of economic evidence^{44,45}. Overall, there is:

- inconclusive / equivocal evidence of effect^{47,48}
- inconclusive evidence for improving cardiorespiratory fitness^{11,13}
- inconsistent evidence of the impact on worker productivity⁴⁹
- some evidence for decreases in waist circumference and total body fat⁵⁰
- no convincing evidence for other health-related outcomes¹¹; such as blood pressure and blood lipids⁵¹
- very low-quality evidence of no effect on mental wellbeing, job stress, job satisfaction and quality of life⁵²
- no evidence for reduced levels of sick absence¹³

There is preliminary evidence that mHealth interventions are effective in improving physical activity, but not in helping workers to lose weight; higher quality and longer-term studies are needed⁵³.

Dietary interventions

Studies are very heterogeneous⁵⁴⁻⁵⁶; most have methodological limitations (short duration, high or unknown risk of bias; poor reporting of interventions); and about one half of studies were performed in North America^{54,55}. Most systematic reviews are of moderate quality⁵⁷. Better quality and longer-term studies are needed as are assessments of the costs and cost-effectiveness of different approaches^{54,55}. Where improved diet is observed it occurs for both individual (e.g., nutrition education) and organisational interventions (e.g., healthy canteen food, information posters)¹¹, with better outcomes being related to combined interventions^{55,56}. Overall, there is:

- limited to moderate-quality evidence of a positive effect from healthy eating programs^{12,59-62}
- stronger evidence for small increases in vegetable and especially fruit intake^{15,55,59}

Multi-component workplace interventions

There is some evidence that multi-component workplace interventions are more effective and can improve specific anthropometric, dietary and cardiometabolic risk factors i.e., body weight and waist circumference^{52,55,57,63-70}; but the evidence for long-term effectiveness is more limited^{64,68}. Inconsistent conclusions between reviews for the statistical significance of effects on other parameters i.e., blood pressure, serum cholesterol, fat intake, fasting blood glucose, etc^{47,55,67} may be due to a lack of large high-quality studies²⁴. There is need for better quality and longer-term studies and examination of economic outcomes^{66,70}. Overall, it appears that:

- Multi-component health promotion interventions appear to be more effective
- Success depends on participants' motivation¹⁵, provider's expertise and the nature of the interventions⁶²
- Effective components include coaching techniques and those promoting physical activity⁶⁹
- There is strong evidence for a positive effect among those at risk of cardiovascular disease⁷¹

Smoking cessation

Individual workplace smoking cessation interventions:

- can be effective for smokers who are willing to quit¹¹ and among those who participate; but the absolute numbers who quit are small⁷² and the strength of evidence is low¹²
- effectiveness decreases over time¹³
- should employ a range of different interventions to meet the different needs of employees at different stages of readiness to change⁷³
- are more likely to lead to cessation when interventions are directed towards individual smokers⁷²
- may have less impact than smoke-free workplace policies³

Substance use interventions

It is only recently that systematic reviews have examined substance use interventions in the workplace. These reviews have limitations because the included studies are heterogeneous and of low to medium-quality^{28,74} making it challenging to synthesise the evidence²⁸. Overall, studies provide mixed results; with no intervention showing effectiveness in more than half of studies⁷⁴. Interventions examining impact on workplace injuries or accidents more commonly report effectiveness⁷⁴. Higher quality studies are needed.

Alcohol use interventions

There is limited evidence that alcohol use prevention and treatment programs are cost-saving and cost-effective²⁸. There are few high-quality studies; one limitation being that research is focused on self-reported behaviour change^{29,74}. Screening for alcohol misuse is not recommended; there being no suitable test for population screening and no evidence that screening is effective in reducing long-term harm⁷⁵. While brief interventions can lead to reduced alcohol intake in the short to medium-term the findings do not relate to a screening or a population context⁷⁵. eHealth interventions have small and non-significant effects on alcohol intake⁷⁶.

References

1. Levy DE, Thorndike AN. Workplace wellness program and short-term changes in health care expenditures. *Prev Med Rep* 2018; 13: 175-178.
2. Jones D, Molitor D, Reif J. What do workplace wellness programs do? Evidence from the Illinois Workplace Wellness Study. *Q J Econ* 2019; 134: 1747-1791.
3. Reif J, Chan D, Jones D, et al. Effects of a workplace wellness program on employee health, health beliefs, and medical use: a randomized clinical trial. *JAMA Intern Med* 2020; 180: 952-960.
4. Song Z, Baicker K. Effect of a workplace wellness program on employee health and economic outcomes: a randomized clinical trial. *JAMA* 2019; 321: 1491-1501.
5. Jacobs JC, Yaquian E, Burke SM, et al. The economic impact of workplace wellness programmes in Canada. *Occup Med (Lond)* 2017; 67: 429-434.
6. Martínez-Lemos RI. Economic impact of corporate wellness programs in Europe: A literature review. *J Occup Health* 2015; 57: 201-211.
7. Verbeek J. Wellness: a useful concept but highjacked by commerce. *Occup Med (Lond)* 2019; 69: 233-234.
8. Global Industry Analysts. *Global Corporate Wellness Industry*. San Jose. Global Industry Analysts. 2021.
9. Expert Market Research. *Global Corporate Wellness Market. Historical market report and forecast 2022-2027*. Sheridan. Expert Market Research. 2021.
10. Whitmore M, Stewart K, Pollard J, et al. *Promising practices for health and wellbeing at work. A review of the evidence landscape*. Santa Monica. RAND Corporation. 2018.
11. Sockoll I, Kramer I, Bodeker W. *Effectiveness and economic benefits of workplace health promotion and prevention. Summary of the scientific evidence 2000 to 2006*. Report 13e. Essen. Initiative Gesundheit & Arbeit. 2009.
12. Feltner C, Peterson K, Weber RP, et al. The effectiveness of total worker health interventions: A systematic review for a National Institutes of Health Pathways to Prevention workshop. *Ann Int Med* 2016; 165: 262-269.
13. Hill D, Lucy D, Tyers C, et al. *What works at work? Review of evidence assessing the effectiveness of workplace interventions to prevent and manage common health problems*. Leeds. The Stationery Office. 2007.
14. Pieper C, Schröer S, Eilerts AL. Evidence of workplace interventions-a systematic review of systematic reviews. *Int J Environ Res Public Health* 2019; 16: 3553.
15. Coenen P, Robroek SJW, van der Beek AJ, et al. Socioeconomic inequalities in effectiveness of and compliance to workplace health promotion programs: an individual participant data (IPD) meta-analysis. *Int J Behav Nutr Phys Act* 2020; 17: 112.
16. MacMillan F, Kolt GS, Le A, et al. Systematic review of randomised control trial health promotion intervention studies in the fire services: study characteristics, intervention design and impacts on health. *Occup Environ Med* 2020: oemed-2020-106613.

