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Evidence Check

Managing health and wellbeing in the workplace

An **Evidence Check** rapid review brokered by the Sax Institute for SafeWork NSW. January 2018.

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This report was prepared by: Bill Bellew Consulting Associates

January 2018
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Managing health and wellbeing in the workplace

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Glossary of terms

Evidence grading	
Strong evidence	'Strong evidence' indicates high confidence that the evidence reflects the true effect and further research is very unlikely to change our confidence in the estimate of the effect
Moderate (Sufficient) evidence	'Moderate' evidence indicates moderate confidence in the body of evidence and that further research may change our confidence and the estimate; the accompanying narrative indicates whether the evidence is deemed 'Sufficient' to commence implementation with accompanying evaluation
Weak evidence	'Weak evidence' indicates low confidence and further research is likely to change our confidence and the estimate
Insufficient evidence	'Insufficient' indicates that either a body of evidence is unavailable or there was a paucity of studies of reliable quality for the setting / strategy in question

Executive summary

Purpose of the review

SafeWork NSW would like to develop, promote and facilitate a model or framework for NSW workplaces to manage the health and wellbeing of workers. A review of national and international evidence on what has been implemented and shown to be effective will be used to inform the development of this model or framework. An Evidence Check review is a rapid review of existing evidence tailored to the individual needs of an agency. Evidence Check reviews answer specific policy or program questions and are presented as reports in a policy friendly format. Reviewers identify gaps in the evidence but do not undertake new research to fill these gaps. This report summarises the findings of the Evidence Check review undertaken to address the needs identified by SafeWork NSW with the technical assistance of the Sax Institute.

This review aimed to address the following questions:

Question 1: Evidence of effectiveness

What programs, frameworks or models designed to create healthy workplaces have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

Question 2: Essential program components

Of the papers included in question one, what key components of the program, framework or model have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

Question 3: Implementation success factors

From the papers included in question one, what are the main barriers or facilitators to successful implementation of the program, framework or model?

Question 4: Organisational factors, leadership, systems, policies, culture, work design

What does the evidence suggest regarding the role and impact of organisational factors, leadership, systems, policy, workplace culture, work design and work processes?

Summary of methods

Although an Evidence Check is a rapid style of review, a rigorous approach (normally associated with more lengthy and detailed full systematic reviews) was undertaken. A sentinel search was undertaken to confirm the availability of systematic review (SR) evidence, the recency of analysis, and the adequacy of coverage across the specified research questions. Since the evidence coverage was deemed adequate, we proceeded with a more robust review using a typical selection of electronic databases. Search terms were selected consistent the US National Library Medical Subject Headings (MeSH®) Thesaurus (with modifications as required for specific databases). Grey literature searches were also undertaken using selected key words within the advanced search functions of Google/Google Scholar and limited to the first 200 results in keeping with evidence-based guidance. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocols were used with transparent reporting of search strategy and study retrieval (details in Appendices).

Evidence grading

The review adopted the protocol used by the US Community Preventive Services Task Force (The Community Guide). This protocol is particularly helpful in identifying the strength of a body of evidence. The approach is consistent overall with the evidence hierarchy stipulated by NHMRC, but provides better flexibility when different levels of evidence may need to be considered in an integrated way with respect to a given program, strategy or framework. The approach has been described in detail in the peer reviewed literature. Four grades of evidence are defined in this Evidence Check: Strong evidence, Moderate (Sufficient) evidence, Weak evidence and Insufficient evidence (see Glossary).

Key findings

After screening, in answering the four research questions, the Evidence Check used 160 research studies and reports, of which more than half (53%) were systematic or semi-systematic reviews. Only studies deemed to provide strong and sufficient strength evidence were used to answer the research questions. There has been a rapid evolution of practice and evidence in wellness programs over the past decade. Key characteristics of that evolution include: (a) greater emphasis on leadership, systems approaches, and the importance of organisational culture; (b) use of Health Risk Appraisal (HRA); (c) use of incentives (including financial); (d) integration (more holistic designs); (e) use of digital technology, social media and customisation of programs; (f) extension to the family and wider community; and (g) more sophisticated indicators and metrics, increasingly tied to corporate objectives.

Q1: What programs, frameworks or models designed to create healthy workplaces have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

The US Centers for Disease Control and Prevention (CDC), World Health Organisation and the National Institute for Occupational Safety and Health (NIOSH) provide frameworks which meet these criteria. The evidence is more definitive for well-established components of the frameworks (for example, Health Risk Assessment) and more emergent for the recent or more complex components (for example, systems approaches). We have distilled a model (Workplace Wellness 3.0) which is designed to capture these, whilst also showing the current status of the underpinning evidence.

There is strong (definitive) evidence that lifestyle management interventions as part of workplace wellness programs can reduce risk factors, such as smoking, and increase healthy behaviours, such as exercise and healthy eating; these effects are sustainable over time and are clinically meaningful. Interventions to prevent Type 2 diabetes and to tackle obesity/overweight can be effective, but current models are varied. The greatest weight loss is achieved only through intensive lifestyle interventions (that is, at least four months in duration) that implement one of the available structured, well-established programs.

There is strong evidence that a workplace-based resistance training exercise program can help prevent and manage upper body musculoskeletal disorders and symptoms, and moderate evidence that stakeholder participation and work modification are more effective and cost effective at returning to work adults with musculoskeletal conditions than other workplace-linked interventions.

Evidence on the contribution of wellness programs to productivity is patchy. The Total Worker Health™(TWH) model has been used to develop the Employer Health and Productivity RoadMap™. The Roadmap comprises six interrelated and integrated core elements: (i) optimise environment, (ii) increase healthy behaviours, (iii) minimise avoidable or inefficient acute care, (iv) optimise chronic care, (v) reduce excessive surgery, and (vi) speed transitions from care to home and work. This model is promising but requires confirmatory research evidence.

There is strong evidence for the effectiveness of Health Risk Appraisals/Assessments when used in combination with programs and interventions, in relation to tobacco use, alcohol use, dietary fat intake,

blood pressure and cholesterol. There is sufficiently strong evidence to suggest that for every dollar invested in these programs (HRA+ program combinations) an annual return of $3.20 (ROI median $3.2; range $1.40 to $4.60) can be achieved. It is important, going forward, to raise the standards of quality and consistency of workplace wellness economic research which has to date been very variable.

There is promising evidence that even higher returns on investment can be achieved in programs incorporating newer technologies such as telephone coaching of high risk individuals together with the use of financial incentives; more research is required to be definitive on this point. Linked telephonic lifestyle coaching services (such as Get Healthy at Work) and clinical non-communicable disease (NCD) support services were noted among the fasted growing components in Australia and New Zealand. Yet these components only feature in 37% and 28% respectively of programs (current, planned in next one to three years), which may indicate scope for further uptake of these particular program components.

Total Worker Health™ is a promising concept and has significant strategic momentum Integrated TWH interventions can deliver the lifestyle benefits already identified, but effectiveness on injuries and overall quality of life are not known and the TWH model will benefit from further confirmatory research.

Q2: What key components of the program, framework or model have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

WHO identifies five such components: (i) leadership commitment and engagement, (ii) involvement of workers and their representatives, (iii) business ethics and legality, (iv) a systematic, comprehensive process to ensure effectiveness and continual improvement, and (v) sustainability and integration. The US Centers for Disease Control and Prevention (CDC) identifies four such components (sub-divided into more detail) (i) Workplace Health Assessment (includes an Organisational Assessment); (ii) Planning the Program (includes Leadership Support and Management); (iii) Implementing the Program (includes Policies); (iv) Determining the Impact through Evaluation (includes Organisational Change, "Culture of Health"). In the TWH approach, NIOSH identifies four fundamental components: (i) Demonstrate leadership commitment to worker safety and health at all levels of the organisation; (ii) Design work to eliminate or reduce safety and health hazards and promote worker well-being; (iii) Promote and support worker engagement throughout program design and implementation; (iv) Ensure confidentiality and privacy of workers; and (v) Integrate relevant systems to advance worker well-being. The Framework of Best Practice Guidelines developed by Workplace Health Association of Australia identifies 15 guiding principles for effective workplace health programs, of which the first is: Active support and participation by senior leadership. There is strong agreement between these organisations and across the key components; the essential key components and principles identified in this Evidence Check were brought together and synthesised into a revised, third generation model for workplace wellness programs, Workplace Wellness 3.0.

Q3: What are the main barriers or facilitators to successful implementation of the (identified) program, framework or model?

Typical barriers identified at leadership/cultural level were "limited management support for the intervention", an unfavourable health-promoting "organisational culture/climate" and "participation of the worksites in another health promotion activity". Three main organisational barriers were identified: (i) "organisational structure and the physical work environment" (size, organisational and building structure); (ii) "support for the intervention by management/union representatives" and (iii) resources (time, money, staff and infrastructure). Other organisational barriers were: "changes in organisational structure/work environment" (for example, outsourcing of department individuals), 'organisational climate' (for example, pre-existing conflicts and conflicting priorities) and lack of "experience with (workplace) health promotion". In the intervention phase, identified barriers referred to (a) the (in)appropriateness of the "intervention approach/concept/format" (for example, [non]-use of a participatory approach); (b) "procedural aspects of the intervention" (for example, unrealistic time schedule as obstacle; a timely start of the intervention as

facilitator); (c) "fit between the intervention and structures/expectations"(referring to (dis)harmony of the intervention with existing organisational processes and structures, including the compatibility of the intervention with working hours/processes); (d) "interactivity and interactivity-influencing structures" (for example, the presence/absence of role conflicts); and (e) "an (un)favourable climate during the intervention as well as the quality of communication" (for example, lack of face-to-face communication and multiple communication channels). A detailed summary of barriers and facilitators is provided as Table 4 in the body of the report.

Q4: What does the evidence suggest regarding the role and impact of organisational factors, leadership, systems, policy, workplace culture, work design and work processes?

Building evidence in these complex domains is more challenging and therefore an ongoing 'work in progress'. Nonetheless, the major international and national health agencies (CDC, WHO, NIOSH, NICE, WHAA) are consistent in stipulating leadership and workplace culture very prominently and typically place this in the first position within the frameworks and models identified. Workplace Health Association of Australia (WHAA) elucidates the role of the leader/CEO as follows: (i) creating the vision (e.g. mission statement), (ii) connecting the vision to organisational values, strategy, practice and policy (i.e. build a health culture); (iii) gaining budget and resource commitment, (iv) educating and engaging senior management; (v) sharing the vision with employees, (vi) serving as a role model ('walk the talk'), (vii) ensuring accountability and responsibility (for instance, KPI's for senior management), (viii) rewarding success (for example, incentives, public recognition), (ix) adapting the program content and delivery in light of new findings (i.e. keeping the program current, relevant and efficacious), and (x) integration of work systems/functional units, in particular the integration of OH&S with employee health and wellness initiatives. The National Institute for Health and Care Excellence (NICE) has published (on the basis of reviewed evidence) 2016 guidance and recommendations on improving the health and wellbeing of employees, with a focus on organisational culture and the role of line managers. Guidance is provided in 11 categories, spanning the main substance of Question 4. Interactive links are provided in the main report. A new (2017) framework for leadership development has been developed by researchers; whilst Scandinavian in origin, it represents a useful starting point for considering such a framework for the Australian context. Detailed evidence and principles for better work design processes in the Australian context has recently been issued by Comcare.

Gaps in the evidence

The Research Compendium developed by National Institute for Occupational Safety and Health (NIOSH) provides a comprehensive analysis with a specific section devoted to this issue: Research Agenda: Gaps in Current Literature and Key Issues to be Addressed in Future Research (pp. 32-45 of the Compendium).

The model developed in this Evidence Check, Workplace Wellness 3.0 distinguishes between components supported by Strong and Moderate (Sufficient) evidence respectively. A priority research agenda may be summarised as undertaking implementation and scaling-up research to turn the Moderate evidence into Strong evidence.

With respect to evaluation and evaluation research, important development work has been done by Sorensen and colleagues in the domain of integrated approaches to health protection and health promotion (also known as Total Worker Health™). A large team of researchers have set out a proposed definition of integrated approaches to worker health, accompanied by indicators and measures that may be used by researchers, employers, and workers. The metrics and indicators are included as Table 7 in this report.

Discussion of key findings

From the perspective of a regulatory agency there is nothing specific or unique from the evidence identified in this review to preclude or include specific functions for a regulator. Effective programs are available but the evidence indicates that their effectiveness is driven by good fundamental design (crucially including stakeholder engagement), appropriate targeting, optimal and efficient use of information and communications technology, and customised approaches based on a robust HRA process. The definition of quality standards by Government is an option to consider, overall, and especially in the case of third party providers. So, the core strategic implication for the government to consider is about evidence-based specification for procurement, or for auditing the quality of third party service provision, and the complementarity of any state government approach with that undertaken at the federal level, for example under the auspices of Comcare and in accordance with the (Federal) Work Health and Safety Act 2011.

Table 7 in the main report summarises the main implications from the Evidence Check with respect to the NSW jurisdictional context by considering three criteria: (a) Potential linkage or synergy with the Work Health and Safety Roadmap for NSW 2022, (b) Feasibility or relevance for a regulatory agency such as SafeWork NSW, and (c) Appropriateness and applicability for the NSW context.

Conclusion

The main strategic implications for the NSW government to consider are threefold: (i) evidence-based specification for procurement and/ or auditing the quality of any third party service provision that may be considered, (ii) considering the advantages of an integrated approach to workplace wellness/OH&S/TWH through one lead government agency, and (iii) ensuring the complementarity of any state government approaches with that undertaken at the federal level, for example under the auspices of Comcare and in accordance with the (Federal) Work Health and Safety Act 2011.

Key messages

This report is presented in sections. The key messages from each are highlighted below.

Situational analysis

Situational analysis provides a situational and trend analysis from a Global, Regional and National perspective. The evolution of Workplace Wellness over the past decade has featured the following innovations:

a) Use of Health Risk Appraisal (HRA)
b) Use of incentives (including financial)
c) Integration (with EAP, with more holistic designs)
d) Use of digital technology, social media and customisation of programs
e) Extension to the family and wider community
f) Much more sophisticated metrics, increasingly tied to corporate objectives.

Global predictions for the future of Workplace Wellness suggest that:

(i) Governments and businesses alike will be highly motivated to reverse the current trend of an unhealthy workforce
(ii) Wellness at work will gain further momentum globally in the next 5–10 years
(iii) Organisations will need to adopt a wellness culture as the default, not the exception, to attract and retain good staff
(iv) Companies will recognise that doing right by employees and by the community makes good business sense
(v) The healthiest workplaces of the future may become 'desirable destinations' where people go to improve their wellness.

The next generation of more effective programs is predicted to combine a comprehensive approach together with interventions targeting high-risk individuals and incorporating a dose–response model of increasing levels of intensity whilst making optimal use of digital strategies. A revised, third generation model (Workplace Wellness 3.0) is identified in this evidence review.

Results

This section provides an overview and bibliometric analysis of the evidence. There was substantial growth in research conducted in the area of workplace health, with an accelerating trend over the decade from 2007. Alcohol is poorly represented in the research evidence.

Findings

Findings provides detailed evidence on (i) effectiveness (ii) essential program components, and (iii) implementation success factors.

There is strong evidence that lifestyle management interventions as part of workplace wellness programs can reduce risk factors such as smoking and increase healthy behaviours such as exercise and healthy eating; these effects are sustainable over time and are clinically meaningful. There is evidence of effectiveness for interventions to prevent type 2 diabetes and to tackle obesity/overweight in the workplace; however, interventions vary substantially in their effectiveness. The greatest weight loss is achieved only

through intensive lifestyle interventions of at least four months in duration that implement a structured, established program.[1]

For musculoskeletal (MSK) injuries (including back pain), there is strong evidence that duration away from work from both MSK or pain-related conditions were significantly reduced by multi-domain interventions encompassing at least two of three stipulated domains: (i) health-focused, (ii) service coordination, and (iii) work modification interventions. Strong evidence supports workplace-based resistance training exercise programs to help prevent and manage upper body musculoskeletal disorders and symptoms. There is moderate evidence that stakeholder participation and work modification are more effective and cost effective at returning to work adults with musculoskeletal conditions than other workplace-linked interventions (including exercise).

Essential key components and principles identified in this evidence review are encapsulated in a newly proposed, third generation model for workplace wellness programs, Workplace Wellness 3.0; see 'Evidence-at-a-glance'.

There is good quality research on the barriers to and facilitators of implementation. The practical implication of this is for policymakers and practitioners to consider not only the influencing factors at different levels (contextual/organisational), but also for the different phases of implementation. The findings are summarised in Table 4.

Implications

The final sections distil the potential implications for policy and decision makers arising from the Evidence Check review findings. From a regulatory perspective, there is nothing specific or unique from the evidence identified in this review to preclude or include specific functions for a regulatory agency. Effective programs are available but the evidence indicates that their effectiveness is driven by good fundamental design (crucially including stakeholder engagement), appropriate targeting, optimal and efficient use of information and communications technology, and customised approaches based on a robust HRA process.

The main strategic policy options for the NSW government to consider are threefold: (i) evidence-based specification for procurement and/ or auditing the quality of any third party service provision that may be considered; (ii) considering the advantages of an integrated approach to workplace wellness/OH&S/TWH coordinated through one lead government agency; and (iii) ensuring the complementarity of any State government approaches with that undertaken at the federal level, for example under the auspices of Comcare[2] and in accordance with the (Federal) Work Health and Safety Act 2011.[3] The policy implications and options in NSW are mapped by the key components of the third-generation model (Workplace Wellness 3.0) overleaf.

[1] The Diabetes Prevention Program (DPP)

[2] http://www.comcare.gov.au/about_us

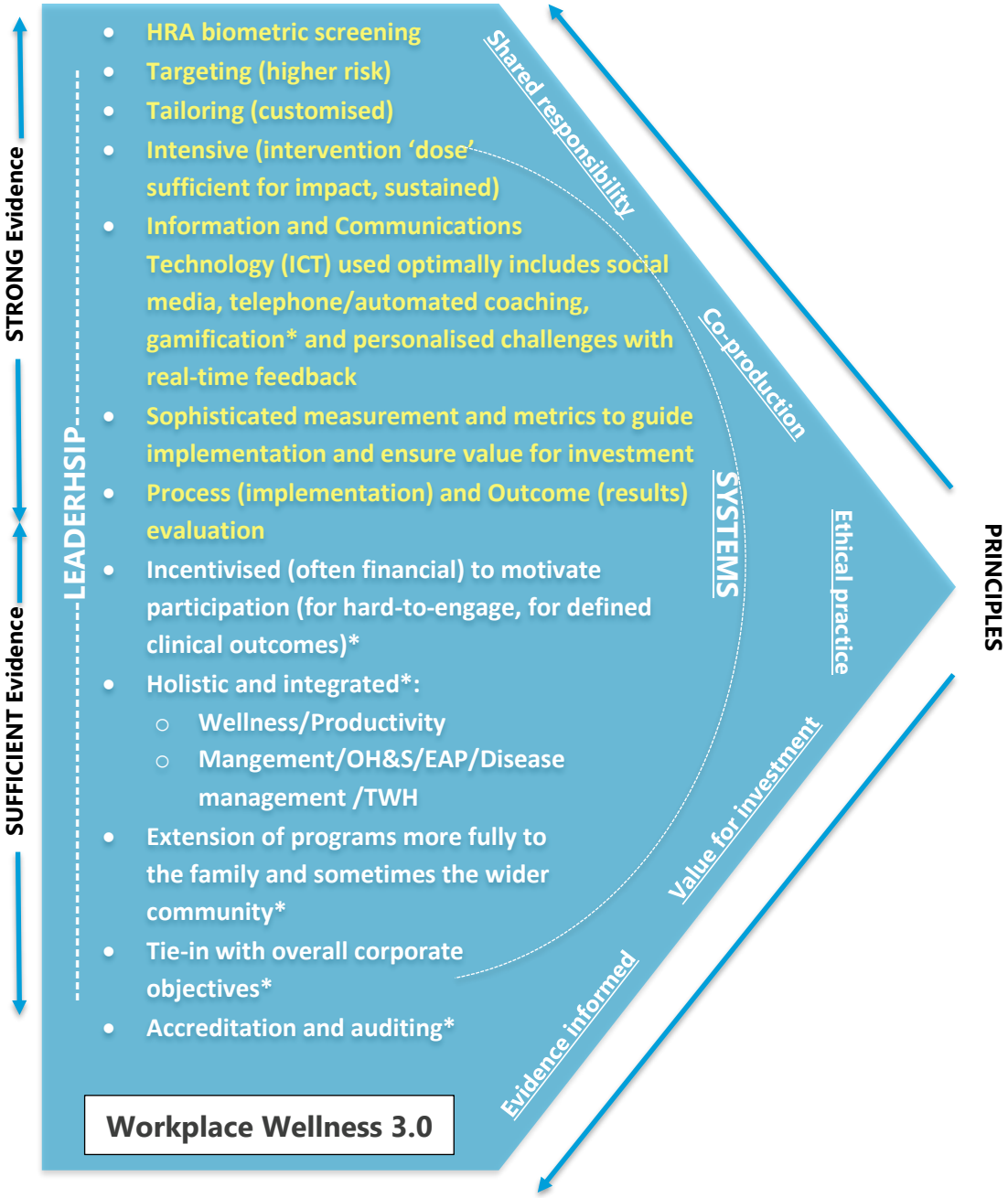
[3] https://www.legislation.gov.au/Details/C2015C00472

Analysis of key components of Workplace Wellness 3.0 to suggest policy implications and options in NSW

	Criteria		
Strategic Component	Linkage/synergy with Work Health and Safety Roadmap for NSW 2022	Regulatory agency relevance/feasibility	Appropriateness, applicability for NSW context
	See Figure 11		
Focus on NCD prevention, wellness, health and safety	✓	✓	✓
Incorporate HRA, biometric screening	✓	✓	✓
Incorporate targeted approaches (high-risk)	Includes a high-risk/'hot-spot' approach. ✓	✓	✓
Implement intensive and sustained programs	Not inconsistent. Piloting and phased implementation recommended in the first instance. ✓?		
Ensure optimal use of ICT including social media and telephonic coaching	Focus includes digital workplace systems, online advisory and mobile field services and digital evaluation. ✓	✓	Build on the Get Healthy at Work Model ✓
Develop and implement metrics to guide implementation & ensure value for investment	Consistent with Roadmap; requires design, system testing and implementation support ✓	Feasible (as for RoadMap). Standardised evaluation framework can be mandated for any 3rd party services providers ✓	✓
Ensure process (implementation) and outcome (results) evaluation	Essential to continue to build knowledge through continuous evaluation, especially of any innovative approaches. "*SafeWork NSW's decisions and actions will be driven by insights and evidence from data*" ✓		
Provide incentives (incl. financial) to motivate participation for hard-to-engage workers & for defined outcomes	Not inconsistent. Piloting and phased implementation recommended in the first instance. ✓?		
Develop an integrated approach to programs Wellness/Productivity management/OH&S/EAP/ Disease management/TWH	"*NSW workplaces will be managing health and safety effectively*" Functions could be managed by one lead agency spanning these integrated functions (SafeWork NSW) Piloting and phased implementation recommended in the first instance. ✓		
Program extension to include family and/or wider community	Not inconsistent. Piloting and phased implementation recommended in the first instance. ✓?		
Align programs with overall corporate objectives	✓	✓	✓
Develop quality standards and compliance monitoring	SafeWork NSW will be recognised for working with business to design innovative regulatory approaches aimed at eliminating WHS risk and improve regulatory approaches. ✓		
Develop accreditation and auditing systems	Regulatory approach is an option; workplace charter or awards programs (UK and USA models available) represent another option, perhaps through Workplace Health Association Australia?		

Evidence at a glance

The graphic below summarises the evidence for the key components and principles for the new (third) generation of workplace wellness programs, based on the current review.



Third generation workplace wellness programs: key components and principles (Bellew 2017)

** key components have **moderate strength** supportive evidence, sufficient to warrant implementation on the proviso that confirmatory process and outcome evaluation is undertaken. Other components are supported by **strong evidence.***

Introduction

SafeWork NSW would like to develop, promote and facilitate a model or framework for NSW workplaces to manage the health and wellbeing of workers. A review of national and international evidence on what has been implemented and shown to be effective will be used to inform the development of this model or framework. Bill Bellew Consulting Associates was commissioned by SafeWork NSW through the Sax Institute to undertake an Evidence Check review of the evidence around programs, frameworks and models which aim to maintain and/or improve the health and wellbeing of workers.

The agreed research questions for this Evidence Check were:

Question 1: Evidence of effectiveness

What programs, frameworks or models designed to create healthy workplaces have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

Question 2: Essential program components

Of the papers included in answering question one, what key components of the program, framework or model have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

Question 3: Implementation success factors

From the papers included in question one, what are the main barriers or facilitators to successful implementation of the program, framework or model?

Question 4: Organisational factors, leadership, systems, policies, culture, work design

What does the evidence suggest regarding the role and impact of organisational factors, leadership, systems, policy, workplace culture, work design and work processes?

Scope of the research questions

The brief for the review stipulated that the search would take account of the following principles.

Effectiveness and outcomes focussed

"Effective" should be understood as maintaining and/or improving health and wellbeing of workers. Outcomes may include (but are not limited to): reduced numbers of sick days, staff satisfaction, return on investment (ROI), increased productivity. Other outcomes presented in the studies may also be included.

Research was confined to:

- Programs, frameworks or models that have been implemented and evaluated
- Programs that could be implemented or funded by a government regulator
- Evidence published since January 2007 to the present.

Take account of specified areas of interest to SafeWork NSW

- Programs that aim to maintain or improve health and wellbeing, rather than those with a focus on workplace safety, and include the Total Worker Health™ concept
- Prevention and management of both communicable diseases (e.g. through vaccination programs) and chronic disease Programs that have been effective in maintaining or improving health and wellbeing through (but not limited to): systems and practices; work design; flexible working arrangements; task design; other as needed.
- Identification of models, frameworks and programs that may be applicable across a range of industries and workplaces programs

- Less emphasis and/or exclusion of areas of lower interest
- The focus of the review is not on programs targeted specifically at mental health; however, where mental health is included as part of an overall approach this can be considered.
- The focus of the review is not on legislation per se; however, where legislation/ regulation has supported the implementation of programs to improve worker health and wellbeing this can be considered.
- The focus of the review is not on workplace safety per se but rather on health and wellbeing, including the Total Worker Health™ concept; however, where workplace safety is integral to programs or models this may be considered.

Situational analysis

Global situational analysis

This section is designed to provide a situational and trend analysis from a ***global*** perspective. The Global Wellness Institute's report, *The Future of Wellness at Work* identifies some of the main global trends influencing the development of Workplace Wellness Programs.[1] These are illustrated below in Figure 1.

