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# Primary prevention of chronic disease in Australia through interventions in the workplace setting: a rapid review

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An **Evidence Check** Review  
brokered by the Sax Institute for the  
Victorian Government Department of Human Services

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## Glossary

### **Strong to definitive evidence:**

A causal relationship has been established between exposure to the intervention or program and improvement in one or more of the relevant risk factors or determinants. In the context of this rapid review this assessment is obtained from a systematic review of all relevant randomised trials.

### **Indicative evidence:**

An *association* only has been established between exposure to the intervention or program and improvement in one or more of the relevant risk factors or determinants. The association may or may not be causal but the limitations of the primary study (ies) preclude this determination.

### **Systematic review:**

A systematic literature review is a means of identifying, evaluating and interpreting all available research relevant to a particular question, topic area or phenomenon of interest. A systematic review has the following features – (a) a defined review protocol that sets out the research question being addressed and the methods to be used; (b) a defined search strategy that aims to detect as much of the relevant literature as possible; (c) explicit documentation of the search strategy so that readers can assess its rigour and completeness; (d) explicit inclusion and exclusion criteria to assess each potential primary study; and (e) specification of the information to be obtained from each primary study including the quality criteria by which the primary studies are to be evaluated. (A systematic review is a prerequisite step for a quantitative meta-analytic review). Reviews that fail to meet the five characteristics identified above are termed ‘non-systematic’ in this report.

### **Meta-analytic review:**

Meta-analysis is a statistical technique used to summarise the results of several studies in a single weighted estimate, wherein more weight is given to results of studies with more events and sometimes to studies of higher quality. This is distinct from data pooling, which is based purely on the raw data.

### **Publication bias:**

Publication bias refers to the problem whereby *positive* results are more likely to be published than *negative* results. Publication bias can lead to systematic bias in systematic reviews unless special efforts are used, such as scanning grey literature, conference proceedings and liaising with experts in the area regarding any potentially unpublished results.

### **Internal validity:**

The extent to which the design and conduct of a study is likely to prevent systematic error. (Internal validity is a prerequisite for external validity).

### **External validity:**

The extent to which the effects observed in a study are applicable outside of the study – otherwise termed ‘generalisability’ or ‘applicability’.



## EXECUTIVE SUMMARY

The Victorian Department of Human Services commissioned a rapid review to determine what types of primary prevention programs in the workplace are most likely to be effective in preventing chronic disease.

No systematic reviews dealing with alcohol interventions in the workplace were found; in other respects the systematic reviews are of an acceptable quality to address the terms of reference. Eighteen systematic reviews and 5 meta-analytic reviews were directly relevant to the terms of reference and form the main basis for the conclusions drawn here; these studies were supplemented as necessary with evidence from RCTs, longitudinal studies and other reviews in order to address the review questions.

The review found *strong to definitive evidence* for effectiveness of interventions in the following areas:

### **Tobacco control**

- interventions directed towards individual smokers to increase the likelihood of quitting smoking; and
- tobacco policies and bans to decrease cigarette consumption during the working day and exposure of non-smoking employees to environmental tobacco smoke at work.

### **Physical activity**

- prompts to increase stair use;
- access to places and opportunities for physical activity;
- education, employee and peer support; and
- multicomponent interventions combining nutrition and physical activity.

### **Nutrition**

- multicomponent interventions that include physical activity as well as nutrition (strategies such as nutrition education, dietary prescription, behavioural skills development and training to control adult overweight and obesity)
- enhanced access to and availability of nutritious foods;
- promotional strategies at point-of-purchase.

### **Stress**

- interventions that focus on both the organisation and the individual;
- employee participation strategies designed to increase job control and autonomy;
- strategies to provide personal support to employees; and
- cognitive-behavioural intervention programs.

### **Comprehensive or multi-component programs**

- individualised risk reduction for high risk employees within the context of a comprehensive program.

The review found *indicative evidence* for workplace interventions incorporating the following *cross cutting approaches*:

- use of the Transtheoretical model (stages of change);
- individual tailoring of interventions;
- internet-provided health information;
- benefits-linked financial incentives;
- telephone based high-risk intervention coaching;
- self-directed goal-setting for change; and
- annual required morbidity-based health risk appraisals (HRAs) used for individual targeting of interventions.

### **Alcohol**

The review found *indicative evidence* only for alcohol interventions in the workplace. These focused mainly on face-to-face/individualised strategies; and multiple risk factor or comprehensive approaches at individual or environmental/organisational levels.

There was insufficient evidence to determine whether any specific programs are more likely to be effective with particular socioeconomic groups and there was a dearth of well designed studies conducted in Australia. Some studies suggest that returns on investment in WHP over the period 1995-2005 have doubled from a cost: benefit ratio of 1:3 to 1:6.3. Systematic reviews for the health economics of smoking and physical activity interventions indicate that a cautious acceptance of these conclusions on the cost to benefit ratio of WHP is warranted until more robust and specific evidence is available in these areas.

### **Success factors for WHP**

The review found indicative evidence for success factors in WHP including:

- Senior management involvement;
- Participatory planning;
- Integrating Health Productivity Management (HPM)/ Workplace Health Promotion (WHP) programs into the organization's operations
- Strengthening the organisational climate for implementation by making sure that targeted employees have easy access to high-quality training, technical assistance and documentation;
- Providing incentives for use and providing feedback on innovation use (all of which enhance motivation) and by making the innovation easily accessible or easy to use;
- Giving targeted employees time to learn how to deliver and use the innovation, and redesigning work processes to fit innovation use (all of which increase opportunities or remove barriers);



- Simultaneously addressing individual, environmental, policy, and cultural factors affecting health and productivity;
- Targeting several health issues;
- Recognition that a person's health is determined by an interdependent set of factors;
- Focusing primarily on employees' needs;
- Tailoring programs to address specific needs;
- Attaining high participation;
- Optimising the use of on-site resources;
- Ensuring long term commitment to the program;
- Rigorously evaluating programs; and
- Disseminating successful outcomes/promising practices to key stakeholders.

### **Limitations**

The majority of studies were conducted in North America or in Europe so that review findings may not always be generalisable to an Australian setting. In many cases, study subjects for whom the WHP interventions 'worked' were self-selecting so that interventions proven to be 'effective' in the context of research trials may encounter many barriers in a subsequent 'real world' implementation process.

### **WHP Research priorities for Victoria**

This review found a dearth of well designed Australian studies. In addressing this gap the following three overall priorities are suggested:

- (i) use of theory based approaches for the design, testing and development of interventions in Victoria;
- (ii) use of formative research (qualitative and quantitative) to inform the design of programs; and
- (iii) translational research with transparent reporting of 'RE-AIM': intervention reach, adoption, implementation, and maintenance.

Modelling of Incremental Cost Effectiveness Ratios (ICERs) for WHP interventions through an "ACE" (Assessing Cost-Effectiveness) type study is also worth considering in the medium term.

# 1 MAIN REVIEW

## 1.1 Search Strategy

Electronic databases Medline and PubMed were searched for the period January 1996 to June 2008. Search terms included: health promotion, healthy people programs health education, preventive medicine, primary prevention, heart diseases, neoplasms, cardiovascular diseases, coronary disease diabetes mellitus, hypertension, preventive health services, chronic disease, non communicable disease, obesity, workplace, workplace, worksite wellness, occupational medicine, occupational health services cost effectiveness, cost-benefit analysis, systematic review, meta-analysis, smoking, tobacco nutrition, alcohol, physical activity, stress. With few exceptions searches were confined to studies for which abstracts were available. Secondary searches of the most relevant papers as well as searches for 'similar papers' were completed. Separate searches of databases provided by the Cochrane library, National Institute for Health and Clinical Excellence (UK), Centre for Reviews and Dissemination (University of York) and CDC Community Guide (Preventive Services Task Force) were also undertaken.

Information relating to the characteristics and content of interventions, participants, outcomes and methods of the study was abstracted by one reviewer and checked by two others. All abstracts were screened for relevance and stored in a relational database - EndNote© Version 9.0.1. Studies dealing predominantly with musculoskeletal injuries, cancer screening or treatment services were excluded. For 'stress', studies which dealt with depression or mental health promotion were retained. Additional searches for relevant reports and unpublished studies were undertaken using internet search engines. In keeping with the review terms of reference and because of heterogeneity in the design and content of the included studies, formal meta-analysis was not undertaken and studies were evaluated using qualitative narrative synthesis. Publication bias is a possible factor in systematic reviews – this rapid review incorporated a search strategy beyond the usual electronic databases as well as the involvement of two independent expert reviewers. Attempts were made to incorporate non-English language studies, but this is generally acknowledged as a current limitation in our review methodologies.

Studies were classified into Systematic reviews, Meta-analytic reviews, non-systematic reviews and single studies (emphasis on RCTS and Cohort studies)/ and other relevant reports. Systematic reviews and Meta-analytic reviews were tabulated showing study details, aim, population(s) involved, and main conclusions. The tabulation and list of internet sites are both available as separate supporting documentation. Individual RCTs, longitudinal studies and other reviews were screened for relevance to the terms of reference and used selectively to address gaps in coverage by systematic reviews; a bibliography of these studies is available as separate supporting documentation.

## 1.2 Overall Quality of Research

Eighteen systematic reviews deemed directly relevant to the terms of reference were found; two of these were updates of the same review published by Pelletier in 1997 so that the total number of systematic reviews might more correctly be counted as sixteen. A further seventeen systematic reviews were deemed indirectly relevant and are featured in a tabulated support document. No systematic reviews dealing with alcohol interventions in the workplace were found; in other respects the systematic reviews were of an acceptable quality to address the terms of reference. Eight meta-analytic reviews deemed directly relevant to the terms of reference were found; five deal with stress, two with smoking and one with economic returns. A further 5 meta-analytic reviews were deemed indirectly relevant and are featured in a tabulated support document.

One hundred 'other studies' (other reviews, RCTs and longitudinal studies) deemed directly relevant to the terms of reference were found. Based on title and keyword analysis, 10% dealt with smoking or tobacco, 29% dealt with nutrition (including fruit & vegetable consumption, weight, obesity), 5% dealt with alcohol, 31% dealt with physical activity, 6% dealt with chronic disease or more than one risk factor, 38% dealt with stress or mental health related issues and 15% dealt with economics or cost-benefit analyses. Studies were screened to provide additional information where systematic or meta-analytic reviews were not available or where studies were sufficiently recent that they were not included in systematic reviews.

Within the systematic reviews, those dealing with stress were generally of poorer quality (for example see Murta *et al.*<sup>1</sup>) compared to those dealing with the other specified areas; this was largely a function of the methodological weaknesses of the primary studies. There are noteworthy epidemiological data suggesting an average 50% excess risk for CHD among employees with work stress thus making a strong case for the development of effective stress reduction interventions. There are also well documented cohort studies involving Professor Sir Michael Marmot, which show the association of socioeconomic factors<sup>2</sup> as well as psychosocial characteristics of the work itself<sup>3</sup> with common mental disorders and sickness leave respectively.

Generalisability of review findings is an issue; the majority of studies were not conducted in Australia but in North America or in Europe. We cannot automatically assume that findings will translate directly into the Australian context. Overall, many of the studies used in reviews are subject to the possible limitation that the subjects for whom the interventions 'worked' tended to be self-selecting<sup>4</sup>.

The consequences of low external validity are that implemented interventions that have been shown to be effective in a trial or in some reviews of these trials, may encounter many barriers in the 'real world' dissemination process. An intervention could end up being effective in the few companies that are interested, but most worksites might simply not adopt the intervention. In terms of the quality of research,

this final issue is the most important for policymakers to note in tandem with the overall conclusions of this rapid review.

### 1.3 The Overall Review Question

**Overall** - *what types of primary prevention programs in the workplace are likely to be most effective in (a) changing risk factors for chronic disease (SNAPS – smoking, nutrition, alcohol, physical activity, stress) and (b) reducing rates of chronic disease? Wherever possible, comment on the cost effectiveness of the primary prevention programs.*

#### 1.3.1 Systematic reviews

##### *Smoking*

Albertsen and colleagues (2006, Denmark) conducted a systematic review exploring how the workplace might contribute to changes in smoking status and smoking behaviour<sup>5</sup>. The authors found strong evidence for an effect of the work environment on the amount smoked, but insufficient or mixed evidence regarding cessation and relapse. High job demands were associated with higher amount smoked and with increased likelihood of cessation. Resources at work and social support were positively associated with cessation and negatively associated with relapse and the amount smoked. The authors call for more intervention studies where changes in work environment are carried out in combination with health promotion interventions.

Hey and Perera (2005, UK) conducted a systematic review to determine whether competitions and incentives lead to higher long-term quit rates; to examine the relationship between incentives and participation rates<sup>6</sup>. The authors considered randomized controlled trials, which allocated individuals, workplaces, groups within workplaces, or communities to experimental or control conditions. They also considered controlled studies with baseline and post-intervention measures. The authors concluded that incentives and competitions do not appear to enhance long-term cessation rates, with early success tending to dissipate when the rewards are no longer offered. Rewarding participation and compliance in contests and cessation programmes may have more potential to deliver higher absolute numbers of quitters. Cost effectiveness analysis was not appropriate within this review, since the efficacy of the intervention has not been demonstrated.