17. Cancelliere C, Cassidy JD, Ammendolia C, et al. Are workplace health promotion programs effective at improving presenteeism in workers? A systematic review and best evidence synthesis of the literature. *BMC Public Health* 2011; 11, 395.
18. Osilla KC, van Busum K, Schnyer C, et al. Systematic review of the impact of worksite wellness programs. *Am J Manag Care* 2012; 18, e68-e81.
19. Rongen A, Robroek SJ, van Lenthe FJ, et al. Workplace health promotion: a meta-analysis of effectiveness. *Am J Prev Med* 2013; 44: 406-415.
20. Grimani A, Aboagye E, Kwak L. The effectiveness of workplace nutrition and physical activity interventions in improving productivity, work performance and workability: a systematic review. *BMC Public Health* 2019; 19: 1676.
21. Lutz N, Taeymans J, Ballmer C, et al. Cost-effectiveness and cost-benefit of worksite health promotion programs in Europe: a systematic review. *Eur J Public Health* 2019; 29: 540-546.
22. Crane MM, Halloway S, Walts ZL, et al. Behavioural interventions for CVD risk reduction for blue-collar workers: a systematic review. *J Epidemiol Community Health* 2021; 75: 1236-1243.
23. Merkur S, Sassi F, McDaid D. *Promoting health, preventing disease: is there an economic case? Policy Summary 6*. Copenhagen. WHO. 2013.
24. Cuello-Garcia CA, Santesso N, Morgan RL, et al. GRADE guidance 24 optimizing the integration of randomized and non-randomized studies of interventions in evidence syntheses and health guidelines. *J Clin Epidemiol* 2021; 142: 200-208.
25. Higgins JPT, Thomas J, Chandler J, et al. *Cochrane handbook for systematic reviews of Interventions* version 6.2 (updated February 2021). London. Cochrane. 2021.
26. Proper KI, van Oostrom SH. The effectiveness of workplace health promotion interventions on physical and mental health outcomes - a systematic review of reviews. *Scand J Work Environ Health* 2019; 45: 546-559.
27. Chandler J, Abraham J, Lane M, et al. The Work Foundation. *Workplace health interventions and accreditation schemes. A rapid evidence review and global mapping exercise*. Lancaster. The Work Foundation. 2019.
28. Caloyeras JP, Liu H, Exum E, et al. Managing manifest diseases, but not health risks, saved PepsiCo money over seven years. *Health Aff (Millwood)* 2014; 33: 124-31.
29. Mattke S, Kapinos K, Caloyeras JP, et al. Workplace wellness programs: services offered, participation, and incentives. *Rand Health Q* 2015; 5: 7.
30. Song Z, Baicker K. Health and economic outcomes up to three years after a workplace wellness program: a randomized controlled trial. *Health Aff (Millwood)* 2021; 40: 951-960.
31. de Oliveira C, Cho E, Kavelaars R, et al. Economic analyses of mental health and substance use interventions in the workplace: a systematic literature review and narrative synthesis. *Lancet Psychiatry*. 2020; 7: 893-910
32. Payne J, Cluff L, Lang J, et al. Elements of a workplace culture of health, perceived organizational support for health, and lifestyle risk. *Am J Health Promot*. 2018; 32: 1555-1567.
33. Ott-Holland CJ, Shepherd WJ, Ryan AM. Examining wellness programs over time: Predicting participation and workplace outcomes. *J Occup Health Psychol* 2019; 24: 163-179.
34. Basińska-Zych A, Springer A. Organizational and individual outcomes of health promotion strategies-a review of empirical research. *Int J Environ Res Public Health* 2021; 18: 383.
35. Baxter S, Sanderson K, Venn AJ, et al. The relationship between return on investment and quality of study methodology in workplace health promotion programs. *Am J Health Promot* 2014; 28: 347-363.
36. Jones D, Molitor D, Reif J. What do workplace wellness programs do? Evidence from the Illinois Workplace Wellness Study. *Q J Econ* 2019; 134: 1747-1791
37. Chandler J, Abraham J, Lane M, et al. The Work Foundation. *Workplace health interventions and accreditation schemes. A rapid evidence review and global mapping exercise*. Lancaster. The Work Foundation. 2019.
38. Muir SD, Silva SSM, Woldegiorgis MA, et al. Predictors of success of workplace physical activity interventions: a systematic review. *J Phys Act Health* 2019; 16: 647-656.
39. Meng L, Wolff MB, Mattick KA, et al. Strategies for worksite health interventions to employees with elevated risk of chronic diseases. *Saf Health Work* 2017; 8: 117-129.
40. Wolfenden L, Goldman S, Stacey FG, et al. Strategies to improve the implementation of workplace-based policies or practices targeting tobacco, alcohol, diet, physical activity and obesity. *Cochrane Database of Systematic Reviews* 2018; 1: CD012439.
41. Nielsen K, Nielsen MB, Ogonnaya C, et al. Workplace resources to improve both employee well-being and performance: A systematic review and meta-analysis. *Work & Stress* 2017;31: 101-120.
42. Vargas-Martinez AM, Romero-Saldaña M, De Diego-Cordero R. Economic evaluation of workplace health promotion interventions focused on lifestyle: systematic review and meta-analysis. *J Adv Nurs* 2021; 77: 3657-3691.
43. María-Ángeles S, Maqueda J, Francisco M, et al. Evaluation of the effectiveness of workplace health promotion programs from 2000 to 2020: literature review. *Open J Prev Med* 2021; 11: 113-131.
44. Lutz N, Clarys P, Koenig I, et al. Health economic evaluations of interventions to increase physical activity and decrease sedentary behavior at the workplace: a systematic review. *Scand J Work Environ Health* 2020; 46: 127-142.
45. Vuillemin A, Rostami C, Maes L, et al. Worksite physical activity interventions and obesity: a review of European studies (the HOPE Project). *Obesity Facts* 2011; 4: 479-88.
46. To Q, Chen TT, Magnussen C, et al. Workplace physical activity interventions: A systematic review. *Am J Health Promot* 2013; 27, e113-e123.
47. Malik SH, Blake H, Suggs LS. A systematic review of workplace health promotion for increasing physical activity. *Br J Health Psychol* 2014; 19: 149-80
48. Wong JYL, Gilson ND, van Uffelen JGZ, et al. The effects of workplace physical activity interventions in men: a systematic review. *Am J Men's Health* 2012; 6: 303-13.
49. Pereira MJ, Coombes BK, Comans TA, et al. The impact of on-site workplace health-enhancing physical activity interventions on worker productivity: A systematic review. *Occup Environ Med* 2015; 72: 401-12.
50. de Sevilla GGP, Vicente-Arche FC, Thuissard IJ, et al. Effectiveness of workplace exercise interventions on body composition: a systematic review and meta-analysis. *Am J Health Promot* 2021; 35: 1150-1161.
51. Mulchandani R, Chandrasekaran AM, Shivashankar R, et al. Effect of workplace physical activity interventions on the cardio-metabolic health of working adults: Systematic review and meta-analysis. *Int J Behav Nutr Phys Act* 2019; 16: 134.
52. National Institute for Health and care Excellence. Mental wellbeing at work: evidence reviews for individual targeted interventions Appendix E. Draft Consultation report. London. NICE. 2021.
53. Jung J, Cho I. Promoting physical activity and weight loss with mhealth interventions among workers: systematic review and meta-analysis of randomized controlled trials. *JMIR Mhealth Uhealth* 2022; 10: e30682.
54. Murphy B, Parekh N, Vieira DL, et al. A systematic review of randomized controlled trials examining workplace wellness interventions. *Nutr Health* 2021;260106021996935.