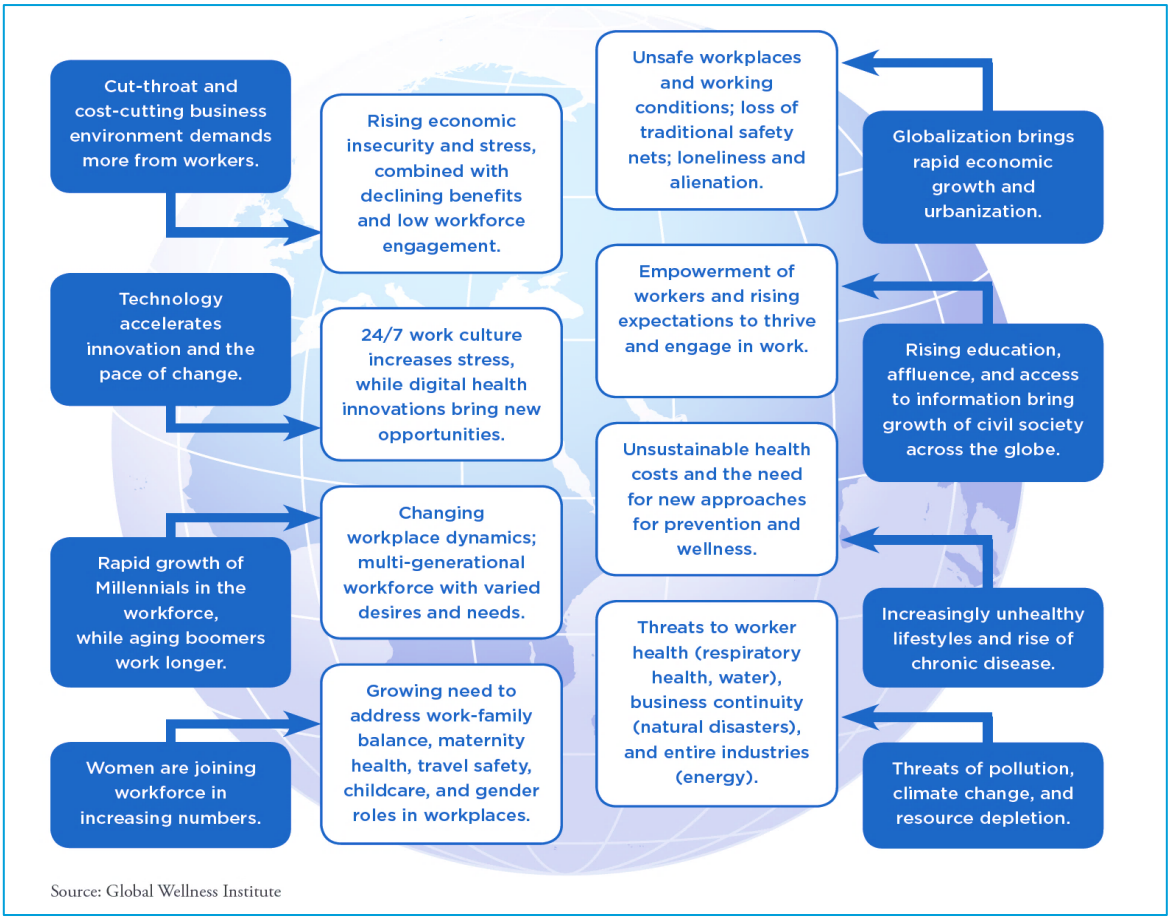


Figure 1 - Global trends influencing Wellness Programs

Source: Global Wellness Institute (2016)[1]

A combination of global factors is influencing the relationship between work and personal wellness. Some of the trends in these factors are positive: for example increasing numbers of women in the workplace, rising levels of education and access to information, digital health innovations, and growing worker empowerment. However, many of these trends are suggesting a path towards ever-increasing levels of economic insecurity, stress, and healthcare costs in the future. The Global Wellness Institute predictions include the following developments (adapted):

- Companies and governments will be highly motivated to reverse the current trend of an unwell workforce.
- Wellness at work will gain further momentum globally in the next 5–10 years.
- Organisations will need to adopt a culture of wellness as the default, not the exception, if they want to attract and retain good staff.
- Companies will recognise that doing right by employees and by the community is good business.
- The healthiest workplaces will become 'desirable destinations' where people go to improve their wellness.[1]

The recent reports from the Global Survey of Workplace Wellness Strategies provide a useful situational analysis.[2, 3]

Evolution of workplace wellness programs

The evolution of wellness programs over approximately the past decade is depicted below in Figure 2 as three generations — from Wellness 1.0 through to Wellness 3.0. Key characteristics of that evolution include: (a) use of Health Risk Appraisal (HRA); (b) use of incentives (including financial); (c) integration (with EAP, with more holistic designs); (d) use of digital technology, social media and customisation of programs; (e) extension to the family and wider community; and (f) much more sophisticated metrics, increasingly tied to corporate objectives.

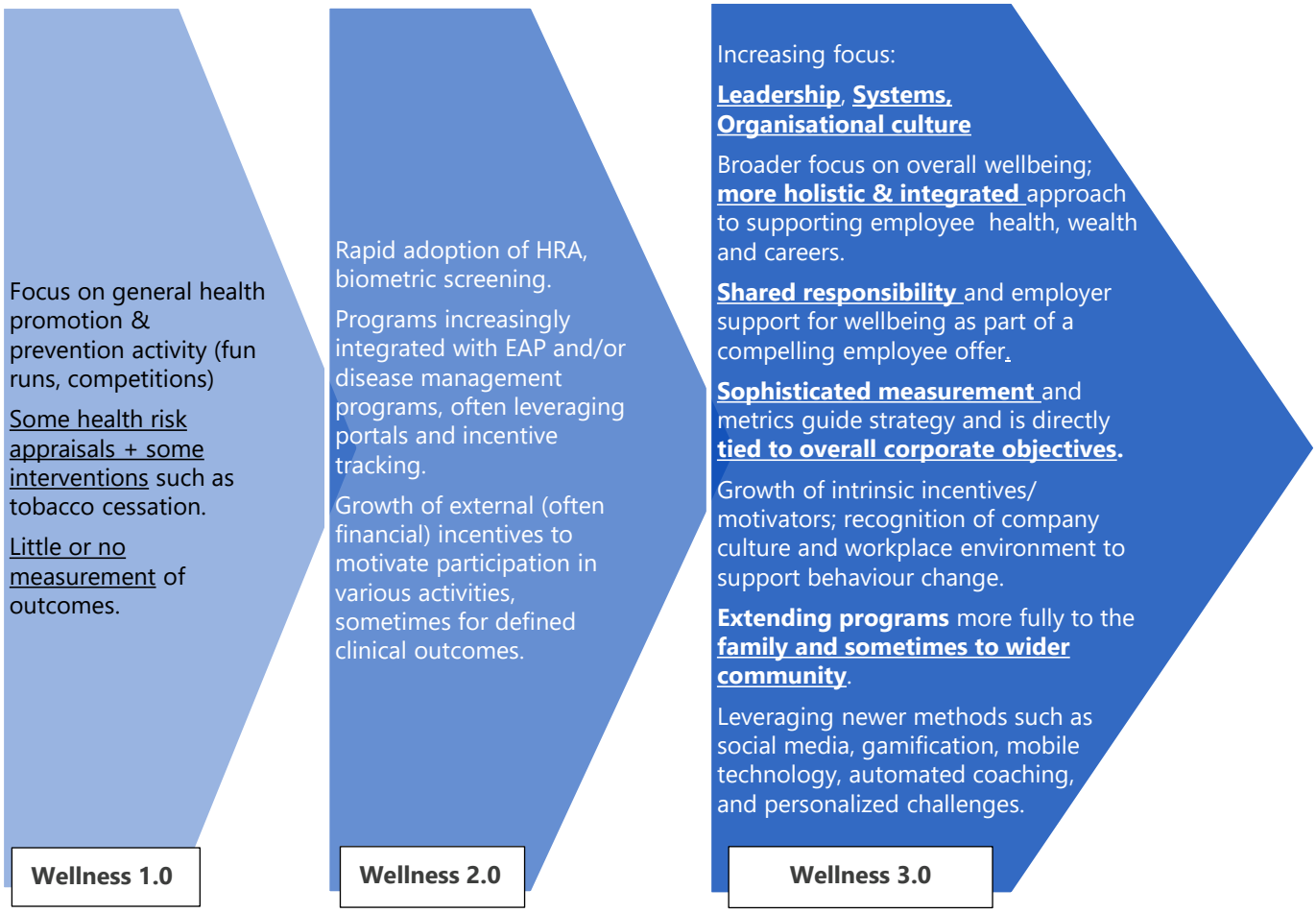


Figure 2 - Evolution of workplace wellness programs

Factors driving workplace wellness programs

Table 1 shows the main drivers of wellness program design (in terms of modifiable risks and issues). Physical activity and stress are the top priorities globally and in Australia. Workplace safety is of highest importance in Asia, Africa/Middle East and Latin America. Figure 4 shows the fasting growing program components and especially the growth of telephonic support and lifestyle coaching services.[3]

Table 1 - Extent to which certain health risks and issues drive wellness strategy – by region

	All regions*	Africa/ Middle East	Asia	Australia /NZ	Canada	Europe	Latin America	United States
Stress	1	2	4	2	1	1	2	3
Physical activity/ exercise	2	5	2	1	2	2	4	1
Nutrition/healthy eating	3	8	6	3	3	3	5	2
Workplace safety	4	1	1	5	9	6	1	12
Work/life issues	5	2	13	4	6	4	8	9
Depression/anxiety	6	8	11	8	5	5	7	10
High blood pressure (hypertension)	6	5	4	12	6	12	9	6
Chronic disease (e.g. heart disease, diabetes)	8	12	8	8	3	10	11	4
Personal safety	9	5	3	10	10	11	6	15
Psychosocial work environment	10	10	7	11	12	7	3	14
Sleep/fatigue	11	12	10	6	11	9	12	11
High cholesterol (hyperlipidemia)	12	15	9	14	8	12	10	7
Obesity	13	12	15	6	12	14	13	5
Tobacco use/smoking	14	16	12	13	14	8	14	8
Infectious diseases/AIDS/HIV	15	2	16	16	17	17	17	17
Substance use	16	10	17	15	15	16	16	16
Maternity/newborn health	17	17	14	16	16	15	15	13
1=highest impact, 17=lowest impact				Ranked 1st		Ranked 2nd	Ranked 3rd	

Source: Xerox Corporation 2014[3]

Table 2 - Fastest growing workplace wellness components by region (2014)

All regions	Africa/ Middle East	Asia	Australia/ NZ	Canada	Europe	Latin America	United States
Telephonic physician support (telemedicine services)	Cycle to work program	On-site childcare	On-site employee health fairs	Telephonic physician support (telemedicine services)	Personal health record (electronic summary of personal health information)	Telephonic physician support (telemedicine services)	Telephonic physician support (telemedicine services)
Cycle to work program	Environmental support*	Cycle to work program	Telephonic lifestyle coaching	Other on-site services	On-site healthy lifestyle programs and coaching**	Telephonic lifestyle coaching	Cycle to work program
On-site childcare	On-site childcare	Other internet tools (provider quality and cost information)	Telephonic chronic disease management support or coaching	Health risk appraisal (health and lifestyle questionnaire)	Health risk appraisal (health and lifestyle questionnaire)	On-site childcare	On-site healthy lifestyle programs and coaching**
On-site healthy lifestyle programs and coaching**	Telephonic chronic disease management support or coaching	Work/life balance support (e.g. legal, financial services, elder or child care support)	Telephonic physician support (telemedicine services)	Cycle to work program	Telephonic chronic disease management support or coaching	Work/life balance support (e.g. legal, financial services, elder or child care support)	Personal health record (electronic summary of personal health information)
Personal health record (electronic summary of personal health information)	Ergonomic adaptations and awareness	On-site employee health fairs	Other internet tools (provider quality and cost information)	On-site occupational health programs	On-site childcare	Other internet tools (provider quality and cost information)	On-site medical facility

Source: Xerox Corporation, 2014[3]

Australian situational analysis

Table 1 shows that physical activity, stress, and nutrition/ healthy eating are the top three risk influencers for employers in Australia and New Zealand. Employer perceptions of the ***relative importance*** of workplace wellness program objectives are shown below as Figure 3, with utilitarian factors featuring prominently but by no means exclusively. It is perhaps not too surprising that in the Australian context, reducing health care or health insurance costs is less of priority than in systems where this might feature more prominently as a corporate benefit; this factor was seen to be extremely or very important to 37% of employers (compared with 88% in the USA).

Perceived program importance to Australian/NZ employers

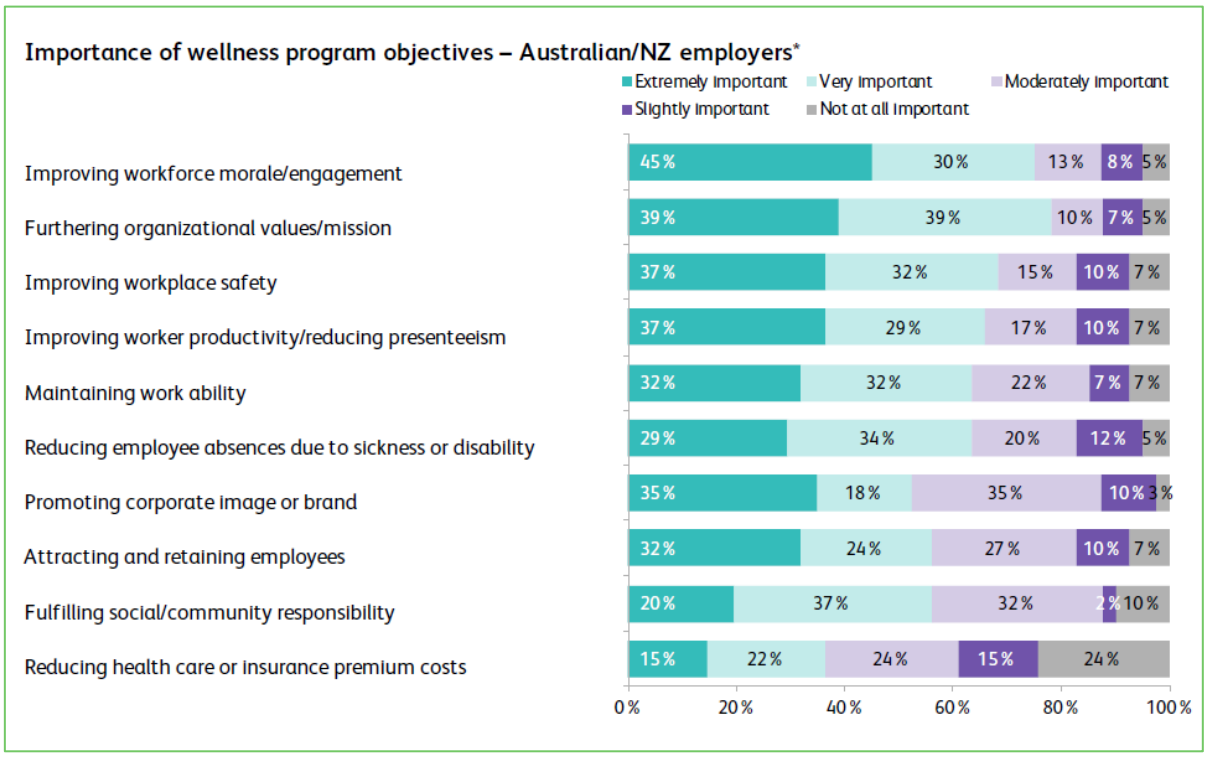


Figure 3 - Relative importance of program objectives to Australian and NZ Employers
Source: Xerox Global Survey (2014)[3]

In the 2016 Global Health Survey (below) improving performance and productivity rose from 4th to 1st place in order of importance (global ranking).[2]

Figure 4 – Workplace wellness objectives for Australian Employers

Workplace Wellness Program Components in Australian and New Zealand

The components of Workplace Wellness Programs in Australia and New Zealand are shown in Figure 5 below.[3] In Table 2 telephonic lifestyle coaching services (such as Get Healthy at Work) and clinical (NCD) support services were noted among the fasted growing components in Australia/NZ; Figure 4 shows that these components feature in 37% and 28% respectively of Workplace Wellness programs (current, planned in next one to three years), which may indicate scope for further uptake of these particular program components.

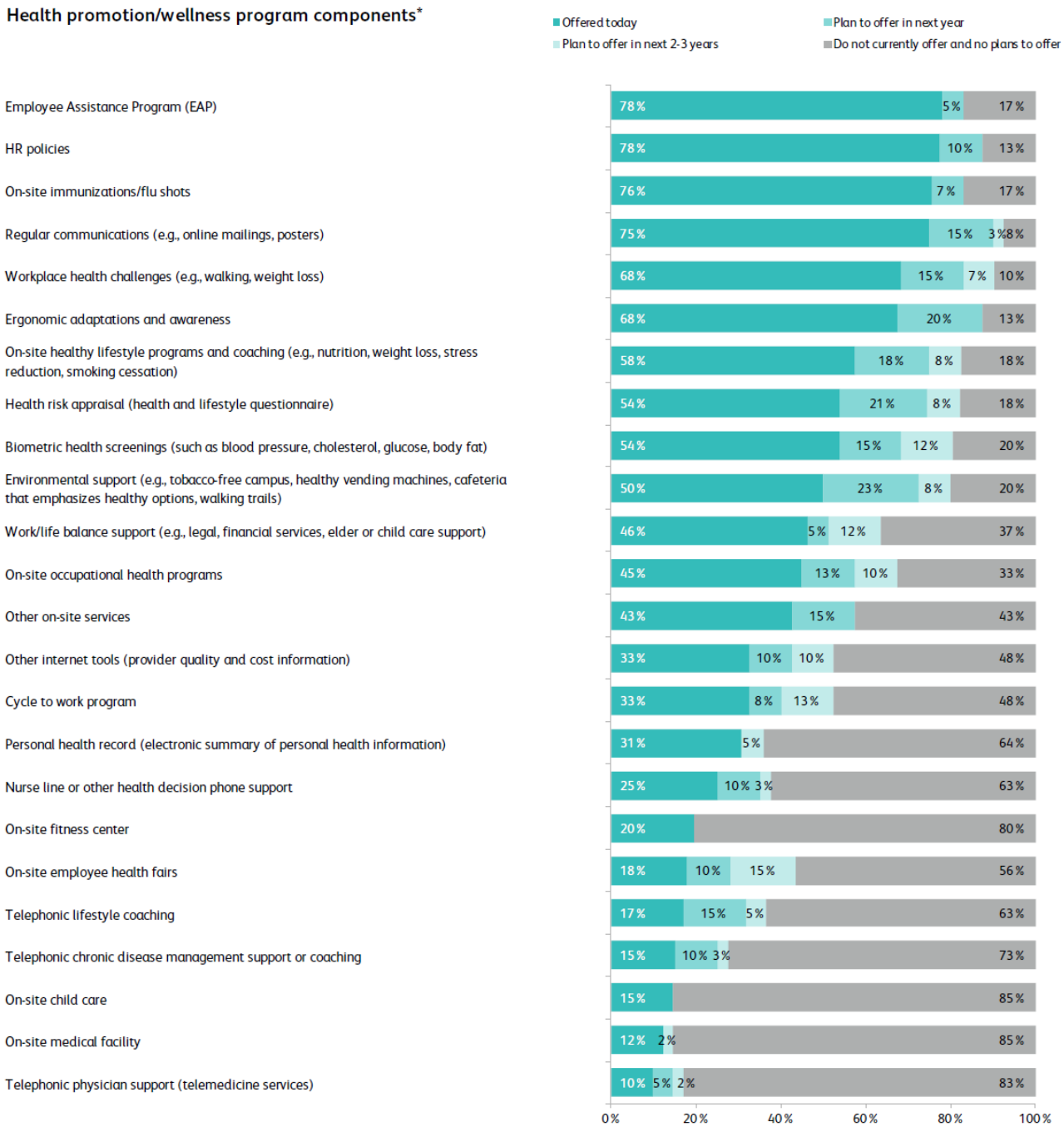


Figure 5 - Workplace wellness program components – Australia / New Zealand (2014)

Method

Rapid reviews

BBCA works closely with clients in agreeing the initial scope of the review and the research questions to be addressed. We then undertake what we call a 'sentinel review', which is an even more rapid scan than Evidence Check and helps us predict whether the questions can be addressed through recent systematic review level evidence of sufficient quality to obviate the need for searching for individual randomised controlled trials (RCTs), quasi-experimental and longitudinal studies. Whilst this can provide a more comprehensive analysis, it is much more resource intensive and is usually out of scope. We typically take the most recently available systematic review of acceptable quality as a marker in time to commence our search for subsequently published studies; the individual studies are only included if it is considered that they will change the strength of the evidence for a given program/ intervention or provide some unique and valuable insights for policymakers.

Levels and strength of evidence

Having undertaken many rapid reviews, including those focussed on the workplace setting, we recommend and have worked consistently with the protocol used by the US Community Preventive Services Task Force (The Community Guide)[4]; this approach is helpful in identifying the strength of a body of evidence. The approach is consistent overall with NHMRC, but provides better flexibility when different levels of evidence may need to be considered in an integrated way with respect to a given program, strategy or framework. The approach has been described in detail by Briss and colleagues.[4]

Tabulation of selected papers

Selected studies for which there is strong or sufficient evidence (as per The Community Guide protocol) and which were most salient in the Evidence Check conclusions are featured as Appendix 6. The full database of studies was also provided to SafeWork NSW and The Sax Institute; an overview is featured as Appendix 7.

Our overall approach explained

The process map of our methodology is discussed in Appendix 2 together with the results of the sentinel search.

[4] https://www.thecommunityguide.org/task-force/community-preventive-services-task-force-members

Results

After removal of duplicates, the search resulted in 296 records: 271 from the sentinel search, full and grey literature search (Group A), and 25 from the search of more recently published RCTs and longitudinal studies not already captured in systematic reviews (Group B) — see the PRISMA flow diagram in Appendix 3.

A coding framework was developed iteratively, based on the categories of interest to SafeWork NSW and on the content coverage of retrieved studies. This was then re-applied to all retrieved studies for both Group A and Group B. Studies could appear in more than one category so that the cumulative total exceeds the actual number of records. The larger, cumulative total was used as the denominator for the analysis. A bibliometric analysis by category is shown below as Figure 5. 'Physical Activity' focussed (including sedentary behaviour) studies were the most numerous (39 or 11% of the total), followed by Mental Health/Stress (34 or 10% of total). Alcohol (3) was the category with the fewest retrieved studies. Studies conducted in Australia/by Australian researchers (34) made up 10% of retrieved studies in this bibliometric analysis.

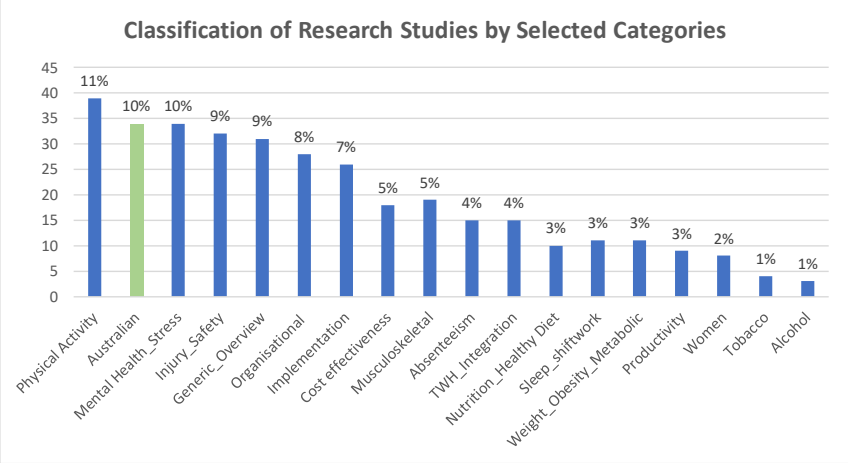


Figure 6 - Bibliometric analysis of studies 2007-2017 by strategic theme

A bibliometric analysis by year of publication is shown below as Figure 7. Overall, analysis of the database resulting from the search strategy suggests an increasing trend over the past decade from the lowest number in 2008 (9) to the highest in 2016 (43). Figures for all of 2017 were not available at the time of the analysis.

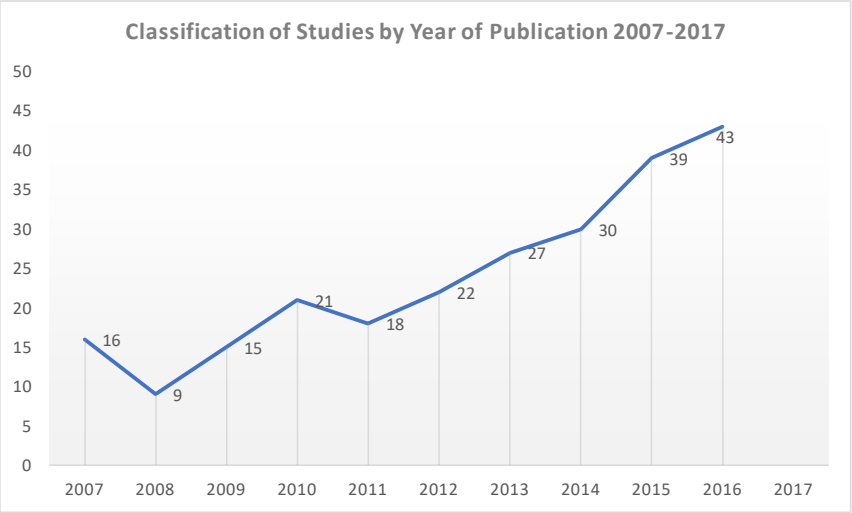


Figure 7 - Bibliometric analysis of studies 2007-2017 by year of publication

Overview of evidence by selected categories

Appendix 6 provides the full list of studies retained in the database after screening for relevance, redundancy and/or duplication. These were further screened and prioritised so that not all listed studies were cited in the final synthesis but are provided for completeness (see PRISMA flowchart, Appendix 3).

Findings

Research Question 1: Evidence of effectiveness

What programs, frameworks or models designed to create healthy workplaces have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

In assessing the evidence of effectiveness, we were able to draw (after initial screening) on more than 120 systematic reviews and 25 more recent RCTs or longitudinal studies.