Moher and colleagues (2005, UK) conducted a systematic review to categorize workplace interventions for smoking cessation tested in controlled studies and to determine the extent to which they help workers to stop smoking or to reduce tobacco consumption<sup>7</sup>. This review found:

(i) strong evidence that interventions directed towards individual smokers increase the likelihood of quitting smoking. These include advice from a health professional, individual and group counselling and pharmacological treatment to overcome nicotine addiction. Self-help interventions are less effective. All these interventions are

effective whether offered in the workplace or elsewhere. Although people taking up these interventions are more likely to stop, the absolute numbers who quit are low;

- (ii) Limited evidence that participation in programmes can be increased by competitions and incentives organized by the employer;
- (iii) Consistent evidence that workplace tobacco policies and bans can decrease cigarette consumption during the working day by smokers and exposure of non-smoking employees to environmental tobacco smoke at work, but conflicting evidence about whether they decrease prevalence of smoking or overall consumption of tobacco by smokers;
- (iv) A lack of evidence that comprehensive approaches reduce the prevalence of smoking, despite the strong theoretical rationale for their use; and
- (v) A lack of evidence about the cost-effectiveness of workplace programmes.

### *Physical Activity and Nutrition*

Matson-Koffman and colleagues (2007, USA) conducted a site-specific systematic review to determine whether policy and environmental interventions can increase people's physical activity or improve their nutrition<sup>8</sup>. The authors concluded that policy and environmental strategies may promote physical activity and good nutrition. Interventions judged to provide the strongest evidence for influencing these behaviours included: prompts to increase stair use (N = 5); access to places and opportunities for physical activity (N = 6); comprehensive work-site approaches, including education, employee and peer support for physical activity, incentives, and access to exercise facilities (N = 5); the availability of nutritious foods (N = 33), point-of-purchase strategies (N = 29). Further research is needed to determine long-term effectiveness of different policy and environmental interventions with various populations and to identify the steps necessary to successfully implement these types of interventions.

Katz and colleagues reported (2005, USA) on systematic reviews of the evidence on nutrition, physical activity, combinations of these interventions, and other behavioural interventions (e.g., cognitive techniques such as self-awareness and cue recognition) under the auspices of the US Task Force on Community Preventive Services<sup>9</sup>. The review aimed to identify effective strategies for weight control that can be implemented in school and worksite settings. Task Force recommendations are based on evidence of effectiveness, which is defined here as achieving a mean weight loss of > or =4 pounds, measured > or =6 months after initiation of the intervention program. The Task Force found sufficient evidence for effectiveness of multicomponent interventions aimed at diet, physical activity, and cognitive change; it found insufficient evidence to determine effectiveness of single component interventions aimed at diet, physical activity, or cognitive change alone. The Task Force recommends multicomponent interventions that include nutrition and physical activity (including strategies such as providing nutrition education or dietary prescription, physical activity prescription or group activity, and behavioural skills development and training) to control overweight and obesity among adults in worksite settings.

Norris and colleagues reported (2002, USA) a systematic review of the effectiveness and economic efficiency of self-management education interventions for people with diabetes<sup>10</sup>. The review forms the basis for recommendations by the US Task Force on Community Preventive Services. The Task Force found that the evidence was insufficient to assess the effectiveness of self-management education interventions at the worksite.

### *Physical Activity*

The National Institute for Health and Clinical Excellence (NICE) conducted an (2007, UK) economic review of public health interventions aimed at promoting physical activity in the workplace<sup>11</sup>. Seven studies were included in the review but only one of these was published within the previous nine years. Overall there was limited recent evidence on the economic benefits of workplace interventions that promote physical activity. The authors concluded that there is no strong economic evidence to support the implementation of workplace interventions that promote physical activity; applicability of the results was also considered potentially limited as all studies were conducted outside the UK (4 from USA, 1 from Canada, 1 from Netherlands and 1 from Australia).

### *Stress*

Murta and colleagues (2007, Brazil) conducted a systematic review of workplace stress management intervention studies that incorporated process evaluation<sup>1</sup>. Of 84 studies identified that met the study inclusion criteria, 52 (61.9%) reported findings on at least one of the key process-relevant variables. Variables most frequently included were recruitment (30%), intervention dose received (22%), participants' attitudes toward intervention (19%), and program reach (13%). Fewer than half of the studies presented any findings linking process evaluation and outcome evaluation. The authors concluded that incomplete reporting of information relevant to process evaluation makes it difficult to identify reliable determinants of effective intervention implementation or outcomes.

Lamontagne and colleagues (2007, Australia) conducted a systematic review of the job-stress intervention evaluation literature, 1990-2005<sup>12</sup>. The review assessed systematic evaluations of job-stress interventions in terms of the degree of systems approach used. A high rating was defined as both organizationally and individually focused, versus moderate (organizational only), and low (individual only). The authors concluded that "Individual-focused", low-rated approaches are effective at the individual level, favourably affecting individual-level outcomes, but tend not to have favourable impacts at the organizational level. "Organizationally-focused" high- and moderate-rated approaches are beneficial at both individual and organizational levels. Further measures are needed to foster the dissemination and implementation of systems approaches to examining interventions for job stress.

Egan and colleagues (2007, Scotland/UK) conducted a systematic review of the health and psychosocial effects of increasing employee participation and control through workplace reorganisation<sup>13</sup>. The authors concluded that some organisational-

level participation interventions may benefit employee health but may not protect employees from generally poor working conditions. More investigation of the relative impacts of different interventions, implementation and the distribution of effects across the socioeconomic spectrum is required.

Bambra and colleagues (2007, UK, Scotland) conducted a systematic review of the health and psychosocial effects of changes to the work environment brought about by task structure work reorganisation<sup>14</sup>. In the authors' view the evidence suggests that task-restructuring interventions that increase demand or decrease control adversely affect the health of employees, in line with observational research. This lends support to policy initiatives such as European Union directive on participation at work, which aims to increase job control and autonomy.

A systematic review (2003, UK) assessed the effectiveness of workplace stress management for nurses<sup>15</sup>. The quality of research identified was weak. Authors reported more evidence for the effectiveness of programmes based on providing personal support than environmental management to reduce stressors. However, since the number and quality of studies was low, the question as to which, if any, approach is more effective could not be answered definitively.

#### *Comprehensive or Multi-component*

The Effective Public Health Practice Project (2007, Canada) conducted a systematic review to determine the effectiveness of multi-faceted studies in the workplace to reduce chronic diseases (cardiovascular disease, cancer, chronic obstructive lung disease, and diabetes), or their risk factors<sup>16</sup>. Eleven multi-faceted studies and two sub-studies were found to be relevant. Three studies examined interventions combining nutrition and physical activity, two studies focused on nutrition and smoking cessation, and eight studies focussed on combined nutrition, physical activity and smoking cessation. The authors state that the findings support the distribution of educational material and professional instruction to increase the likelihood of adopting healthy eating practices, increasing physical activity and decreasing smoking.

A systematic review was conducted (2006, UK) to assess the effects of multiple risk factor intervention for reducing cardiovascular risk factors, total mortality, and mortality from CHD among adults without clinical evidence of established cardiovascular disease<sup>17</sup>. (An updated review, it examined studies published up to 2001). Although not specific to the workplace setting the review is included because the findings are deemed sufficiently relevant for the design of interventions in that setting. This updated review of all relevant studies found that the approach of trying to reduce more than one risk factor - multiple risk factor intervention - advocated by these Programmes - do result in small reductions in blood pressure, cholesterol, salt intake, weight loss, etc. Contrary to expectations, these lifestyle changes had little or no impact on the risk of heart attack or death. Possible explanations offered for this are that the small risk factor changes are not maintained long-term or are not real but caused by some of the studies being poorly conducted. Note that several other

studies noted in this rapid review *do* support intervention on more than one risk factor and that design of recent interventions is multi-level so that strategies targeting both the individual, social, environmental and organisational levels are used in combination.

Pelletier (1997-2005, USA) has provided a systematic review (and a series of updates) of the clinical effectiveness and cost-effectiveness studies of comprehensive, multifactorial health promotion and disease management programs conducted in worksites<sup>18, 19, 20, 21</sup>. The author suggests that providing individualized risk reduction for high risk employees within the context of comprehensive programming is the critical element of worksite interventions. The author states that the vast majority of the research to date indicates positive clinical and cost outcomes although the quality of studies analysed between 2001 and 2005 was deemed poor.

#### *Stages of change TTM*

Riemsma and colleagues (2002, UK) conducted a review to systematically assess the effectiveness of interventions using a stage-based approach in bringing about positive changes in health-related behaviour<sup>22</sup>. Although not specific to the workplace setting the review is included because the findings are deemed sufficiently relevant for the design of interventions in that setting. The authors found overall that there was little evidence to suggest that stage-based interventions are more effective than non-stage-based interventions. Similarly there was little evidence that stage-based interventions were more effective than no intervention or usual-care. Out of 37 trials, 17 showed no significant differences between groups, eight trials showed mixed effects, and ten trials showed effects in favour of the stage-based intervention(s). They concluded that, given the limited evidence for the effectiveness of interventions tailored to the stages-of-change approach, practitioners and policy makers need to recognise that this approach has a status which appears to be unwarranted when it is evaluated in a systematic way. A later review (see Meta-analytic review in 2005) however suggests that use of TTM is associated with positive outcomes.

#### *Broad review of effectiveness*

Harden and colleagues (1999, UK) conducted a systematic review of the effectiveness of health promotion interventions in the workplace<sup>23</sup>. The review aimed to assess the extent to which evaluated interventions considered employees' expressed needs or involved employee-employer partnerships. Overall, 110 outcome evaluations were located. Only a quarter of these reported that interventions were implemented in response to the explicit needs and/or views of the employees and very few involved partnerships. The majority of the outcome evaluations were not sufficiently rigorous to make a strong case for the effectiveness of workplace health promotion.

#### *OH&S Systems*

The concept of integrating workplace health promotion with Occupational Health and Safety (OH&S) or broader management strategies appears many times in the



reviewed literature. Robson and colleagues (2007, Canada) have published a systematic review on the effectiveness of occupational health and safety management system interventions<sup>24</sup>. The reviewers set out to determine (i) relative effectiveness of mandatory and voluntary occupational health and safety management systems (OHMSMs) on employee health and safety and on associated economic outcomes; (ii) facilitators and barriers to adoption and to effectiveness of OHMSMs; and (iii) evidence on the effectiveness of OHMSMs. Of the nine studies that met 'moderate' (minimal) quality criteria, four examined voluntary systems and five examined mandatory systems. None provided information of sufficient quality on facilitators and barriers, but they did provide information on the implementation and effectiveness of OHMSMs. Synthesis of the best available evidence showed consistently positive effects in workplaces for voluntary and mandatory OHMSMs; this was based on a small number of studies and quality was not high. The authors concluded that there was insufficient evidence to recommend for or against specific occupational health and safety management system interventions.

#### *Pending CDC Systematic Review*

A systematic review of worksite interventions was underway for the (US) Task Force on Community Preventive Services at the time of writing. Priority interventions identified for this review are as follows:

#### **Smoking:**

- Incentives and competitions to increase smoking cessation; and
- smoke-free policies to reduce tobacco use among workers.

#### **Nutrition:**

- Enhancing access to healthy foods;

#### **Physical activity**

- Point-of decision prompts to increase stair use;
- Enhancing access to places for physical activity (e.g. providing venues, classes or information)

#### **Assessment of health risk**

- With feedback to the employee to change health behaviours;
- With feedback and health education for the employee, along with other health interventions to help workers develop or enhance behaviours that support good health (e.g. reducing out-of-pocket costs through reduced gym membership fees or holding incentives and competitions to increase smoking cessation)

Whilst the actual Task Force recommendations are pending, the priorities selected for the review provides good clues as to where the effective interventions may be found; note that evidence provided in the rapid review supports this set of priorities with the exception of incentives for smoking cessation (systematic review reported by Hey and Perera).

### 1.3.2 Meta-analytic reviews

#### *Smoking*

Smedslund and colleagues (2004, Norway) conducted a meta-analysis to compare the effectiveness of controlled trials of worksite smoking cessation during the 1990s with a previous meta-analysis of programmes conducted in the 1980s<sup>25</sup>. The authors concluded that workplace smoking cessation interventions showed initial effectiveness, but the effect seemed to decrease over time and was not present beyond 12 months.

A meta-analysis (2002, USA) has been conducted to quantify the effects of smoke-free workplaces on smoking in employees and compare these effects to those achieved through tax increases<sup>26</sup>. The authors concluded that smoke-free workplaces not only protect non-smokers from the dangers of passive smoking, they also encourage smokers to quit or to reduce consumption. Totally smoke-free workplaces are associated with reductions in prevalence of smoking of 3.8% (95% confidence interval 2.8% to 4.7%) and 3.1 (2.4 to 3.8) fewer cigarettes smoked per day per continuing smoker. Combination of the effects of reduced prevalence and lower consumption per continuing smoker yields a mean reduction of 1.3 cigarettes per day per employee, which corresponds to a relative reduction in consumption of 29%.

A meta-analysis was conducted (2008, USA) to determine the effectiveness of stress management interventions in occupational settings<sup>27</sup>. The overall weighted effect size (Cohen's *d*) for all studies was 0.526 (95% confidence interval 0.364, 0.687) a significant medium to large effect. Cognitive-behavioural programs consistently produced larger effects than other types of interventions, but if additional treatment components were added the effect was reduced. Within the sample of studies, relaxation interventions were most frequently used.

Kim (2007, Korea) also conducted a meta-analysis to determine the effectiveness of stress management interventions (SMIs)<sup>28</sup>. Six intervention types were distinguished: cognitive-behavioural intervention (CBT), relaxation techniques (RT), exercise (EX), multimodal programs 1 and 2 (MT1, 2), and organization focused interventions (OTs). The review concluded that SMIs are effective. Interventions involving RT and CBT are more effective than other types. Individual worker-focused interventions (ITs) were more effective than OTs. A small but significant overall effect was found. A moderate effect was found for RT, and small effects were found for other ITs. The effect size for OTs was the smallest.