55. Peñalvo JL, Sagastume D, Mertens E, et al. Effectiveness of workplace wellness programmes for dietary habits, overweight, and cardiometabolic health: a systematic review and meta-analysis. *Lancet Public Health* 2021 ;6: e648-e660.
56. Melián-Fleitas L, Franco-Pérez Á, Caballero P, et al. Influence of nutrition, food and diet-related interventions in the workplace: a meta-analysis with meta-regression. *Nutrients* 2021; 13: 3945.
57. Schliemann D, Woodside JV. The effectiveness of dietary workplace interventions: a systematic review of systematic reviews. *Public Health Nutr* 2019; 22: 942-955.
58. Rachmah Q, Martiana T, Mulyono M, et al. The effectiveness of nutrition and health intervention in workplace setting: a systematic review. *J Public Health Res* 2021.
59. Geaney F, Kelly C, Greiner BA, et al. The effectiveness of workplace dietary modification interventions: a systematic review. *Prev Med* 2013; 57: 438-47.
60. Mhurchu NC, Aston LM, Jebb SA. Effects of worksite health promotion interventions on employee diets: a systematic review. *BMC Public Health* 2010; 10: 62.
61. Maes L, Van CE, Van LW, et al. Effectiveness of workplace interventions in Europe promoting healthy eating: A systematic review. *Eur J Pub Health* 2012; 22: 677-683.
62. García Pérez de Sevilla G, Sánchez-Pinto Pinto B. Effectiveness of workplace Mediterranean diet interventions on cardiometabolic risk factors: a systematic review. *Workplace Health Saf* 2022 Jan 25:21650799211045708.
63. Zusman EZ, Kapanen AI, Klaassen A, et al. Workplace cardiovascular risk reduction by healthcare professionals-a systematic review. *Occup Med (Lond)* 2021; 71: 270-276.
64. Verweij LM, Coffeng J, van Mechelen W, et al. Meta-analyses of workplace physical activity and dietary behaviour interventions on weight outcomes. *Obes Rev* 2011; 12: 406-429.
65. Anderson LM, Quinn TA, Glanz K, et al. The effectiveness of worksite nutrition and physical activity interventions for controlling employee overweight and obesity: A systematic review. *Am J Prev Med*, 2009; 37: 340-357.
66. Lee NK, Roche A, Benedict MA, et al. Worksite-based weight loss programs: A systematic review of recent literature. *Am J Health Promot* 2008; 22: 408-416.
67. Gudzone K, Hutfless S, Maruthur N, et al. Strategies to prevent weight gain in workplace and college settings: a systematic review. *Prev Med* 2013; 57: 268-77.
68. Tam G, Yeung M. A systematic review of the long-term effectiveness of work-based lifestyle interventions to tackle overweight and obesity. *Prev Med* 2018; 107: 54-60.
69. Gea Cabrera A, Caballero P, Wanden-Berghe C, et al. Effectiveness of workplace-based diet and lifestyle interventions on risk factors in workers with metabolic syndrome: a systematic review, meta-analysis and meta-regression. *Nutrients* 2021; 13: 4560.
70. van Dongen J, Proper KI, van Wier, MF, et al. A systematic review of the cost-effectiveness of worksite physical activity and/or nutrition programs. *Scand J Work Environ Health* 2012; 38: 393-408.
71. Groeneveld IF, Proper KI, Van Der Beek AJ, et al. Lifestyle-focused interventions at the workplace to reduce the risk of cardiovascular disease: A systematic review. *Scand J Work Environ Health* 2010; 36: 202-215.
72. Cahill K, Lancaster T. Workplace interventions for smoking cessation. *Cochrane Database of Systematic Reviews*, 2014; 2: CD003440.
73. Carroll C, Rick J, Leaviss J. A qualitative evidence synthesis of employees' views of workplace smoking reduction or cessation interventions. *BMC Public Health*, 2013; 13: 1095.
74. Akanbi MO, Iroz CB, O'Dwyer LC, et al. A systematic review of the effectiveness of employer-led interventions for drug misuse. *J Occupat Heal* 2020;62, e121333.
75. Pittam G, Lines C. *Screening for alcohol misuse*. London. UK National Screening Committee. 2017.
76. Phillips EA, Gordeev VS, Schreyogg J. Effectiveness of occupational e-mental health interventions: A systematic review and meta-analysis of randomized controlled trials. *Scand J Work Environ Health* 2019; 45: 560-576.
77. Martin A, Sanderson K, Cocker F. Meta-analysis of the effects of health promotion intervention in the workplace on depression and anxiety symptoms. *Scand J Work Environ Health* 2009; 35: 7-18.
78. Restrepo J, Lemos M. Addressing psychosocial work-related stress interventions: a systematic review. *Work* 2021; 70: 53-62.
79. National Institute for Health and care Excellence. *Mental wellbeing at work Appendix G Economic modelling underpinning recommendations in the NICE guideline. Draft for consultation*. London. NICE. 2021
80. Wagner SL, Koehn C, White MI, et al. Mental health interventions in the workplace and work outcomes: A best-evidence synthesis of systematic reviews. *Int J Occup Environ Med* 2016; 7: 1-14.
81. Estevez Cores S, Sayed AA, Tracy DK, et al. Individual-focused occupational health interventions: A meta-analysis of randomized controlled trials. *J Occup Health Psychol* 2021;26: 189-203.
82. National Institute for Health and care Excellence. *Mental wellbeing at work: evidence reviews for individual universal interventions Appendix D*. Draft Consultation report. London. NICE. 2021.
83. Stratton E, Lampit A, Choi I, et al. Effectiveness of eHealth interventions for reducing mental health conditions in employees: A systematic review and meta-analysis. *PLoS One* 2017; 12: e0189904.
84. Hulls PM, Richmond RC, Martin RM, et al. Workplace interventions that aim to improve employee health and well-being in male-dominated industries: a systematic review. *Occup Environ Med* 2022; 79: 77-87.