NCD risk factors: Tobacco, nutrition, physical activity, type 2 diabetes, healthy weight

There is strong evidence that lifestyle management interventions as part of workplace wellness programs can reduce risk factors such as smoking,[5-7] and increase healthy behaviours such as physical activity[8-23] and healthy eating; [20, 21, 24-26] these effects are sustainable over time and are clinically meaningful. There is evidence of effectiveness for interventions to prevent type 2 diabetes and to tackle obesity/overweight in the workplace; however, interventions vary substantially in their effectiveness. The greatest weight loss is achieved only through intensive lifestyle interventions (that is, at least 4 months in duration) that implemented a structured, established program.[5] By contrast, weight reduction was minimal among less intensive interventions, and/or those that did not comply with the specifications of the established model. Further, more work is needed to refine efforts to address socio-economic inequalities in obesity.[27-29]

Musculoskeletal health and back pain

The evidence with respect to impacts on absenteeism covered several themes. For musculoskeletal (MSK) injuries (including back pain), there was strong evidence that duration away from work from both MSK or pain-related conditions were significantly reduced by multi-domain interventions encompassing at least two of three stipulated domains: (i) health-focused, (ii) service coordination, and (iii) work modification interventions.[30] In addition, there was evidence that stakeholder participation and work modification are more effective and cost effective at returning to work adults with musculoskeletal conditions than other workplace-linked interventions, including exercise.[31] There was also strong evidence that a workplace-based resistance training exercise program can help prevent and manage upper body MSK disorders and symptoms, and there was moderate evidence for the effectiveness of stretching programs, mouse use feedback and forearm supports.[32] A 2014 review identified a management model to reduce absenteeism involving six steps: (i) time off and recovery period, (ii) initial contact with the worker, (iii) evaluation of the worker and his/her job tasks, (iv) development of a return-to-work plan with accommodations, (v) work resumption, and (vi) follow-up of the return-to-work process. The researchers recommended that this model be included within a broader policy of health promotion and job retention.[33]

Productivity

Evidence on the productivity dimension of workplace wellness programs was derived from 7 retrieved studies.[3, 16, 26, 34-37] Current evidence of the impact of onsite workplace physical activity programs on worker productivity was inconsistent; we await further evidence.[16] One US study across 49 States concluded that reducing multiple health risk behaviours was associated with emotional and physical health, better functioning and productivity.[35] A 2011 review concluded that well-targeted and efficiently implemented diet-related worksite health promotion interventions may improve labour productivity by one to two per cent; in larger workplaces; these productivity gains were deemed likely to be cost-effective.[26] A systematic review of the effects of cancer treatment provided insights that impaired productivity was associated with: (a) disease-and treatment-related effects (for example,

[5] The Diabetes Prevention Program (DPP)

disease progression and severity), (b) cognitive and neurological impairments, (c) poor physical and psychological status, (d) receipt of chemotherapy, and (e) time and expenses required to receive therapy.[34] The TWH model has been used to identify the Employer Health and Productivity RoadMap™. The Roadmap is designed to provide an integrated and incentivised strategy for employers to address the core drivers of poor health, excessive medical costs, and lost productivity. It comprises six interrelated and integrated core elements: (i) optimise environment, (ii) increase healthy behaviours, (iii) minimise avoidable or inefficient acute care, (iv) optimise chronic care, (v) reduce excessive surgery, and (vi) speed transitions from care to home and work.[36]

Organisational factors

With respect to organisational factors, the review found moderate evidence in support of systems approaches[38], including the establishment of a health promoting culture and using strategic communications.[39] Key elements that contribute to a culture of health are: (i) leadership commitment, (ii) social and physical environmental support, and (ii) employee engagement and involvement.[39, 40] Strategic communications are those designed to educate, motivate, market offerings and build trust. They are tailored and targeted, multi-channelled, bi-directional, with optimum timing, frequency, and placement.[39] One review found that small businesses tend to have distinctive social relations of work, apprehensions of workplace risk, and legislative requirements; it questions moves to exempt small businesses from OHS regulations and suggests a legislative focus on their particular needs, together with recommendations for third party interventions and improved worker representation.[41] The psychosocial and health effects of workplace reorganisation have been examined in two coordinated systematic reviews that addressed: (i) organisational-level interventions that aim to increase employee control[42], and (ii) task restructuring interventions.[43] These reviews concluded that: (a) some organisational-level participation interventions may benefit employee health (the demand-control-support model),[6] but may not protect employees from generally poor working conditions — more investigation of the relative impacts of different interventions and the distribution of effects across the socioeconomic spectrum is required[42]; and (b) task-restructuring interventions that increase demand or decrease control adversely affect the health of employees and conversely, those that decreased demand and increased control resulted in improved health.[43] This is recognised in policy initiatives such as the EU directive on participation at work, which aims to increase job control and autonomy.[7]

Health Risk Appraisal/Assessment (HRA) and cost-effectiveness

The use of Health Risk Appraisals/Assessments (HRAs) is increasingly being incorporated in the design of a Workplace Wellness Program (WWP) and in Australia is expected to rise from 54% incorporation to over 80% in the next few years.[2, 3] There is strong evidence for the effectiveness of HRAs (when used in combination with other interventions) in relation to favourable impacts on tobacco use, alcohol use, dietary fat intake, blood pressure and cholesterol. There is sufficiently strong evidence to suggest that for every dollar invested in these programs (HRA+ program combinations) an annual return of $3.20 (range $1.40 to $4.60) can be achieved; this is described in more detail in a 2012 Australian review.[44] There is promising evidence that even higher returns on investment can be achieved in programs incorporating newer technologies such as telephone coaching of high risk individuals, together with the use of financial incentives; more research is required to be definitive on this point.

Total Worker Health™ (TWH)

TWH was of particular interest in this review. Feltner and her colleagues conducted a comprehensive systematic review to evaluate evidence on the benefits and harms of integrated TWH interventions.[45] This is a promising concept and one which has significant strategic momentum in the USA. Current evidence indicates that integrated TWH interventions could reduce tobacco use and sedentary behaviour and improve the diet of

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[6] The Demand-Control-Support Model

[7] EurWORK: European Observatory of Working Life

workers, but effects of these interventions on injuries and overall quality of life are not known; the TWH model overall will benefit from further confirmatory evidence.

Program evolution

The evolution of Workplace Wellness over the past decade has featured the following innovations:

(a) Use of Health Risk Appraisal (HRA)

(b) Use of incentives (including financial)

(c) Integration (with EAP, with more holistic designs)

(d) Use of digital technology, social media and customisation of programs

(e) Extension to the family and wider community

(f) Much more sophisticated metrics, increasingly tied to corporate objectives.[2, 3]

The next generation of more effective programs may combine a comprehensive approach together with interventions targeting high-risk individuals and incorporating a dose–response model of increasing levels of intensity whilst making optimal use of digital strategies.[1, 44] Linked telephonic lifestyle coaching services (such as Get Healthy at Work) and clinical (NCD) support services were noted among the fastest growing components in Australia and New Zealand.[2, 3] Yet these components only feature in 37% and 28% respectively of current programs (or programs planned in the next one to three years), which may indicate scope for further uptake of these particular program components.

Safety and mental health

Injury/safety[46-57] and mental health[30, 38, 58-70] were not stipulated as areas to investigate in this review. Whilst not explored in any detail here, for completeness, the relevant evidence retrieved in these areas was retained in the database and is fully referenced.

Additional research not yet included in systematic reviews

From our analysis of RCTs and cohort research not captured in systematic reviews, 12 studies were retained.[70-81] These strengthened the evidence base as follows:

Recent individual studies

For mental health, the 2016 Australian study by Jarman and colleagues is noted here for its potential interest to NSW and other policymakers.[70] The study investigated the association between mental health and comprehensive workplace health promotion (WHP) delivered to an entire state public service workforce (~28,000employees) over a three-year period. Government departments in Tasmania's public service were supported to design and deliver a comprehensive, multi-component health promotion program, Healthy@Work, which targeted modifiable health risks including unhealthy lifestyles and stress. Repeated cross-sectional surveys compared self-reported psychological distress (Kessler-10; K10) at commencement (N=3406) and after 3 years (N=3228). Healthy@Work was successful in attracting participation from men with higher than average psychological distress, and in increasing participation among women with poorer mental health scores. While these contributions were important, they did not translate to a change in men's mental health and only made a partial contribution to the observed reduction in women's psychological distress over time. These researchers concluded, nevertheless, that scope remains for comprehensive WHP to prove its worth as a universal intervention for mental health because direct interventions have evidence of success and because they provide a pathway that raises the profile of mental health, thereby reducing its stigma.[70] Other research from this project found that workers who had variable work schedules, those who smoked, or who had cardio-metabolic problems were less likely to participate despite activities being available. Participation was more common among administrative employees and workers who undertook leisure-time physical activity.[70] Given the evolving evidence identified in this review, this finding from Tasmania invites us to carefully consider the

importance of targeted and tailored approaches through HRA, matched with financial and other incentives for Australian programs.

Diabetes/metabolic conditions

For prevention of diabetes/metabolic disorders, two studies from the USA were retained: FUEL Your Life[71] and Steinberg et al.[76]

FUEL Your Life (a low intensity intervention) was translated from the Diabetes Prevention Program to better fit within the worksite context. The main difference under scrutiny was the use of peer health coaches to provide social support and reinforcement and an occupational nurse to provide lesson content (six sessions of 10 minutes) to participants instead of the lifestyle coaches employed by the Diabetes Prevention Program, resulting in a less structured meeting schedule. Participants in the intervention program maintained weight/BMI (-.1 pounds/-.1 BMI), whereas the control participants gained weight/BMI (+2.6 pounds/+.3 BMI), resulting in a statistically significant difference between groups. The program was not effective for promoting weight loss, but was effective for helping workers maintain weight over a 12-month period.[71]

Steinberg and colleagues evaluated a year-long program that included a limited genetic profile, a traditional psychosocial assessment, and high intensity coaching in a randomized controlled study of employees with an increased risk for metabolic syndrome. Employee engagement of 50% was sustained over the course of 1 year; 76% of participating employees lost an average of 10 pounds (4.5 kg) ($P<0.001$ vs baseline weight), and there were trends in improved clinical outcomes relative to three of five metabolic factors. Average health care costs were reduced by $122 per participant per month, resulting in a positive ROI in the program's first year. The researchers concluded that at scale, such programs would be expected to lead to significant downstream reduction in major clinical events and costs.[76]

Self-management of chronic diseases and conditions

In NCD self-management, the recent study by Schopp and colleagues provides the first empirical validation of the Chronic Disease Self-Management Program for a general employee population in a workplace setting with an emphasis on disease prevention and health promotion. Although based on three-month follow-up only, it nonetheless shows that adapting a lay-facilitated NCD self-management program for the workplace holds promise as a replicable, scalable, affordable model for organisations.[77]

Integrated or TWH approach

For integration/TWH approaches, one hospital-based quasi-experimental longitudinal study found a significant increase in proximal outcomes over time in the intervention group compared with the control group, and a trend toward improvement in the distal outcomes workability and productivity. Integrating health protection and health promotion, together with a continuous improvement system promoted better staff engagement in health protection and promotion, as well as improving their understanding of the link between work and health.[75]

Work scheduling

For work organisation, one US study looking at workplace schedule control/supervisor support in the context of family life was retained. The setting was the Information Technology (IT) division of a US Fortune 500 company; follow-up was three months only. This workplace intervention designed to reduce employees' work-family conflict had positive effects on the regularity of adolescents' night time sleep duration, sleep quality, and time to fall asleep (although not sleep duration).[80]

Research Question 2: Essential program components

From the papers included in question one, what key components of the program, framework or model have been shown to be effective to maintain and/or improve the health and wellbeing of workers?

The previous section summarised the evidence for effectiveness of programs addressing prevention of NCDs, musculoskeletal health, safety, stress and mental health; in addition, the TWH approach, use of HRA, cost-effectiveness, organisational factors and productivity were discussed. To describe the key components of effective programs, this section draws on three sources, the US Chambers of Commerce,[82] US Department of Health and Human Services/CDC/NIOSH,[83] and the Workplace Health Association of Australia.[84]

The essential components of workplace wellness programs was reviewed for the US Chambers of Commerce in 2016 by Prochaska, Short and colleagues.[82] According to this review: *"There is no one-size-fits-all wellness program. When designing a program, employers should rely on evidence-based best practice strategies and tailor interventions to their populations. When developing a well-designed workplace wellness initiative, consider the following evidence-based components that spell out IDEAS:*

Infrastructure
Data
Evaluation and Planning
AEI Programming
Success"

Table 3 - Evidence-based best practice components of well-designed workplace wellness initiatives

Key Components	Description
Infrastructure	Build an internal foundation to sustain wellness initiatives. An internal foundation includes senior leadership support and wellness champions and teams. A focus on well-being encompasses policy and environmental interventions designed for the workplace.
Data	Collecting baseline data is important to build a targeted workplace wellness program tailored to the population
Evaluation and Planning	After putting in place the workplace wellness infrastructure and collection of baseline data, evaluate the information collected and then move to craft a customized strategic work plan.
AEI Programming: *Awareness programs	These programs encompass a blend of awareness, education, and behaviour change interventions (AEI) that appeal to a wide variety of participants and to those who are at different levels of preparedness to change. An awareness program, for example, a health risk assessment (HRA) or biometric screening, increases participants' cognition of their own health status and of the benefits and risks of certain healthy lifestyle behaviours. They are beneficial to those who may not yet be ready to change and may help move them to think about change, prepare for change, and/or commit to action.
*Education programs	Education programs teach participants about their health, lifestyle behaviours and risks, as well as how to engage in healthy lifestyle behaviours. Education programs inform individuals about health risks and can enlighten participants about their health and well-being.
*Interventions	Interventions are typically a six-to-eight-week health behaviour change program designed to lead to sustained action and maintenance (e.g. weekly weight loss programs).
Success	Measuring, evaluating, and monitoring workplace wellness programs on a regular basis leads to success. Making regular adjustments to the program and the strategic plan helps improve engagement and outcomes.

Source: Short, L.J., Prochaska, J.O., Prochaska, J.M., Roberts, J. (2016) A Review of Employer Best Practices and Well-Designed Workplace Wellness Programs in Winning with Wellness; US Chambers of Commerce.[82]

The defining elements of the TWH approach are described in the 2016 publication from the US US Department of Health and Human Services (DHHS), CDC, and NIOSH, *Fundamentals of Total Worker Health™ Approaches*. These elements are:

- Demonstrate leadership commitment to worker safety and health at all levels of the organization
- Design work to eliminate or reduce safety and health hazards and promote worker well-being
- Promote and support worker engagement throughout program design and implementation
- Ensure confidentiality and privacy of workers
- Integrate relevant systems to advance worker well-being.[83]

For Australia, the Workplace Health Association of Australia (WHAA) has recently issued revised best practice guidelines which comprise 15 key components:[84]

1. Active support and participation by senior leadership
2. Health as a shared responsibility
3. Engagement of key stakeholders
4. Supportive environment and culture
5. Participatory planning and design
6. Targeted health interventions
7. Evidence base, standards and accreditation
8. High levels of program engagement
9. OH&S integration
10. Technology and online programs/content
11. ROI – assumptions and calculations
12. Innovative marketing and communication
13. Evaluation and monitoring
14. Commitment to ethical business practices
15. Sustainability.

We can observe elements in common across these three assessments of the essential program components, and we argue that Short, Prochaska et al. may be critiqued for the lack of environmental/safe and healthy by design approaches.[82] Additionally, the emphasis on an integrated systems approach/integration with the OHS/TWH approach, whilst appearing plausible and bureaucratically appealing in terms of possible efficiencies, is in anticipation of, rather than based on, definitive evidence of comparative effectiveness. Integration is most strongly represented in the Total Worker Health™ (TWH) concept; the concept has significant strategic momentum, coming from the USA.

Evidence from our current review allows us to conclude that integrated TWH interventions can reduce tobacco use and sedentary behaviour and improve diet of workers. However, the effects of these interventions on injuries and overall quality of life are not known and the TWH model overall will benefit from further confirmatory evidence.

The essential elements identified above are a mixture of content (evidence based programs such as physical activity) and process (evidence-based cross-cutting principles such as HRA, co-production). These have implications for and feed into the next section, which draws out implementation success factors.

Research Question 3: Implementation success factors

From the papers included in question one, what are the main barriers or facilitators to the successful implementation of the program, framework or model?

For evidence with an explicit focus on barriers or facilitators to implementation, four systematic reviews were retained,[40, 85-87] as well as a report published by WHO.[88]

Rojatz and colleagues' 2016 qualitative systematic literature review was carried out to systematically identify and synthesise factors influencing the phases of WHP interventions: needs assessment, planning, implementation and evaluation. The practical implication arising from the research is for policymakers and practitioners to consider not only the influencing factors at different levels (contextual/organisational), but also for the different phases of implementation. Their findings are summarised in Table 4, which is sourced directly from the systematic review.[86] By phase, the findings were as follows:

Needs Assessment

No influencing factors were reported.

Planning

Only a few key factors were found for the planning phase. Contextual factors referred to an economic crisis as an 'external condition' (barrier) hindering the organisation to participate in the intervention and to the 'conducting of a pre-study' to guide the intervention (facilitator). Factors at organisational level were 'limited management support for the intervention', an unfavourable health-promoting 'organisational culture/climate' and 'participation of the worksites in another health promotion activity'. The only facilitator reported at the organisational level referred to the perceived usefulness of the intervention (for example, reduction of sick leave).

Implementation

The majority of reported factors were in this phase. Contextual factors were 'external conditions' (for example, an economic crisis during intervention as barrier, the absence of adverse effects as facilitator) and three barriers. These referred to problems in 'coordinating the intervention' (for example, through delayed arrival of intervention material), "changes in external project management" and 'resources' including a lack of control by the external project team. Three main organisational factors were identified; these referred to "organisational structure and the physical work environment" (size, organisational and building structure), "support for the intervention by management/union representatives" and 'resources' (time, money, staff and infrastructure). Other barriers were: "changes in organisational structure/work environment" (for instance, outsourcing of department individuals), 'organisational climate' (for example, pre-existing conflicts and conflicting priorities) and lack of "experience with health promotion". The most important intervention design factors referred to were: (a) the (in)appropriateness of the "intervention approach/concept/format" (for example, [non]-use of a participatory approach); (b) "procedural aspects of the intervention" (for example, unrealistic time schedule as obstacle; a timely start of the intervention as facilitator); (c) "fit between the intervention and structures/expectations" (referring to [dis]harmony of the intervention with existing organisational processes and structures, including the compatibility of the intervention with working hours/processes); (d) "Interactivity and interactivity-influencing structures" (referring to, for example, to the presence/absence of role conflicts); and (e) an (un)favourable climate during the intervention as well as the quality of communication (for instance, lack of face-to-face communication and multiple communication channels).

Evaluation

The key contextual factor was, 'seasonal conditions' (holiday seasons), which was a hindrance limiting the presence of participants. At the organisational level the research identified two main barriers: (a) "changes in organisational structure and work environment", for example, structural changes at control sites that affected their usefulness for comparability with the intervention sites; and (b) a limited "compliance to the evaluation",

such as not returning survey data. The use of an 'evaluation framework' was reported as a facilitator, whereas a lack of 'blinding' (for instance, not being able to blind the participants to their group designation during randomisation) and 'characteristics of data' (for example, missing or inconsistent data) were reported as barriers.

Workplace wellness programs: barriers and facilitators for needs assessment, planning, implementation and evaluation phases

Table 4 - Barriers & facilitators for implementation of Workplace Wellness Programs

Factor	Needs assessment	Planning	Implementation	Evaluation
Factors at contextual level				
External condition (season and economic condition)		B	B/F	B
Coordination of the intervention			B	
Changes in external project management			B	
Resources (resource intensive delivery and lack of control by external project team)			B	
Conduct of pre-study		F		
Factors at organizational level				
Organizational structures and physical work environment			B/F	
(Management) support for the intervention		B		
Resources (time, money, human resources and infrastructure)			B/F	
Changes in organizational structure/work environment			B	B
Organizational culture/climate		B	B	
Participation of worksites in another health promotion activity		B		
Experience with health promotion			B	
Perceived usefulness of intervention		F		
Compliance to evaluation				B
Factors at intervention level				
Intervention approach/concept/format			B/F	
Procedural aspects of intervention (timing and technical issues)			B/F	
Fit between intervention and structures/expectations			B/F	
Interactivity and interactivity-influencing structures			B/F	
User (un)friendliness of intervention (material)			B/F	
Support for stakeholders (implementers/participants)			B/F	
Resources (human resources and intervention material/infrastructure)			B/F	
Marketing and promotion of intervention			F	

Continues over

Factors at implementer level				
Personality and work attitude of implementers			B/F	
Resources (knowledge and competencies)			B/F	
Accessibility of participants			B	
Quality of intervention delivery (no show of implementers and intervention material forgotten)			B	
Side-effects for implementers			B	
Factors at participant level				
Participants' characteristics			B/F	B
Resources (control over intervention and time)			B/F	
Commitment and compliance to intervention/evaluation			B/F	B
Side-effects			B/F	
Motivation			B	
Motivators to participate			F	
Factors referring to methodological and data aspects				
Data-collection issues				B/F
Evaluation framework				F
Blinding				B
Characteristics of data (missing data and inconsistent data				B

Source: Rojatz et al. 2016[86]

Research Question 4: Organisation, leadership and systems approaches

What does the evidence suggest regarding the role and impact of organisational factors, leadership, systems, policy, workplace culture, work design and work processes?

The section dealing with question one noted evidence in support of systems approaches, including the establishment of a culture of a health promoting culture and using strategic communications. Key elements identified that contribute to a culture of health are: (i) leadership commitment, (ii) social and physical environmental support, and (ii) employee engagement and involvement. This section deals with these issues in greater detail.

Statements and recommendations from International and National Health Agencies

US Centers for Disease Control and Prevention (CDC)

The US Centers for Disease Control and Prevention (CDC) has recently established a new Workplace Health Resource Center (see web portal)[89] which embraces a systems approach and includes guidance on Planning/Governance[90] and Leadership support.[91] The overarching model[92] is shown as Figure 7.

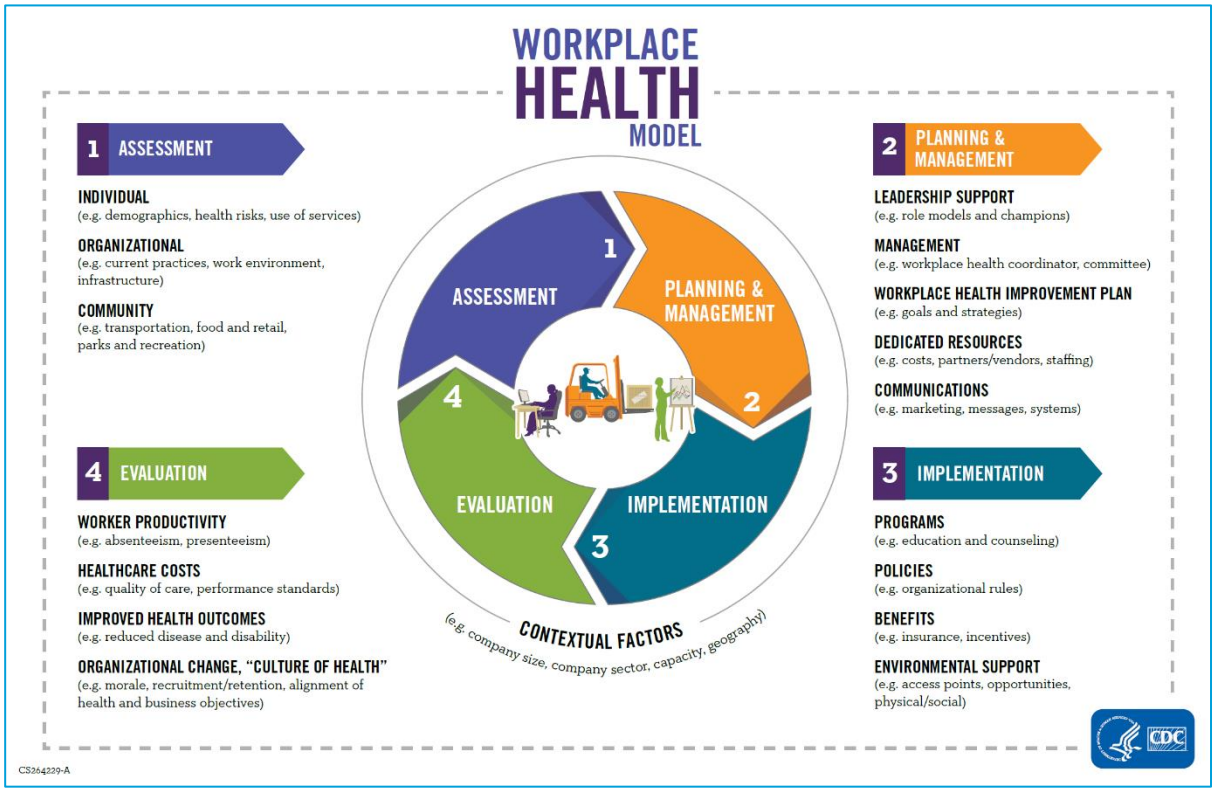


Figure 8 - The USCDC Workplace Health Model (2017)[8]

USCDC set out a systematic approach to building a workplace health promotion program, configured as four main steps:

1. Workplace Health Assessment (includes an Organisational Assessment)
2. Planning the Program (includes Leadership Support and Management)
3. Implementing the Program (includes Policies)
4. Determine Impact through Evaluation (includes Organisational Change, "Culture of Health")

[8] Available at https://www.cdc.gov/workplacehealthpromotion/pdf/WorkplaceHealth-model-update.pdf

World Health Organization

The World Health Organization (WHO) places a strong emphasis on leadership within the core model (Figure 8) and relevant policy documents which focus on healthy workplaces. These include the *Global Plan of Action on Workers' Health 2008–2017*,[93] and *Healthy workplaces: a model for action* in which WHO sets out a framework for the development of healthy workplace initiatives adaptable to diverse countries, workplaces and cultures.[88]

Leadership identified in the core of WHO Model and Policy statements on Healthy Workplace

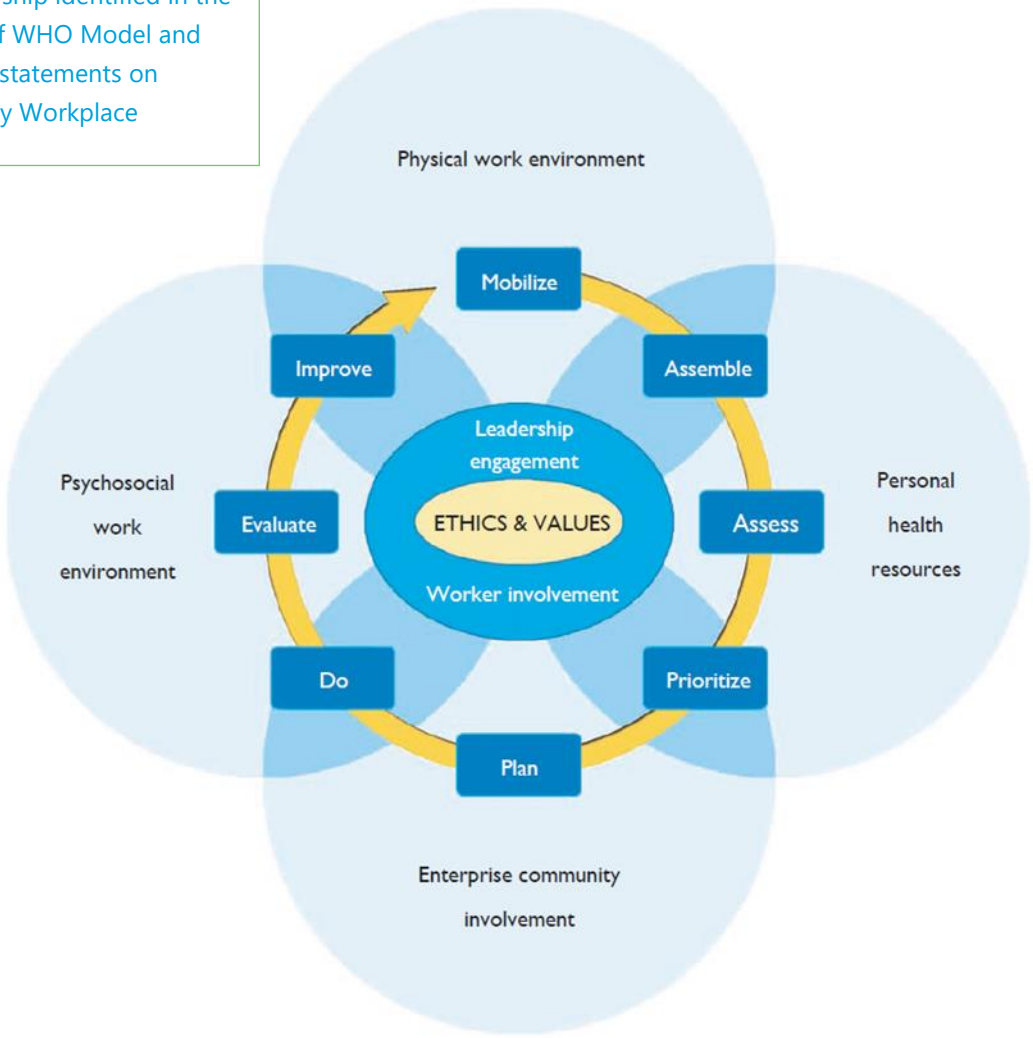


Figure 9 - WHO healthy workplace model

WHO identifies "Leadership engagement based on core values" as the primary key to success with the underlying principles.[88] Three factors of leadership are further elucidated: (i) mobilizing and gaining commitment from major stake-holders (because a healthy workplace program must be integrated into the enterprise's business goals and values); (ii) getting necessary permissions, resources and support from owners, senior managers, union leaders or informal leaders (critical to get that commitment and buy-in before trying to proceed); and (iii) providing key evidence of this commitment by developing and adopting a comprehensive policy that is signed by the enterprise's highest authority and communicated to all workers (this clearly indicates that healthy workplace initiatives are part of the organisation's business strategy).[88]

WHO has also identified 5 Keys to Healthy Workplaces with leadership being the first of five (Table 5).