A meta-analysis of psychosocial work stressors and common mental disorders (using longitudinal studies) was conducted (2006, UK) to clarify the associations between psychosocial work stressors and mental ill health<sup>29</sup>. This meta-analysis provides robust consistent evidence that (combinations of) high demands and low decision latitude and (combinations of) high efforts and low rewards are prospective risk factors for common mental disorders and suggests that the psychosocial work environment is important for mental health. The strongest effects were found for job

strain and effort-reward imbalance. The strength of the link between work stressors and common mental disorders differs for women and men.

Another meta-analysis (2001, Netherlands) sought to determine the effectiveness of occupational stress-reducing interventions and the populations for which such interventions are most beneficial<sup>30</sup>. The authors concluded that stress management interventions are effective. Cognitive-behavioural interventions are more effective than the other intervention types. A small but significant overall effect was found. A moderate effect was found for cognitive-behavioural interventions and multimodal interventions, and a small effect was found for relaxation techniques. The effect size for organization-focused interventions was non-significant. Effects were most pronounced on the following outcome categories: complaints, psychological resources and responses, and perceived quality of work life.

A systematic review and meta-analysis of prospective cohort studies (2006, Finland) focused on estimating the relative risk of coronary heart disease (CHD) in association with work stress<sup>31</sup>. Reviewers reported that the evidence suggests an average 50% excess risk for CHD among employees with work stress; further research is needed to confirm that a reduction in work stress will lead to a reduction in CHD risk. The age- and gender-adjusted relative ratio of CHD for high versus low job strain was 1.43 [95% confidence interval (95% CI) 1.15-1.84], but the ratio decreased to 1.16 (95% CI 0.94-1.43) after adjustment for risk factors and potential mediators. The age- and gender-adjusted risk ratio for a combination of high efforts and low rewards was 1.58 (95% CI 0.84-2.97). For organizational injustice, the age- and gender-adjusted, and multiple-adjusted relative risks were 1.62 (95% CI 1.24-2.13) and 1.47 (95% CI 1.12-1.95), respectively.

#### *Economic returns*

A meta-evaluation (2005, USA) assessed the overall validity of the worksite health promotion economic return studies<sup>32</sup>. The review notes wide variation in methods and approaches used for the determination of economic impact and return but that results nonetheless show a surprising amount of congruence. More recent and larger studies received the most weight in the meta-evaluation methodology and reflect the most important research efforts. Recent studies also tend to use newer prevention technologies, including:

- Use of the TTM,
- Internet-provided health information,
- Tailoring,
- Benefits-linked financial incentives,
- Telephonic high-risk intervention coaching,
- Self-directed change, and
- annual required morbidity-based health risk appraisals (HRAs) used for individual targeting of interventions.

The newer prevention technologies were also associated with higher levels of economic impact and return. Their use in the studies that have been published in the

last 10 years have resulted in slightly more than double the average cost/benefit ratio reported in studies of traditional program models. Instead of the typical 1:3.0 cost/benefit ratio, they report a ratio of 1:6.3.

### 1.3.3 Selected RCTs, longitudinal studies and other reviews

#### Physical activity

##### *Physical activity*

A recent physical activity controlled trial (2008, Japan) increased awareness of the benefits of physical activity, using environmental rearrangement and health promotion campaigns, which especially targeted walking, and appears to have contributed to a beneficial change in serum HDL-cholesterol levels in the participants<sup>33</sup>.

##### *Physical activity and TTM*

An RCT (2007, Canada) to compare the effects of stage-matched and standard print materials for physical activity promotion has been conducted<sup>34</sup>. At 12 months mean weekly MET minutes for combined moderate and vigorous activity increased from baseline by 223, 67, and 78 for the stage-matched, standard, and control groups, respectively; however, differences were not significant ( $p > .05$ ). Women in the stage-matched group significantly increased their activity over the 12-month period by 327 weekly MET minutes whereas the standard and control groups declined their activity ( $F = 3.01, p < .05$ ). The authors conclude that stage-matched physical activity materials delivered in the workplace appear to be efficacious for women but not men.

##### *Physical activity – internet versus printed material*

Marcus and colleagues (2007, USA) have reported on an RCT for a comparison of internet- and print-based physical activity interventions<sup>35</sup>.

Although not specific to the workplace setting the study is included because the findings are deemed sufficiently relevant for the design of interventions in that setting. At 6 months, participants in the tailored print arm reported a median of 112.5 minutes of physical activity per week, those in the tailored Internet arm reported 120.0 minutes, and those in the standard Internet arm reported 90.0 minutes ( $P=.15$ ). At 12 months, the physical activity minutes per week were 90.0, 90.0, and 80.0 for those in the tailored print, tailored Internet, and standard Internet arms, respectively ( $P=.74$ ). Results indicated no significant differences between the 3 arms. The authors conclude that the use of tailored Internet, tailored print, and standard Internet as part of a behaviour change program increased physical activity behaviour similarly. Because the use of the Internet was not different from the print-based intervention, this may be an opportunity to reach more sedentary adults in a more cost-effective way.

##### *Physical activity – Fitness, Musculoskeletal disorders*

A review (2003, Netherlands) of the effectiveness of worksite physical activity programs on physical activity, physical fitness, and health was conducted<sup>36</sup>. Strong evidence was found for a positive effect of a worksite physical activity program on physical activity and musculoskeletal disorders.

## **Nutrition and physical activity**

### *Physical activity and nutrition, environmental intervention*

Engbers and colleagues conducted a RCT (2007, Netherlands) focussed on nutrition and physical activity<sup>37</sup>. The 12-month environmental intervention consisted of: a 'Food'-part: to stimulate healthier food choices by means of product information in the canteen, and a 'Steps'-part: focused on stimulating stair use by means of motivational prompts in staircases and on elevator doors. Significant differences in change between groups (n=540) in favour of the intervention group were found on: [1] total cholesterol for women (-0.35 mmol/l); [2] HDL for men at 3 months (0.05 mmol/l) and 12 months (0.10 mmol/l); and [3] the total-HDL ratio for the total intervention group at 3 and 12 months (-0.45 mmol/l). Both groups showed a decrease in all body composition values at both follow-ups. A significant difference in change in systolic BP was found in favour of the control group (approximately 4 mm Hg), due to an increase in the intervention group at both follow-ups. The authors conclude that this modest environmental intervention was ineffective in reducing cardiovascular risk in a population of office workers.

### *Physical activity – fitness*

An RCT (2006, Australia) investigated the effects of a comprehensive exercise and lifestyle intervention on physical fitness<sup>38</sup>. Intention to treat analysis revealed no impact for this intervention.

### *Intensive lifestyle intervention for NCDs*

An RCT (2005, USA) examined the behavioural and clinical impact of a worksite chronic disease prevention program (an intensive lifestyle intervention) with 6-month follow-up<sup>39</sup>. Participants had significantly lower body fat, blood pressure, and cholesterol. The authors conclude that a worksite chronic disease prevention program can significantly increase health knowledge, can improve nutrition and physical activity, and can improve many employee health risks in the short term.

## **Nutrition**

### *Nutrition – fruit and vegetable consumption*

Sorensen and colleagues (2004, USA) conducted a review of worksite-based research and initiatives to increase fruit and vegetable consumption<sup>40</sup>. The review revealed that environmental/organizational initiatives rely on management commitment, supervisory support, and supportive organizational structures to sustain policy efforts over time. Program effectiveness is enhanced when they are (i) based on social ecological approaches; (ii) include worker participation in program planning and implementation (e.g. employee advisory boards and peer-delivered interventions); (iii) address multiple (vs. single) risk factors for change; and (iv) integrate workers' broader social context (e.g. families, neighbourhoods, etc.).

## **Internet based intervention**

### *Internet based intervention – stress, anxiety, depression*

Van Straten and colleagues (2008, Netherlands) conducted an RCT to study whether a Web-based self-help intervention is effective in reducing depression, anxiety, and

work-related stress (burnout)<sup>41</sup>. The authors reported statistically and clinically significant effects on symptoms of depression and anxiety. Effects were even more pronounced among participants with more severe baseline problems and for participants who fully completed the 4 week intervention. The effects on work-related stress and quality of life were less clear. The intervention comprised a web-based course lasting 4 weeks. Every week an automated email was sent to the participants to explain the contents and exercises for the coming week. In addition, participants were supported by trained psychology students who offered feedback by email on the completed exercises. The core element of the intervention was a procedure in which the participants learned to approach solvable problems in a structured way. The intervention was effective in reducing symptoms of depression (CES-D: Cohen's  $d = 0.50$ , 95% confidence interval (CI) 0.22-0.79; MDI:  $d = 0.33$ , 95% CI 0.03-0.63) and anxiety (SCL-A:  $d = 0.42$ , 95% CI 0.14-0.70; HADS:  $d = 0.33$ , 95% CI 0.04-0.61) as well as in enhancing quality of life ( $d = 0.31$ , 95% CI 0.03-0.60). Moreover, a higher percentage of patients in the intervention group experienced a significant improvement in symptoms (CES-D: odds ratio [OR] = 3.5, 95% CI 1.9-6.7; MDI: OR = 3.7, 95% CI 1.4-10.0; SCL-A: OR = 2.1, 95% CI 1.0-4.6; HADS: OR = 3.1, 95% CI 1.6-6.0). The course was less effective for work-related stress, but participants in the intervention group recovered more often from burnout than those in the control group (OR = 4.0, 95% CI 1.2-13.5). Further research is needed to enhance the effectiveness for work-related stress.

#### *Internet – physical activity, nutrition, stress*

An RCT (2007, USA) was conducted to evaluate the effectiveness of a Web-based multimedia health promotion program for the workplace, designed to improve dietary practices, reduce stress, and increase physical activity<sup>42</sup>. The Web-based program was more effective than print materials in producing improvements in the areas of diet and nutrition but was not more effective in reducing stress or increasing physical activity. The higher ratings given to the Web-based program suggest that workers preferred it to the print materials. The results suggest that a multimedia Web-based program can be a promising means of delivering health promotion material to the workforce, particularly in the area of diet and nutrition.

#### *Internet – weight loss program, participation rates*

Glasgow and colleagues (2007, USA) have conducted a multi-site randomized controlled trial Internet-based weight loss program<sup>43</sup>. Although not specific to the workplace setting (participants came from Health Maintenance Organisations – HMOs) the review is included because the findings are deemed sufficiently relevant for the design of interventions in that setting. The authors report that personalized mailings produced higher enrolment rates than member newsletters and that members with diabetes or heart disease were more likely to enrol than those without these diagnoses. Males, those over age 60, smokers, and those estimated to have higher medical expenses were less likely to enrol (all  $P < .001$ ). Males and those in the combined intervention were less likely to engage initially, or to continue to be engaged with their Web program, than other participants. The study concludes that a single personalized mailing increases enrolment in an internet-based weight loss

intervention. eHealth programs offer great potential for recruiting large numbers of participants, but may not reach those at highest risk. Characteristics of target participants related to each of these important factors may be different, and more comprehensive analyses of determinants of enrolment, engagement, and retention in eHealth programs are needed.

Verheijden and colleagues (2007, Netherlands) conducted a non-randomised study to identify rates and determinants of repeat participation in a web-based health behaviour change program<sup>44</sup>. Over 6000 participants were analysed; the odds ratios for the age categories 41-50, 51-60, and > 60 years were 1.40 (95% CI = 1.02-1.91), 1.43 (95% CI = 1.02-2.01), and 1.68 (95% CI = 1.03-2.72), respectively. Individuals who never smoked were more likely to participate repeatedly than current smokers and ex-smokers (OR = 1.44, 95% CI = 1.14-1.82 and OR = 1.49, 95% CI = 1.17-1.89, respectively). People meeting the guidelines for physical activity of moderate intensity (OR = 1.23 95% CI = 1.04-1.46) and for vegetable consumption (OR = 1.26 95% CI = 1.01-1.57) were also more likely to participate repeatedly than people who did not, as were obese people compared to individuals with normal weight (OR = 1.41 95% CI = 1.09-1.82). For smoking, physical activity and fruit & vegetable consumption, this study suggested these programs may reach those who need them the least. However, contrary to most expectations, obese people were more likely to participate in follow-up than people of normal body weight. The non-stigmatizing way of addressing body weight through the Internet may be part of the explanation for this. The findings suggest that Web-based health behaviour change programs may be more successful in the area of weight management than in many other health-related areas.

#### *Internet – smoking cessation*

Graham and colleagues (2007, USA) have reported the effectiveness of an internet-based worksite smoking cessation intervention at 12 months<sup>45</sup>. Based on the quit rates the authors suggest that internet cessation programs can be effective in promoting cessation and preventing relapse in a worksite setting.

#### *Internet – physical activity, web versus print material, TTM*

Leslie and colleagues (2005, Australia) have reported participant engagement and retention with a stage-based physical activity website RCT in a workplace setting<sup>46</sup>. The trial was designed to test the efficacy of a print- vs. website-delivered intervention in which participants received four stage-targeted e-mails over 8 weeks, with hyperlinks to a website. The authors found quite limited website engagement despite the perceived usefulness of the materials, demonstrating possible constraints on the use of e-mails and websites in delivering health behaviour change programs. The authors concluded that the issues of engagement and retention in website-delivered programs require attention. Marshall and colleagues (2003, Australia) have also reported on this RCT. The main outcome measure was change in self-reported physical activity. There was no significant increase in total reported physical activity within or between groups when analysed by intention to treat ( $F [1,653] = 0.41, p=0.52$ ). There was a significant increase in total physical activity reported by the

Print participants who were inactive at baseline ( $t [1,173] = -2.21, p=0.04$ ), and a significant decrease in the average time spent sitting on a weekday in the Web group ( $t [1,326] = 2.2, p=0.03$ ). The authors concluded that there were no differences between the Print and Web program effects on reported physical activity. The Print group demonstrated slightly larger effects and a higher level of recognition of program materials.