Appendix 4. Occupational health services: the evidence

Key points

- Several occupational health interventions have been shown to be cost-effective and have short payback periods
- Occupational health disability case management interventions – in addition to evidence-based treatment - including early contact with workers on sick leave and specific arrangements around work modifications result in faster returns to work and are cost saving
- The cost-effectiveness of occupational health interventions depends on suitable and sufficient risk assessments to identify those to be included in the programs, and the use of valid and easily applied procedures
- Expert/skilled consideration is necessary to design and deliver effective and cost-effective services
- Evidence supports restricting pre-placement health assessments to only job-specific examinations
- Health surveillance can detect some cases of occupational disease early and lead to improved long-term clinical outcomes

It is possible to demonstrate that some occupational health interventions offer more value than others. Active occupational health care aimed at prevention and rehabilitation can be more profitable than a focus on treatment². A systematic review of different types of intervention identified musculoskeletal interventions (in certain sectors) and return to work / disability management interventions as usually worth making from an economic point of view³. The evidence for effectiveness is published separately^{7,8}; the conclusions are summarised in Table 3.

Table 3: Occupational health interventions worth undertaking for economic reasons

	Multiple sectors	Manufacturing & warehousing	Administration & support	Transport	Healthcare
Return to work / disability management programs	Strong evidence				
Musculoskeletal interventions		Strong evidence	Moderate evidence	Moderate evidence	Moderate evidence ^a
Occupational disease prevention interventions					Moderate to limited evidence ^b

a. Most studies evaluated mechanical lifts. Some investigated lifting teams, manual handling training, or exercise programs

b. Two interventions – needle-stick injury prevention programs, and substitution of powdered latex gloves with powder-free gloves

Whether occupational health interventions are effective and cost-effective in a particular workplace will almost always depend on whether the health needs of the workforce have been assessed properly by a competent person and whether the interventions that are offered reflect the identified needs and the best evidence. Success also depends on organisational support for occupational health interventions. This is apparent for return-to-work interventions where effectiveness depends on support from managers, supervisors and co-workers to provide access to modified work and facilitate a sustained return⁹⁻¹².

Long term sickness absence management

The interventions that are effective in facilitating return to work may depend on the nature of the underlying illness or injury and on factors that lie outside the control of an occupational health service. Overall, there is:

- Strong evidence supporting disability management interventions³
- Strong evidence that workplace interventions reduce duration of sickness absence²¹
- Consistent evidence that line manager, supervisor and co-worker support is effective⁹
- Moderate evidence that graded activity interventions reduce sickness absence²² especially for absence that exceed 6 months²³
- Limited evidence that multidisciplinary intervention and cognitive behavioural therapy reduce absence²¹
- Limited evidence to support sustainability beyond one year
- Insufficient evidence to assess the general effectiveness of eHealth interventions^{24,25}

Considering that musculoskeletal disorders (especially back pain) and common mental disorders are highly prevalent and account for a large proportion of sickness absence and health-related costs it is unsurprising that more studies have been undertaken to examine interventions designed to prevent and manage these conditions.