Table 5 - Five Keys to Healthy Workplaces

Key 1:	Leadership commitment and engagement
Key 2:	Involve workers and their representatives
Key 3:	Business ethics and legality
Key 4:	Use a systematic, comprehensive process to ensure effectiveness and continual improvement
Key 5:	Sustainability and integration

Source: WHO, 2010 [94]

Workplace Health Association of Australia

Finally, the 2015 Best Practice Guidelines developed by Workplace Health Association of Australia (WHAA) identify 15 guiding principles for effective workplace health programs; principle number 1 is Active support and participation by senior leadership.[84]

1. Active support and participation by senior leadership
2. Health as a shared responsibility
3. Engagement of key stakeholders
4. Supportive environment and culture
5. Participatory planning and design
6. Targeted health interventions
7. Evidence base, standards and accreditation
8. High levels of program engagement
9. OH&S integration
10. Technology and online programs/content
11. ROI – assumptions and calculations
12. Innovative marketing and communication
13. Evaluation and monitoring
14. Commitment to ethical business practices
15. Sustainability.

The WHAA Code of Ethics (see www.workplacehealth. org.au) serves as a code of professional conduct for all WHAA members, including professional responsibility, confidentiality, professional competency, consumer protection, assessment and referral, and procedures for review of member's conduct.

WHAA identifies 10 primary roles that the senior leadership team, particularly the CEO, must embrace:

1. Creating the vision (e.g. mission statement)
2. Connecting the vision to organisational values, strategy, practice and policy (i.e. build a health culture)
3. Gaining budget and resource commitment
4. Educating and engaging senior management
5. Sharing the vision with employees
6. Serving as a role model (i.e. walk the talk)
7. Ensuring accountability and responsibility (e.g. KPIs for senior management)
8. Rewarding success (e.g. incentives, public recognition)
9. Adapting the program content and delivery in light of new findings (i.e. keeping the program current, relevant and efficacious)
10. Integration of work systems/functional units, in particular the integration of OH&S with employee health and wellness initiatives.

Empirical evidence

NICE UK

Perhaps one of the most useful studies or policy documents retrieved in this rapid review was published by the UK-based National Institute for Health and Care Excellence (NICE) in 2016. On the basis of reviewed evidence, guidance and recommendations on improving the health and wellbeing of employees, with a focus on organisational culture and the role of line managers, the study provides detailed, evidence-based recommendations across the following eleven categories (click links to see recommendations).[95]

1.1 Organisational commitment

1.2 Physical work environment

1.3 Mental wellbeing at work

1.4 Fairness and justice

1.5 Participation and trust

1.6 Senior leadership

1.7 Role of line managers

1.8 Leadership style of line managers

1.9 Training

1.10 Job design

1.11 Monitoring and evaluation

Eriksson et al.

The 2017 review by Eriksson and colleagues examined whole-system approaches to workplace health promotion with a focus on management, leadership, and economic efficiency.[96] The review focussed on Nordic countries (Sweden, Finland, Norway, Denmark) with most evidence derived from Sweden. The in-depth analysis (twenty eligible studies) of management and/or leadership approaches revealed four different categories in the published evidence:

1. Studies applying an explicit whole-system understanding, in which management and/or leadership was linked to health promotion, with an explicit aim of measuring the effects on workplace sustainability
2. Approaching sustainability by studying success factors for the implementation of workplace health promotion
3. Studies using sustainability for framing the importance of the study
4. Studies highlighting that an explicit economic focus can counteract sustainability.

Whilst the researchers noted a dearth of true 'whole-system understanding' and 'sustainability' research, they also concluded that: "*leadership can…be seen as playing an important role in inspiring and motivating employees to participate in the development of a sustainable workplace. Participatory leadership may be health-promoting in itself, but may also increase positive forms of work engagement. This, in turn, can contribute to both individual employee health and to employees' willingness to engage in improvements to work processes*" (Erikkson et al. 2017).

The researchers highlight a new framework for leadership development[97] (Figure 10) as well as two examples of research studies that better attempt to address the whole-of-system paradigm.[98, 99]

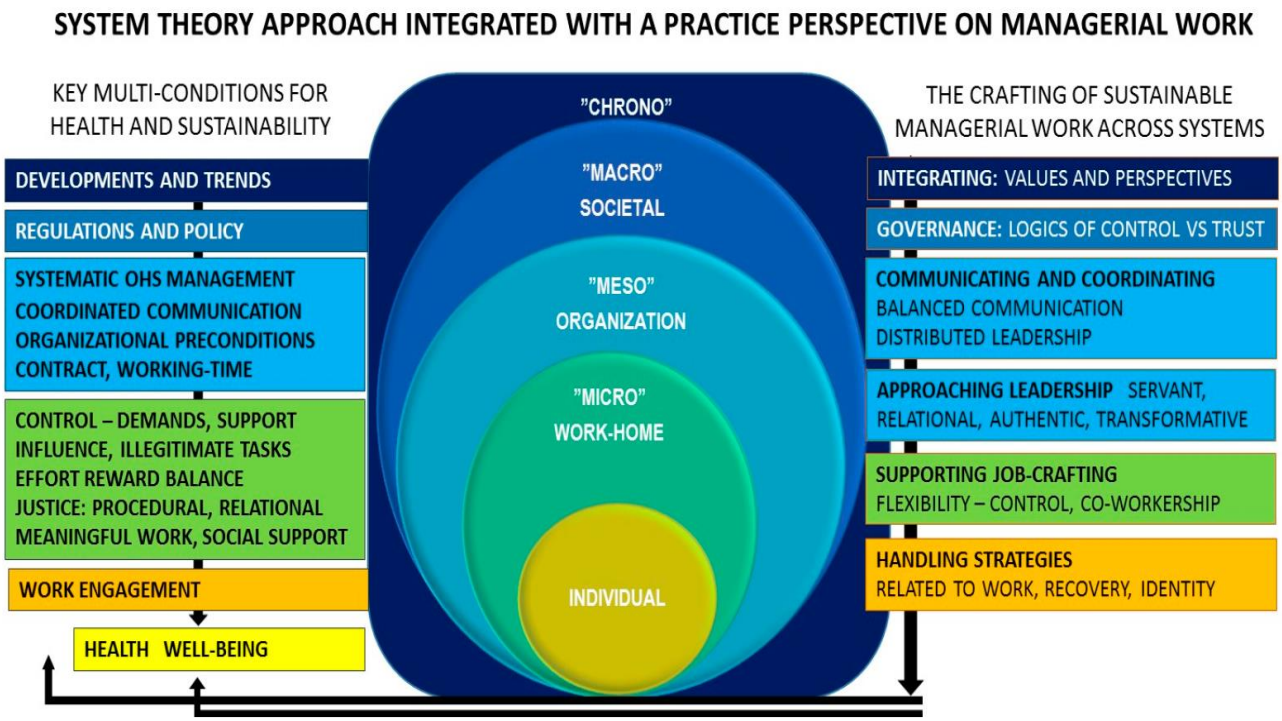


Figure 10 - Theoretical framework: sustainable leadership for workplace wellness
Source: Dellve & Eriksson 2017 cited in Eriksson et al. 2017

Information is presented according to two highlighted perspectives: (1) the selected key conditions for health and sustainability, and (2) the crafting of sustainable managerial work across systems, applied to the chrono-socio-bio-ecological model. The arrows illustrate only the overall associations.

Other studies regarding systems approaches retrieved in the rapid review are not discussed further because of redundancy, but for completeness are featured in the Tabulation appendices.[38, 100-106]

Work and job design

With respect to work and job design, the NICE (2016) recommendations are of significance, and have previously been highlighted.[95] Importantly, the 2014 review by Parker and Griffin[107] was commissioned by Comcare to inform the project 'Good Work Through Effective Design'. In this context 'Good work' is healthy and safe work where the hazards and risks created by the work are eliminated or minimised so far as is reasonably practical and where the work design optimises human performance, productivity and job satisfaction. [107]

Shift work, duration of work shift, flexible working, sub-contracting, outsourcing, home-based work

Other studies (see tabulation for detail) have examined the health and safety effects of shift work,[108, 109] the risks of very long working hours for increasing heart disease and stroke[110], the health implications of flexible working arrangements (flexible working interventions that increase worker control and choice (such as self-scheduling or gradual/partial retirement) are likely to have a positive effect on health outcomes).[111] The 2008 study by Quinlan and Bohle reviewed international studies of the occupational health and safety (OHS) effects of subcontracting, outsourcing and home-based work undertaken over the previous 20-year period, finding overwhelmingly that outsourcing/ subcontracting and home-based work led to poorer OH&S outcomes. The researchers consider that governments have taken little account of findings on these work arrangements in their laws and policies, in part because neoliberal ideas dominate national and global policy agendas; they make suggestions for future research and policy interventions.[112]

Implications for policy and decision makers

The evidence synthesis for the current review provided substantial justification for the observed trends in the evolution of workplace wellness programs, described earlier (see Figure 2) as the third generation or Workplace 'Wellness 3.0' (see graphic below).

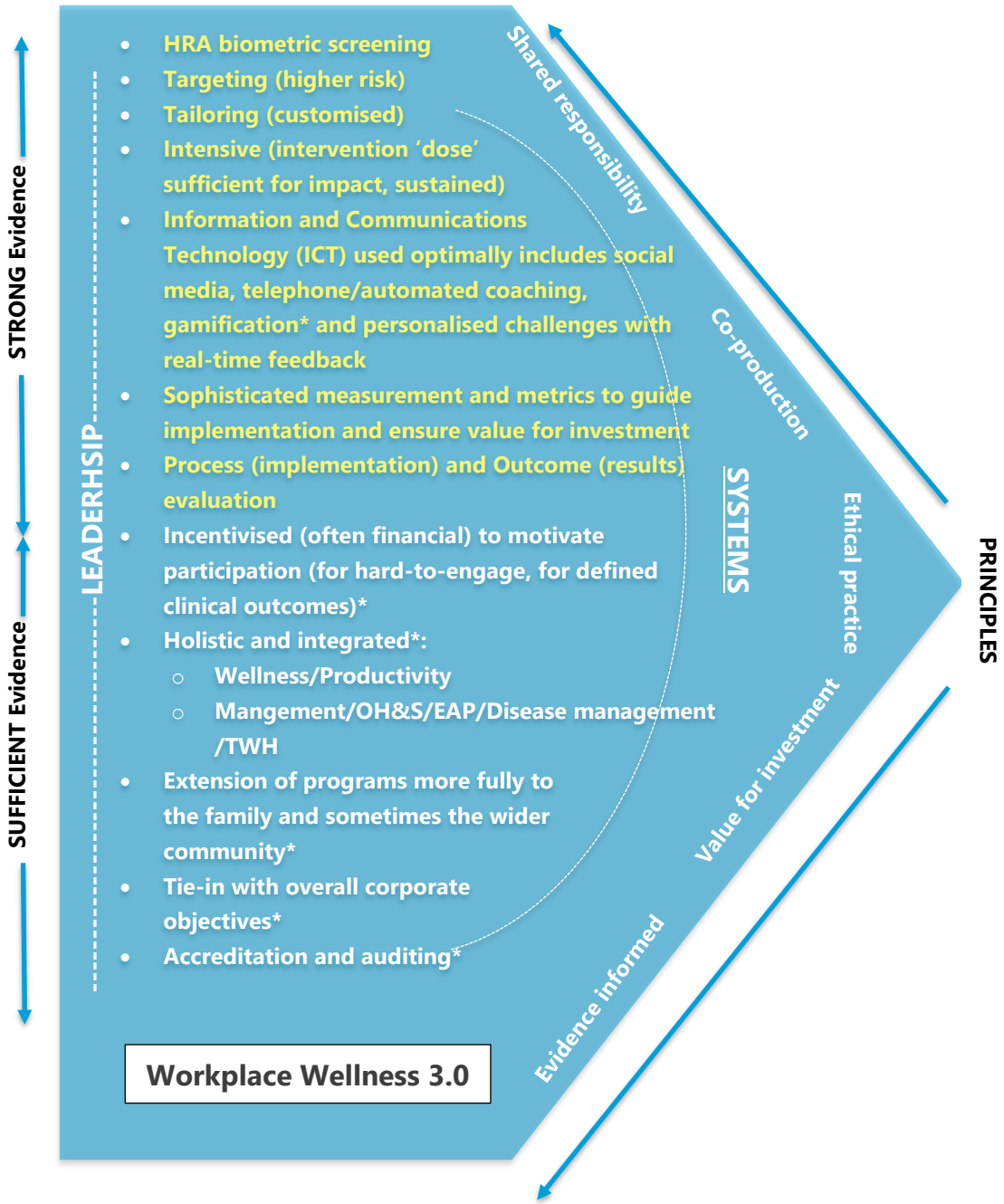


Figure 11 - Third generation workplace wellness programs (Bellew 2018)

** key components have **moderate strength** supportive evidence, sufficient to warrant implementation on the proviso that confirmatory process and outcome evaluation is undertaken. Other components are supported by **strong evidence.***

This is an encouraging development, suggesting that policymakers are increasingly mindful of evidence of effectiveness in their deliberations.

As the sentinel review predicted, there was a substantial increase in relevant research output in the decade since 2007. The reviews on TWH clearly establish it as promising, but also not yet definitively proven approach, in the sense of being superior to non-integrated approaches. Conversely, there is no evidence to suggest that the TWH would hinder current efforts were this approach to be adopted by SafeWork NSW as a putative lead agency across wellness as well as OH&S / health protection for the NSW Government.

From the perspective of a regulatory agency there is nothing specific or unique from the evidence identified in this review to preclude or include specific functions for a regulator. Effective programs are available but the evidence indicates that their effectiveness is driven by good fundamental design (crucially including stakeholder engagement), appropriate targeting, optimal and efficient use of information and communications technology, and customised approaches based on a robust HRA process. The definition of quality standards by Government is an option to consider, overall, and especially in the case of third party providers. So, the core strategic implication for the government to consider is about evidence-based specification for procurement, or for auditing the quality of third party service provision, and the complementarity of any State government approach with that undertaken at the federal level, for example under the auspices of Comcare[9] and in accordance with the (Federal) Work Health and Safety Act 2011.[10]

[9] http://www.comcare.gov.au/about_us

[10] https://www.legislation.gov.au/Details/C2015C00472

Table 6 - Third generation programs: Workplace Wellness 3.0 (Bellew, 2018)

KEY COMPONENTS	DESCRIPTION
Infrastructure (including leadership, and safe-and-healthy-by-design)	Build an internal foundation to sustain wellness initiatives. An internal foundation includes senior leadership support and wellness champions and teams. A focus on wellbeing encompasses **policy and environmental** interventions designed for the workplace. Design the working environment and work tasks to eliminate or reduce safety and health hazards and promote worker well-being from the outset (safe-and-healthy-by-design)
Data	Collecting baseline data is important to build a targeted workplace wellness program tailored to the population
Engagement, Evaluation, and Integrated Planning	Promote and support worker engagement throughout program design and implementation. After putting in place the workplace wellness infrastructure and collection of baseline data, evaluate the information collected and then move to craft a customized strategic work plan. The Plan should consider the benefits of integrating relevant systems to advance worker well-being (e.g. wellness & OH&S, TWH approach).
AEI Programming: * Awareness programs	These programs encompass a blend of awareness, education, and behaviour change interventions (AEI) that appeal to a wide variety of participants and to those who are at different levels of preparedness to change. Awareness programs—for example, health risk assessments (HRA) or biometric screenings, increase participants' cognition of their own health status and of the benefits and risks of certain healthy lifestyle behaviours. They are beneficial to those who may not yet be ready to change and may help move them to think about change, prepare for change, and/or commit to action.
* Education programs	Education programs teach participants about their health, lifestyle behaviours and risks, as well as how to engage in healthy lifestyle behaviours. Education programs inform individuals about health risks and can enlighten participants about their health and well-being.
* Interventions	Interventions are typically a six-to-eight-week health behaviour change program designed to lead to sustained action and maintenance (e.g. weekly weight loss programs).
Success	Measuring, evaluating, and monitoring workplace wellness programs on a regular basis can lead to success. Making regular adjustments to the program and the strategic plan helps improve engagement and outcomes.
PRINCIPLES FOR DESIGN AND IMPLEMENTATION	
• Evidence informed	
• Health as a shared responsibility	
• Co-production of plan and design	
• Quality standards compliance and accreditation	
• Commitment to ethical practice including confidentiality and privacy of workers	
• Value for investment	

Notwithstanding the compelling evidence for effectiveness reported in this review, recent research from Tasmania gives policy and decision makers pause for thought and provides a case study which also serves as a cautionary tale.[70] The take home message is that workplace wellness programs, integrated or not, really do need to be very well designed, well targeted and to comply with the evidence-based essential components and design principles identified in this review if they are to be effective. The program interventions also need to be quite intensive to be effective, and it is increasingly becoming clear that financial incentives are required to deliver the best outcomes for those who are at greater health or injury risk, but who are often those most difficult to engage and retain in wellness programs. The current review advances our understanding of the specifications (quality standards) or Workplace Wellness 3.0 – the third generation of wellness programs. Figure 10 and Table 3 respectively show our update of the key components and principles, acknowledging the publications which underpin the revised model.[14, 82, 83, 88]

Implications for the NSW policy context

ANALYSIS QUESTION

What implications arise in considering the potential implementation within the NSW jurisdiction of the identified menu of evidence-based policy actions?

The current review allowed us to refine Workplace Wellness 3.0, a revised third generation model (see Figure 10, Table 3). We have noted that the current evidence does not, per se, preclude or include specific functions for a regulator such a SafeWork NSW or NSW Health. Table 7 below summarises the main implications for the review with respect to the NSW jurisdictional context by considering three criteria: (a) potential linkage or synergy with the Work Health and Safety Roadmap for NSW 2022[11], (b) feasibility or relevance for a regulatory agency such as SafeWork NSW, and (c) appropriateness and applicability for the NSW context.

✓

[11] http://www.safework.nsw.gov.au/__data/assets/pdf_file/0006/99123/swnsw-roadmap-8067.pdf

Table 7 - Workplace Wellness 3.0 and policy implications in NSW

Strategic component	**Criteria** Linkage/synergy with Work Health and Safety Roadmap for NSW 2022 *See Figure 11*	Regulatory agency relevance/feasibility	Appropriateness, applicability for NSW context
Focus on NCD prevention, wellness, health and safety	✓	✓	✓
Incorporate HRA, biometric screening	✓	✓	✓
Incorporate targeted approaches (high-risk)	Includes a high-risk/'hot-spot' approach. ✓	✓	✓
Implement intensive and sustained programs	Not inconsistent. Piloting and phased implementation recommended in the first instance. ✓?		
Ensure optimal use of ICT including social media and telephonic coaching	Focus includes digital workplace systems, online advisory and mobile field services and digital evaluation. ✓	✓	Build on the Get Healthy at Work Model ✓
Develop and implement metrics to guide implementation & ensure value for investment	Consistent with Roadmap; requires design, system testing and implementation support ✓	Feasible (as for RoadMap). Standardised evaluation framework can be mandated for any 3rd party services providers ✓	✓
Ensure process (implementation) and outcome (results) evaluation	Essential to continue to build knowledge through continuous evaluation, especially of any innovative approaches. "*SafeWork NSW's decisions and actions will be driven by insights and evidence from data.*" ✓		
Provide incentives (incl. financial) to motivate participation for hard-to-engage workers & for defined outcomes	Not inconsistent. Piloting and phased implementation recommended in the first instance. ✓?		
Develop an integrated approach to programs Wellness/Productivity management/OH&S/EAP/ Disease management/TWH	"*NSW workplaces will be managing health and safety effectively.*" Functions could be managed by one lead agency spanning these integrated functions (SafeWork NSW) Piloting and phased implementation recommended in the first instance. ✓		
Program extension to include family and/or wider community	Not inconsistent. Piloting and phased implementation recommended in the first instance. ✓?		
Align programs with overall corporate objectives	✓	✓	✓
Develop quality standards and compliance monitoring	SafeWork NSW will be recognised for working with business to design innovative regulatory approaches aimed at eliminating WHS risk and improve regulatory approaches. ✓		
Develop accreditation and auditing systems	Regulatory approach is an option; workplace charter or awards programs (UK and USA models available) represent another option, perhaps through Workplace Health Association Australia?		

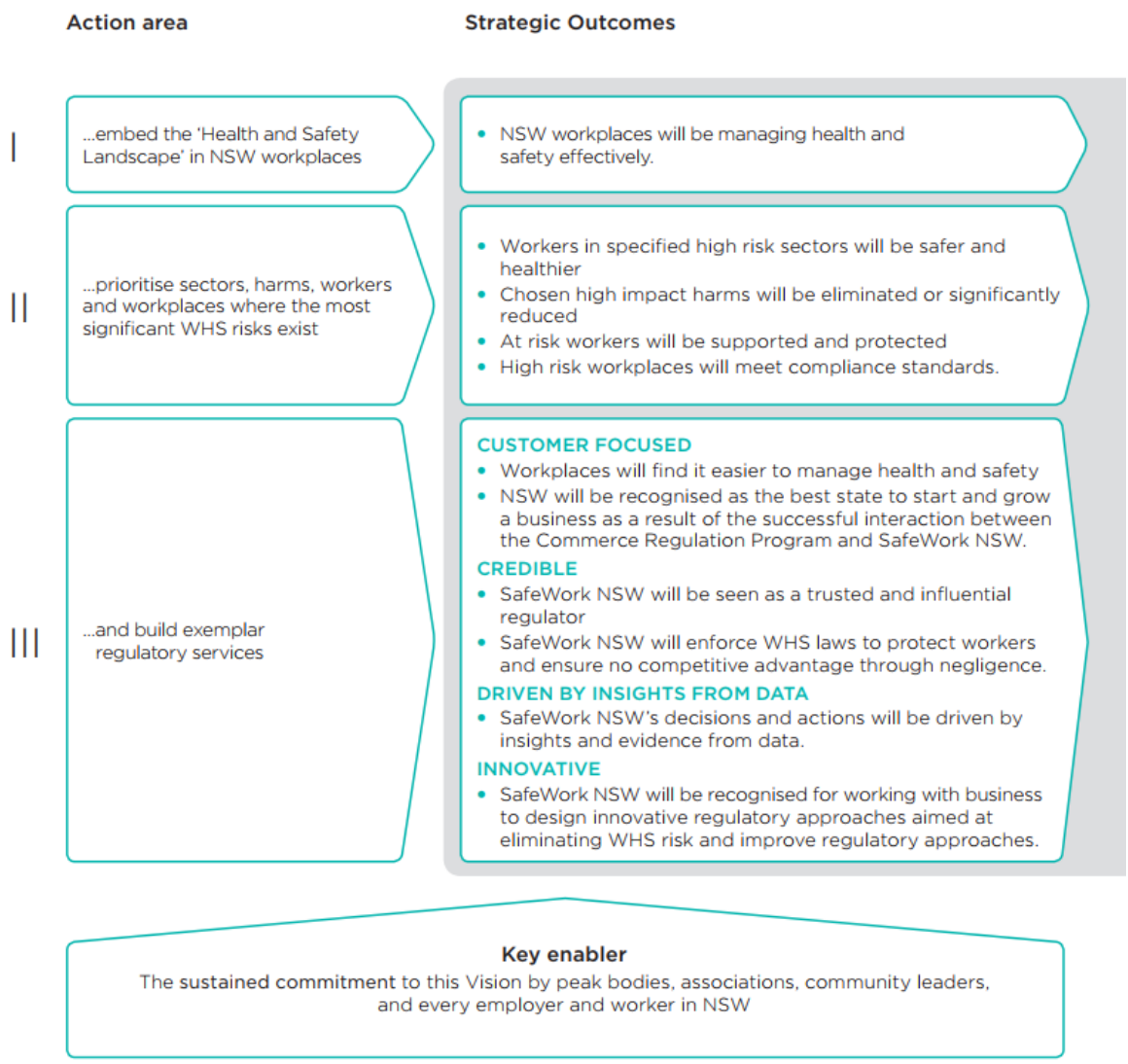


Figure 12 - Work Health and Safety Roadmap for NSW 2022 Strategy

Source: SafeWork NSW, Work Health and Safety Roadmap for NSW 2022 (p.8). Available for download from: http://www.safework.nsw.gov.au/roadmap

Gaps in the evidence and research priorities

As explained in the glossary, 'Moderate' evidence indicates moderate confidence in the body of evidence and indicates that further research may change our confidence and the estimate; the accompanying narrative indicates whether the evidence is deemed 'Sufficient' to commence implementation with accompanying evaluation. In this review, we have developed a third generation Workplace Wellness model (on the next page). An obvious agenda for research is the elements of the model where the evidence is currently 'sufficient'.

Many retrieved studies and reports attempt to identify gaps in evidence and to distil research priorities; in this section we identify the studies that in our view provide the best analysis and synthesis of these gaps/priorities.

The Research Compendium developed by National Institute for Occupational Safety and Health, (NIOSH) has done perhaps the most comprehensive analysis.[113] Specifically, the NIOSH compendium contains a section devoted to this issue: Research Agenda: Gaps in Current Literature and Key Issues to be Addressed In Future Research.

Table 8 - Key directions for future research

Social epidemiological research
OSH data by race/ethnicity and gender
Expanding our understanding of social contextual determinants of worker health outcomes
Methods development research
Further specification of integrated interventions
Further development of measurement tools
Assessing intervention efficacy
Assessment of intervention efficacy for OSH and worksite health promotion outcomes
Assessment of the efficacy of diverse types of integrated OSH/WHP interventions
Assessing intervention effectiveness
Assessment of the efficacy of interventions for diverse groups of workers
Consideration of a range of research methodologies
Process evaluation
Intervention and implementation evaluation
Cost and related analyses
Assessment of worksite characteristics associated with participation
Process-to-outcome analyses
Dissemination and durability research
Research of the sustainability of organizational and behavioral changes
Research on the process of dissemination of tested interventions

Source: NIOSH, Research Compendium: The NIOSH Total Worker Health™ Program: Seminal Research Papers 2012 (p. 34).[113]

Figure 13 - Third generation workplace wellness programs: key components and principles (Bellew 2017)

Other gaps and more specific research needs have been identified in a variety of studies, including regarding people with disabilities,[114, 115] productivity management[37], and ergonomic interventions.[116]

Finally, important development work has been done by Sorensen and colleagues in the domain of integrated approaches to health protection and health promotion (also known as Total Worker Health™). A large team of researchers have set out a proposed definition of integrated approaches to worker health,

accompanied by indicators and measures that may be used by researchers, employers, and workers (Table 9).