## **Alcohol**

### *Alcohol, email, face-to-face education*

An RCT (Japan, 2006) examined the effectiveness of a traditional face-to-face health education and e-mail health education on alcohol usage among male workers in comparison with a control group<sup>47</sup>. In the face-to-face group, knowledge ( $p=0.001$ ), attitude ( $p=0.026$ ), alcohol consumption ( $p=0.003$ ) and serum gamma-GTP showed significant improvement. In the e-mail group, only alcohol consumption showed marginal improvement ( $p=0.077$ ). In the control group, no variables changed remarkably. The authors concluded that face-to-face health education was more effective than the e-mail program and suggest that this may have been because of self-monitoring, goal setting processes and timely feedback.

### *Alcohol, heavy drinking, Employee Assistance programs (EAPS)*

A longitudinal study (2005, USA) set out to assess the effects of the worksite wellness program and employee assistance program (EAP) on healthcare utilization and costs, identify predictors of outpatient costs and visits, and assess the effect of the intervention on health attitudes, behaviours, and behavioural health-related costs and visits<sup>48</sup>. The results indicated that visits to the EAP increased as did overall healthcare visits, that utilization of healthcare services and costs were higher in the population receiving substance abuse prevention intervention, and that employees in the substance abuse prevention intervention reported lower heavy drinking and binge drinking. Data suggested that substance abuse prevention may result in higher healthcare costs and utilization in the short term, but a reduction in health risk behaviours such as heavy drinking may result in lower healthcare costs and utilization in the long term.

### *Alcohol, brief intervention, individual*

A trial (USA, 2002) evaluated the efficacy of a brief, individualized, alcohol abuse prevention program designed to reduce problem drinking within the workplace environment<sup>49</sup>. One hundred and fifty-five randomly selected employees of a medium-sized company in the food and retail services sector participated in a 6-month controlled worksite prevention trial. Female problem drinkers who received the intervention were more likely than those in the no-treatment control group to reduce alcohol-related negative consequences at follow-up. In addition, there was a significant multivariate treatment effect, suggesting that participants who received the intervention were significantly more likely to reduce drinking frequency at follow-up. Evaluation of attrition rates and reports of participant satisfaction suggest that the intervention was effective in engaging participants at all levels of alcohol consumption.



*Alcohol, lifestyle intervention, Australia post employees*

A randomised trial (Australia, 2000) was conducted to evaluate the effects of a workplace-based lifestyle intervention (Workscreen) to reduce excessive drinking<sup>50</sup>. Eight Australia Post networks randomly allocated to experimental and control conditions, comprising 67 worksites and 1206 employees. The experimental condition involved a broad spectrum lifestyle campaign, incorporating support from management, employee awareness of health, and brief interventions for high-risk behaviours, including excessive alcohol use. Focus groups identified relevant cultural factors. Changes in workplace culture and employee behaviour were assessed 10 months after baseline. Males and females were analysed separately. Over half of APOST employees participated at each screening point. In the experimental condition 61% of employees overall and 58% of those identified as excessive drinkers in Phase 1 responded to the lifestyle campaign by attending health assessments. Analyses focusing on the organization as a whole did not reveal significant reductions in excessive alcohol consumption among men or women. However, a significant reduction in number of drinks was observed in the experimental condition among women for whom completion of baseline and follow-up could be confirmed ( $P < 0.001$ ). The authors concluded that a workplace-based lifestyle campaign can assist *self-selected* employees in reducing their alcohol consumption. There was a moderately high level of participation among those identified as drinking excessively, which supported the chosen approach of embedding a low-intensity alcohol program within the context of a broader health promotion campaign.

*Alcohol, context of CVD programs, outreach*

A randomised study by Heirich (2000, USA) examined the question of worksites as an effective route to alcohol abuse prevention<sup>51</sup>. The study confirmed hypotheses that (i) cardiovascular disease risk reduction programs can provide effective access for alcohol behaviour change; and (ii) proactive outreach and follow-up have more impact on health behaviour change than health education classes.

*Alcohol, EAP, worksite training*

A review (1996, USA) of worksite alcohol interventions published up to 1995 was conducted<sup>52</sup>. The authors found strong suggestive evidence and some conclusive evidence that worksite interventions including core components of employee assistance programs are effective in rehabilitating employees with alcohol problems. There was suggestive evidence that worksite training oriented toward alcohol problems affects the attitudes of supervisors and employees for reasonable periods after the completion of training. The review concluded that investment in worksite interventions directed at reducing alcohol-related problems appears to be a sound strategy, although considerably more research is needed. This much needed research should include broad representation of appropriate worksite populations. Similar measurements should be used across studies and randomized control group designs are needed.

## **Comprehensive or multi-component programs**

*Multiple risk factors, internet, health risk appraisal, education, absenteeism*

Mills and colleagues have reported (2007, UK) a quasi-experimental 12-month before-after intervention-control study to evaluate the impact of a multicomponent WHP program on employee health risks and work productivity<sup>53</sup>. The authors of the study conclude that a well-implemented multicomponent workplace health promotion program can produce sizeable changes in health risks and productivity. Outcome measures were (i) cumulative count of health risk factors, and the World Health Organization health and work performance questionnaire measures of (ii) workplace absenteeism and (iii) work performance. Mean excess reductions of 0.45 health risk factors and 0.36 monthly absenteeism days and a mean increase of 0.79 on the work performance scale were observed in the intervention group compared with the control group. The intervention yielded a positive return on investment, even using conservative assumptions about effect size estimation. The interventions in this multicomponent program focussed around:

- a health risk appraisal questionnaire;
- access to a tailored health improvement web portal;
- wellness literature; and
- seminars and workshops focused upon identified wellness issues.

## **Economic returns**

*Returns on investment*

The American Institute for Preventive Medicine has published a 'white paper' (2008, USA) on The Health & Economic Implications of Worksite Wellness Programs<sup>54</sup>. It includes a synthesis of published studies on worksite wellness and concludes that the return on investment is \$3.48:1 due to reduced medical costs and \$5.82:1 due to reduced absenteeism. Returns on investment data are provided for 13 selected US companies.

*Returns on investment, success factors*

Goetzel and Ozminkowski (2008, USA) have reviewed the health and cost benefits of work site health-promotion (WHP) programs<sup>55</sup>. The authors conclude that despite methodological limitations in many available studies, the results suggest that, when properly designed, WHP can increase employees' health and productivity. Characteristics of effective programs are described; these include their ability to:

- assess the need for services;
- attract participants;
- use behavioural theory as a foundation;
- incorporate multiple ways to reach people; and
- make efforts to measure program impact.

Promising practices are noted including senior management support for and participation in WHP programs. Greater dissemination of information regarding success factors is needed because only 7% of employers were found to use all the program components required for successful interventions. There is need to invest in healthy work environments, to complement individual based interventions.

### *Reduced absenteeism, Reduced healthcare costs*

Aldana (2001, USA) undertook a review to summarize the literature on the ability of health promotion programs to reduce employee-related health care expenditures and absenteeism<sup>56</sup>. The major conclusions were that there were good correlational data to suggest that high levels of stress, excessive body weight, and multiple risk factors are associated with increased health care costs and illness-related absenteeism. The associations between seat belt use, cholesterol, diet, hypertension, and alcohol abuse and absenteeism and health care expenditures were either mixed or unknown. Health promotion programs were associated with lower levels of absenteeism and health care costs, and fitness programs were associated with reduced health care costs.

## **Broad reviews of effectiveness**

### *General Success Factors*

The Canadian Labour and Business Centre established a review (2004, Canada) project to document and analyse the innovative healthy workplace practices of twelve Canadian organizations<sup>57</sup>. Initiatives targeted the physical workplace environment, lifestyle, social environment and personal resources. Reviewers examined motives for undertaking the projects; roles of unions, workers and management in design, implementation and management of programs; relationship between programs and business strategies; and effectiveness of nine programs with regard to employee health and productivity outcomes. Initiatives focusing on traditional occupational healthy and safety issues, lifestyle concerns, and employee assistance programs were widespread. Some corporations had also developed programs concerning communication, flexible work hours, and issues of employee morale. Motives included responses to crises in the workplace, alignment of organizational philosophy with practice, enhancement of job satisfaction, and employee recruitment and retention. Results showed improved individual employee health and enhanced workplace safety. Lessons learned included that senior leadership's investment was important to success, employee participation was essential, and the size of the workplace had an impact on the type of programming that worked best. The report highlights nine points critical to program success.

### *Healthy workplaces and productivity*

A discussion paper (2003, Canada) on healthy workplaces and productivity has been published<sup>58</sup>. **For employers**, the paper's central message is that workplace wellness programs can yield cost savings and productivity payoffs. However, the underlying determinants of health and productivity can only be altered through changes to job design, organizational systems, human resource management practices, and the overall culture of the workplace. The emerging healthy organization model can guide this, as can the high performance workplace model presented in human resource management research. Another key implication for employers is the importance of integrating occupational health and safety, workplace wellness, work-family concerns, with other human resource management initiatives. A coordinated approach will increase the likelihood that change barriers are removed, and that the underlying organizational and work environment determinants of wellness and

employee performance are addressed. **For policy makers**, the paper's major insight is how healthy work environments contribute to the well being of individual workers and the performance of the economy. Healthy and safe work environments reduce the overall costs of health care, both public and private. Healthy organizations are ones that support workers to use their skills and talents, thereby contributing both to the quality of work life and performance. **For researchers**, the major implication is that they must push far beyond their disciplinary boundaries in order to contribute to meaningful change in workplaces. Improving workplace health depends almost entirely on management priorities and decisions, making it important that research be responsive to the concerns of employers. At the same time, much of Canada's economic and social policy rests on the assumption that productivity improvements are a means to improved living standards and quality of life. The practical challenge in framing an action-oriented workplace research agenda is striking the appropriate balance between the interests of employers, employees (and their unions and associations) and society as a whole.

#### *Effectiveness, Success factors*

Thesenvitz (2003, Canada) produced a literature review on the effectiveness of workplace health promotion (WHP) <sup>59</sup>. The author suggests WHP can be worthwhile if it is comprehensive, including occupational health and safety, voluntary health practice and organizational change approaches and meets certain conditions for success including

- senior management involvement;
- participatory planning;
- primary focus on employees' needs;
- optimal use of on-site resources;
- integration;
- recognition that a person's health is determined by an interdependent set of factors;
- tailoring to the special features of each workplace environment; evaluation; and
- long-term commitment.

## **1.4 Specific Review Questions**

### **1.4.1 What types of intervention (e.g. educative, system change, cognitive behavioural) are most likely to be effective?**

There is strong to definitive level evidence for all the areas of intervention identified in the terms of reference with the exception of alcohol. There is also indicative evidence for certain 'cross-cutting approaches'. Specific evidence exists to support the following strategies:

### **Smoking/Tobacco control**

- Interventions directed towards individual smokers increase the likelihood of quitting smoking. These include advice from a health professional, individual and group counselling and pharmacological treatment to overcome nicotine addiction. These interventions are effective whether offered in the workplace or elsewhere but the absolute numbers who quit are low<sup>7</sup>;
- Workplace tobacco policies and bans to decrease cigarette consumption during the working day and exposure of non-smoking employees to environmental tobacco smoke at work (evidence about whether they decrease prevalence of smoking or overall consumption of tobacco by smokers is equivocal)<sup>7, 25, 26</sup>.

### **Nutrition and Physical activity**

- Prompts to increase stair use<sup>8</sup>;
- Access to places and opportunities for physical activity<sup>8</sup>;
- Education, employee and peer support for physical activity<sup>8</sup>; and
- Multicomponent interventions that include nutrition and physical activity (including strategies such as providing nutrition education or dietary prescription, physical activity prescription or group activity, and behavioural skills development and training) to control overweight and obesity<sup>9, 16</sup>.

### **Stress**

- Interventions that are both organisationally and individually focussed<sup>12, 13</sup>;
- Employee participation strategies designed to increase job control and autonomy<sup>14</sup>;
- Strategies to provide personal support to employees<sup>15</sup>; and
- Cognitive-behavioural programs<sup>27, 28, 30</sup>.

### **Comprehensive or multi-component programs**

- Individualised risk reduction for high risk employees within the context of comprehensive programming,<sup>18, 19</sup> and
- Distribution of educational material and professional instruction to address healthy eating and physical activity<sup>16</sup>.

### **Cross cutting approaches<sup>32</sup> (indicative evidence)**

- Use of the Transtheoretical model (TTM or stages of change);
- Internet-provided health information,
- Tailoring,
- Benefits-linked financial incentives,
- Telephonic high-risk intervention coaching,
- Self-directed change, and
- Annual required morbidity-based health risk appraisals (HRAs) used for individual targeting of interventions.

### **Alcohol**

There is indicative evidence only, derived from single RCTs and longitudinal studies that face-to-face/individualised strategies<sup>60,49</sup>, employee assistance programs

(EAP)<sup>61</sup>, using CVD risk reduction programs as access for alcohol behaviour change<sup>51</sup> and embedding a low-intensity alcohol program with a broader WHP program<sup>50</sup> can be effective.

#### **1.4.2 Is there evidence about the relative effectiveness of programs provided to the whole population in a workplace compared with those targeted at high risk individuals?**

Current evidence supports individualised risk reduction for high risk employees within the context of a comprehensive WHP approach. There is systematic review level evidence for targeting individual smokers for cessation<sup>7</sup> and Pelletier's systematic review which found that providing individualized risk reduction for high risk employees within the context of comprehensive programming is the critical element of worksite interventions<sup>18,19</sup>. Screening of the database prepared for this review revealed eleven other studies in support of a high risk approach, of which six studies incorporated randomised designs<sup>51,53,62,63,64,65,66</sup>, one was a systematic review not previously cited in the main section of this report<sup>67</sup>, one was longitudinal<sup>68</sup>, one quasi-experimental<sup>69</sup> and one cross-sectional<sup>70</sup>.