Among surveyed UK employers, and in all sectors, a flexible and inclusive working culture and referral to occupational health are the top-ranking methods for most effectively supporting employees with disabilities and long-term health conditions¹³. Conversely, lack of access to occupational health is cited consistently as a barrier to effective sickness absence management¹⁴.

An independent review of sickness absence in Great Britain gave examples of hospital trusts that achieved large savings in salary, overtime and temporary staff costs by enhanced management of sickness absence and early referral to occupational health¹⁵. There is similar evidence from scientific studies. A large Canadian healthcare employer that strengthened its disability management program (emphasis on early contact, supervisor training and involving union representatives in return-to-work planning) achieved larger reductions in disability durations compared to the comparison group over the 6-year observation period¹⁵. Two years after an English hospital introduced a new service (intensive case management for staff absent sick beyond 4 weeks and a bio-psychosocial approach) there was a 10.7% difference in reduction of absences beyond 8 weeks compared to a control site; the intervention was reported to be effective and cost-effective¹⁶. A similar intervention followed up for four years in Scottish hospitals and with referral to occupational health at day 10 of absence (previously day 28) was associated with 12% greater reduction of sickness absence compared to control sites¹⁷. Accommodating for start-up costs the predicted long-term return on investment was estimated to be 1.56:1¹⁷.

When facilitating return to work it must be recognised that cost savings attributable to reduced absenteeism may be offset by increased presenteeism costs. Return to work interventions do not appear to be cost effective on the basis of studies that include an economic evaluation^{18,19}; although this may reflect the lack of relevant studies. A cross-sectional survey of 11 major Japanese companies reported that 7/11 achieved a net benefit from comprehensive workplace mental health programs. Companies that

achieved a return on investment >1 used full-time occupational health nurses; had significantly higher disease management and rehabilitation program implementation rates; and substantially lower total costs²⁰. This study suggests that the engagement of occupational health nurses to manage the tertiary prevention programs may lead to reduced absenteeism and increased return on investment.

Musculoskeletal disorder interventions

Prevention

The evidence from syntheses of reviews indicates that:

- Physical activity programs reduce the prevalence of and sickness absence attributable to musculoskeletal disorders^{26,27}
- Other interventions i.e., educational interventions, theoretical trainings, back schools and lumbar supports/back belts are generally ineffective²⁶⁻²⁹

Management

For workers suffering from back pain:

- Back schools appear to be useful^{26,27,30}
- Temporarily modified work (transitional work arrangements) can facilitate early return to work^{26,31,32}
- Cognitive behavioural approaches are effective in reducing sickness absence duration²⁶

Return to work

There is insufficient evidence to support the sustainability of effects beyond one year³¹; however, the following return to work interventions are reported to be effective and likely to provide a net cost-saving (avoided sickness absence savings minus intervention costs):

- Graded activity intervention/phased return to work^{23,32,34}
- Early assessment and early rehabilitation, including work and/or workplace adjustments^{27,33,35}
- Multi-component programs^{27,32,36,37}
- Early and good communication between the worker, employer and occupational health^{31,34}
- Simple, feasible, inexpensive interventions are more likely to be cost-effective³⁸

The National Institute for Health and Care Excellence (NICE) concluded that multi-component programs were ineffective but that this was likely due to population and comparison group heterogeneity in the studies reviewed, considering that other studies demonstrated benefits³⁷. Interventions aimed at the individual without recourse to changes in work organisation and the working environment are likely at best to deliver small benefits³⁸. Of work-related factors there is strong evidence that the physical demands of the job, job satisfaction and the offer of modified work predict the likelihood and timing of return to work and moderate evidence of an effect from the workplace psychosocial environment i.e., factors related to work pace, control and social support³⁹. NICE recommends considering the use of interventions focused on reducing potential workplace barriers and interventions aimed to strengthen individuals' physical and mental health resources in those who are absent from work with musculoskeletal conditions³⁷.

Stress and mental health interventions

Mental health issues account for increasing proportions of long-term sickness absence; this is reflected by the quantity of new studies, albeit study quality remains low³⁷. Compared with musculoskeletal disorders there is greater heterogeneity between studies investigating mental health interventions³⁶. There are few economic evaluations; these too are heterogeneous and of low quality, or evidence on effectiveness is lacking^{18,40}. Consequently only tentative conclusions can be drawn¹⁸ and it is unwise to generalise

findings⁴⁰. Nonetheless, there appears to be evidence that; while the primary focus ought to be on organisational interventions to prevent mental ill health²², employee-focussed interventions are effective, especially in employees at risk of developing common mental health problems and in those who have high control over their work^{26,27}

Prevention

Reviews report mixed results for the effects of workplace mental health interventions on mental health and work productivity¹⁸. Stress interventions which focus on employees only – without addressing organisational causes of stress i.e., management style or culture – will have limited effect²⁷. While few studies have examined organisational interventions¹⁸; research indicates that:

- Multi-component interventions aimed at both individuals and the organisation are more effective²⁷
- Preventive mental health activities can reduce sickness absence²⁶ and might be cost-effective¹⁸
- Mental health awareness training improves identification of employees at risk, uptake of support, discussion of mental health problems and de-stigmatisation (moderate-quality evidence)⁴¹
- Screening has no effect on mental health symptoms, uptake of support, or productivity (low-quality evidence)⁴²

Management

- Cognitive behavioural therapy is effective in reducing psychological ill-health and sickness absence among employees absent from work²⁶
- Cognitive behavioural therapy is cost-saving (and in some cases cost-effective) to address depression¹⁹
- Cognitive behavioural therapy for insomnia significantly improves sleep quality^{45,46} and may improve presenteeism⁴⁵