Table 9 - Indicators and metrics for integrated approaches to workplace wellness

Indicator	Measures
Organizational leadership and commitment	• Top management expresses its commitment to a culture of health and an environment that supports employee health. • Both worker and worksite health are included as part of the organization's mission. • Senior leadership allocates adequate human and fiscal resources to implement programs to promote and protect worker health.
Coordination between health protection and health promotion	• Decision making about policies, programs and practices related to worker health is coordinated across departments, including those responsible for occupational safety and health and those responsible for worksite wellness • Processes are in place to coordinate and leverage interdepartmental budgets allocated toward both worksite wellness and occupational safety and health. • Efforts to promote and protect worker health include both policies about the work organization and environment and education and programs for individual workers.
Supportive organizational policies and practices	
Processes for accountability and training	• Program managers responsible for worksite wellness and occupational safety and health are trained to coordinate and implement programs, practices and policies to target both worksite wellness and occupational safety and health. • Operations managers are trained to ensure employee health through coordination with and support for occupational safety and health and worksite wellness. • Job descriptions for staff responsible for worksite wellness and occupational safety and health include roles and responsibilities that require interdepartmental collaboration and coordination of worksite wellness and occupational safety and health programs, policies, and practices. • Performance metrics for those responsible for worksite wellness and occupational safety and health include success with interdepartmental collaboration and coordination of worksite wellness and occupational safety and health programs, policies, and practices. • Professional development strategies include training and setting goals at performance reviews related to interdepartmental collaboration and coordination of worksite wellness and occupational safety and health programs, policies, and practices. • Worksite wellness and occupational safety and health vendors have the experience and expertise to coordinate with and/or deliver approaches that support the coordination and collaboration of workplace health promotion and protection efforts.

Indicator	Measures
Coordinated management and employee engagement strategies	• Both managers and employees are engaged in decision-making about priorities for coordinated worksite wellness and occupational safety and health programs, policies, and practices. • Joint worker-management committees addressing worker and worksite health reflect both worksite wellness and occupational safety and health. • Workers are actively engaged in planning and implementing worksite wellness and occupational safety and health programs and policies.
Benefits and incentives to support workplace health promotion and protection	• Incentives are offered to employees to complete activities to stay healthy (e.g. attend a training on health/safety), reduce high risk behaviours (e.g. quit smoking), and/or practice healthy lifestyles (e.g. gym membership discounts). • Incentives are offered to managers who protect and promote health (e.g. accomplish health and safety in their departments and encourage reporting of hazards, illnesses, injuries and near misses; lead and encourage their employees in health promotion and protection efforts). • Workplace benefits address health, safety, and well-being (e.g. health care coverage, flex-time, paid sick leave, screening and prevention coverage, wellness opportunities).
Integrated evaluation and surveillance	• The effects of worksite wellness and occupational safety and health programs are monitored jointly. • Data related to employee health outcomes are integrated within a coordinated system. • High-level indicator reports (e.g., "dashboards") on integrated programs are presented to upper level management on a regular basis, while protecting employee confidentiality.
Comprehensive program content	• The content of educational programs such as classes, online courses or webinars, or toolbox talks, addresses potential additive or synergistic risks posed by exposures on the job and risk-related behaviours. • The content of educational programs such as classes, online courses or webinars, or toolbox talks, acknowledges the impact of job experiences and the work environment on successful health behaviour change.

Source: Sorensen et al. 2013[117]

References

1. Global Wellness Institute. The Future of Wellness at Work2016. Available from: http://www.globalwellnesssummit.com/images/stories/gwi/GWI_2016_Future_of_Wellness_at_Work.pdf
2. Xerox Corporation and Buck Consultants. Working Well: A Global Survey of Workforce Wellbeing Strategies — Survey Report, Seventh Edition 2016. Available from: https://tinyurl.com/yb87l6se
3. Xerox Corporation and Buck Consultants. Working Well: A Global Survey of Health Promotion, Workforce Wellness, and Productivity Strategies — Survey Report, Sixth Edition 2014. Available from: https://tinyurl.com/y85wvpk6
4. Briss PA BR, Fielding JE, Zaza S. . Developing and Using the Guide to Community Preventative Services: Lessons Learned About Evidence-Based Public Health. Annu Rev Public Health. 2004;25
5. Wang X, Qin Y, Gu J, Wang F, Jia P, et al. [Systematic Review of Studies of Workplace Exposure to Environmental Tobacco Smoke and Lung Cancer Risk]. Zhongguo Fei Ai Za Zhi. 2011;14(4):345-50.
6. Leeks KD, Hopkins DP, Soler RE, Aten A, Chattopadhyay SK, et al. Worksite-Based Incentives and Competitions to Reduce Tobacco Use. A Systematic Review. Am J Prev Med. 2010;38(2 Suppl):S263-74.
7. Volpp KG, Troxel AB, Pauly MV, Glick HA, Puig A, et al. A Randomized, Controlled Trial of Financial Incentives for Smoking Cessation. New England Journal of Medicine. 2009;360(7):699-709.
8. U.S. Department of Health and Human Services; Public Health Service; Centers for Disease Control and Prevention; National Institute for Occupational Safety and Health; DHHS (NIOSH). Using Total Worker Health Concepts to Reduce the Health Risks from Sedentary Work. Afanuh, S., Johnson, Ai. For Dhhs (Niosh) Publication No. 2017–1312017. Available from: https://www.cdc.gov/niosh/docs/wp-solutions/2017-131/pdfs/2017-131.pdf
9. Reed JL, Prince SA, Elliott CG, Mullen KA, Tulloch HE, et al. Impact of Workplace Physical Activity Interventions on Physical Activity and Cardiometabolic Health among Working-Age Women: A Systematic Review and Meta-Analysis. Circ Cardiovasc Qual Outcomes. 2017;10(2)
10. Brinkley A, McDermott H, Munir F. What Benefits Does Team Sport Hold for the Workplace? A Systematic Review. J Sports Sci. 2017;35(2):136-48.
11. White MI, Dionne CE, Wärje O, Koehoorn M, Wagner SL, et al. Physical Activity and Exercise Interventions in the Workplace Impacting Work Outcomes: A Stakeholder- Centered Best Evidence Synthesis of Systematic Reviews. International Journal of Occupational and Environmental Medicine. 2016;7(2):61-74.
12. Moreira-Silva I, Teixeira PM, Santos R, Abreu S, Moreira C, et al. The Effects of Workplace Physical Activity Programs on Musculoskeletal Pain: A Systematic Review and Meta-Analysis. Workplace Health Saf. 2016;64(5):210-22.
13. Gardner B, Smith L, Lorencatto F, Hamer M, Biddle SJ. How to Reduce Sitting Time? A Review of Behaviour Change Strategies Used in Sedentary Behaviour Reduction Interventions among Adults. Health psychol. 2016;10(1):89-112.
14. Exercise & Sports Science Australia. Physical Activity in the Workplace: A Guide2016. Available from: http://exerciseismedicine.com.au/wp-content/uploads/2016/11/EIM_Workplace_PA_Guide.pdf
15. Chu AH, Ng SH, Tan CS, Win AM, Koh D, et al. A Systematic Review and Meta-Analysis of Workplace Intervention Strategies to Reduce Sedentary Time in White-Collar Workers. Obes Rev. 2016;17(5):467-81.
16. Pereira MJ, Coombes BK, Comans TA, Johnston V. The Impact of Onsite Workplace Health-Enhancing Physical Activity Interventions on Worker Productivity: A Systematic Review. Occupational and Environmental Medicine. 2015;72(6):401-12.
17. Reed JL, Prince SA, Cole CA, Fodor JG, Hiremath S, et al. Workplace Physical Activity Interventions and Moderate-to-Vigorous Intensity Physical Activity Levels among Working-Age Women: A Systematic Review Protocol. Systematic Reviews. 2014;3(1)
18. Xu H, Wen LM, Rissel C. The Relationships between Active Transport to Work or School and Cardiovascular Health or Body Weight: A Systematic Review. Asia Pac J Public Health. 2013;25(4):298-315.
19. Mitchell MS, Goodman JM, Alter DA, John LK, Oh PI, et al. Financial Incentives for Exercise Adherence in Adults. Am J Prev Med. 2013;45(5):658-67.
20. van Dongen JM, Proper KI, van Wier MF, van der Beek AJ, Bongers PM, et al. A Systematic Review of the Cost-Effectiveness of Worksite Physical Activity and/or Nutrition Programs. Scand J Work Environ Health. 2012;38(5):393-408.

21. van Dongen JM, Proper KI, van Wier MF, van der Beek AJ, Bongers PM, et al. Systematic Review on the Financial Return of Worksite Health Promotion Programmes Aimed at Improving Nutrition and/or Increasing Physical Activity. Obes Rev. 2011;12(12):1031-49.
22. Barr-Anderson DJ, AuYoung M, Whitt-Glover MC, Glenn BA, Yancey AK. Integration of Short Bouts of Physical Activity into Organizational Routine a Systematic Review of the Literature. Am J Prev Med. 2011;40(1):76-93.
23. Anderson LM, Quinn TA, Glanz K, Ramirez G, Kahwati LC, 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(4):340-57.
24. Allan J, Querstret D, Banas K, de Bruin M. Environmental Interventions for Altering Eating Behaviours of Employees in the Workplace: A Systematic Review. Obes Rev. 2017;18(2):214-26.
25. Geaney F, Kelly C, Greiner BA, Harrington JM, Perry IJ, et al. The Effectiveness of Workplace Dietary Modification Interventions: A Systematic Review. Prev Med. 2013;57(5):438-47.
26. Jensen JD. Can Worksite Nutritional Interventions Improve Productivity and Firm Profitability? A Literature Review. Perspect Public Health. 2011;131(4):184-92.
27. Hafez D, Fedewa A, Moran M, O'Brien M, Ackermann R, et al. Workplace Interventions to Prevent Type 2 Diabetes Mellitus: A Narrative Review. Curr Diab Rep. 2017;17(2):9.
28. Weerasekara YK, Roberts SB, Kahn MA, LaVertu AE, Hoffman B, et al. Effectiveness of Workplace Weight Management Interventions: A Systematic Review. Curr. 2016;5(2):298-306.
29. Cairns JM, Bambra C, Hillier-Brown FC, Moore HJ, Summerbell CD. Weighing up the Evidence: A Systematic Review of the Effectiveness of Workplace Interventions to Tackle Socio-Economic Inequalities in Obesity. J Public Health (Oxf). 2015;37(4):659-70.
30. Cullen KL, Irvin E, Collie A, Clay F, Gensby U, 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. 2017
31. Carroll C, Rick J, Pilgrim H, Cameron J, Hillage J. 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(8):607-21.
32. Van Eerd D, Munhall C, Irvin E, Rempel D, Brewer S, et al. Effectiveness of Workplace Interventions in the Prevention of Upper Extremity Musculoskeletal Disorders and Symptoms: An Update of the Evidence. Occup Environ Med. 2016;73(1):62-70.
33. Durand MJ, Corbiere M, Coutu MF, Reinharz D, Albert V. A Review of Best Work-Absence Management and Return-to-Work Practices for Workers with Musculoskeletal or Common Mental Disorders. Work. 2014;48(4):579-89.
34. Kamal KM, Covvey JR, Dashputre A, Ghosh S, Shah S, et al. A Systematic Review of the Effect of Cancer Treatment on Work Productivity of Patients and Caregivers. J Manag Care Spec Pharm. 2017;23(2):136-62.
35. Evers KE, Castle, P. H., Prochaska, J. O., Prochaska, J. M. Examining Relationships between Multiple Health Risk Behaviors, Well-Being, and Productivity. Psychol Rep. 2014;114(3):843-53.
36. Parkinson MD. Employer Health and Productivity Roadmaptm Strategy. J Occup Environ Med. 2013;55(12 Suppl):S46-51.
37. Goetzel RZ, Shechter D, Ozminkowski RJ, Marmet PF, Tabrizi MJ, et al. Promising Practices in Employer Health and Productivity Management Efforts: Findings from a Benchmarking Study. J Occup Environ Med. 2007;49(2):111-30.
38. LaMontagne AD, Keegel T, Vallance D. Protecting and Promoting Mental Health in the Workplace: Developing a Systems Approach to Job Stress. Health Promot J Aust. 2007;18(3):221-8.
39. Kent K, Goetzel, R. Z., Roemer, E. C., Prasad, A., Freundlich, N. Promoting Healthy Workplaces by Building Cultures of Health and Applying Strategic Communications. J Occup Environ Med. 2016;58(2):114-22.
40. van Eerd D, Cole D, Irvin E, Mahood Q, Keown K, et al. Process and Implementation of Participatory Ergonomic Interventions: A Systematic Review. Ergonomics. 2010;53(10):1153-66.
41. MacEachen E, Kosny A, Scott-Dixon K, Facey M, Chambers L, et al. Workplace Health Understandings and Processes in Small Businesses: A Systematic Review of the Qualitative Literature. J Occup Rehabil. 2010;20(2):180-98.
42. Egan M, Bambra C, Thomas S, Petticrew M, Whitehead M, et al. The Psychosocial and Health Effects of Workplace Reorganisation. 1. A Systematic Review of Organisational-Level Interventions That Aim to Increase Employee Control. J Epidemiol Community Health. 2007;61(11):945-54.
43. Bambra C, Egan M, Thomas S, Petticrew M, Whitehead M. The Psychosocial and Health Effects of Workplace Reorganisation. 2. A Systematic Review of Task Restructuring Interventions. J Epidemiol Community Health. 2007;61(12):1028-37.
44. Bellew B, St George, A., King, L. . Workplace Screening Programs for Chronic Disease Prevention: An Evidence Check Brokered by the Sax Institute (http://www.saxinstitute.org.au/) for the Nsw Ministry of

Health.2012. Available from: https://www.saxinstitute.org.au/wp-content/uploads/04_Workplace-screening-programs-for-chronic-disease-preventi.pdf
45. Feltner C, Peterson, K., Weber, R.P., Cluff, L., Coker-Schwimmer, E., Viswanathan, M., Lohr, K. N. The Effectiveness of Total Worker Health Interventions: A Systematic Review for a National Institutes of Health Pathways to Prevention Workshop. Ann Intern Med [Internet]. 2016 Aug 16; 165(4):[262-9 pp.]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27240022 doi:10.7326/M16-0626
46. Sundar V. Operationalizing Workplace Accommodations for Individuals with Disabilities: A Scoping Review. Work. 2017;56(1):135-55.
47. Nikathil S, Olaussen A, Gocentas RA, Symons E, Mitra B. Review Article: Workplace Violence in the Emergency Department: A Systematic Review and Meta Analysis. Emerg Med Australas. 2017;29(3):265-75.
48. Lachance CC, Jurkowski MP, Dymarz AC, Robinovitch SN, Feldman F, et al. Compliant Flooring to Prevent Fall-Related Injuries in Older Adults: A Scoping Review of Biomechanical Efficacy, Clinical Effectiveness, Cost-Effectiveness, and Workplace Safety. PLoS ONE. 2017;12(2):e0171652.
49. Estill CF, Rice CH, Morata T, Bhattacharya A. Noise and Neurotoxic Chemical Exposure Relationship to Workplace Traumatic Injuries: A Review. J Safety Res. 2017;60:35-42.
50. Young AE, Viikari-Juntura E, Boot CR, Chan C, de Porras DG, et al. Workplace Outcomes in Work-Disability Prevention Research: A Review with Recommendations for Future Research. J Occup Rehabil. 2016;26(4):434-47.
51. Pourshaikhian M, Abolghasem Gorji H, Aryankhesal A, Khorasani-Zavareh D, Barati A. A Systematic Literature Review: Workplace Violence against Emergency Medical Services Personnel. Arch Trauma Res. 2016;5(1):e28734.
52. Nilsson K. Interventions to Reduce Injuries among Older Workers in Agriculture: A Review of Evaluated Intervention Projects. Work. 2016;55(2):471-80.
53. Martinez AJ. Managing Workplace Violence with Evidence-Based Interventions: A Literature Review. J Psychosoc Nurs Ment Health Serv. 2016;54(9):31-6.
54. Luong Thanh BY, Laopaiboon M, Koh D, Sakunkoo P, Moe H. Behavioural Interventions to Promote Workers' Use of Respiratory Protective Equipment. Cochrane Database of Systematic Reviews. 2016;12:CD010157.
55. Uehli K, Mehta AJ, Miedinger D, Hug K, Schindler C, et al. Sleep Problems and Work Injuries: A Systematic Review and Meta-Analysis. Sleep Med Rev. 2014;18(1):61-73.
56. Pidd K, Roche AM. How Effective Is Drug Testing as a Workplace Safety Strategy? A Systematic Review of the Evidence. Accid Anal Prev. 2014;71:154-65.
57. van der Molen HF, Lehtola MM, Lappalainen J, Hoonakker PL, Hsiao H, et al. Interventions for Preventing Injuries in the Construction Industry. Cochrane Database of Systematic Reviews. 2007(4):CD006251.
58. Memish K, Martin, A., Bartlett, L., Dawkins, S., Sanderson, K. Workplace Mental Health: An International Review of Guidelines. Prev Med [Internet]. 2017 Mar 25. Available from: https://www.ncbi.nlm.nih.gov/pubmed/28347696
59. Joyce S, Modini M, Christensen H, Mykletun A, Bryant R, et al. Workplace Interventions for Common Mental Disorders: A Systematic Meta-Review. Psychol Med. 2016;46(4):683-97.
60. Hayward SM, McVilly KR, Stokes MA. Challenges for Females with High Functioning Autism in the Workplace: A Systematic Review. Disabil Rehabil. 2016:1-10.
61. Hanisch SE, Twomey CD, Szeto AC, Birner UW, Nowak D, et al. The Effectiveness of Interventions Targeting the Stigma of Mental Illness at the Workplace: A Systematic Review. BMC Psychiatry. 2016;16:1.
62. Milner A, Page K, Spencer-Thomas S, Lamotagne AD. Workplace Suicide Prevention: A Systematic Review of Published and Unpublished Activities. Health Promot Internation. 2015;30(1):29-37.
63. McDowell C, Fossey E. Workplace Accommodations for People with Mental Illness: A Scoping Review. J Occup Rehabil. 2015;25(1):197-206.
64. Tan L, Wang MJ, Modini M, Joyce S, Mykletun A, et al. Preventing the Development of Depression at Work: A Systematic Review and Meta-Analysis of Universal Interventions in the Workplace. BMC Med. 2014;12:74.
65. Hammer LB, Sauter S. Total Worker Health and Work-Life Stress. J Occup Environ Med. 2013;55(12 Suppl):S25-9.
66. Pomaki G, Franche RL, Murray E, Khushrushahi N, Lampinen TM. Workplace-Based Work Disability Prevention Interventions for Workers with Common Mental Health Conditions: A Review of the Literature. J Occup Rehabil. 2012;22(2):182-95.
67. Dietrich S, Deckert S, Ceynowa M, Hegerl U, Stengler K. Depression in the Workplace: A Systematic Review of Evidence-Based Prevention Strategies. Int Arch Occup Environ Health. 2012;85(1):1-11.
68. Stergiopoulos E, Cimo A, Cheng C, Bonato S, Dewa CS. Interventions to Improve Work Outcomes in Work-Related Ptsd: A Systematic Review. BMC Public Health. 2011;11:838.

69. 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(1):7-18.
70. Jarman L, Martin A, Venn A, Otahal P, Blizzard L, et al. Workplace Health Promotion and Mental Health: Three-Year Findings from Partnering Healthy@Work. PLoS ONE. 2016;11(8):e0156791.
71. Wilson MG, DeJoy DM, Vandenberg R, Padilla H, Davis M. Fuel Your Life: A Translation of the Diabetes Prevention Program to Worksites. Am J Health Promot. 2016;30(3):188-97.
72. Lahiri S, Tempesti T, Gangopadhyay S. Is There an Economic Case for Training Intervention in the Manual Material Handling Sector of Developing Countries? J Occup Environ Med. 2016;58(2):207-14.
73. Yeo CD, Lee HY, Ha JH, Kang HH, Kang JY, et al. Efficacy of Team-Based Financial Incentives for Smoking Cessation in the Workplace. Yonsei Med J. 2015;56(1):295-9.
74. Wilkin CL, Connelly CE. Dollars and Sense: The Financial Impact of Canadian Wellness Initiatives+. Health Promot Internation. 2015;30(3):495-504.
75. von Thiele Schwarz U, Augustsson H, Hasson H, Stenfors-Hayes T. Promoting Employee Health by Integrating Health Protection, Health Promotion, and Continuous Improvement: A Longitudinal Quasi-Experimental Intervention Study. Journal of occupational and environmental medicine. 2015;57(2):217-25.
76. Steinberg G, Scott A, Honcz J, Spettell C, Pradhan S. Reducing Metabolic Syndrome Risk Using a Personalized Wellness Program. Journal of occupational and environmental medicine. 2015;57(12):1269-74.
77. Schopp LH, Bike DH, Clark MJ, Minor MA. Act Healthy: Promoting Health Behaviors and Self-Efficacy in the Workplace. Health Educ Res. 2015;30(4):542-53.
78. Reynolds GS, Bennett JB. A Cluster Randomized Trial of Alcohol Prevention in Small Businesses: A Cascade Model of Help Seeking and Risk Reduction. Am J Health Promot. 2015;29(3):182-91.
79. Newman LS, Stinson KE, Metcalf D, Fang H, Brockbank C, et al. Implementation of a Worksite Wellness Program Targeting Small Businesses: The Pinnacol Assurance Health Risk Management Study. J Occup Environ Med. 2015;57(1):14-21.
80. McHale SM, Lawson KM, Davis KD, Casper L, Kelly EL, et al. Effects of a Workplace Intervention on Sleep in Employees' Children. J Adolesc Health. 2015;56(6):672-7.
81. Lippke S, Fleig L, Wiedemann AU, Schwarzer R. A Computerized Lifestyle Application to Promote Multiple Health Behaviors at the Workplace: Testing Its Behavioral and Psychological Effects. J Med Internet Res. 2015;17(10):e225.
82. US Chambers of Commerce. Winning with Wellness2016. Available from: https://www.uschamber.com/sites/default/files/022436_labr_wellness_report_opt.pdf
83. Lee M, Hudson, H., Richards, R., Chang, CC., Chosewood, LC., Schill, A.L, on behalf of the NIOSH Office for Total Worker Health.]. Fundamentals of Total Worker Health Approaches: Essential Elements for Advancing Worker Safety, Health, and Well-Being. Dhhs (Niosh) Publication No. 2017-112 2016.
84. Workplace Health Association Australia. Workplace Health in Australia - Best Practice Guidelines2015. Available from: http://www.workplacehealth.org.au/_literature_175889/Best_Practice_Guidelines
85. Taylor AW, Pilkington R, Montgomerie A, Feist H. The Role of Business Size in Assessing the Uptake of Health Promoting Workplace Initiatives in Australia. BMC Public Health. 2016;16:353.
86. Rojatz D, Merchant A, Nitsch M. Factors Influencing Workplace Health Promotion Intervention: A Qualitative Systematic Review. Health Promot Int. 2016
87. Wierenga D, Engbers LH, Van Empelen P, Duijts S, Hildebrandt VH, et al. What Is Actually Measured in Process Evaluations for Worksite Health Promotion Programs: A Systematic Review. BMC Public Health. 2013;13:1190.
88. World Health Organization. Healthy Workplaces: A Model for Action: For Employers, Workers, Policymakers and Practitioners. 2010. Available from: http://www.who.int/occupational_health/publications/healthy_workplaces_model_action.pdf
89. US Centers for Disease Control and Prevention (CDC). Cdc Workplace Health Resource Center [Web Portal]2017. Available from: https://www.cdc.gov/workplacehealthpromotion/initiatives/resource-center/index.html
90. US Centers for Disease Control and Prevention (CDC). Workplace Health Promotion | Governance Structure & Management (Web Portal). 2015
91. US Centers for Disease Control and Prevention (CDC). Workplace Health Promotion | Leadership Support | Web Portal2015. Available from: https://www.cdc.gov/workplacehealthpromotion/planning/leadership.html
92. US Centers for Disease Control and Prevention (CDC). Workplace Health Promotion | Workplace Health Model | Web Portal. 2015
93. World Health Organization. Global Plan of Action on Workers' Health 2008–20172007. Available from: http://www.who.int/occupational_health/WHO_health_assembly_en_web.pdf?ua=1
94. World Health Organization. Five Keys to Healthy Workplaces 2010

95. National Institute for Health and Care Excellence (NICE). Workplace Health: Management Practices; Nice Guideline [Ng13]2016. Available from: https://www.nice.org.uk/guidance/ng13/chapter/recommendations
96. Eriksson A, Orvik A, Strandmark M, Nordsteien A, Torp S. Management and Leadership Approaches to Health Promotion and Sustainable Workplaces: A Scoping Review. Societies. 2017;7(2)
97. Dellve L, Eriksson A. Health-Promoting Managerial Work: A Theoretical Framework for a Leadership Program That Supports Knowledge and Capability to Craft Sustainable Work Practices in Daily Practice and During Organizational Change. Societies [Internet]. 2017; 7(2). Available from: http://www.mdpi.com/2075-4698/7/2/12 doi:10.3390/soc7020012
98. Sirola-Karvinen P, Jurvansuu H, Rautio M, Husman P. Cocreating a Health-Promoting Workplace. J Occup Environ Med. 2010;52(12):1269-72.
99. Larsson J, Landstad B, Vinberg S. To Control with Health: From Statistics to Strategy. Work. 2009;32(1):49-57.
100. Gambatese J, AlOmari K. Degrees of Connectivity: Systems Model for Upstream Risk Assessment and Mitigation. Accident Analysis & Prevention. 2016;93:251-9.
101. Yazdani A, Neumann WP, Imbeau D, Bigelow P, Pagell M, et al. Prevention of Musculoskeletal Disorders within Management Systems: A Scoping Review of Practices, Approaches, and Techniques. Appl Ergon. 2015;51:255-62.
102. Carayon P, Hancock P, Leveson N, Noy I, Sznelwar L, et al. Advancing a Sociotechnical Systems Approach to Workplace Safety--Developing the Conceptual Framework. Ergonomics. 2015;58(4):548-64.
103. van Vuuren B, Zinzen E, van Heerden HJ, Becker PJ, Meeusen R. Work and Family Support Systems and the Prevalence of Lower Back Problems in a South African Steel Industry. J Occup Rehabil. 2007;17(3):409-21.
104. Takeuchi R, Lepak DP, Wang H, Takeuchi K. An Empirical Examination of the Mechanisms Mediating between High-Performance Work Systems and the Performance of Japanese Organizations. J Appl Psychol. 2007;92(4):1069-83.
105. Shumway ST, Kimball TG, Korinek AW, Arredondo R. A Family Systems-Based Model of Organizational Intervention. J Marital Fam Ther. 2007;33(2):134-48.
106. Manuaba A. A Total Approach in Ergonomics Is a Must to Attain Humane, Competitive and Sustainable Work Systems and Products. J Hum Ergol (Tokyo). 2007;36(2):23-30.
107. Parker S, Griffin, M. Principles and Evidence for Good Work through Effective Design. A Report Commissioned by Comcare to Inform the Safe Work Australia Members Collaborative Project 'Good Work through Effective Design'.2014. Available from: https://www.comcare.gov.au/__data/assets/pdf_file/0003/145236/Professor_Sharon_Parker_Full_evidence_report.pdf
108. Aisbett B, Condo D, Zacharewicz E, Lamon S. The Impact of Shiftwork on Skeletal Muscle Health. Nutrients [Internet]. 2017 Mar 08 PMC5372911]; 9(3). Available from: https://www.ncbi.nlm.nih.gov/pubmed/28282858 doi:10.3390/nu9030248
109. Wagstaff AS, Sigstad Lie JA. Shift and Night Work and Long Working Hours--a Systematic Review of Safety Implications. Scand J Work Environ Health [Internet]. 2011 May; 37(3):[173-85 pp.]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21290083 doi:https://dx.doi.org/10.5271/sjweh.3146
110. Kivimäki M, Jokela M, Nyberg ST, Singh-Manoux A, Fransson EI, et al. Long Working Hours and Risk of Coronary Heart Disease and Stroke: A Systematic Review and Meta-Analysis of Published and Unpublished Data for 603 838 Individuals. The Lancet [Internet]. 2015; 386(10005):[1739-46 pp.]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26298822 doi:10.1016/S0140-6736(15)60295-1
111. Joyce K, Pabayo R, Critchley JA, Bambra C. Flexible Working Conditions and Their Effects on Employee Health and Wellbeing. Cochrane Database Syst Rev. 2010(2):Cd008009.
112. Quinlan M, Bohle, P. Under Pressure, out of Control, or Home Alone? Reviewing Research and Policy Debates on the Occupational Health and Safety Effects of Outsourcing and Home-Based Work. Int J Health Serv. 2008;38(3):489-523.
113. U.S. Department of Health and Human Services PHS, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH),. Research Compendium: The Niosh Total Worker Health Program: Seminal Research Papers Washington, Dc: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Dhhs (Niosh) Publication No. 2012-1462012.
114. Williams-Whitt K, Bultmann U, Amick B, 3rd, Munir F, Tveito TH, et al. Workplace Interventions to Prevent Disability from Both the Scientific and Practice Perspectives: A Comparison of Scientific Literature, Grey Literature and Stakeholder Observations. J Occup Rehabil [Internet]. 2016 Dec PMC5104758]; 26(4):[417-33 pp.]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27614465 doi:10.1007/s10926-016-9664-z