#### **1.4.3 Are single or multi-risk factor programs more likely to be effective?**

There is strong evidence for an integrated approach to intervention on physical activity and nutrition risk factors and indicative evidence for multiple risk factor or comprehensive approaches at individual or environmental/organisational levels. Notwithstanding the intuitively plausible role for physical activity and nutrition in the area, it should be noted that there is currently insufficient evidence to support WHP based intervention on diabetes<sup>10</sup>. Three systematic reviews support multi-risk factor or comprehensive WHP approaches. The US Preventive Services Task Force review (2005, USA) found evidence to support multicomponent interventions aimed at diet, physical activity and cognitive change (and insufficient evidence for these components individually)<sup>9</sup>. The Effective Public Health Practice Project (2007, Canada) systematic review supported multi-faceted intervention for physical activity, nutrition and smoking<sup>16</sup>. The reviews (1997-2005, USA) conducted by Pelletier<sup>18,19,20,21</sup> also supported multifactorial health promotion and disease prevention programs in worksites. The Cochrane (generic, not worksite specific) systematic review of multiple risk factor reduction for reducing CVD risk factors (2006, UK) must be noted, given its findings that multiple risk factor interventions at the individual level result in small reductions in blood pressure, cholesterol, salt intake, weight loss, etc. but that contrary to expectations, these lifestyle changes had little or no impact on the desired CVD health outcomes (risk of heart attack or death)<sup>17</sup>. However it is also worth noting (i) that this Cochrane review has so far only considered studies published up to 2001 and (ii) many of the WHP interventions are multi-component (environmental as well as individual) and not merely multi-risk factor at the individual level. Finally, more recent studies have been published which provide support for multiple risk factor intervention for nutrition<sup>40</sup>, as well as for overall effectiveness and return on investment<sup>54, 55, 59</sup>.

#### **1.4.4 Are specific programs more likely to be effective with particular socioeconomic groups?**

There is insufficient evidence from systematic reviews or higher quality studies to answer this question.

Selected studies are noted here to provide some insights into available evidence. In general the notion that blue collar workplaces offer good access points for health promotion interventions is an attractive one. The challenge is to ensure the reach of the programs and interventions to the populations that need them; a comment on the external validity of many primary studies used in systematic reviews is made in the section on overall quality of research and is again relevant here. A practical example to illustrate this is provided in the case of a recent study of (general) eHealth programs<sup>43</sup>. eHealth programs might well be expected to offer great potential for recruiting large numbers of participants, but in fact were found not to reach those at highest risk so that comprehensive analyses of determinants of enrolment, engagement, and retention in eHealth and other workplace based programs are needed. The evidence database assembled for this review was screened for any studies that could shed any light on the issue of socioeconomic status or on cultural diversity. Five studies are noted below of which none are Australian.

Novak and colleagues (2007, New Zealand) reviewed the evidence for the effectiveness of workplaces as settings for cardiovascular health promotion and reduction of heart health inequalities<sup>71</sup>. The authors suggest that workplaces have good potential as settings for health promotion. Reviewers found mixed but largely supportive evidence that workplace interventions can lead to improvements in health outcomes, workplace environments, lifestyles, and productivity. Workplace programmes that ranked highest in both clinical and cost-effectiveness targeted industries employing large numbers of blue-collar workers, tackled multiple risk factors, intervened at both individual and environmental levels and incorporated occupational safety components. These programmes appear to offer a substantial return on investment for employers in other countries, but local evidence (for NZ) was lacking.

Thomas and colleagues (2007, Canada) reviewed the evidence for the effectiveness of interventions (generally, i.e. not worksite specific) to increase physical activity among marginalized populations<sup>72</sup>. There was virtually no relevant evidence in the published literature. The authors conclude that intervention design for marginalized populations is very complex and that the context for programs is crucial to participation and outcomes. Programs may not be generalisable across groups.

Sorensen (2007, USA) reports an RCT intervention targeting multiple risk-related behaviours in working-class, multiethnic populations<sup>73</sup>. Researchers examined the relationships between the social contextual factors and changes in fruit and vegetable consumption from baseline to completion of intervention in health centers and small business studies. Stronger social networks, social norms that were more

supportive, food sufficiency and less household crowding were associated with greater change in fruit and vegetable intake. The challenge for policy makers is how to take account of these findings when designing interventions.

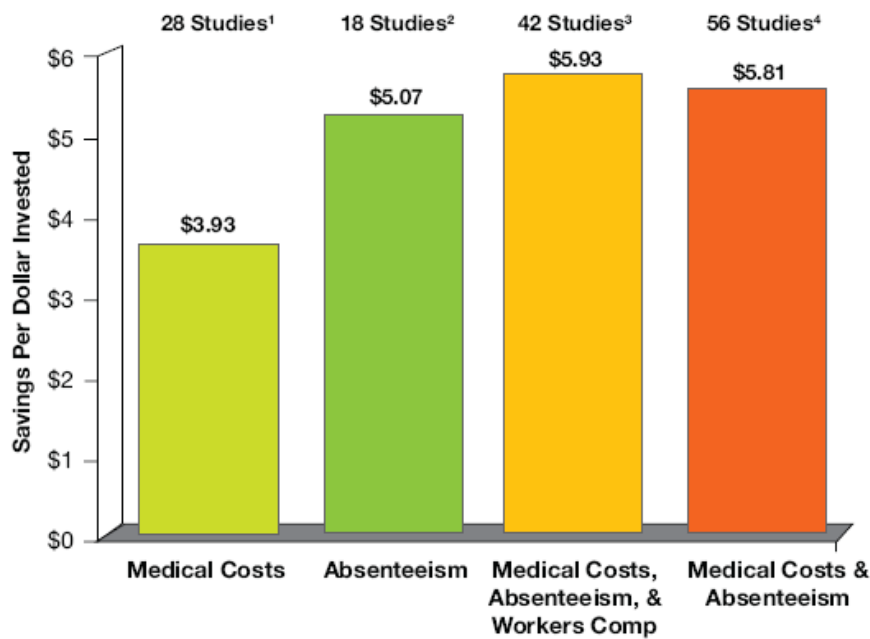
Peterson and colleagues (2007, USA) examined two worksite RCTs (10 health centres and 26 manufacturing businesses) conducting an analysis focussed on multiethnic, working-class populations. Age, sex, race/ethnicity, and socioeconomic position were independently associated with leisure-time physical activity in both settings; multivariable models explained 15% of the variance in physical activity in the health centers setting and 11% of the variance in physical activity in the small business setting. Leisure-time physical activity and motivation to change lifestyle behaviours were inversely associated with BMI, adjusting for individual, interpersonal, and neighbourhood factors. The authors concluded that a social-contextual framework highlights the contribution of social class and race/ethnicity in the variance in leisure-time physical activity and weight status and that behavioural influences may vary in multiethnic, working-class populations.

Devine and colleagues (2007, USA) reported from a cross-sectional analytic study involving 1108 (44% response) unionized construction labourers<sup>74</sup>. A range of 20% to 50% of respondents reported negative work-to-family spillover ('spillover' is the effect of one role on another as working adults attempt to integrate demands from work and family), agreeing that work demands, time, fatigue, and stress interfered with family meals or food choices. Higher spillover was associated with job factors, being of white race/ethnicity, and having children at home. Lower fruit and vegetable consumption was associated with higher work-to-family spillover ( $p = .002$ ), being of white race or ethnicity ( $p < .0001$ ), and working the graveyard or day shift ( $p = .02$ ). The authors concluded that negative experience of work-to-family spillover may link employment to fruit and vegetable consumption and thus to worker health.

#### **1.4.5 Is it possible to identify factors that are critical to the success of workplace health promotion programs?**

Notwithstanding the review by Chapman<sup>32</sup> and Aldana<sup>56</sup>, The American Institute for Preventive Medicine 'white paper'<sup>54</sup> (see Figure 1) or the review by Goetzel and Ozminkowski<sup>55</sup> - all testifying to the returns on investment in WHP programs, there are also reviews which failed to corroborate the cost-effectiveness of workplace programs for smoking<sup>7</sup> and physical activity<sup>11</sup>. A cautious acceptance that there are potentially positive returns on investments in WHP is thus warranted until further robust evidence is available in these specific areas.





1. Source: Aldana, SG, *Financial impact of health promotion programs: a comprehensive review of the literature*, *American Journal of Health Promotion*, 2001, volume 15:5; pages 296-320.
2. Source: Aldana, SG, *Financial impact of health promotion programs: a comprehensive review of the literature*, *American Journal of Health Promotion*, 2001, volume 15:5; pages 296-320.
3. Source: Chapman, LS, *Meta-evaluation of worksite health promotion economic return studies*, *Art of Health Promotion*, 2003, 6:6, pages 1-16.
4. Source: Chapman, LS, *Meta-evaluation of worksite health promotion economic return studies: 2005 Update* *Art of Health Promotion*, 2005, p. 1-16.

## 1.5 Success Factors for WHP Programs

Success factors for WHP programs have been identified in the literature; the findings are indicative rather than definitive because of the limitations/ type of studies they are derived from. Identified success factors include:

- (i) Senior management involvement<sup>59</sup>;
- (ii) Participatory planning<sup>59,75</sup>;
- (iii) Integrating Health Productivity Management (HPM)/ Workplace Health Promotion (WHP) programs into the organization's operations<sup>76,59,75</sup>
- (iv) Strengthening the organisational climate for implementation by making sure that targeted employees have easy access to high-quality training, technical assistance and documentation<sup>75</sup>;
- (v) Providing incentives for use and providing feedback on innovation use (all of which enhance motivation) and by making the innovation easily accessible or easy to use<sup>75</sup>;
- (vi) Giving targeted employees time to learn how to deliver and use the innovation, and redesigning work processes to fit innovation use (all of which increase opportunities or remove barriers)<sup>75</sup>;

- (vii) Simultaneously addressing individual, environmental, policy, and cultural factors affecting health and productivity<sup>76</sup>;
- (viii) Targeting several health issues<sup>76</sup>;
- (ix) Recognition that a person's health is determined by an interdependent set of factors<sup>59</sup>;
- (x) Focusing primarily on employees' needs<sup>59</sup>;
- (xi) Tailoring programs to address specific needs<sup>76,59</sup>;
- (xii) Attaining high participation<sup>76</sup>;
- (xiii) Optimising the use of on-site resources<sup>59</sup>;
- (xiv) Ensuring long term commitment to the program<sup>59</sup>;
- (xv) Rigorously evaluating programs<sup>59,76</sup>; and
- (xvi) Disseminating successful outcomes/promising practices to key stakeholders<sup>76</sup>.

### **1.5.1 Australian studies of workplace health promotion**

The evidence database compiled for this review was screened for studies, not already mentioned, that involved Australian populations and were potentially relevant to the review terms of reference.

Eleven studies were retrieved: they addressed (1) Indigenous community health promotion initiatives (generic – not workplace specific)<sup>77</sup>, (2) using pedometers to increase daily physical activity<sup>78</sup>, (3) the association of corporate work environment factors, health risks, and medical conditions with presenteeism among Australian employees<sup>79</sup> (this study provides initial evidence that health management programming may benefit on-the-job productivity outcomes if expanded to include interventions targeting work environments), (4) the association of two productivity measures with health risks and medical conditions in an Australian employee population<sup>80</sup> (this study provides a first indication<sup>80</sup> of the potential benefits of health promotion programming to Australian employees in improving health and to the corporation in minimizing health-related productivity loss), (5) a mental health first aid training course in a workplace setting<sup>81</sup> (the course was judged to be effective in improve participants' mental health literacy and mental health), (6) the association between health risk status and health care costs among the membership of an Australian health plan<sup>82</sup> (low-risk participants had the lowest health care costs [377 Australian dollars] compared with medium- [484 Australian dollars] or high-risk [661 Australian dollars] participants and non-participants [438 Australian dollars] - excess

health care costs associated with excess health risks were 13.5% of total expenditures), (7) internet-based physical activity intervention (diabetes related),<sup>83</sup> (8) design and baseline data collection for the Australian National Workplace Health Project<sup>84</sup>, (9) workplace smoking restrictions<sup>85</sup>, (10) the influence of lifestyle, coping, and job stress on blood pressure<sup>86</sup> (the study found that work stress *per se* had no direct effect on blood pressure, but the ways that individuals reported coping with stress were significantly related to blood pressure, with blood pressure elevation effects appearing to be mediated largely by dietary and drinking habits and physical inactivity; the results point to the need to target individual coping strategies and lifestyle as much as the working environment in WHP programs), (11) health risk assessment, risk factor education, behavioural counseling, or behavioural counseling plus incentives<sup>87</sup> (this study found that behavioural counseling produces larger changes in the life-style behaviours contributing to coronary heart disease risk than other commonly used interventions).

These studies provide a very modest amount of additional Australia-specific evidence and some contextual information for the review. This evidence does not impact the findings from the review overall and serves mainly to highlight the need for well designed Australian studies in the future.

## 2 Conclusions

The review found **strong to definitive evidence** (see glossary) for effectiveness of interventions in the following areas:

### **Tobacco control**

- interventions directed towards individual smokers to increase the likelihood of quitting smoking; and
- tobacco policies and bans to decrease cigarette consumption during the working day by smokers and exposure of non-smoking employees to environmental tobacco smoke at work.

### **Physical activity**

- prompts to increase stair use;
- access to places and opportunities for physical activity;
- education, employee and peer support; and
- multicomponent interventions combining nutrition and physical activity.

### **Nutrition**

- multicomponent interventions that include physical activity as well as nutrition (strategies such as nutrition education, dietary prescription, behavioural skills development and training to control adult overweight and obesity);
- enhanced access to and availability of nutritious foods; and
- promotional strategies at point-of-purchase.

### **Stress**

- interventions that focus on both the organisation and the individual;
- employee participation strategies designed to increase job control and autonomy;
- strategies to provide personal support to employees; and
- cognitive-behavioural intervention programs.