Return to work

Return to work interventions reviewed by NICE did not show evidence of effectiveness; the authors noted that it was unclear to what degree this reflected a failure of the interventions studied, or a failure of their implementation³⁷. Studies are generally too heterogeneous to synthesise,¹⁹ and more high-quality studies are needed^{36,37,45}. However, some systematic reviews report:

- High-quality evidence for maintaining contact with the workplace⁴⁶
- Strong evidence that regular and active involvement of occupational health professionals is cost-saving and cost-effective in reducing sick leave related to mental health and in encouraging return to work¹⁹
- Moderate-quality evidence for gradual return to work; especially for stress-related disorders⁴⁶
- Moderate-quality evidence that adding a work-directed intervention reduces sickness absence duration in the first year of follow-up for those suffering from depression⁴⁵

More research is needed on combining work-directed interventions with clinical interventions to establish which type and combination of interventions are the most effective²⁹. For example, while cognitive behavioural therapy can improve symptoms it is only effective in helping employees return to work when it focuses on work-related solutions and is implemented alongside any necessary workplace modifications such as modified duties or working hours³⁶.

Return to work interventions for other health conditions

Most studies included in systematic reviews involve musculoskeletal problems and common mental disorders; there is less direct evidence for the occupational health management of other health conditions and a lack of high-quality studies³⁶. There is no conclusive evidence to support any specific return to work

intervention for workers suffering from conditions such as subjective health complaints⁴⁷ or chronic pain⁴⁸, or to improve work participation for older workers generally⁴⁹. Nonetheless multidisciplinary interventions are recommended^{36,48,49}. There is moderate evidence that interventions which include vocational counselling enhance return to work in patients with cancer^{50,51}; however, more research is needed particularly to follow up individuals over several years⁵².

Occupational health assessments

In an occupational setting, the purpose of health assessments is to detect any effect of health on work (e.g., fitness for specific duties) or work on health (e.g., health surveillance of those exposed to a hazard).

Post-offer health assessments

Two systematic reviews found little⁵³, no or inconsistent evidence⁵⁴ that health questions asked before employment are effective in determining future health or occupational outcomes for prospective employees. Another systematic review reported that pre-employment or post-offer personality assessments appeared to be of low utility in predicting common mental disorder among emergency workers and that further high-quality longitudinal research was required⁵⁵. A subsequent prospective study demonstrated no association between validated pre-employment measures of personality and psychopathology with mental health outcomes among Australian police officers in their first seven years of employment⁵⁶.

There is very low-quality evidence that examination-based recommendations for work accommodation or training may be effective in reducing an increased risk for occupational injuries⁵⁴. However, large numbers of fit people must be screened to identify few at risk. An audit at one hospital trust revealed that almost 3,000 pre-placement assessments were undertaken in a year. Of those assessed, 98.5% were passed fit, 1.5% were passed 'fit with comments', and no-one was considered unfit for work⁵⁶. Evidence supports restricting post-offer health assessments to only job-specific examinations⁵⁴.

Health surveillance

Some health surveillance is usually legally mandated and so it is rarely evaluated for effectiveness or cost-effectiveness. Health surveillance offers the potential to detect occupational disease at an early stage to prevent further deterioration and improve the chances of recovery. The case for health surveillance is made in a systematic review of occupational asthma (where there are valid tests) on the grounds that outcome is better in workers who have shorter duration of symptoms prior to diagnosis, relatively normal lung function at diagnosis, and no further exposure to the causative agent after diagnosis⁶⁰. Other than that cost-effectiveness of surveillance for occupational asthma has only been demonstrated in mathematical simulation models using estimates; and then mostly at the societal level^{60,61}.

Improving cost-effectiveness

Occupational health staffing costs are a major consideration⁶²; and employers rank them as one of the top three most significant costs when implementing occupational safety and health programs⁶³. Some employers perceive the costs of providing an occupational health service to be prohibitive in spite of recognising the benefits⁶⁴; these costs may be a particular barrier for small and medium-sized employers⁶⁶. Occupational health programs can, but do not have to, involve significant resources and costs – the evidence shows they can be devised and delivered in cost-effective ways³¹. Including all employees in occupational health programs, as opposed to targeting programs towards groups at risk, does not make optimal use of occupational health resources. Return-to-work efforts should be reserved for individuals who are experiencing difficulty returning to work¹⁹; whilst health surveillance should be offered to those employees who have been identified to be at risk of exposure by suitable and sufficient risk assessments.

Since occupational health services are a scarce commodity, interventions should be both effective and efficient in terms of allocating available resources to their best use⁶⁶. Expensive interventions should be implemented only with rigorous cost-benefit evaluation planned from the outset³⁸.