115. Clayton S, Barr B, Nylen L, Burstrom B, Thielen K, et al. Effectiveness of Return-to-Work Interventions for Disabled People: A Systematic Review of Government Initiatives Focused on Changing the Behaviour of Employers. Eur J Public Health. 2012;22(3):434-9.
116. Tompa E, Dolinschi R, de Oliveira C, Amick BC, 3rd, Irvin E. A Systematic Review of Workplace Ergonomic Interventions with Economic Analyses. J Occup Rehabil. 2010;20(2):220-34.
117. Sorensen G, McLellan D, Dennerlein JT, Pronk NP, Allen JD, et al. Integration of Health Protection and Health Promotion: Rationale, Indicators, and Metrics. J Occup Environ Med. 2013;55(12 Suppl):S12-8.
118. Haddaway N, Collins A, Coughlin D, Kirk S. The Role of Google Scholar in Evidence Reviews and Its Applicability to Grey Literature Searching. PLoS ONE. 2015
119. Feltner C, Peterson, K., Weber, R.P., Cluff, L., Coker-Schwimmer, E., Viswanathan, M., Lohr, K. N. Ahrq Comparative Effectiveness Reviews. Total Worker Health(R) [Internet]. 2016. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27308686
120. U.S. Department of Health and Human Services PHS, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH),. Using Total Worker Health™ Concepts to Enhance Workplace Tobacco Prevention and Control. Afanuh, S., Lee, M., Hudson, H. For the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. Dhhs (Niosh) Publication No. 2015–202.2015. Available from: https://www.cdc.gov/niosh/docs/wp-solutions/2015-202/pdfs/2015-202.pdf
121. Anger WK, Elliot, D. L., Bodner, T., Olson, R., Rohlman, D. S., Truxillo, D. M., Kuehl, K. S., Hammer, L. B., Montgomery, D. Effectiveness of Total Worker Health Interventions. J Occup Health Psychol [Internet]. 2015 Apr; 20(2):[226-47 pp.]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/25528687 doi:10.1037/a0038340
122. Institute of Medicine. Promising and Best Practices in Total Worker Healthtm: Workshop Summary [Online Resource] Washington, Dc: The National Academies Press.2014. Available from: https://www.nap.edu/read/18947/chapter/1

Appendix 1 The Total Worker Health™ Concept

The defining elements of the TWH approach are described in the 2016 publication from US DHHS, CDC, and NIOSH: Fundamentals of Total Worker Health™ Approaches:[83]

- Demonstrate leadership commitment to worker safety and health at all levels of the organization
- Design work to eliminate or reduce safety and health hazards and promote worker well-being
- Promote and support worker engagement throughout program design and implementation
- Ensure confidentiality and privacy of workers
- Integrate relevant systems to advance worker well-being.

Summary table of key findings and strength of evidence for TWH interventions, from the 2016 systematic review by Feltner et al. is shown in Table 10 below.

Table 10 - Key findings and strength of evidence for Total Worker Health™

Table. Summary of Key Findings and Strength of Evidence for Total Worker Health Interventions

Population (Reference)	Intervention and Comparator	Time Point, *wk*	Studies, *n*	Participants, *n*	Study Limitations	Outcome and Results	Strength of Evidence
Construction (25) and manufacturing (22) workers	Integrated intervention vs. no intervention	22-26	2	737	Medium or high	Self-reported 7-d smoking abstinence, intervention vs. no intervention 1 RCT (*n* = 188 smokers and recent quitters at baseline) rated as having medium ROB (25): 19% vs. 8% of workers at 26 wk; *P* = 0.03* 1 RCT (*n* = 490 smokers at baseline) rated as having high ROB (22): 26% vs. 17% of workers at 22 wk; *P* = 0.014	Low for benefit
Manufacturing (19, 26) and construction (25) workers	Integrated intervention vs. no intervention	26-104	3	6056	Medium or high	Self-reported fruit and vegetable consumption, intervention vs. no intervention 2 RCTs rated as having medium ROB: 1 RCT (*n* = 578) (25): mean change from baseline in servings of fruits and vegetables per day, 1.52 (SD, 3.39) vs. −0.09 (SD, 3.31); *P* ≤ 0.0001 1 RCT (*n* = 3092) (26): mean change from baseline in number of workers consuming ≥5 servings of fruits and vegetables per day†, 7.5% vs. 1.1%; *P* = 0.048 1 RCT (*n* = 2386) rated as having high ROB (10): mean change from baseline in servings of fruits and vegetables per day, 0.22 vs. 0.09; *P* = 0.04	Low for benefit
Sedentary office workers (31, 32)	Integrated intervention vs. any comparator	16-52	2	262	Medium	Sedentary activity at work, intervention vs. comparator 1 RCT (*n* = 412) (31): change in minutes spent sedentary per day (physical environment intervention vs. control group), −57.9 (95% CI, −111.7 to 4.2); *P* = 0.03‡ 1 RCT (*n* = 60) (32): change in percentage of work time spent sedentary (integrated intervention§ vs. OSH-only group), −2.0 (95% CI, −4.4 to 0.3) vs. −0.4 CI, −1.1 to 0.2); *P* = 0.08	Low for benefit

OSH = occupational safety and health; RCT = randomized, controlled trial; ROB = risk of bias.
* This RCT also found benefit favoring the integrated intervention for rates of 7-d abstinence from any tobacco use (19% vs. 8%; *P* = 0.005) (25).
† In the overall sample of workers, intervention and control worksites did not differ (mean change from baseline in percentage consuming ≥5 servings per day: 5.4% vs. 1.7%; *P* = 0.41), and managers at intervention worksites reported decreased consumption of fruits and vegetables compared with managers at control worksites (mean change from baseline in percentage consuming ≥5 servings per day: −5.5% vs. 3.6%; *P* = 0.048) (26).
‡ The other 2 active comparators (social environmental intervention and combined social and physical environmental intervention) and the control group did not differ on any measure of work-specific physical activity or sedentary behavior outcome (31).
§ Workers were randomly assigned to an ergonomic workstation optimization intervention alone or an integrated intervention that included the same ergonomic intervention plus access to a seated activity-permissive workstation (32).

Source: Feltner et al. 2016 [45]

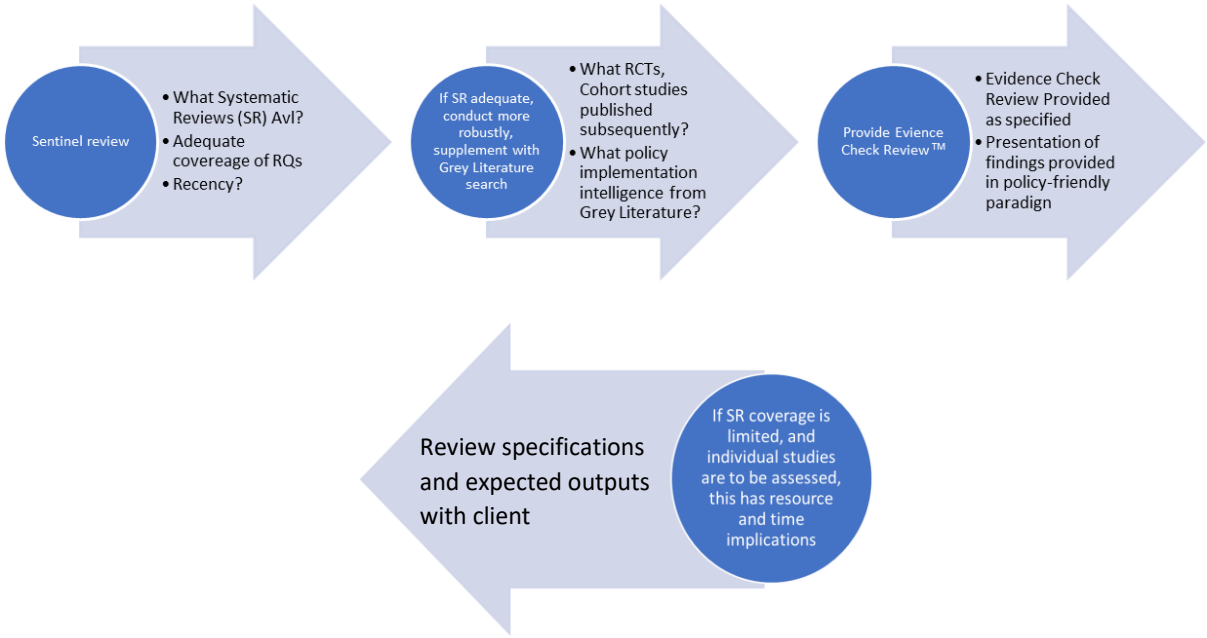
Appendix 2 Our approach explained; Sentinel Review 2007-2017

Our overall approach explained

The process map of our methodology is discussed here, together with the results of the sentinel search. We provide a very rapid Sentinel Review to ascertain what systematic review (SR) evidence is available, the recency of analysis, and the adequacy of coverage across the specified research questions.

Assuming these are adequate, we then proceed with a more robust review using typical electronic databases (such as Medline, Pre Medline, Cochrane database of systematic reviews, PubMed and/or Scopus, NHS Economic Evaluation Database, Health Technology Assessment). Search terms used will be consistent with the US National Library Medical Subject Headings (MeSH®) Thesaurus (with modifications as required for specific databases). We also search for any high-quality studies (RCT, Quasi-experimental, Cohort) published later than the most recent Systematic Review. We conduct a supplementary search of the grey literature. For grey literature, searches were undertaken using selected key words within the advanced search functions of Google/Google Scholar; the search is limited to a maximum of the first 200 results, in keeping with recent guidance from Haddaway et al. (2015)[118]

If SR coverage is very limited and there is still a desire to explore individual studies, BBCA may not proceed unless the client wishes to review specifications and expected outputs. This is simply because of the labour-intensive nature of searching for and analysing individual studies which, in any event, would be unlikely to provide a robust evidentiary base in the absence of SRs.



Sentinel review results

The bibliometric graph below shows the results of a preliminary ('sentinel') search using PubMed for titles with Systematic or Review AND Workplace or Worksite. We found 189 reviews which were retrieved and noted that there was a trend towards a higher number of publications in the area in more recent years (29 already published by the mid-point of 2017). This analysis, albeit very preliminary and cursory, together with our detailed knowledge of the literature in this space, suggested that there would be more than enough SR evidence to answer the review questions.

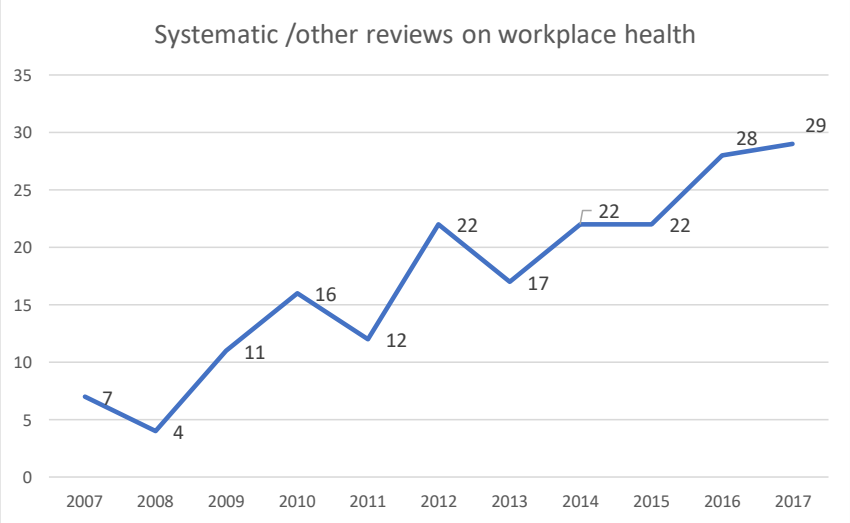


Figure 14 - Preliminary search results, PubMed

Appendix 3 Search strategy PRISMA flow diagram

Databases searched

Medline, Pre Medline, Cochrane database of systematic reviews, PubMed, NHS Economic Evaluation Database, Health Technology Assessment.

Grey literature search terms (Google/Google Scholar)

Workplace, Worksite, Wellness, Health, Health Promotion, Case Studies, Best Practice, Systematic Review, Literature Review, Cost-effectiveness, Leadership, Systems, Policy, task design, flexible work, organisation culture, work process, healthy by design, safe by design.

Electronic database search terms

Search Terms	Records retrieved
1. "Total worker health"	32
2. "Occupational Health"[Mesh] OR "Occupational Health Services"[Mesh] OR "Workplace"[Mesh] OR "worksite health"	80,903
3. (("Health Promotion"[Mesh]) OR "Accident Prevention"[Mesh]) OR "Wounds and Injuries/prevention and control"[Mesh]	204,833
4. (#2 AND #3)	6818
5. (#1 OR #4) Filters: Humans; English; Publication date from 2007/01/01	2675
6. #5 Filter "Review Articles"	**262**
7. ("Clinical Trial" [Publication Type] OR "Controlled Clinical Trial" [Publication Type] OR "Randomized Controlled Trial" [Publication Type]) OR "Evaluation Studies" [Publication Type] OR ("Cohort Studies"[Mesh]) OR "Longitudinal Studies"[Mesh	
8. (#7 and #5)	
9. (#8 Filter: Publication date from 2015	**151**

After the main search of systematic reviews/grey literature (yielded 262 studies), we established the most recent comprehensive systematic review as that undertaken by Feltner and colleagues with a temporal search filter of September 21, 2015.[119] We ran an additional search using the same protocols, for any Randomized Trials and Longitudinal Studies published after 2015 and with the potential to enhance the review findings which yielded 151 records (25 were ultimately retained); see PRISMA diagram overleaf.

Supplementary searches

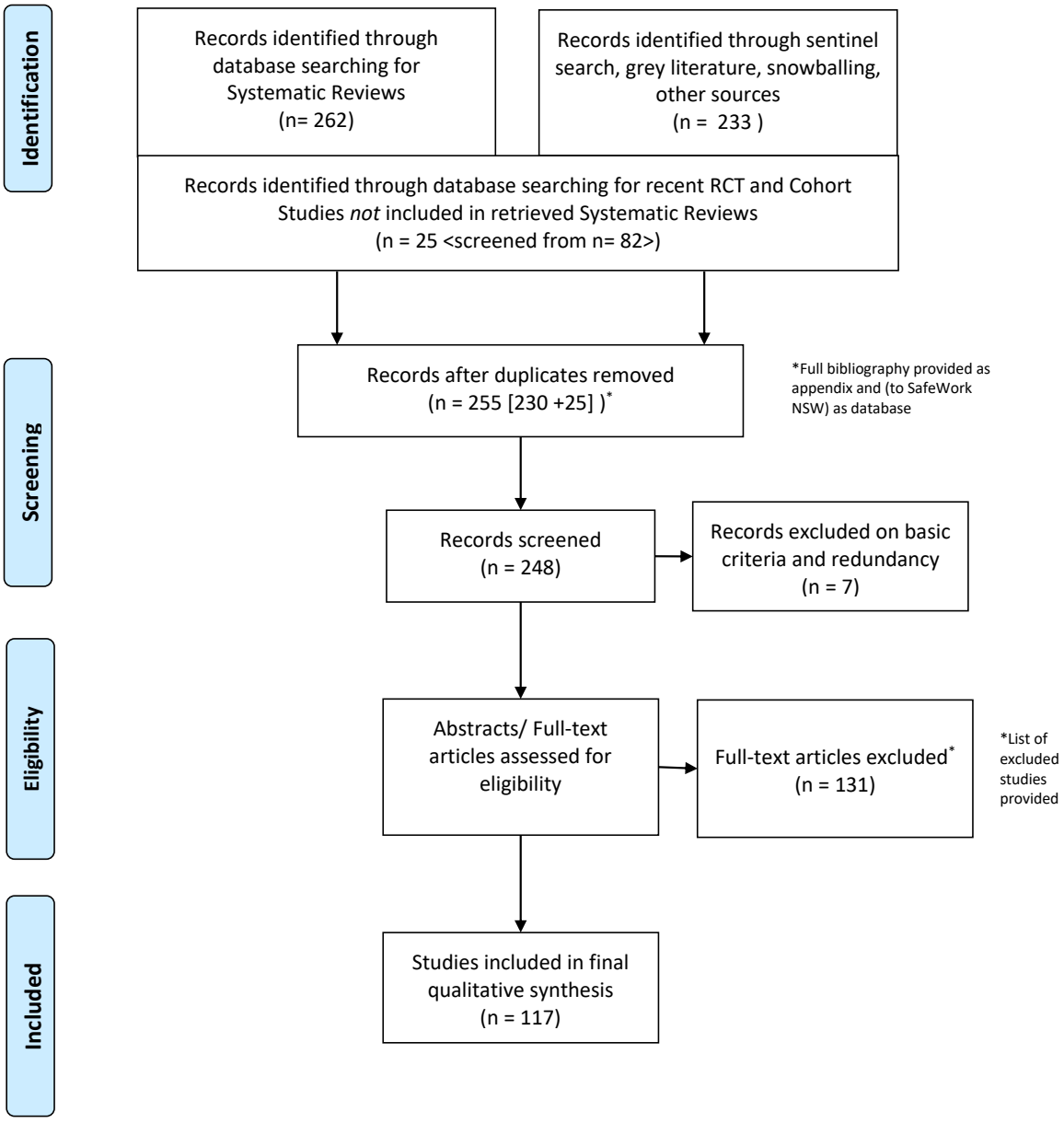
Additional searches of the peer review literature were undertaken using the following terms:

Leadership, Systems, Policy, task design, flexible work, organisation culture, work process, healthy by design, safe by design. (3366 records – Filtered to Reviews -> 462 before screening, 82 retained from initial screening by title;)

Additional grey literature searches were also undertaken (16 records after initial screening) (82+16=98)

After full screening, where necessary, of complete papers, the database category for the supplementary search had an extra 60 records.

PRISMA Flow Diagram



Appendix 4 Case studies and useful links

Many organisations around the world capture and document good practices in employee health and wellness, work-life balance, supportive company cultures, and related topics. Many of these also provide case studies, with details on effective approaches and policies as well as award schemes operating in several countries. Below is a sample of some of the major case study resources, as well as links to sites where you can find more information and ideas.

Global
Global Center for Healthy Workplaces, Global Healthy Workplace Awards: http://www.globalhealthyworkplace.org/
Great Place to Work® Institute: http://www.greatplacetowork.net/
World Economic Forum, Workplace Wellness Alliance Case Studies: http://www.weforum.org/content/pages/case-studies
Society for Human Resource Management (SHRM) – Case Studies: https://www.shrm.org/resourcesandtools/hr-topics/benefits/pages/wellnessrc-case-studies.aspx
Australia
Heart Foundation – Wide range of workplace wellness resources: https://www.heartfoundation.org.au/for-professionals/physical-activity/workplace-wellness
ComCare Home Page Returns on investment: https://www.comcare.gov.au/__data/assets/pdf_file/0006/99303/Benefits_to_business_the_evidence_for_investing_in_worker_health_and_wellbeing_PDF,_89.4_KB.pdf
Price Waterhouse Cooper (PWC) – 2010 report on workplace wellness in Australia: http://www.usc.edu.au/media/3121/WorkplaceWellnessinAustralia.pdf
Workplace Health Association Australia: http://www.workplacehealth.org.au/
SafeSearch: https://www.safesearch.com.au/news/growing-trends-in-corporate-health-and-wellbeing-programs-in-australia-in-2015/9121/
Workplace Resources (ACT Gov): http://www.healthierwork.act.gov.au/supporting-resources/publications_and_links/
Canada
Excellence Canada, Canada Awards for Excellence: https://www.excellence.ca/en/awards/

Europe
European Agency for Safety and Health at Work EU-OSHA Case Studies: https://osha.europa.eu/en/tools-and-publications/publications Worker participation practices: A review of EU-OSHA case studies: https://osha.europa.eu/en/tools-and-publications/publications/literature_reviews/workerparticipation-practices-a-review-of-eu-osha-case-studies EU Healthy Workplaces Good Practice Awards: https://osha.europa.eu/en/healthy-workplaces-campaigns/awards/
India
Arogya World, Healthy Workplaces Awards: http://arogyaworld.org/programs/healthy-workplaces/
South Africa
Discovery, Healthy Company Index: http://www.healthycompanyindex.co.za/
United Kingdom
RSA, Fairplace Award: http://www.fairplaceaward.com/
Times Higher Education, Best University Workplace Survey: https://www.timeshighereducation.com/features/best-university-workplace-survey-2015-results-and-analysis/2018272.article
VitalityHealth/Mercer/The Sunday Telegraph, Britain's Healthiest Company: https://www.britainshealthiestcompany.co.uk/
United States
Wellness Council of America Case Studies: https://www.welcoa.org/resourcecategory/case-studies/ Well Workplace Awards: https://www.welcoa.org/services/recognize/well-workplace-awards/
Harvard Business Review (HBR) - Hard Returns on Employee Wellness Programs: https://hbr.org/2010/12/whats-the-hard-return-on-employee-wellness-programs
American College of Occupational and Environmental Medicine, Corporate Health Achievement Award: http://www.chaa.org/
American Psychological Association, Psychologically Healthy Workplace Awards: https://www.apaexcellence.org/awards/
Glassdoor, Best Places to Work: https://www.glassdoor.com/Best-Places-to-Work-LST_KQ0,19.htm
National Business Group on Health, Best Employers for Healthy Lifestyles Awards: https:// www.businessgrouphealth.org/bestemployers/
Quantum Workplace, Best Places to Work Awards and Employee Voice Awards: http://www.quantumworkplace.com/client-success/
The Health Project, C. Everett Koop National Health Awards: http://thehealthproject.com/winning-programs/

Appendix 5 Gaps in evidence and research priorities

Long-term impact of programs

Given the long latency between health risks and development of manifest chronic diseases, a much longer follow-up period will be required to fully capture the effect of worksite wellness programs on health outcomes and cost.

Design of programs

Research is needed on program design features that are most likely to achieve wellness goals. Smoking cessation is an area where additional research could inform program development. A more granular look at different program components would provide valuable insights into the determinants of program success. For example, such analyses could compare the differential effects of modalities for program delivery (e.g., telephone, Internet, and in-person). Research into the relative impact of individual-level and workforce-level interventions could help to increase program efficiency.

Impact on a broad range of measures

Future studies should look at a broader range of outcomes, in particular work-related outcomes and health-related quality of life. Work-related outcomes, such as absenteeism, productivity, and retention, are of critical importance to employers as they directly affect business performance.

Contextual factors that modify program impact

Contextual factors will influence the effectiveness and cost-effectiveness of workplace wellness interventions. Employer characteristics, such as workplace culture and leadership support, might modify the effect of wellness programs. Understanding the role of such modifying factors should be considered for future research. Similarly, we need to understand better how employee demographic characteristics drive decisions about program uptake and how those factors interact with financial incentives.

Effect of financial incentives

"High-powered" incentives that tie a substantial proportion of the cost of coverage to specific health standards remain rare. Thus, comprehensive evaluation of the intended and unintended effects of such incentives and different incentive amounts may require a prospective or even experimental study. In addition, there is limited information on the differential impact of different incentive types (e.g., whether rewards have a different effect from penalties and whether premium reductions have a different effect from cash payments) and of changes in incentives over time.

Employer Health and Productivity RoadMap

Evidence on the contribution of wellness programs to productivity is patchy. The TWH model has been used to develop the Employer Health and Productivity RoadMap comprising six interrelated and integrated core elements (see Chapter 6 – evidence of effectiveness). Further research here is needed.

Effectiveness of extension programs

Workplace wellness/ TWH programs may be extended to the family and/or the wider community. Understanding the effectiveness of these extension programs will be important, together with the research agenda outlined above, in developing the fourth generation of programs – 'workplace wellness 4.0'.

Adapted from Mattke et al (2013) and enhanced.

Appendix 6 Tabulation of selected key papers

Table 11 - Selected studies which made important contributions to the analysis and policy options

Source	Country (Population)	Purpose of research	Key findings	Policy relevance
Feltner et al.[119]	USA Global review	Detailed evidence review and report; can use to inform a workshop on TWH.	The body of evidence was small and diverse in terms of populations, interventions, and measured outcomes. TWH interventions were effective in improving intermediate outcomes traditionally measured in health promotion programs (smoking cessation and fruit and vegetable consumption) and reducing sedentary work behaviour.	High quality global evidence review is relevant for the Australian context. Usual caveats apply about generalisability of specific programs from USA to other countries. Broad scientific findings hold true.
Lee et al.[83]	USA	Implementation focussed research compilation. Reflects the evolution and progression of TWH concept into an evidence-based implementation workbook.	NIOSH Total Worker Health™ (TWH) program was established in 2011. Sets out (stepwise) essential elements to implement TWH, which is defined as "*policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness–prevention efforts to advance worker well-being*"	Essential elements and process steps likely translate to Australian context where several programs are already in existence (e.g. Get Healthy at Work). Integration of workplace safety and wellness concepts may require development work at organisational and govt agency levels.
National Institute for Occupational Safety and Health (NIOSH)[8]	USA	Implementation focussed research synthesis. Describes organizational practices that can reduce the risks associated with sedentary work.	Prolonged sitting is associated with back and shoulder pain, premature mortality, diabetes, chronic diseases, metabolic syndrome, and obesity. These risks may persist even if a worker engages in recommended levels of physical activity during free time. Obesity associated with occupational injury and decreased productivity at work. It may also be a co-risk factor for occupational asthma and can affect a worker's response to chemical exposures	Total Worker Health™: Integrated Approach recommended; sets out Recommendations for Incorporating Total Worker Health™ into workplace programs. Sets out specific recommendations for incorporation of movement into workday. Translates readily to Australian context where several organizations are early adopters.