### **Comprehensive or multi-component programs**

- individualised risk reduction for high risk employees within the context of a comprehensive program.

The Review found indicative evidence (see Glossary) to support the following generic strategies or 'cross cutting approaches':

### **Cross cutting approaches**

- use of the Transtheoretical model (stages of change);
- individual tailoring of interventions;
- internet-provided health information;
- benefits-linked financial incentives;
- telephone based high-risk intervention coaching;
- self-directed goal-setting for change; and

- annual required morbidity-based health risk appraisals (HRAs) used for individual targeting of interventions.

For workplace interventions dealing with alcohol the review found indicative evidence only. These interventions focused mainly on face-to-face/individualised strategies and for multiple risk factor or comprehensive approaches at individual or environmental/organisational levels. There was insufficient evidence to determine whether any specific programs are more likely to be effective with particular socioeconomic groups and there was a dearth of well designed studies conducted in Australia. Some studies suggest that returns on investment in WHP over the period 1995-2005 have doubled from a cost: benefit ratio of 1:3 to 1:6.3. A cautious acceptance of this assertion that there are potentially positive returns on investments in WHP is warranted. The cautionary approach is taken until further robust evidence is available because this review has found two studies which failed to corroborate the cost effectiveness of workplace programs in the areas of smoking and physical activity respectively.

### **Gaps in research from the perspective of the Victorian government**

The need for Australia-specific studies has been highlighted in this rapid review. Over and above this, three main gaps are suggested and are aligned with recommended priorities for investment.

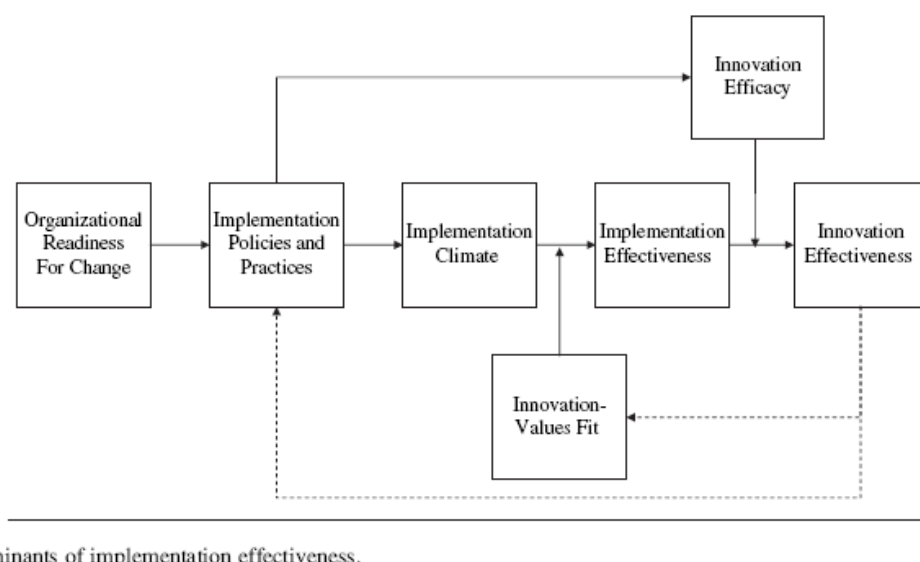
#### *Priority 1: Use of theory based approaches to design, testing and development of interventions in Victoria.*

Worksite health promotion has moved toward the development and testing of comprehensive programs that target health behaviours with interventions operating at multiple levels of influence. Yet, observational and process evaluation studies indicate that such programs are challenging for worksites to implement effectively. Research has identified several organizational factors that promote or inhibit effective implementation of comprehensive worksite health promotion programs. Until recently, no integrated theory of implementation has emerged from this research; however a paper by Weiner and colleagues (2008, USA) provides some new insights in describing a theory of the organizational determinants of effective implementation of comprehensive worksite health promotion programs<sup>75</sup>. The theory is illustrated in Figure 2 below where there are seven main constructs:

- Organisational readiness for change;
- Implementation policies and practices;
- Implementation climate;
- Implementation-Values fit;
- Implementation effectiveness;
- Innovation efficacy; and
- Innovation effectiveness.

The authors contend that the theory described in this paper is:

- suitable for guiding research into the determinants of effective implementation of comprehensive worksite health promotion programs and other complex innovations in organizations;
- suitable for multi-organisational research using longitudinal study designs; and
- capable of being combined fruitfully with process evaluation studies.



**Figure 2** Weiner and colleagues’ organisational theory of the determinants of effective implementation of worksite health promotion programs<sup>75</sup>.

*Priority 2: Use of formative research (qualitative and quantitative) to inform the design of programs*

Taking a theory based approach as suggested above, it is argued that the strategies chosen and the relative weight given to these strategies within a WHP program need to be customised according to an assessment of the current/ emerging context for implementation. In the case of social marketing campaigns it is assumed good practice to include a phase of formative research as well as ‘pre-testing’ of the proposed communication concepts<sup>88</sup>; the same should hold true for development of workplace programs in Victoria or elsewhere in Australia. A case study of formative research is provided later in this report.

*Priority 3: Conduct translational research with transparent reporting of ‘RE-AIM’ intervention reach, adoption, implementation, & maintenance.*

The consequences of low external validity are as obvious as expensive: interventions implemented state-wide or nationally that were shown to be effective in a trial may encounter many barriers in the ‘real world’ dissemination process. However, these real-world diffusion studies are needed to learn about the exportability and adoption of interventions in less controlled conditions than those accompanied with trials.

Within these studies, stronger emphasis is needed on representativeness of employees, work site settings studied, and longer term results<sup>4,89</sup>. Bull and colleagues conducted a literature review of workplace health behavioural interventions and, using the “RE-AIM” framework, they summarised characteristics and results of these studies to document the reporting of intervention reach (RE), adoption (A), implementation (I), and maintenance (M). The authors reviewed a total of 24 publications from 11 leading health behaviour journals. They found that:

- participation rates of eligible employees were reported in 87.5% of studies;
- intervention adoption was reported in only 25% of studies;
- characteristics of participants versus nonparticipants were reported in fewer than 10% of studies;
- implementation data were reported in only 12.5% of the studies; and
- only 8% of studies reported any type of maintenance data.

Oldenburg and colleagues have argued that less than 1% of all public health and health promotion studies are categorized as diffusion research<sup>90</sup>. Controlled trials with good process measures provide information on the potential effectiveness of intervention elements. Translational studies are urgently needed to inform us on the adoption and efficacy of successful intervention elements in health promotion practice. Only the supplementation of dissemination studies to controlled trials will illuminate the usefulness of interventions in daily health promotion practice. The research burden for participants should be minimized in order to coincide with the ‘real world’.

An approach to modelling ICERs (Incremental Cost Effectiveness Ratios) for interventions has been pioneered in Victoria by the Department of Human Services and Professor Rob Carter and colleagues at the University of Melbourne (now at Deakin University) – the ACE methodology (Assessing Cost-Effectiveness) as recently described by Haby and colleagues<sup>91</sup>. The approach depends on the availability of well evaluated interventions – identified through a preliminary screening process. This type of methodology could be considered for workplace health promotion in the future, perhaps with some preliminary investment for the screening process as a first step.

## **IMPLEMENTATION CASE STUDY 1: Using formative research to develop WHP interventions**

Wilson and colleagues (2007, USA) recent paper on formative research provides a nice example of the approach with respect to workplace programs to address overweight and obesity<sup>92</sup>.

*The formative research methods included:*

- an environmental assessment;
- an organisational climate survey;
- leadership focus groups and interviews; and
- archival organisational data.

*The research results showed:*

- 83% of employees at the proposed intervention sites were overweight or obese;
- leadership was very supportive of health initiatives and felt integrating the strategies into organisational operations would increase their likelihood of success
- environmental assessment scores ranged from 47 to 19 on a 100-point scale.
- health services personnel tended to view the organizational climate for health more positively than did site leadership.

*Intervention strategies chosen as a result included:*

- increasing healthy food choices in vending machines, cafeterias, and company meetings;
- providing a walking path;
- targeting messages;
- developing site specific goals;
- training leaders; and
- establishing leaders at the work group level.

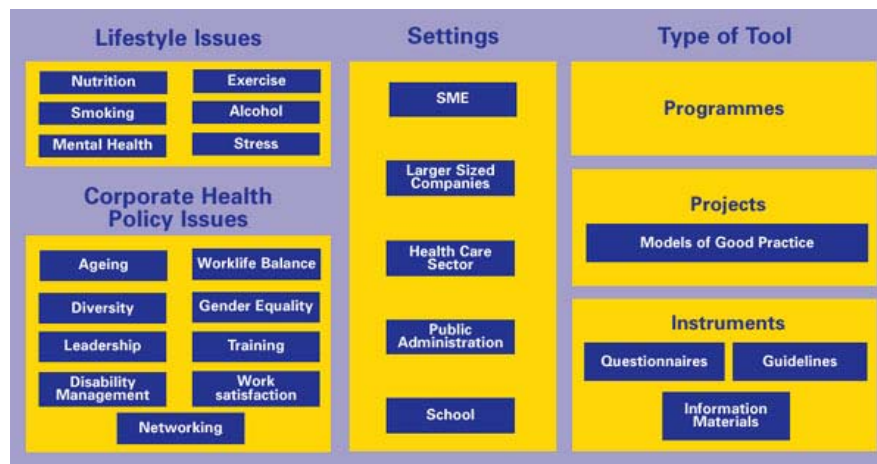


## IMPLEMENTATION CASE STUDY 2: Building networks and resources for WHP - The European Network and Toolbox for Workplace Health Promotion

<http://www.enwhp.org>

The European Network for Workplace Health Promotion is an informal network of national occupational health and safety institutes, public health, health promotion and statutory social insurance institutions. In a joint effort, all the members and partners aim to improve workplace health and well-being and to reduce the impact of work related ill health on the European workforce. The ENWHP promotes good practice in workplace health promotion and advocates the adoption of such practice in all European workplaces. With the support of the European Commission, the ENWHP has carried out a number of important European initiatives over the past decade which have established workplace health promotion (WHP) as a field of action for public health at European and national level. A website provides links to all of the ENWHP initiatives of which the first was "Quality Criteria and Success Factors of Workplace Health Promotion" and the most recent (seventh) is "Move Europe - A Campaign for the Improvement of Lifestyle-Related Workplace Health Promotion in Europe" (lifestyle related WHP focussing especially on the combination of physical activity, healthy diet, mental health and smoking prevention).

The ENWHP toolbox (below) contains effective WHP methods and instruments which are being used in practical context in all European countries. The collection therefore represents a true European 'exchange pool' for WHP practitioners and decision makers in the fields of HR management, occupational health and safety and public health.



**European Toolbox for Workplace Health Promotion**

The inventory consists of programmes, projects (Models of Good Practice) or instruments (questionnaires, guidelines & information materials), suitable for improvement or promotion of health at the workplace, and provides solutions for tackling health related problems at the workplace such as ageing workforce, disability management, alcohol abuse, smoking, unhealthy eating habits, mental health and stress. At organisational level a tool can be used on a participatory basis, or for establishing processes. They can be integrated in company management and the daily routines and structures of the organisation and used to induce organisation change, etc. All tools in this toolbox are:

- used on a company level;
- used more than once (multi-use);
- transferable to different working situations and companies and accessible to various user groups.

### IMPLEMENTATION CASE STUDY 3:

## A graduated award program for WHP: Scotland's Healthy Working Lives (HWL) Program

<http://www.shaw.uk.com>

Early in 2007, the Healthy Working Lives (HWL) Award Programme was launched. The scheme encompasses a wide range of topics enabling organisations to select those that are most relevant to the workforce, including health promotion, occupational health and safety, health and the environment, mental health and well-being, community involvement and employability. For each level there is a set of core and additional criteria. Workplaces must fulfil all of the core criteria and select one or more of the additional criteria to achieve an award. This gives workplaces the flexibility to choose topics which will most interest their staff.

#### **BRONZE AWARD**

**Core Criteria** - The workplace must:

- (i) Provide information on relevant health issues on a regular basis.
- (ii) Raise awareness of health issues through appropriate activity.
- (iii) Establish a health promotion working group which represents staff from all levels of the organisation  
OR Provide evidence that an existing group within the organisation, e.g. quality circles, health and safety, regularly includes health on its working agenda  
OR Demonstrate that there is an appropriate means to address staff health needs.
- (iv) Implement a stated policy on smoking that promotes a smoke-free environment and provides smoking cessation support.
- (v) Meet the relevant legal obligations for health and safety at work.

**Additional Criteria** - The workplace must also undertake ONE of the following:

- (i) Provide all employees with an opportunity to have a health check that includes a review of lifestyle behaviour and the giving of personal health advice.
- (ii) Promote physical activity  
OR Alcohol awareness  
OR Stress handling among staff.
- (iii) Provide healthy food choices/facilities in the workplace where appropriate.
- (iv) Take action to assess staff health needs. This should focus on environmental, organisational and individual lifestyle issues.

#### **SILVER AWARD**

The workplace must have fulfilled the criteria stipulated for the Bronze Award

**Core Criteria** - The workplace must:

- (i) Have implemented a stated policy and procedures on the following:
  - Alcohol or drugs misuse in the workplace which includes education on sensible drinking and support.
  - The provision and promotion of healthy food choices/facilities in the workplace.
  - The promotion of physical activity.
- (ii) Take formal action to assess staff health needs. This should focus on environmental, organisational and individual lifestyle issues.
- (iii) Provide all employees with an opportunity to have a health check that includes a review of lifestyle behaviour and the giving of personal health advice.