References

1. Dibben P, Wood G, O'Hara R. Do return to work interventions for workers with disabilities and health conditions achieve employment outcomes and are they cost effective? A systematic narrative review. *Employee Relations* 2018; 40: 999-1014.
2. Targoutzidis A, Koukoulaki T, Schmitz-Felten E, et al. *The business case for safety and health at work: Cost-benefit analyses of interventions in small and medium-sized enterprises*. Luxembourg. Publications Office of the European Union. 2014.
3. Tompa E, Dolinschi R, de Oliveira C, et al. *A systematic review of OHS interventions with economic evaluations*. Toronto. Institute for Work & Health. 2007.
4. Rezagholi M, Bantekas A. Making economic social decisions for improving occupational health – a predictive cost-benefit analysis. *Occup Med Health Aff* 2015; 3: 225.
5. Uegaki K, de Bruijne MC, van der Beek AJ, et al. Economic evaluations of occupational health interventions from a company's perspective: a systematic review of methods to estimate the cost of health-related productivity loss. *J Occup Rehabil* 2011; 21: 90-9.
6. Bell E, Taylor M. *Workplace health: long-term sickness absence and capability to work (NG146)*. York. York Health Economics Centre. 2019.
7. Amick B, Tullar J, Brewer S, et al. *Interventions in health-care settings to protect musculoskeletal health: A systematic review*. Toronto. Institute for Work & Health. 2006.
8. Brewer S, King E, Amick BC, et al. *A systematic review of injury/illness prevention and loss control (IPC) programs*. Toronto. Institute for Work and Health. 2007.
9. Etuknwa A, Daniels K, Eib C. Sustainable return to work: a systematic review focusing on personal and social factors. *J Occup Rehabil* 2019; 29: 679-700.
10. Jansen J, van Ooijen R, Koning PWC, et al. The role of the employer in supporting work participation of workers with disabilities: a systematic literature review using an interdisciplinary approach. *J Occup Rehabil* 2021; 31: 916-949.
11. Gray SE, Sheehan LR, Lane TJ, et al. Concerns about claiming, post-claim support, and return to work planning. *J Occup Environ Med* 2019; 61: e139-e145.
12. White C, Green RA, Ferguson S, et al. The influence of social support and social integration factors on return-to-work outcomes for individuals with work-related injuries: a systematic review. *J Occup Rehabil* 2019; 29: 636-659.
13. Chartered Institute of Personnel Development. *Health and wellbeing at work 2021: survey report*. London. CIPD. 2021.
14. Black C, Frost D. *Health at work – an independent review of sickness absence*. Norwich. The Stationery Office. 2011.
15. Mustard CA, Skivington K, Lay M, et al. Implementation of a disability management policy in a large healthcare employer: a quasi-experimental, mixed-methods evaluation. *BMJ Open* 2017; 7: e014734.
16. Smedley J, Harris EC, Cox V, et al. Evaluation of a case management service to reduce sickness absence. *Occup Med (Lond)*, 2013; 63: 89-95.
17. Brown J, Mackay D, Demou E, et al. The EASY (Early Access to Support for You) sickness absence service: a four-year evaluation of the impact on absenteeism. *Scand J Work Environ Health* 2015; 41: 204–215.
18. Hamberg-van Reenen HH, Proper KI, van den Berg M. Worksite mental health interventions: a systematic review of economic evaluations. *Occup Environ Med* 2012; 69: 837-45.
19. de Oliveira C, Cho E, Kavelaars R, et al. Economic analyses of mental health and substance use interventions in the workplace: a systematic literature review and narrative synthesis. *Lancet Psychiatry* 2020; 7: 893-910.
20. Iijima S, Yokoyama K, Kitamura F, et al. Cost-benefit analysis of comprehensive mental health prevention programs in Japanese workplaces: a pilot study. *Ind Health* 2013; 51: 627-33.
21. van Vilsteren M, van Oostrom SH, de Vet HCW, et al. Workplace interventions to prevent work disability in workers on sick leave. *Cochrane Database of Systematic Reviews* 2015; 10: CD006955.
22. Odeen M, Magnussen LH, Maeland S, et al. Systematic review of active workplace interventions to reduce sickness absence. *Occup Med (Lond)* 2013; 63: 7-16.
23. Maas ET, Koehoorn M, McLeod CB. Does gradually returning to work improve time to sustainable work after a work-acquired musculoskeletal disorder in British Columbia, Canada? A matched cohort effectiveness study. *Occup Environ Med* 2021; 78: 715-723.
24. Howarth A, Quesada J, Silva J, et al. The impact of digital health interventions on health-related outcomes in the workplace: A systematic review. *Digit Health* 2018; 4: 2055207618770861.
25. Johnsen TL, Johansen T, Momsen AH, et al. eHealth interventions to facilitate work participation: a scoping review *JBIM Evidence Synthesis* 2021; 19: 2739-2759.
26. Hill D, Lucy D, Tyers C, et al. *What works at work? Review of evidence assessing the effectiveness of workplace interventions to prevent and manage common health problems*. Leeds. The Stationery Office. 2007.
27. Sockoll I, Kramer I, Bodeker W. *Effectiveness and economic benefits of workplace health promotion and prevention. Summary of the scientific evidence 2000 to 2006. Report 13e*. Essen. Initiative Gesundheit & Arbeit. 2009.
28. Verbeek J, Martimo KP, Karppinen J, et al. Manual material handling advice and assistive devices for preventing and treating back pain in workers. *Cochrane Database of Systematic Reviews* 2011; 7: CD005958.
29. van Duijvenbode I, Jellema P, van Poppel M, et al. Lumbar supports for prevention and treatment of low back pain. *Cochrane Database of Systematic Reviews* 2008; 2: CD001823.
30. Grimani A, Bergström G, Casallas MIR, et al. Economic evaluation of occupational safety and health interventions from the employer perspective: a systematic review. *J Occup Environ Med* 2018; 60: 147-166.
31. Waddell G, Burton AK, Kendall N. *Vocational Rehabilitation: What works, for whom, and when? Vocational Rehabilitation Task Group Report*. London. The Stationery Office. 2008.
32. Verbeek J, Pulliainen M, Kankaanpää E. A systematic review of occupational safety and health business cases. *Scand J Work Environ Health* 2009; 35: 403–412.
33. Pieper C, Schröer S, Eilerts AL. Evidence of workplace interventions-a systematic review of systematic reviews. *Int J Environ Res Public Health* 2019; 16: 3553.