Source	Country (Population)	Purpose of research	Key findings	Policy relevance
Dellve, L. Eriksson A.[97]	Sweden Global review plus country specific research	Theoretical framework, (theoretical underpinnings and pedagogical principles) for leadership programs that support managers' evidence-based knowledge of health-promoting psychosocial work conditions, as well as their capability to apply, adapt and craft sustainable managerial work practices	The complexity of interactions among different factors in a work system, and the variety in possible implementation approaches, presents challenges for the capability of managers to craft sustainable and health-promoting conditions, as well as the evaluation of the program components. The evaluation reveals the strength of the program, in providing holistic and context-sensitive approaches to how to train and apply an integrative approach for improving the work environment.	Provides outstanding analysis from a systems perspective. Theoretical framework provides a useful reference point. Would require testing and development for relevance and transferability to Australia/NSW.
Feltner et al.[45]	USA Global review	Systematic review. To evaluate evidence on the benefits and harms of integrated TWH interventions.	Integrated TWH interventions might improve health behaviours (for example, reduce tobacco use and sedentary behaviour and improve diet) of workers, but effects of these interventions on injuries and overall quality of life are not known.	High quality global evidence review is relevant for the Australian context
National Institute for Health and Care Excellence (NICE)[95]	UK Global review	Evidence review and guideline; covers how to improve the health and wellbeing of employees; focus on organisational culture and the role of line manager	Detailed, evidence-based recommendations are provided across eleven categories	High quality global evidence review is relevant for the Australian context
Rojatz, D. Merchant, A and Nitsch, M[86]	Austria Global review	Qualitative systematic review to identify factors influencing 4 phases of Workplace Wellness interventions: (i) needs assessment (ii) planning (iii) implementation (iv) evaluation.	Factors at different levels have to be considered; factors at different levels do not affect every phase of intervention. External conditions surrounding the intervention are important; not only must different levels of the intervention but also different phases of the intervention need to be considered. This can lead to better research and to more effective program design.	Important implications are (a) the importance of ***context*** and (b) the important of looking at which of phases (i) –(iv) is under consideration and at what *level*. Global review, with relevance for the Australian context in terms of program design, testing and development.

Source	Country (Population)	Purpose of research	Key findings	Policy relevance
National Institute for Occupational Safety (NIOSH)[120]	USA	Implementation focussed research synthesis. Describes organizational practices that can enhance workplace tobacco use prevention and control.	Worksite health promotion programs designed to improve worker health, such as those that help workers stop or reduce tobacco use, have traditionally focused on individual factors and not taken work-related exposures and hazards into account. Through its Total Worker Health™ Program, the National Institute for Occupational Safety and Health (NIOSH) recommends an integrated approach to addressing personal as well as workplace safety and health factors.	Total Worker Health™: Integrated Approach recommended; sets out Recommendations for Incorporating Total Worker Health™ into workplace programs. Sets out specific recommendations for incorporation of tobacco control into workday. Translates readily to Australian context where several organizations are early adopters. Tobacco control interventions are effective independent of workplace context and are advanced in Australia. Supporting cessation is recommended.
Anger et al.[121]	USA	Systematic Review of TWH evidence: (a) occupational safety and/or health (OSH, or health protection) and wellness and/or well-being (health promotion, or HP) in the same intervention study, and (b) reporting both OSH and HP outcomes	TWH interventions that address both injuries and chronic diseases may improve workforce health effectively and more rapidly than the alternative of separately employing more narrowly focused programs to change the same outcomes in serial fashion (based on 17 studies that met inclusion criteria).	17 articles retrieved in the review provide examples of how TWH interventions can be structured. The potential for simultaneous improvements in safety, health, and well-being warrants TWH research to identify and disseminate best practices. This research agenda is relevant for the Australian context.
Parker, S. and Griffin, M.[107] (for ComCare)	Australia	Commissioned review designed to inform best practice in the workplace through effective design and process	• Identifies principles and actions to support the design of good work • Provides evidence for these principles and actions • Covers the 'how' of work design • Reviews the key approaches to redesigning work and to enhancing work health and safety more generally • Reviews the key principles or 'lessons-learned' within each approach.	Authoritative review and framework, specifically developed for the Australian context. Highly relevant

Source	Country (Population)	Purpose of research	Key findings	Policy relevance
Institute of Medicine[122]	USA	Peer-reviewed workshop report on TWH, best practices in the integration of occupational health and safety and health promotion in the workplace	The report identifies prevalent and best practices in programs that integrate occupational safety and health protection with health promotion in small, medium, and large workplaces; employer and employee associations; academia; government agencies; and other stakeholder groups.	The workshop and report represents an example of process more than content (many other evidence reviews provide 'content'). A similar key stakeholder engagement process would be a likely step in efforts to embrace a TWH approach in NSW or Australia more broadly.
National Institute for Occupational Safety and Health (NIOSH)[113]	USA	Updated versions of 3 specifically commissioned research papers.	Establishes a scientific rationale for integrating health promotion and health protection programs to prevent worker injury and illness and to advance health and well-being.	Scientific rationale likely acceptable to Australian given the global nature of the evidence base. However, consultation and consensus building may be pre-requisites for progress.

Appendix 7 Overview of full database by selected categories

Note: references used in this appendix do not correspond to those in the main body of this report.

This appendix provides the full list of studies retained in the database after screening for relevance, redundancy and/or duplication. These were further screened and prioritised so that not all listed studies were cited in the final synthesis but are provided here for completeness. Studies may feature in more than one category.

Absenteeism/ Return to work strategies

The search yielded 15 systematic or other reviews dealing with absenteeism and /or return to work strategies and programs.[1-15]

Alcohol

Three of the retrieved studies address alcohol focussed strategies within the workplace. [16-18]

Cost-effectiveness

Eighteen studies addressing cost-effectiveness, returns on investment, and/or savings were retained after screening. [19-36]

Implementation

This category focussed on design recommendations, best practice principles and/or insights into program implementation; 26 studies addressing implementation issues/ guidelines were retained.[13, 21, 23, 32, 37-58]

Injury and Safety

For studies addressing injury (including violence-related injury) and safety issues, 32 studies were retained.[4, 34, 59-82]

Mental Health

This category covered mental health, mental illness, depression and stress; 34 studies were retained. [4, 28, 58, 60, 68, 83-101]

Musculoskeletal issues

This category included musculoskeletal impacts (especially lower back), ergonomics, and posture; 19 studies were retained.[1, 80, 102-118]

Nutrition and healthy eating

After initial screening, 10 studies were retained.[27, 29, 31, 119-125]

Organisational factors

This category included overall systems and practices, work design, task design managing reorganisation and distinguishing organisational factors applicable to smaller businesses; 29 studies were retained.[47, 54, 99, 114, 115, 126-149]

Physical activity

This category included physical activity, fitness, sport and sedentary behaviour (sitting) focussed programs and interventions; 39 studies were retained.[27, 29, 44, 50, 102, 103, 121, 124, 150-180.]

Productivity

Nine studies were retained in this category.[10, 21, 31, 33, 159, 181-184].

Sleep

This category included studies dealing with the relationship between sleep, shift work, and employee performance, including safety. This area of research is emergent but likely will acquire greater significance in the future; 11 studies were retained.[16, 70, 89, 140, 144, 185-190.]

Generic/overview

This category included studies and reports which were deemed strategically important to inform the review, regardless of study design. It included global and national surveillance of workplace wellness programs as well as importance individual reports of particular relevance for Australia; 31 studies were included.[19, 21, 23, 35, 39, 43, 53, 191-214]

Tobacco

This category included environmental tobacco smoke (ETS) as well as tobacco related programs; Four studies were retained.[215-218]

Total Worker Health™

This category addressed studies focussing on the Total Worker Health™ model. The Total Worker Health™ (TWH) program was established in 2011, setting out (stepwise) essential elements to implement TWH, defined as "*policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness–prevention efforts to advance worker well-being*".[219] 15 studies were retained.[26, 33, 48, 89, 107, 136, 150, 183, 210, 215, 219-223.]

Obesity

This category included prevention of overweight and obesity, promotion of healthy weight and strategies to address diabetes/ metabolic disorders; 11 studies were retained. [173, 179, 224-232.]

Women

Studies which focussed on or were relevant to female gender were identified; nine studies were retained.[85, 151, 163, 188, 233-237.]

Recent randomized trials and longitudinal studies

This category included any recently published high quality studies (RCT, Quasi-experimental, Cohort) not already covered by the retained systematic reviews; 12 studies were retained after screening.[186, 238-248.]

References for Appendix 7 only

1.	Cullen, K.L., 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, 2017.
2.	Vargas-Prada, S., et al., Effectiveness of very early workplace interventions to reduce sickness absence: a systematic review of the literature and meta-analysis. Scand J Work Environ Health, 2016. 42(4): 261-72.
3.	Van Eerd, D., et al., Effectiveness of workplace interventions in the prevention of upper extremity musculoskeletal disorders and symptoms: an update of the evidence. Occup Environ Med, 2016. 73(1):62-70.
4.	Nielsen, M.B., A.M. Indregard, and S. Overland, Workplace bullying and sickness absence: a systematic review and meta-analysis of the research literature. Scand J Work Environ Health, 2016. 42(5):359-70.
5.	Street, T.D. and S.J. Lacey, A systematic review of studies identifying predictors of poor return to work outcomes following workplace injury. Work, 2015. 51(2): 373-81.
6.	Wagner, S., et al., Modifiable worker risk factors contributing to workplace absence: a stakeholder-centred best-evidence synthesis of systematic reviews. Work, 2014. 49(4):541-58.
7.	Durand, M.J., et al., A review of best work-absence management and return-to-work practices for workers with musculoskeletal or common mental disorders. Work, 2014. 48(4):579-89.
8.	Casey, P.P., L. Guy, and I.D. Cameron, Determining return to work in a compensation setting: a review of New South Wales workplace rehabilitation service provider referrals over 5 years. Work, 2014. 48(1):11-20.
9.	Odeen, M., et al., Systematic review of active workplace interventions to reduce sickness absence. Occup Med (Lond), 2013. 63(1):7-16.
10.	Lenssinck, M.L., et al., Consequences of inflammatory arthritis for workplace productivity loss and sick leave: a systematic review. Ann Rheum Dis, 2013. 72(4):493-505.
11.	Cancelliere, 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.
12.	Carroll, C., 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(8):607-21.
13.	Shaw, W., et al., A literature review describing the role of return-to-work coordinators in trial programs and interventions designed to prevent workplace disability. J Occup Rehabil, 2008. 18(1):2-15.
14.	Kuoppala, J., A. Lamminpaa, andHusman, Work health promotion, job well-being, and sickness absences -a systematic review and meta-analysis. Journal of Occupational & Environmental Medicine, 2008. 50(11):1216-27.
15.	Schultz, A.B. and D.W. Edington, Employee health and presenteeism: a systematic review. Journal of Occupational Rehabilitation, 2007. 17(3):547-79.
16.	Dorrian, J., et al. Alcohol use in shiftworkers. Accid Anal Prev, 2017. 99, 395-400 DOI: 10.1016/j.aap.2015.11.011. https://www.ncbi.nlm.nih.gov/pubmed/26621201
17.	Ames, G.M. and J.B. Bennett, Prevention interventions of alcohol problems in the workplace. Alcohol Health & Research World, 2011. 34(2):175-87.
18.	Webb, G., Shakeshaft, A., Sanson-Fisher, R., Havard, A., A systematic review of work-place interventions for alcohol-related problems. Addiction, 2009. 104(3):365-77.
19.	US Chambers of Commerce Winning with Wellness. 2016. https://www.uschamber.com/sites/default/files/022436_labr_wellness_report_opt.pdf
20.	Kapinos, K.A., et al., Does Targeting Higher Health Risk Employees or Increasing Intervention Intensity Yield Savings in a Workplace Wellness Program? J Occup Environ Med, 2015. 57(12):1257-61.
21.	Xerox Corporation and Buck Consultants Working Well: A Global Survey of Health Promotion, Workforce Wellness, and Productivity Strategies — Survey Report, Sixth Edition 2014. https://tinyurl.com/y85wvpk6
22.	Baxter, S., et al., The relationship between return on investment and quality of study methodology in workplace health promotion programs. American Journal of Health Promotion, 2014. 28(6):347-63.
23.	Aneni, E.C., et al., A systematic review of internet-based worksite wellness approaches for cardiovascular disease risk management: outcomes, challenges & opportunities. PLoS One, 2014. 9(1):e83594.
24.	Lerner, D., et al., A systematic review of the evidence concerning the economic impact of employee-focused health promotion and wellness programs. Journal of Occupational & Environmental Medicine, 2013. 55(2):209-22.

25.	Horwitz, J.R., B.D. Kelly, and J.E. DiNardo, Wellness incentives in the workplace: cost savings through cost shifting to unhealthy workers. Health Aff (Millwood), 2013. 32(3):468-76.
26.	Cherniack, M., Integrated health programs, health outcomes, and return on investment: measuring workplace health promotion and integrated program effectiveness. Journal of Occupational & Environmental Medicine, 2013. 55(12 Suppl):S38-45.
27.	van Dongen, J.M., et al., A systematic review of the cost-effectiveness of worksite physical activity and/or nutrition programs. Scand J Work Environ Health, 2012. 38(5):393-408.
28.	Hamberg-van Reenen, H.H., K.I. Proper, and M. van den Berg, Worksite mental health interventions: a systematic review of economic evaluations. Occup Environ Med, 2012. 69(11):837-45.
29.	van Dongen, J.M., et al., Systematic review on the financial return of worksite health promotion programmes aimed at improving nutrition and/or increasing physical activity. Obesity Reviews, 2011. 12(12):1031-49.
30.	Pelletier, K.R., A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: update VIII 2008 to 2010. J Occup Environ Med, 2011. 53(11):1310-31.
31.	Jensen, J.D., Can worksite nutritional interventions improve productivity and firm profitability? A literature review. Perspect Public Health, 2011. 131(4):184-92.
32.	Lee, S., H. Blake, and S. Lloyd, The price is right: making workplace wellness financially sustainable. International Journal of Workplace Health Management, 2010. 3(1):58-69.
33.	Kirsten, W., Making the link between health and productivity at the workplace--a global perspective. Industrial Health, 2010. 48(3):251-5.
34.	Tompa, E., et al., A systematic review of occupational health and safety interventions with economic analyses. Journal of Occupational & Environmental Medicine, 2009. 51(9):1004-23.
35.	Pelletier, K.R., A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: update VII 2004-2008. J Occup Environ Med, 2009. 51(7):822-37.
36.	Goetzel, R.Z. and R.J. Ozminkowski, The health and cost benefits of work site health-promotion programs. Annual Review of Public Health, 2008. 29:303-23.
37.	Motalebi, G.M., et al., How far are we from full implementation of health promoting workplace concepts? A review of implementation tools and frameworks in workplace interventions. Health Promot Int, 2017.
38.	Lydell, M., et al., Future challenges for occupational health services can be prevented by proactive collaboration with the companies using the services: a participatory and reflection project. J Multidiscip Healthc, 2017. 10:217-225.
39.	Xerox Corporation and Buck Consultants Working Well: A Global Survey of Workforce Wellbeing Strategies — Survey Report, Seventh Edition 2016. https://tinyurl.com/yb87l6se
40.	Taylor, A.W., et al., The role of business size in assessing the uptake of health promoting workplace initiatives in Australia. BMC Public Health, 2016. 16:353.
41.	Rojatz, D., A. Merchant, and M. Nitsch, Factors influencing workplace health promotion intervention: a qualitative systematic review. Health Promot Int, 2016.
42.	Massie, J. and J.M. Ali, Workplace-based assessment: a review of user perceptions and strategies to address the identified shortcomings. Adv Health Sci Educ Theory Pract, 2016. 21(2):455-73.
43.	Khanal, S., et al., Evaluation of the implementation of Get Healthy at Work, a workplace health promotion program in New South Wales, Australia. Health Promot J Austr, 2016.
44.	Exercise & Sports Science Australia Physical Activity in the Workplace: A Guide. 2016. http://exerciseismedicine.com.au/wp-content/uploads/2016/11/EIM_Workplace_PA_Guide.pdf
45.	Workplace Health Association Australia Workplace Health in Australia - Best Practice Guidelines. 2015. http://www.workplacehealth.org.au/_literature_175889/Best_Practice_Guidelines
46.	Cahalin, L.P., et al., Development and Implementation of Worksite Health and Wellness Programs: A Focus on Non-Communicable Disease. Progress in Cardiovascular Diseases, 2015. 58(1):94-101.
47.	McCoy, K., et al., Health promotion in small business: a systematic review of factors influencing adoption and effectiveness of worksite wellness programs. J Occup Environ Med, 2014. 56(6):579-87.

48.	Institute of Medicine Promising and best practices in Total Worker Health™: Workshop summary [online resource] Washington, DC: The National Academies Press. 2014. https://www.nap.edu/read/18947/chapter/1
49.	Wierenga, D., et al., What is actually measured in process evaluations for worksite health promotion programs: a systematic review. BMC Public Health, 2013. 13:1190.
50.	Ryde, G.C., et al., Recruitment rates in workplace physical activity interventions: characteristics for success. American Journal of Health Promotion, 2013. 27(5):e101-12.
51.	Saedon, H., et al., The role of feedback in improving the effectiveness of workplace based assessments: a systematic review. BMC Med Educ, 2012. 12:25.
52.	Volpp , K.G., et al., Redesigning Employee Health Incentives — Lessons from Behavioral Economics. New England Journal of Medicine, 2011. 365(5):388-390.
53.	Soler, R.E., et al., A systematic review of selected interventions for worksite health promotion. The assessment of health risks with feedback. Am J Prev Med, 2010. 38(2 Suppl):S237-62.
54.	Organization, W.H. Healthy workplaces: a model for action: for employers, workers, policymakers and practitioners. . 2010. http://www.who.int/occupational_health/publications/healthy_workplaces_model_action.pdf
55.	Hnizdo, E., H.W. Glindmeyer, and E.L. Petsonk, Workplace spirometry monitoring for respiratory disease prevention: a methods review. Int J Tuberc Lung Dis, 2010. 14(7):796-805.
56.	Robroek, S.J., et al., Determinants of participation in worksite health promotion programmes: a systematic review. Int J Behav Nutr Phys Act, 2009. 6:26.
57.	Booth, A., et al., Applying findings from a systematic review of workplace-based e-learning: implications for health information professionals. Health Info Libr J, 2009. 26(1):4-21.
58.	Murta, S.G., K. Sanderson, and B. Oldenburg, Process evaluation in occupational stress management programs: a systematic review. American Journal of Health Promotion, 2007. 21(4):248-54.
59.	Lachance, C.C., et al., Compliant flooring to prevent fall-related injuries in older adults: A scoping review of biomechanical efficacy, clinical effectiveness, cost-effectiveness, and workplace safety. PLoS One, 2017. 12(2):e0171652.
60.	Houck, N.M. and A.M. Colbert, Patient Safety and Workplace Bullying: An Integrative Review. J Nurs Care Qual, 2017. 32(2):164-171.
61.	Estill, C.F., et al., Noise and neurotoxic chemical exposure relationship to workplace traumatic injuries: A review. J Safety Res, 2017. 60:35-42.
62.	Young, A.E., et al., Workplace Outcomes in Work-Disability Prevention Research: A Review with Recommendations for Future Research. J Occup Rehabil, 2016. 26(4):434-447.
63.	Pourshaikhian, M., et al., A Systematic Literature Review: Workplace Violence Against Emergency Medical Services Personnel. Arch Trauma Res, 2016. 5(1):e28734.
64.	Nilsson, K., Interventions to reduce injuries among older workers in agriculture: A review of evaluated intervention projects. Work, 2016. 55(2):471-480.
65.	Martinez, A.J., Managing Workplace Violence With Evidence-Based Interventions: A Literature Review. J Psychosoc Nurs Ment Health Serv, 2016. 54(9):31-6.
66.	Luong Thanh, B.Y., et al., Behavioural interventions to promote workers' use of respiratory protective equipment. Cochrane Database of Systematic Reviews, 2016. 12:CD010157.
67.	Leisy, H.B. and M. Ahmad, Altering workplace attitudes for resident education (A.W.A.R.E.): discovering solutions for medical resident bullying through literature review. BMC Med Educ, 2016. 16:127.
68.	Purpora, C., A. Cooper, and C. Sharifi, The prevalence of nurses' perceived exposure to workplace bullying and its effect on nurse, patient, organization and nursing-related outcomes in clinical settings: a quantitative systematic review protocol. JBI Database System Rev Implement Rep, 2015. 13(9):51-62.
69.	Xiang, J., et al., Health impacts of workplace heat exposure: an epidemiological review. Ind Health, 2014. 52(2):91-101.
70.	Uehli, K., et al., Sleep problems and work injuries: a systematic review and meta-analysis. Sleep Medicine Reviews, 2014. 18(1):61-73.
71.	Pidd, K. and A.M. Roche, How effective is drug testing as a workplace safety strategy? A systematic review of the evidence. Accid Anal Prev, 2014. 71:154-65.

72.	Gensby, U., et al., A classification of components of workplace disability management programs: results from a systematic review. J Occup Rehabil, 2014. 24(2):220-41.
73.	Mischke, C., et al., Occupational safety and health enforcement tools for preventing occupational diseases and injuries. Cochrane Database of Systematic Reviews, 2013(8):CD010183.
74.	Cashmore, A.W., et al., Workplace violence in a large correctional health service in New South Wales, Australia: a retrospective review of incident management records. BMC Health Serv Res, 2012. 12:245.
75.	van Gils, R.F., et al., Effectiveness of prevention programmes for hand dermatitis: a systematic review of the literature. Contact Dermatitis, 2011. 64(2):63-72.
76.	Taylor, J.L. and L. Rew, A systematic review of the literature: workplace violence in the emergency department. J Clin Nurs, 2011. 20(7-8):1072-85.
77.	Crawford, J.O., et al., The health safety and health promotion needs of older workers. Occupational Medicine (Oxford), 2010. 60(3):184-92.
78.	Baldasseroni, A., N. Olimpi, and G. Bonaccorsi, [A systematic review of the effectiveness of workplace safety interventions]. Med Lav, 2009. 100(4):268-71.
79.	Palmer, K.T., E.C. Harris, and D. Coggon, Chronic health problems and risk of accidental injury in the workplace: a systematic literature review. Occup Environ Med, 2008. 65(11):757-64.
80.	Williams, R.M., et al., Effectiveness of workplace rehabilitation interventions in the treatment of work-related low back pain: a systematic review. Disabil Rehabil, 2007. 29(8):607-24.
81.	van der Molen, H.F., et al., Interventions for preventing injuries in the construction industry. Cochrane Database of Systematic Reviews, 2007(4):CD006251.
82.	Pollack, K.M. and L.J. Cheskin, Obesity and workplace traumatic injury: does the science support the link? Injury Prevention, 2007. 13(5):297-302.
83.	Milner, A., et al., Workplace suicide prevention: a systematic review of published and unpublished activities. Health Promotion International, 2015. 30(1):29-37.
84.	McDowell, C. and E. Fossey, Workplace accommodations for people with mental illness: a scoping review. J Occup Rehabil, 2015. 25(1):197-206.
85.	Geoffroy, M. and L. Chamberland, [Mental health implications of workplace discrimination against sexual and gender minorities: A literature review]. Sante Ment Que, 2015. 40(3):145-72.
86.	Tan, L., et al., Preventing the development of depression at work: a systematic review and meta-analysis of universal interventions in the workplace. BMC Med, 2014. 12:74.
87.	Battams, S., et al., Workplace risk factors for anxiety and depression in male-dominated industries: a systematic review. Health Psychol Behav Med, 2014. 2(1):983-1008.
88.	Slatore, C.G., et al., An official American Thoracic Society systematic review: Influence of psychosocial characteristics on workplace disability among workers with respiratory impairment. Am J Respir Crit Care Med, 2013. 188(9):1147-60.
89.	Hammer, L.B. and S. Sauter, Total Worker Health™ and work-life stress. Journal of Occupational & Environmental Medicine, 2013. 55(12 Suppl):S25-9.
90.	Pomaki, G., et al., Workplace-based work disability prevention interventions for workers with common mental health conditions: a review of the literature. J Occup Rehabil, 2012. 22(2):182-95.
91.	Furlan, A.D., et al., Systematic review of intervention practices for depression in the workplace. J Occup Rehabil, 2012. 22(3):312-21.
92.	Dietrich, S., et al., Depression in the workplace: a systematic review of evidence-based prevention strategies. Int Arch Occup Environ Health, 2012. 85(1):1-11.
93.	Brohan, E., et al., Systematic review of beliefs, behaviours and influencing factors associated with disclosure of a mental health problem in the workplace. BMC Psychiatry, 2012. 12:11.
94.	Stergiopoulos, E., et al., Interventions to improve work outcomes in work-related PTSD: a systematic review. BMC Public Health, 2011. 11:838.
95.	Noordik, E., et al., Exposure-in-vivo containing interventions to improve work functioning of workers with anxiety disorder: a systematic review. BMC Public Health, 2010. 10:598.

96.	Martin, A., K. Sanderson, and F. Cocker, Meta-analysis of the effects of health promotion intervention in the workplace on depression and anxiety symptoms. Scandinavian Journal of Work, Environment & Health, 2009. 35(1):7-18.
97.	Johnson, S.L., International perspectives on workplace bullying among nurses: a review. Int Nurs Rev, 2009. 56(1):34-40.
98.	Couser, G.P., Challenges and opportunities for preventing depression in the workplace: a review of the evidence supporting workplace factors and interventions. J Occup Environ Med, 2008. 50(4):411-27.
99.	LaMontagne, A.D., T. Keegel, and D. Vallance, Protecting and promoting mental health in the workplace: developing a systems approach to job stress. Health Promotion Journal of Australia, 2007. 18(3):221-8.
100.	Lamontagne, A.D., et al., A Systematic Review of the Job-stress Intervention Evaluation Literature, 1990–2005. International Journal of Occupational and Environmental Health, 2007. 13(3):268-280.
101.	Jackson, D., A. Firtko, and M. Edenborough, Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: a literature review. J Adv Nurs, 2007. 60(1):1-9.
102.	Swinton, P.A., K. Cooper, and E. Hancock, Workplace interventions to improve sitting posture: A systematic review. Prev Med, 2017.
103.	Moreira-Silva, I., et al., The Effects of Workplace Physical Activity Programs on Musculoskeletal Pain: A Systematic Review and Meta-Analysis. Workplace Health & Safety, 2016. 64(5):210-22.
104.	Delloiacono, N., Musculoskeletal safety for older adults in the workplace: review of current best practice evidence. Workplace Health Saf, 2015. 63(2):48-53.
105.	Arezes, P.M., J. Dinis-Carvalho, and A.C. Alves, Workplace ergonomics in lean production environments: A literature review. Work, 2015. 52(1):57-70.
106.	Lowe, B.D. and R.B. Dick, Workplace exercise for control of occupational neck/shoulder disorders: a review of prospective studies. Environ Health Insights, 2014. 8(Suppl 1):75-95.
107.	Punnett, L., et al., Participatory ergonomics as a model for integrated programs to prevent chronic disease. Journal of Occupational & Environmental Medicine, 2013. 55(12 Suppl):S19-24.
108.	Kraatz, S., et al., The incremental effect of psychosocial workplace factors on the development of neck and shoulder disorders: a systematic review of longitudinal studies. Int Arch Occup Environ Health, 2013. 86(4):375-95.
109.	Eijckelhof, B.H., et al., The effects of workplace stressors on muscle activity in the neck-shoulder and forearm muscles during computer work: a systematic review and meta-analysis. Eur J Appl Physiol, 2013. 113(12):2897-912.
110.	van Niekerk, S.M., Q.A. Louw, and S. Hillier, The effectiveness of a chair intervention in the workplace to reduce musculoskeletal symptoms. A systematic review. BMC Musculoskelet Disord, 2012. 13:145.
111.	Patel, A.S., et al., The impact and burden of chronic pain in the workplace: a qualitative systematic review. Pain Pract, 2012. 12(7):578-89.
112.	Palmer, K.T., et al., Effectiveness of community- and workplace-based interventions to manage musculoskeletal-related sickness absence and job loss: a systematic review. Rheumatology, 2012. 51(2):230-42.
113.	Dick, F.D., et al., Workplace management of upper limb disorders: a systematic review. Occup Med (Lond), 2011. 61(1):19-25.
114.	van Eerd, D., et al., Process and implementation of participatory ergonomic interventions: a systematic review. Ergonomics, 2010. 53(10):1153-66.
115.	Tompa, E., et al., A systematic review of workplace ergonomic interventions with economic analyses. J Occup Rehabil, 2010. 20(2):220-34.
116.	van den Berg, T.I., et al., The effects of work-related and individual factors on the Work Ability Index: a systematic review. Occupational & Environmental Medicine, 2009. 66(4):211-20.
117.	Bell, J.A. and A. Burnett, Exercise for the primary, secondary and tertiary prevention of low back pain in the workplace: a systematic review. J Occup Rehabil, 2009. 19(1):8-24.
118.	Durand, M.J., et al., Workplace interventions for workers with musculoskeletal disabilities: a descriptive review of content. J Occup Rehabil, 2007. 17(1):123-36.
119.	Nicholls, R., et al., Barriers and facilitators to healthy eating for nurses in the workplace: an integrative review. J Adv Nurs, 2017. 73(5):1051-1065.