**Additional Criteria** - The workplace must also undertake ONE of the following:

- (i) Provide all employees with an opportunity to have a fitness assessment.
- (ii) Provide a seminar/workshop for staff on a least two health topics appropriate to the needs of the workforce, e.g.
  - stress/mental health
  - healthy eating
  - alcohol/drugs
  - HIV/AIDS and sexual health
  - dental/oral health
  - physical activity
- (iii) Have a system in place which regularly reviews and records health activities to inform future planning.
- (iv) Demonstrate active participation in a local or national health campaign.

#### **GOLD AWARD**

The workplace must have fulfilled the criteria stipulated for the Bronze and Silver Awards.

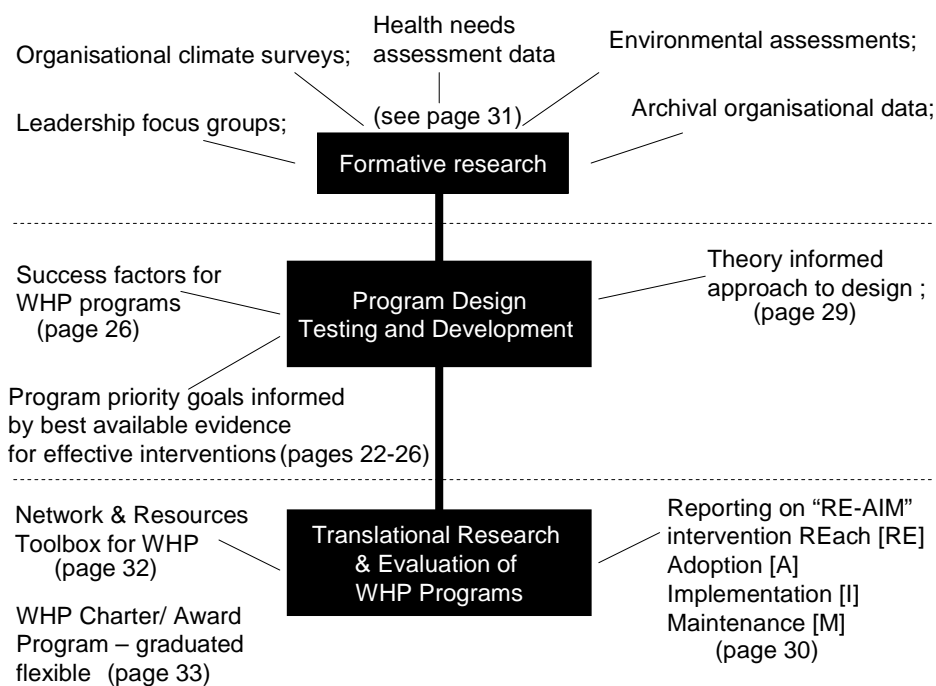
**Core Criteria** - The workplace must:

- (i) Have a three-year strategy and one-year action plan for health based on identified needs.
- (ii) Demonstrate activities that promote health in each of the following areas:
  - smoking
  - alcohol/drugs
  - healthy eating
  - physical activity
  - HIV/AIDS and sexual health
  - stress/mental health
  - dental/oral health
- (iii) Demonstrate active participation in a local or national health campaign or demonstrate active commitment to the health of the local community.

The Scotland's Health at Work Gold Award is awarded for three years with progress reviewed annually. A local SHAW carries out an annual review to confirm that the workplace continues to meet the Gold Criteria and to highlight any areas where additional input may be required. A commendation award is also specified.

**IMPLEMENTATION CASE STUDY 4:  
Back to the future: towards a template for WHP in Victoria and Australia**

Rather than describe existing practice, this final implementation case study is a projection into the future – it attempts to draw together the evidence, recommendations and ideas presented throughout the report into a putative template for future WHP in Victoria and Australia. The template comprises three main components – (i) Formative research, (ii) Program Design, Testing and Development and (iii) Translational Research & Evaluation of WHP programs. Page references guide the reader to sections of this report where further details are available on the relevant sub-components. It is envisaged that the work described could be commenced within one year, progressed to testing and development within three years, and taken through a first cycle in approximately five to eight years.



### 3 Terms of Reference

#### Terms of reference for this review

The Department of Human Services wishes to commission a review about the relative effectiveness of different workplace health promotion strategies in the prevention of chronic disease.

#### Purpose and audience

The review is commissioned in the context of an increased interest in the workplace as a setting to prevent chronic disease. The review may influence the roll out of currently funded programs and inform further funding initiatives. The audience is policy makers in the Department of Human Services.

#### Review questions

The review will address the following question:

*What types of primary prevention programs in the workplace are likely to be most effective in (a) changing risk factors for chronic disease (SNAPS – smoking, nutrition, alcohol, physical activity, stress) and (b) reducing rates of chronic disease? Where ever possible, comment on the cost effectiveness of the primary prevention programs.*

Specifically:

- (i) What types of intervention (e.g. educative, system change, cognitive behavioural) are most likely to be effective?
- (ii) Is there evidence about the relative effectiveness of programs provided to the whole population in a workplace compared with those targeted at high risk individuals?
- (iii) Are single or multi-risk factor programs more likely to be effective
- (iv) Are specific programs more likely to be effective with particular socioeconomic groups?
- (v) Is it possible to identify factors that are critical to the success of workplace health promotion programs?

#### Scope of the review

The review should focus on the published literature and draw heavily on existing systematic reviews if appropriate. The review will include both Australian and overseas studies; where possible, comment should be made about the relevance of overseas studies to the Australian context.

#### Format of the Review

The review will consist of:

- *Executive summary:* This will be one page and summarise the key findings from the review. It should be suitable to be read by very senior policy makers

- *Main review:* This will be around 10-15 pages and for each question will include:
  - A brief statement about the quality of the research in relation to the question
  - Summary of the research findings in relation to the question, with particular reference to the methodologically rigorous papers
  - A brief description of the 3 or 4 most important projects, their findings in terms of impact, cost (if possible), acceptability and relevance to Australia
- *Conclusions:* This will be no more than a page and include:
  - A brief summarised response to the review question: *What types of primary prevention programs in the workplace are likely to be most effective in (a) changing risk factors for chronic disease in the short term and (b) reducing rates of chronic disease in the longer term?*
  - A comment on the main gaps in research in the area from the perspective of the Victorian government
- *Reference list*
  - Limited to papers referred to in the review

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## APPENDIX 1: TABULATION OF SELECTED SYSTEMATIC REVIEWS

Study details	Population(s)	Main conclusions	Main Themes
<p>1. Bonde, J. P. (2008). "Psychosocial factors at work and risk of depression: a systematic review of the epidemiological evidence." <i>Occup Environ Med</i> 65(7): 438-45</p> <p><b>Study Aims:</b> To review follow-up studies addressing the risk of major depression and depressive symptoms relative to psychosocial stressors in the working environment and evaluate the evidence for causality.</p>	<p>Various: sixteen company or population-based studies including some 63,000 employees Follow-up period ranged from 1 to 13 years.</p>	<p>This review provides consistent findings that perception of adverse psychosocial factors in the workplace is related to an elevated risk of subsequent depressive symptoms or major depressive episode; however, methodological limitations preclude causal inference. Studies implementing objective measures of stressors or independent outcome ascertainment are warranted.</p>	<p>workplace stress</p> <p>Status: Indirectly relevant (depression)</p>
<p>2. Abdulwadud, O. A. and M. E. Snow (2007). "Interventions in the workplace to support breastfeeding for women in employment." <i>Cochrane Database Syst Rev</i>(3): CD006177</p> <p><b>Study Aims:</b> To assess the effectiveness of workplace interventions to support and promote breastfeeding among women returning to paid work after the birth of their children, and its impact on process outcomes pertinent to employees and employers.</p>	<p>Women returning to paid work after the birth of their children.</p>	<p>There were no randomised controlled trials or quasi-randomised controlled trials identified. <b>AUTHORS' CONCLUSIONS:</b> No trials have evaluated the effectiveness of workplace interventions in promoting breastfeeding among women returning to paid work after the birth of their child. The impact of such intervention on process outcomes is also unknown. Randomised controlled trials are required to establish the benefits of various types of workplace interventions to support, encourage and promote breastfeeding among working mothers.</p>	<p>workplace nutrition workplace research needs</p> <p>Status: Indirectly relevant (breastfeeding)</p>
<p>3. Beale, S., Bending, M., Hutton, J. (2007). "Workplace Health Promotion: How to Encourage Employees to be Physically Active: A Rapid Review of Economic Literature. ." Retrieved 26 June 2008, from <a href="http://guidance.nice.org.uk/page.aspx?o=449296">http://guidance.nice.org.uk/page.aspx?o=449296</a></p> <p><b>Study Aims:</b> National Institute for Health and Clinical Excellence (NICE) was asked by the UK Department of Health (DH) to develop guidance on a public health interventions aimed at promoting physical activity in the workplace.</p>	<p>Adults working for someone else (self-employed, unemployed or not working excluded).</p>	<p>Overall there was limited recent evidence on the economic benefits of workplace interventions that promote physical activity. A total of seven studies were included in the review and only one of these was published within the last nine years. A summary of the characteristics of the reviewed studies is presented (Table 1 within the review). There is no strong economic evidence to support the implementation of workplace interventions that promote physical activity. Further, the applicability of the results may be limited as all studies were conducted outside of the UK.</p>	<p>workplace PHYSICAL ACTIVITY</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
<p>4. Verhagen, A. P., C. Karelis, et al. (2007). "Exercise proves effective in a systematic review of work-related complaints of the arm, neck, or shoulder." J Clin Epidemiol 60(2): 110-7</p> <p><b>Study Aims:</b> To evaluate whether conservative interventions have a significant impact on outcomes for work-related complaints of the arm, neck, and/or shoulder (CANS).</p>	<p>2,376 patients in 26 studies; 23 studies included patients with chronic nonspecific complaints. &gt;30 interventions &amp; 7 main groups of interventions evaluated, of "exercises" was the largest one.</p>	<p>There is limited evidence for the effectiveness of exercises when compared to massage, adding breaks during computer work, massage as add-on treatment to manual therapy, manual therapy as add-on treatment to exercises, and some keyboards in people with carpal tunnel syndrome when compared to other keyboards or placebo. For other interventions no clear effectiveness could be demonstrated.</p>	<p>workplace PHYSICAL ACTIVITY</p> <p>Status: Indirectly relevant</p>
<p>5. Schultz, A. B. and D. W. Edington (2007). "Employee health and presenteeism: a systematic review." J Occup Rehabil 17(3): 547-79</p> <p><b>Study Aims:</b> To explore the link between employee health and on-the-job productivity, also known as presenteeism.</p>	<p>General – participants in a total of 113 studies found using "presenteeism" or "work limitations" as keywords search strategy.</p>	<p>Based on the research reviewed here, it can be said with confidence that health conditions such as allergies and arthritis are associated with presenteeism. Moreover, health risks traditionally measured by a health risk appraisal (HRA), especially physical activity and body weight, also show an association with presenteeism. The next step for researchers is to tease out the impact of individual health risks or combinations of risks and health conditions on this important outcome measure.</p>	<p>workplace PA workplace-BMI</p> <p>Status: Indirectly relevant</p>
<p>6. Robson L S, C. J. A., Cullen K, Bielecky A, Severin C, Bigelow PL, Irvin E, Culyer A, Mahood Q (2007). "The effectiveness of occupational health and safety management system interventions: a systematic review " Safety Science Volume 45(3) 329-353</p> <p><b>Study Aims:</b> To determine (i) relative effectiveness of mandatory and voluntary OHMSMs on employee health and safety and on associated economic outcomes; (ii) facilitators and</p>	<p>General – participants in nine studies that met the (lenient) inclusion criteria.</p>	<p>Of the nine studies that met 'moderate' (minimal) quality criteria four examined voluntary systems and five examined mandatory systems. None provided information of sufficient quality on facilitators and barriers, but they did provide information on the implementation and effectiveness of OHMSMs.</p> <p>Synthesis of best available evidence showed consistently positive effects in workplaces for voluntary and mandatory OHMSMs. The absolute number of studies producing these results was not</p>	<p>workplace general</p> <p>Status: <b>Directly relevant</b></p>