34. Oakman J, Keegel T, Kinsman N, et al. Persistent musculoskeletal pain and productive employment; a systematic review of interventions. *Occup Environ Med* 2016; 73: 206-14.
35. Carroll C, Rick J, Pilgrim H, et al. Workplace involvement improves return to work rates among employees with back pain on long-term sick leave: a systematic review of the effectiveness and cost-effectiveness of interventions. *Disabil Rehabil* 2010; 32: 607-21.
36. Cullen KL, Irvin E, Collie A, et al. Effectiveness of workplace interventions in return-to-work for musculoskeletal, pain-related and mental health conditions: an update of the evidence and messages for practitioners. *J Occup Rehabil* 2018; 28, 1–15.
37. National Institute for Health and Care Excellence. *Workplace health: long-term sickness absence and capability to work NICE guideline [NG146]. Facilitating the return to work of employees on long-term sickness absence and reducing risk of recurrence.* London. NICE. 2019.
38. Palmer KT, Harris EC, Linaker C, et al. Effectiveness of community- and workplace-based interventions to manage musculoskeletal-related sickness absence and job loss: a systematic review. *Rheumatology* 2012; 51: 230-42.
39. Steenstra I, Irvin E, Heymans M, et al. *Systematic review of prognostic factors for workers time away from work due to acute low-back pain: An update of a systematic review.* Toronto. Institute for Work & Health. 2011.
40. National Institute for Health and Care Excellence. *Mental wellbeing at work Appendix G Economic modelling underpinning recommendations in the NICE guideline. Draft for Consultation.* London. NICE. 2021.
41. National Institute for Health and Care Excellence. *Mental wellbeing at work Appendix B. Manager interventions. Draft for Consultation.* London. NICE. 2021.
42. National Institute for Health and Care Excellence. *Mental wellbeing at work Appendix A. Organisational universal-level approaches. Draft for Consultation.* London. NICE. 2021.
43. Takano Y, Iwano S, Aoki S, Nakano N, et al. A systematic review of the effect of sleep interventions on presenteeism. *Biopsychosoc Med* 2021; 15: 21.
44. Robbins R, Jackson CL, Underwood P, et al. Employee sleep and workplace health promotion: A systematic review. *Am J Health Promot* 2019; 33: 1009-1019.
45. Nieuwenhuijsen K, Verbeek JH, Neumeier-Gromen A, et al. Interventions to improve return to work in depressed people. *Cochrane Database of Systematic Reviews* 2020; 10: CD006237.
46. Mikkelsen MB, Rosholm M. Systematic review and meta-analysis of interventions aimed at enhancing return to work for sick-listed workers with common mental disorders, stress-related disorders, somatoform disorders and personality disorders. *Occup Environ Med* 2018; 75: 675-686.
47. Wegrzynek PA, Wainwright E, Ravalier J. Return to work interventions for chronic pain: a systematic review. *Occup Med (Lond)* 2020; 70: 268-277.
48. Weerdesteijn KHN, Schaafsma F, Bonefaas-Groenewoud K, et al. Predicting return to work after long-term sickness absence with subjective health complaints: a prospective cohort study. *BMC Public Health* 2020; 20: 1095
49. Steenstra I, Cullen K, Irvin E, et al. A systematic review of interventions to promote work participation in older workers. *J Safety Res* 2017; 60: 93-102.
50. de Boer AGEM, Taskila TK, Tamminga SJ, et al. Interventions to enhance return-to-work for cancer patients. *Cochrane Database of Systematic Reviews* 2015, 9.: CD007569.
51. Tikka C, Verbeek J, Tamminga S, et al. *Rehabilitation and return to work after cancer.* European Agency for Safety and Health at Work. Luxembourg. Publications Office of the European Union. 2017.
52. Crawford JO, Davis A, Sleuwenhoek A, et al. *Occupational safety and health considerations of returning to work after cancer.* Leicester. Institution of Occupational Safety and Health. 2017.
53. Madan I, Williams S. Is pre-employment health screening by questionnaire effective? *Occup Med (Lond)*, 2012; 62: 112–116.
54. Schaafsma F, Mahmud N, Reneman MF, et al. Pre-employment examinations for preventing injury, disease and sick leave in workers. *Cochrane Database of Systematic Reviews* 2016; 1: CD008881.
55. Marshall RE, Milligan-Saville JS, Mitchell PB, et al. A systematic review of the usefulness of pre-employment and pre-duty screening in predicting mental health outcomes amongst emergency workers. *Psychiatry Res* 2017; 253: 129-137.
56. Marshall RE, Milligan-Saville JS, Steel Z, et al. A prospective study of pre-employment psychological testing amongst police recruits. *Occup Med (Lond)* 2020; 70: 162-168.
57. Lucey S. Audit of pre-placement assessments undertaken in an NHS Trust. *Occup Med (Lond)* 2008; 58: 512-4.
58. Dale AM, Gardner BT, Zeringue A, et al. The effectiveness of post-offer pre-placement nerve conduction screening for carpal tunnel syndrome. *J Occup Environ Med* 2014; 56: 840-7.
59. Evanoff B, Kymes S. Modeling the cost-benefit of nerve conduction studies in pre-employment screening for carpal tunnel syndrome. *Scand J Work Environ Health* 2010; 36: 299-304.
60. Nicholson PJ, Cullinan P, Burge PS, Boyle C. *Occupational asthma: prevention, identification & management: systematic review & recommendations.* London. British Occupational Health Research Foundation. 2010.
61. Meijster T, van Duuren-Stuurman B, Heederik D, et al. Cost-benefit analysis in occupational health: a comparison of intervention scenarios for occupational asthma and rhinitis among bakery workers. *Occup Environ Med* 2011; 68: 739-45.
62. Guzman J, Tompa E, Koehoorn M, et al. Economic evaluation of occupational health and safety programmes in health care. *Occup Med (Lond)* 2015; 65: 590–597.
63. Bräunig D, Kohstall T. *Calculating the international return on prevention for companies: costs and benefits of investments in occupational safety and health.* Geneva. International Social Security Association. 2012.
64. Fullick S, Maguire K, Hughes K, et al. *Employers' motivations and practices: A study of the use of occupational health services.* London. DWP/DHSC. 2019.
65. HM Government. *Health is everyone's Business. Government response to the consultation on proposals to reduce ill-health related job loss.* London. HM Government. 2021.
66. van Dongen JM, Van Wier MF, Tompa E, et al. Trial-based economic evaluations in occupational health: Principles, methods, and recommendations. *J Occup Environ Med* 2014; 56: 563-572.



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