120.	Allan, J., et al., Environmental interventions for altering eating behaviours of employees in the workplace: a systematic review. Obes Rev, 2017. 18(2):214-226.
121.	Plotnikoff, R., et al., Effectiveness of interventions targeting health behaviors in university and college staff: a systematic review. American Journal of Health Promotion, 2015. 29(5):e169-87.
122.	Geaney, F., et al., The effectiveness of workplace dietary modification interventions: a systematic review. Prev Med, 2013. 57(5):438-47.
123.	Maes, L., et al., Effectiveness of workplace interventions in Europe promoting healthy eating: a systematic review. Eur J Public Health, 2012. 22(5):677-83.
124.	Hutchinson, A.D. and C. Wilson, Improving nutrition and physical activity in the workplace: a meta-analysis of intervention studies. Health Promotion International, 2012. 27(2):238-49.
125.	Ni Mhurchu, C., L.M. Aston, and S.A. Jebb, Effects of worksite health promotion interventions on employee diets: a systematic review. BMC Public Health, 2010. 10:62.
126.	Eriksson, A., et al., Management and Leadership Approaches to Health Promotion and Sustainable Workplaces: A Scoping Review. Societies, 2017. 7(2).
127.	National Institute for Health and Care Excellence (NICE) Workplace health: management practices; NICE guideline [NG13]. 2016. https://www.nice.org.uk/guidance/ng13/chapter/recommendations
128.	Kent, K., Goetzel, R. Z., Roemer, E. C., Prasad, A., Freundlich, N., Promoting Healthy Workplaces by Building Cultures of Health and Applying Strategic Communications. J Occup Environ Med, 2016. 58(2):114-22.
129.	Canadian Centre for Occupational Health and Safety (CCOHS). Flexible Work Arrangements : OSH Answers [Web Portal]. 2016. http://www.ccohs.ca/oshanswers/psychosocial/flexible.html
130.	US Centers for Disease Control and Prevention (CDC), Workplace Health Promotion | Workplace Health Model | Web Portal. 2015.
131.	US Centers for Disease Control and Prevention (CDC) Workplace Health Promotion | Leadership Support | Web Portal. 2015. https://www.cdc.gov/workplacehealthpromotion/planning/leadership.html
132.	US Centers for Disease Control and Prevention (CDC), Workplace Health Promotion | Governance Structure & Management (Web Portal). 2015.
133.	Institute for Health and Productivity; Johns Hopkins Bloomberg School of Public Health. From Evidence to Practice: Workplace Wellness that Works. 2015. https://www.transamericacenterforhealthstudies.org/docs/default-source/wellness-page/from-evidence-to-practice---workplace-wellness-that-works.pdf?sfvrsn=2
134.	Parker, S.K. Beyond motivation: job and work design for development, health, ambidexterity, and more. Annual Review of Psychology, 2014. 65, 661-91 DOI: https://dx.doi.org/10.1146/annurev-psych-010213-115208. https://www.ncbi.nlm.nih.gov/pubmed/24016276
135.	Sorensen, G., et al., Integration of health protection and health promotion: rationale, indicators, and metrics. Journal of Occupational & Environmental Medicine, 2013. 55(12 Suppl):S12-8.
136.	National Institute for Occupational Safety and Health (NIOSH). Research Compendium: The NIOSH Total Worker Health™ Program: Seminal Research Papers 2012. Pub. No. 2012-146. Washington DC: 2012. Available from: https://www.cdc.gov/niosh/docs/2012-146/default.html
137.	Lindberg, and E. Vingard. Indicators of healthy work environments--a systematic review. Work, 2012. 41 Suppl 1, 3032-8 DOI: https://dx.doi.org/10.3233/WOR-2012-0560-3032. http://content.iospress.com/articles/work/wor0560
138.	Kahn-Marshall, J.L. and M.P. Gallant, Making healthy behaviors the easy choice for employees: a review of the literature on environmental and policy changes in worksite health promotion. Health Educ Behav, 2012. 39(6):752-76.
139.	Aldana, S.G., et al., A review of the knowledge base on healthy worksite culture. J Occup Environ Med, 2012. 54(4):414-9.
140.	Wagstaff, A.S. and J.A. Sigstad Lie Shift and night work and long working hours — a systematic review of safety implications. Scandinavian Journal of Work, Environment & Health, 2011. 37, 173-85 DOI: https://dx.doi.org/10.5271/sjweh.3146. https://www.ncbi.nlm.nih.gov/pubmed/21290083
141.	Allen, J. Wellness Leadership White Paper. 2011. http://www.healthyculture.com/Articles/Wellness%20Leadership%20White%20Paper.pdf
142.	Tullar, J.M., et al., Occupational safety and health interventions to reduce musculoskeletal symptoms in the health care sector. Journal of Occupational Rehabilitation, 2010. 20(2):199-219.

143.	MacEachen, E., et al., Workplace health understandings and processes in small businesses: a systematic review of the qualitative literature. J Occup Rehabil, 2010. 20(2):180-98.
144.	Joyce, K., et al., Flexible working conditions and their effects on employee health and wellbeing. Cochrane Database Syst Rev, 2010(2):Cd008009.
145.	Williamson, G. Providing leadership in a culturally diverse workplace. AAOHN Journal, 2007. 55, 329-35. https://www.ncbi.nlm.nih.gov/pubmed/17847627
146.	Egan, M., et al., The psychosocial and health effects of workplace reorganisation. 1. A systematic review of organisational-level interventions that aim to increase employee control. J Epidemiol Community Health, 2007. 61(11):945-54.
147.	Bambra, C., et al., The psychosocial and health effects of workplace reorganisation. 2. A systematic review of task restructuring interventions. J Epidemiol Community Health, 2007. 61(12):1028-37.
148.	Lynn Michelle Ostrem, B. and D.W. Wheeler Lincoln, Servant Leadership and Work-Related Outcomes: a Multilevel Model. 2006.
149.	Parker, S., Griffin, M. Principles and Evidence for Good Work Through Effective Design. A Report commissioned by Comcare to inform the Safe Work Australia Members Collaborative Project 'Good Work Through Effective Design'. 2014. https://www.comcare.gov.au/__data/assets/pdf_file/0003/145236/Professor_Sharon_Parker_Full_evidence_report.pdf
150.	U.S. Department of Health and Human Services; Public Health Service; Centers for Disease Control and Prevention; National Institute for Occupational Safety and Health; DHHS (NIOSH) Using Total Worker Health™ concepts to reduce the health risks from sedentary work. Afanuh, S., Johnson, Al. for DHHS (NIOSH) Publication No. 2017–131. 2017. https://www.cdc.gov/niosh/docs/wp-solutions/2017-131/pdfs/2017-131.pdf
151.	Reed, J.L., et al., Impact of Workplace Physical Activity Interventions on Physical Activity and Cardiometabolic Health Among Working-Age Women: A Systematic Review and Meta-Analysis. Circ Cardiovasc Qual Outcomes, 2017. 10(2).
152.	Brinkley, A., H. McDermott, and F. Munir, What benefits does team sport hold for the workplace? A systematic review. J Sports Sci, 2017. 35(2):136-148.
153.	White, M.I., et al., Physical activity and exercise interventions in the workplace impacting work outcomes: A stakeholder- centered best evidence synthesis of systematic reviews. International Journal of Occupational and Environmental Medicine, 2016. 7(2):61-74.
154.	Page, N.C. and V.O. Nilsson, Active Commuting: Workplace Health Promotion for Improved Employee Well-Being and Organizational Behavior. Front Psychol, 2016. 7:1994.
155.	Gardner, B., et al., How to reduce sitting time? A review of behaviour change strategies used in sedentary behaviour reduction interventions among adults. Health Psychology Review, 2016. 10(1):89-112.
156.	Chu, A.H., et al., A systematic review and meta-analysis of workplace intervention strategies to reduce sedentary time in white-collar workers. Obes Rev, 2016. 17(5):467-81.
157.	Tew, G.A., et al., Systematic review: height-adjustable workstations to reduce sedentary behaviour in office-based workers. Occupational Medicine (Oxford), 2015. 65(5):357-66.
158.	Sabia, A. and W.H. Anger, Cochrane Review Brief: Workplace Interventions for Reducing Sitting at Work. Online J Issues Nurs, 2015. 21(1):11.
159.	Pereira, M.J., et al., The impact of onsite workplace health-enhancing physical activity interventions on worker productivity: A systematic review. Occupational and Environmental Medicine, 2015. 72(6):401-412.
160.	MacEwen, B.T., D.J. MacDonald, and J.F. Burr, A systematic review of standing and treadmill desks in the workplace. Prev Med, 2015. 70:50-8.
161.	Loitz, C.C., et al., The effectiveness of workplace interventions to increase physical activity and decrease sedentary behaviour in adults: Protocol for a systematic review. Systematic Reviews, 2015. 4(1).
162.	Hipp, J.A., et al., Review of measures of worksite environmental and policy supports for physical activity and healthy eating. Prev Chronic Dis, 2015. 12:E65.
163.	Reed, J.L., et al., Workplace physical activity interventions and moderate-to-vigorous intensity physical activity levels among working-age women: A systematic review protocol. Systematic Reviews, 2014. 3(1).
164.	Power, B.T., et al., Effects of workplace-based dietary and/or physical activity interventions for weight management targeting healthcare professionals: a systematic review of randomised controlled trials. BMC Obes, 2014. 1:23.

165.	Neuhaus, M., et al., Reducing occupational sedentary time: a systematic review and meta-analysis of evidence on activity-permissive workstations. Obesity Reviews, 2014. 15(10):822-38.
166.	Malik, S.H., H. Blake, and L.S. Suggs, A systematic review of workplace health promotion interventions for increasing physical activity. British Journal of Health Psychology, 2014. 19(1):149-80.
167.	Kwak, L., et al., Promoting physical activity and healthy dietary behavior: the role of the occupational health services: a scoping review. Journal of Occupational & Environmental Medicine, 2014. 56(1):35-46.
168.	FreakPoli, L.A.R., et al., Workplace pedometer interventions for increasing physical activity. Cochrane Database of Systematic Reviews, 2014(1).
169.	Xu, H., L.M. Wen, and C. Rissel, The relationships between active transport to work or school and cardiovascular health or body weight: a systematic review. Asia-Pacific Journal of Public Health, 2013. 25(4):298-315.
170.	To, Q.G., et al., Workplace physical activity interventions: A systematic review. American Journal of Health Promotion, 2013. 27(6):e113-e123.
171.	Mitchell, M.S., et al., Financial Incentives for Exercise Adherence in Adults. American Journal of Preventive Medicine, 2013. 45(5):658-667.
172.	Wong, J.Y.L., et al., The Effects of Workplace Physical Activity Interventions in Men: A Systematic Review. American Journal of Men's Health, 2012. 6(4):303-313.
173.	Vuillemin, A., et al., Worksite physical activity interventions and obesity: a review of European studies (the HOPE project). Obesity Facts, 2011. 4(6):479-88.
174.	Barr-Anderson, D.J., et al., Integration of short bouts of physical activity into organizational routine a systematic review of the literature. American Journal of Preventive Medicine, 2011. 40(1):76-93.
175.	Hosking, J., et al., Organisational travel plans for improving health. Cochrane Database of Systematic Reviews, 2010(3).
176.	Chau, J.Y., et al., Are workplace interventions to reduce sitting effective? A systematic review. Prev Med, 2010. 51(5):352-6.
177.	Pronk, N.P. and T.E. Kottke, Physical activity promotion as a strategic corporate priority to improve worker health and business performance. Preventive Medicine, 2009. 49(4):316-21.
178.	Conn, V.S., et al., Meta-analysis of workplace physical activity interventions. American Journal of Preventive Medicine, 2009. 37(4):330-9.
179.	Anderson, L.M., 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(4):340-57.
180.	Dugdill, L., et al., Workplace physical activity interventions: a systematic review. International Journal of Workplace Health Management, 2008. 1(1):20-40.
181.	Kamal, K.M., et al., A Systematic Review of the Effect of Cancer Treatment on Work Productivity of Patients and Caregivers. J Manag Care Spec Pharm, 2017. 23(2):136-162.
182.	Evers, K.E., Castle, H., Prochaska, J. O., Prochaska, J. M., Examining relationships between multiple health risk behaviors, well-being, and productivity. Psychol Rep, 2014. 114(3):843-53.
183.	Parkinson, M.D., Employer Health and Productivity Roadmap™ strategy. Journal of Occupational & Environmental Medicine, 2013. 55(12 Suppl):S46-51.
184.	Goetzel, R.Z., et al., Promising practices in employer health and productivity management efforts: findings from a benchmarking study. Journal of Occupational & Environmental Medicine, 2007. 49(2):111-30.
185.	Framke, E., et al. Effect of a participatory organizational-level occupational health intervention on job satisfaction, exhaustion and sleep disturbances: results of a cluster randomized controlled trial. BMC Public Health, 2016. 16, 1210 DOI: 10.1186/s12889-016-3871-6.
186.	McHale, S.M., et al., Effects of a workplace intervention on sleep in employees' children. Journal of Adolescent Health, 2015. 56(6):672-7.
187.	Linton, S.J., et al., The effect of the work environment on future sleep disturbances: a systematic review. Sleep Med Rev, 2015. 23:10-9.
188.	Caruso, C.C., Reducing Risks to Women Linked to Shift Work, Long Work Hours, and Related Workplace Sleep and Fatigue Issues. Journal of Women's Health, 2015. 24(10):789-94.

189.	Mullins, H.M., et al., Sleepiness at work: a review and framework of how the physiology of sleepiness impacts the workplace. J Appl Psychol, 2014. 99(6):1096-112.
190.	Reed, V.A., Shift work, light at night, and the risk of breast cancer. AAOHN Journal, 2011. 59(1):37-45; quiz 46.
191.	Poscia, A., et al., Workplace health promotion for older workers: a systematic literature review. BMC Health Serv Res, 2016. 16 Suppl 5:329.
192.	Pirkola, H.,Rantakokko, and M. Suhonen, Workplace spirituality in health care: an integrated review of the literature. J Nurs Manag, 2016. 24(7):859-868.
193.	Ireson, R., B. Sethi, and A. Williams, Availability of caregiver-friendly workplace policies (CFWPs): an international scoping review. Health Soc Care Community, 2016.
194.	Global Wellness Institute The Future of Wellness at Work. 2016. http://www.globalwellnesssummit.com/images/stories/gwi/GWI_2016_Future_of_Wellness_at_Work.pdf
195.	Watkins, C. and G. English, Moving the worksite health promotion profession forward: is the time right for requiring standards? A review of the literature. Health Promot Pract, 2015. 16(1):20-7.
196.	Descatha, A., et al., Cardiac arrest in the workplace and its outcome: a systematic review and meta-analysis. Resuscitation, 2015. 96:30-6.
197.	Afshin, A., et al., CVD Prevention Through Policy: a Review of Mass Media, Food/Menu Labeling, Taxation/Subsidies, Built Environment, School Procurement, Worksite Wellness, and Marketing Standards to Improve Diet. Curr Cardiol Rep, 2015. 17(11):98.
198.	Shahly, V., R.C. Kessler, and I. Duncan, Worksite primary care clinics: a systematic review. Popul Health Manag, 2014. 17(5):306-15.
199.	Schroer, S., J. Haupt, and C. Pieper, Evidence-based lifestyle interventions in the workplace — an overview. Occupational Medicine (Oxford), 2014. 64(1):8-12.
200.	Yassi, A., et al., Workplace programmes for HIV and tuberculosis: a systematic review to support development of international guidelines for the health workforce. AIDS Care, 2013. 25(5):525-43.
201.	Rongen, A., et al., Workplace health promotion: a meta-analysis of effectiveness. American Journal of Preventive Medicine, 2013. 44(4):406-15.
202.	Mattke, S., Liu, H., Caloyeras, J., Huang, C., Van Busum, K., Khodyakov, D., Shier, V. Workplace Wellness Programs Study: Final Report. Rand Health Quarterly, 2013. 3, 7. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4945172/
203.	Fishwick, D., et al., Asthma in the workplace: a case-based discussion and review of current evidence. Prim Care Respir J, 2013. 22(2):244-8.
204.	Arena, R., et al., Promoting Health and Wellness in the Workplace: A Unique Opportunity to Establish Primary and Extended Secondary Cardiovascular Risk Reduction Programs. Mayo Clinic Proceedings, 2013. 88(6):605-617.
205.	Osilla, K.C., et al., Systematic review of the impact of worksite wellness programs. American Journal of Managed Care, 2012. 18(2):e68-81.
206.	de Groene, G.J., et al., Workplace interventions for treatment of occupational asthma: a Cochrane systematic review. Occup Environ Med, 2012. 69(5):373-4.
207.	Chan, C.W. and L. Perry, Lifestyle health promotion interventions for the nursing workforce: a systematic review. Journal of Clinical Nursing, 2012. 21(15-16):2247-61.
208.	Bellew, B., St George, A., King, L. Workplace screening programs for chronic disease prevention: an Evidence Check brokered by The Sax Institute (www.saxinstitute.org.au) for the NSW Ministry of Health. 2012. https://www.saxinstitute.org.au/wp-content/uploads/04_Workplace-screening-programs-for-chronic-disease-preventi.pdf
209.	Torp, S., L. Eklund, and S. Thorpenberg, Research on workplace health promotion in the Nordic countries: a literature review, 1986-2008. Glob Health Promot, 2011. 18(3):15-22.
210.	Hymel, P.A., et al. Workplace Health Protection and Promotion: A New Pathway for a Healthier—and Safer—Workforce. Journal of Occupational and Environmental Medicine, 2011. 53, 695-702 DOI: 10.1097/JOM.0b013e31822005d0. http://journals.lww.com/joem/Fulltext/2011/06000/Workplace_Health_Protection_and_Promotion__A_New.17.aspx
211.	Groeneveld, I.F., et al., Lifestyle-focused interventions at the workplace to reduce the risk of cardiovascular disease--a systematic review. Scandinavian Journal of Work, Environment & Health, 2010. 36(3):202-15.

212.	Goldgruber, J. and D. Ahrens, Effectiveness of workplace health promotion and primary prevention interventions: a review. Journal of Public Health, 2010. 18(1):75-88.
213.	Bellew, B. Primary prevention of chronic disease in Australia through interventions in the workplace setting: An Evidence Check rapid review brokered by the Sax Institute (http://www.saxinstitute.org.au) for the Chronic Disease Prevention Unit, Victorian Government Department of Human Services. . 2008. https://www.saxinstitute.org.au/wp-content/uploads/29_Primary-prevention-chronic-disease....workplace-setting.pdf
214.	Novak, B., et al., Blue-collar workplaces: a setting for reducing heart health inequalities in New Zealand? New Zealand Medical Journal, 2007. 120(1261):U2704.
215.	National Institute for Occupational Safety and Health (NIOSH). Using Total Worker Health™ Concepts to Enhance Workplace Tobacco Prevention and Control. By Afanuh, S. Lee, M, Hudson, H. Pub. No. 2015–202. Cincinnati, OH: 2015. Available from: https://www.cdc.gov/niosh/docs/wp-solutions/2015-202/pdfs/2015-202.pdf
216.	Wang, X., et al., [Systematic review of studies of workplace exposure to environmental tobacco smoke and lung cancer risk]. Zhongguo Fei Ai Za Zhi, 2011. 14(4):345-50.
217.	Leeks, K.D., et al., Worksite-based incentives and competitions to reduce tobacco use. A systematic review. Am J Prev Med, 2010. 38(2 Suppl):S263-74.
218.	Volpp , K.G., et al., A Randomized, Controlled Trial of Financial Incentives for Smoking Cessation. New England Journal of Medicine, 2009. 360(7):699-709.
219.	Lee, M., Hudson, H., Richards, R., Chang, CC., Chosewood, LC., Schill, A.L, on behalf of the NIOSH Office for Total Worker Health™.] Fundamentals of Total Worker Health™ approaches: essential elements for advancing worker safety, health, and well-being. DHHS (NIOSH) Publication No. 2017-112 2016.
220.	Feltner, C., Peterson, K., Weber, R.P., Cluff, L., Coker-Schwimmer, E., Viswanathan, M., Lohr, K. N. The Effectiveness of Total Worker Health™ Interventions: A Systematic Review for a National Institutes of Health Pathways to Prevention Workshop. Ann Intern Med, 2016. 165, 262-9 DOI: 10.7326/M16-0626. https://www.ncbi.nlm.nih.gov/pubmed/27240022
221.	Feltner, C., Peterson, K., Weber, R.P., Cluff, L., Coker-Schwimmer, E., Viswanathan, M., Lohr, K. N. AHRQ Comparative Effectiveness Reviews. Total Worker Health™, 2016. https://www.ncbi.nlm.nih.gov/pubmed/27308686
222.	Anger, W.K., Elliot, D. L., Bodner, T., Olson, R., Rohlman, D. S., Truxillo, D. M., Kuehl, K. S., Hammer, L. B., Montgomery, D. Effectiveness of Total Worker Health™ interventions. J Occup Health Psychol, 2015. 20, 226-47 DOI: 10.1037/a0038340. https://www.ncbi.nlm.nih.gov/pubmed/25528687
223.	Schill, A.L. and L.C. Chosewood, The NIOSH Total Worker Health™ program: an overview. Journal of Occupational & Environmental Medicine, 2013. 55(12 Suppl):S8-11.
224.	Hafez, D., et al., Workplace Interventions to Prevent Type 2 Diabetes Mellitus: a Narrative Review. Curr Diab Rep, 2017. 17(2):9.
225.	Weerasekara, Y.K., et al., Effectiveness of Workplace Weight Management Interventions: a Systematic Review. Current Obesity Reports, 2016. 5(2):298-306.
226.	Shrestha, N., et al., The Impact of Obesity in the Workplace: a Review of Contributing Factors, Consequences and Potential Solutions. Curr Obes Rep, 2016. 5(3):344-60.
227.	Nowrouzi, B., et al., Lost-time illness, injury and disability and its relationship with obesity in the workplace: A comprehensive literature review. Int J Occup Med Environ Health, 2016. 29(5):749-66.
228.	Cairns, J.M., et al., Weighing up the evidence: a systematic review of the effectiveness of workplace interventions to tackle socio-economic inequalities in obesity. Journal of Public Health, 2015. 37(4):659-70.
229.	Sawada, K., et al., Financial incentive policies at workplace cafeterias for preventing obesity--a systematic review and meta-analysis (Protocol). Syst Rev, 2014. 3:128.
230.	Ausburn, TF. LaCoursier, S. Crouter, SE. McKay T. Review of worksite weight management programs. Workplace Health Saf, 2014. 62(3):122-6; quiz 127.
231.	Gudzune, K., et al., Strategies to prevent weight gain in workplace and college settings: a systematic review. Prev Med, 2013. 57(4):268-77.
232.	Benedict, M.A. and D. Arterburn, Worksite-based weight loss programs: a systematic review of recent literature. American Journal of Health Promotion, 2008. 22(6):408-16.
233.	Hilliard, E.D., A Review of Worksite Lactation Accommodations. Workplace Health Saf, 2017. 65(1):33-44.
234.	Jack, G., et al., Menopause in the workplace: What employers should be doing. Maturitas, 2016. 85:88-95.

235.	Hayward, S.M., K.R. McVilly, and M.A. Stokes, Challenges for females with high functioning autism in the workplace: a systematic review. Disabil Rehabil, 2016:1-10.
236.	Hirani, S.A. and R. Karmaliani, Evidence based workplace interventions to promote breastfeeding practices among Pakistani working mothers. Women & Birth: Journal of the Australian College of Midwives, 2013. 26(1):10-6.
237.	Johnston, M.L. and N. Esposito, Barriers and facilitators for breastfeeding among working women in the United States. JOGNN - Journal of Obstetric, Gynecologic, & Neonatal Nursing, 2007. 36(1):9-20.
238.	Wilson, M.G., et al., FUEL Your Life: A Translation of the Diabetes Prevention Program to Worksites. American Journal of Health Promotion, 2016. 30(3):188-97.
239.	Lahiri, S., T. Tempesti, and S. Gangopadhyay, Is There an Economic Case for Training Intervention in the Manual Material Handling Sector of Developing Countries? Journal of Occupational & Environmental Medicine, 2016. 58(2):207-14.
240.	Jarman, L., et al., Workplace Health Promotion and Mental Health: Three-Year Findings from Partnering Healthy@Work. PLoS ONE [Electronic Resource], 2016. 11(8):e0156791.
241.	Yeo, C.D., et al., Efficacy of team-based financial incentives for smoking cessation in the workplace. Yonsei Medical Journal, 2015. 56(1):295-9.
242.	Wilkin, C.L. and C.E. Connelly, Dollars and sense: the financial impact of Canadian wellness initiatives. Health Promotion International, 2015. 30(3):495-504.
243.	von Thiele Schwarz, U., et al., Promoting employee health by integrating health protection, health promotion, and continuous improvement: a longitudinal quasi-experimental intervention study. Journal of occupational and environmental medicine, 2015. 57(2):217-25.
244.	Steinberg, G., et al., Reducing Metabolic Syndrome Risk Using a Personalized Wellness Program. Journal of occupational and environmental medicine, 2015. 57(12):1269-74.
245.	Schopp, L.H., et al., Act Healthy: promoting health behaviors and self-efficacy in the workplace. Health Education Research, 2015. 30(4):542-53.
246.	Reynolds, G.S. and J.B. Bennett, A cluster randomized trial of alcohol prevention in small businesses: a cascade model of help seeking and risk reduction. American Journal of Health Promotion, 2015. 29(3):182-91.
247.	Newman, L.S., et al., Implementation of a worksite wellness program targeting small businesses: the Pinnacol Assurance health risk management study. Journal of Occupational & Environmental Medicine, 2015. 57(1):14-21.
248.	Lippke, S., et al., A Computerized Lifestyle Application to Promote Multiple Health Behaviors at the Workplace: Testing Its Behavioral and Psychological Effects. Journal of medical Internet research, 2015. 17(10):e225.