Study details	Population(s)	Main conclusions	Main Themes
<p>barriers to adoption and to effectiveness of OHMSMs; and (iii) evidence on the effectiveness of OHSMSs.</p>		<p>large and the quality of the studies was not high.</p> <p>The authors concluded that there was insufficient evidence to recommend for or against specific occupational health and safety management system interventions. This was generally a well-conducted review and the authors' conclusions reflect the limitations of the included studies.</p>	
<p>7. Murta, S. G., Sanderson, K., Oldenburg, B. (2007). "Process evaluation in occupational stress management programs: a systematic review." <i>Am J Health Promot</i> 21(4): 248-54</p> <p><b>Study Aims:</b> To conduct a systematic review of workplace stress management intervention studies that have incorporated process evaluation.</p>	<p>General - Participants in 84 studies of individual- or organizational-level stress management interventions at the workplace, for which an outcome evaluation was available.</p>	<p>Of 84 studies identified that met the study inclusion criteria, 52 (61.9%) reported findings on at least one of the key relevant process-relevant variables. Variables most frequently included were recruitment (30%), intervention dose received (22%), participants' attitudes toward intervention (19%), and program reach (13%). Fewer than half of the studies presented any findings linking process evaluation and outcome evaluation.</p> <p>The incomplete reporting of information relevant to process evaluation makes it difficult to identify reliable determinants of effective intervention implementation or outcomes.</p>	<p>workplace stress</p> <p>Status: <b>Directly relevant</b></p>
<p>8. Lamontagne, A. D., T. Keegel, et al. (2007). "A systematic review of the job-stress intervention evaluation literature, 1990-2005." <i>Int J Occup Environ Health</i> 13(3): 268-80</p> <p><b>Study Aims:</b> To assess systematic evaluations of job-stress interventions in terms of the degree of systems approach used. A high rating was defined as both organizationally and individually focused, versus moderate (organizational only), and low (individual only).</p>	<p>General - Participants across 90 systematic reviews of job-stress interventions.</p>	<p>Ninety reports of systematic evaluations of job-stress interventions were rated in terms of the degree of systems approach used. Studies using high-rated approaches represent a growing proportion of the job-stress intervention evaluation literature. Individual-focused, low-rated approaches are effective at the individual level, favorably affecting individual-level outcomes, but tend not to have favorable impacts at the organizational level. Organizationally-focused high- and moderate-rated approaches are beneficial at both individual and organizational levels. Further measures are needed to foster the dissemination and implementation of systems approaches to examining interventions for job stress.</p>	<p>workplace stress</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
<p>9. Ijmker, S., M. A. Huysmans, et al. (2007). "Should office workers spend fewer hours at their computer? A systematic review of the literature." <i>Occupational &amp; Environmental Medicine</i> 64(4): 211-22</p> <p><b>Study Aims:</b> To summarise the evidence for a relationship between the duration of work time spent using the computer and the incidence of hand-arm and neck-shoulder symptoms and disorders.</p>	<p>General – participants in 9 studies that met inclusion criteria.</p>	<p>Several databases were systematically searched up to 6 November 2005. Two reviewers independently selected articles that presented a risk estimate for the duration of computer use, included an outcome measure related to hand-arm or neck-shoulder symptoms or disorders, and had a longitudinal study design. The strength of the evidence was based on methodological quality and consistency of the results. Nine relevant articles were identified, of which six were rated as high quality. Moderate evidence was concluded for a positive association between the duration of mouse use and hand-arm symptoms. For this association, indications for a dose-response relationship were found. Risk estimates were in general stronger for the hand-arm region than for the neck-shoulder region, and stronger for mouse use than for total computer use and keyboard use. A pathophysiological model focusing on the overuse of muscles during computer use supports these differences. Future studies are needed to improve our understanding of safe levels of computer use by measuring the duration of computer use in a more objective way, differentiating between total computer use, mouse use and keyboard use, attaining sufficient exposure contrast, and collecting data on disability caused by symptoms.</p>	<p>workplace general workplace research needs</p> <p>Status: Indirectly relevant (sedentariness link)</p>
<p>10. Hamberg-van Reenen, H. H., G. A. M. Ariens, et al. (2007). "A systematic review of the relation between physical capacity and future low back and neck/shoulder pain." <i>Pain</i> 130(1-2): 93-107</p> <p><b>Study Aims:</b> To investigate if there is evidence that low muscle strength, low muscle endurance, or reduced spinal mobility</p>	<p>General - participants in 26 prospective cohort studies that met reviewers' inclusion criteria</p>	<p>The objective of this systematic review was to investigate if there is evidence that low muscle strength, low muscle endurance, or reduced spinal mobility are predictors of future low back or neck/shoulder pain. Abstracts found by electronic databases were checked on several inclusion criteria. Two reviewers separately evaluated the quality of the studies. Based on the quality and the consistency of the results of the included studies, three levels of</p>	<p>Workplace PHYSICAL ACTIVITY</p> <p>Status: Indirectly relevant</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>are predictors of future low back or neck/shoulder pain.</p>		<p>evidence were constructed. The results of 26 prospective cohort studies were summarized, of which 24 reported on the longitudinal relationship between physical capacity measures and the risk of low back pain and only three studies reported on the longitudinal relationship between physical capacity measures and the risk of neck/shoulder pain. We found strong evidence that there is no relationship between trunk muscle endurance and the risk of low back pain. Furthermore, due to inconsistent results in multiple studies, we found inconclusive evidence for a relationship between trunk muscle strength, or mobility of the lumbar spine and the risk of low back pain. Finally, due to a limited number of studies, we found inconclusive evidence for a relationship between physical capacity measures and the risk of neck/shoulder pain. Due to heterogeneity, the results of this systematic review have to be interpreted with caution.</p>	
<p>11. Gershon, R. R., P. W. Stone, et al. (2007). "Organizational climate and nurse health outcomes in the United States: a systematic review." <i>Ind Health</i> 45(5): 622-36</p> <p><b>Study Aims:</b> To examine evidence-based research on the association between organizational climate and occupational health outcomes among acute-care registered nurses</p>	<p>Acute-care registered nurses participating in 14 studies that met reviewers' inclusion criteria.</p>	<p>A systematic review of published studies was conducted. Studies assessing the association between organizational climate variables and three common health outcomes in nurses (blood/body fluid exposures, musculoskeletal disorders, and burnout) were reviewed. Fourteen studies met the inclusion criteria. Although most were cross-sectional in design and variability was noted across studies with respect to operational definitions and assessment measures, all noted significant associations between specific negative aspects of hospital organizational climate and adverse health impacts in registered nurses. While evidence for an association between organizational climate constructs and nurses' health was found, data were limited and some of the relationships were weak. Additional studies are warranted to clarify the nature</p>	<p>workplace general</p> <p>Status: Indirectly relevant</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>12. Egan, M., C. Bamba, et al. (2007). "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 61(11): 945-54</p> <p><b>Study Aims:</b> To conduct a systematic review of the health and psychosocial effects of increasing employee participation and control through workplace reorganisation, with reference to the "demand-control-support" model of workplace health.</p>	<p>General – participants in 18 studies that met reviewers' inclusion criteria.</p>	<p>of these complex relationships.</p> <p>This systematic review identified evidence suggesting that some organisational-level participation interventions may benefit employee health, as predicted by the demand-control-support model, but may not protect employees from generally poor working conditions. More investigation of the relative impacts of different interventions, implementation and the distribution of effects across the socioeconomic spectrum is required.</p>	<p>workplace stress workplace general workplace research needs</p> <p>Status: <b>Directly relevant</b></p>
<p>13. Bamba, C., M. Egan, et al. (2007). "The psychosocial and health effects of workplace reorganisation. 2. A systematic review of task restructuring interventions." J Epidemiol Community Health 61(12): 1028-37</p> <p><b>Study Aims:</b> To systematically review the health and psychosocial effects (with reference to the demand-control-support model) of changes to the work environment brought about by task structure work reorganisation, and to determine whether those effects differ for different socioeconomic groups.</p>	<p>General – participants in 19 studies that met reviewers' inclusion criteria.</p>	<p>This systematic review suggests that task-restructuring interventions that increase demand or decrease control adversely affect the health of employees, in line with observational research. It lends support to policy initiatives such as the recently enforced EU directive on participation at work, which aims to increase job control and autonomy.</p>	<p>workplace stress workplace general</p> <p>Status: <b>Directly relevant</b></p>
<p>14. Micucci, S., Thomas, H. (2007). "The effectiveness of multi-faceted health promotion interventions in the workplace to reduce chronic disease. Hamilton, Ca: Effective Public Health Practice Project." Retrieved 26 June 2008, from <a href="http://old.hamilton.ca/phcs/ephpp/Research/">http://old.hamilton.ca/phcs/ephpp/Research/</a></p>	<p>General – participants in Eleven multi-faceted studies meeting reviewer inclusion</p>	<p>The systematic review of randomized controlled trials (RCTs) was conducted to determine the effectiveness of multi-faceted studies in the workplace to reduce the chronic diseases cardiovascular disease, cancer, chronic obstructive lung disease, and diabetes, or their risk factors. Eleven multi-faceted studies and two sub-studies were found to be relevant. Two sub-</p>	<p>workplace PA workplace smoking workplace nutrition</p> <p>Status:</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>Full-Reviews/2007/InterventionsForWorkplaceReductionOfChronicDiseases.pdf.</p> <p><b>Study Aims:</b> To determine the effectiveness of multi-faceted studies in the workplace to reduce the chronic diseases cardiovascular disease, cancer, chronic obstructive lung disease, and diabetes, or their risk factors.</p>	<p>criteria.</p>	<p>studies were embedded in a larger study and were reported as separate studies for the reason that each added an additional component to the main intervention. One study compared two intervention groups to a control group and was reported separately where appropriate. Three studies looked at interventions combining nutrition and physical activity, two studies focused on nutrition and smoking cessation, and eight studies combined nutrition, physical activity and smoking cessation. Findings support the distribution of educational material and professional instruction to increase the likelihood of adopting healthy eating practices, increasing physical activity and decreasing smoking.</p>	<p><b>Directly relevant</b></p>
<p>15. Burton, W., A. Morrison, et al. (2006). "Systematic review of studies of productivity loss due to rheumatoid arthritis." <i>Occup Med (Lond)</i> 56(1): 18-27</p> <p><b>Study Aims:</b> To perform a systematic review of studies of the relationship between RA and reduced workplace productivity</p>	<p>General – participants diagnosed with rheumatoid arthritis (RA) in 38 studies that met reviewer inclusion criteria</p>	<p>A median of 66% (range 36-84%) of employed RA subjects experienced work loss due to RA in the previous 12 months, for a median duration of 39 days (range 7-84 days). The times from RA diagnosis until a 50% probability of being work disabled varied from 4.5 to 22 years. In inception cohort studies, the baseline variables consistently predictive of subsequent work disability were a physically demanding work type, more severe RA and older age. RA-related work-disability rates were similar in the USA and European countries. An apparent decrease in the prevalence of RA-related work disability since the 1970s may be related to a decrease in physically demanding work rather than to epidemiologic changes in RA. The majority of the literature addresses permanent disability and temporary work loss; none of the studies reviewed reported the effect of RA on presenteeism, i.e. work limitation from the employer perspective, and there are few published studies of the effectiveness of disease-modifying anti-rheumatic drugs in reducing work-related productivity loss.</p>	<p>workplace PHYSICAL ACTIVITY</p> <p>Status: Indirectly relevant</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>16. Albertsen, K., V. Borg, et al. (2006). "A systematic review of the impact of work environment on smoking cessation, relapse and amount smoked." Preventive Medicine 43(4): 291-305 workplace smoking</p> <p><b>Study Aims:</b> To conduct a systematic review exploring in which ways the workplace might contribute to changes in smoking status and smoking behaviour.</p>	<p>General – participants in 22 studies that met reviewers' inclusion criteria.</p>	<p>RESULTS: There was strong evidence for an effect of the work environment on the amount smoked, but insufficient or mixed evidence regarding cessation and relapse. Summarizing the results, high job demands were associated with higher amount smoked and with increased likelihood of cessation. Resources at work and social support were positively associated with cessation and negatively associated with relapse and the amount smoked. CONCLUSIONS: The results supported the overall hypothesis that the work environment influences aspects of smoking behaviour. Recommendations are made for more intervention studies where changes in work environment are carried out in combination with health promotion interventions.</p>	<p>workplace smoking</p> <p>Status: <b>Directly relevant</b></p>
<p>17. Pelletier, K. R. (2005). "A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: update VI 2000-2004." J Occup Environ Med 47(10): 1051-8</p> <p><b>Study Aims:</b> One of a series of critical reviews of the clinical effectiveness and cost-effectiveness studies of comprehensive, multifactorial health promotion and disease management programs conducted in worksites.</p>	<p>Studies conducted among worksite populations in USA</p>	<p>This critical review focuses on the 12 new studies focused on the clinical and cost outcomes research focused on worksites and published between 2000 and 2004. Although these new studies indicate further evidence of positive clinical and cost outcomes, the quantity and quality of such research continue to decline. When corporations and health plans are demanding more evidence-based outcomes, this decline in rigorous research marks a serious challenge to the field of health promotion and disease management.</p>	<p>workplace research needs workplace general workplace economics</p> <p>Status: <b>Directly relevant</b></p>
<p>18. Hey, K. and R. Perera (2005). "Competitions and incentives for smoking cessation." Cochrane Database of Systematic Reviews(2): CD004307</p> <p><b>Study Aims:</b> To determine whether competitions and incentives lead to higher</p>	<p>General – participants in 15 studies meeting reviewer inclusion criteria.</p>	<p>Fifteen studies met inclusion criteria. None of the studies demonstrated significantly higher quit rates for the incentives group than for the control group beyond the six-month assessment. There was no clear evidence that participants who committed their own money to the programme did better than those who did not, or that different types of incentives were</p>	<p>workplace smoking</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
<p>long-term quit rates; to examine the relationship between incentives and participation rates.</p>		<p>more or less effective. There is some evidence that although cessation rates have not been shown to differ significantly, recruitment rates can be improved by rewarding participation, which may be expected to deliver higher absolute numbers of successful quitters. Cost effectiveness analysis is not appropriate to this review, since the efficacy of the intervention has not been demonstrated. <b>AUTHORS' CONCLUSIONS:</b> Incentives and competitions do not appear to enhance long-term cessation rates, with early success tending to dissipate when the rewards are no longer offered. Rewarding participation and compliance in contests and cessation programmes may have more potential to deliver higher absolute numbers of quitters.</p>	
<p>19. Chodosh, J., S. C. Morton, et al. (2005). "Meta-analysis: chronic disease self-management programs for older adults." <i>Ann Intern Med</i> 143(6): 427-38</p> <p><b>Study Aims:</b> To assess the effectiveness and essential components of self-management programs for hypertension, osteoarthritis, and diabetes mellitus.</p>	<p>General –chronic disease self management patients participating in 53 studies (26 diabetes studies, 14 osteoarthritis studies, and 13 hypertension studies).</p>	<p>53 studies contributed data to the random-effects meta-analysis (26 diabetes studies, 14 osteoarthritis studies, and 13 hypertension studies). Self-management interventions led to a statistically and clinically significant pooled effect size of -0.36 (95% CI, -0.52 to -0.21) for haemoglobin A1c, equivalent to a reduction in haemoglobin A1c level of about 0.81%. Self-management interventions decreased systolic blood pressure by 5 mm Hg (effect size, -0.39 [CI, -0.51 to -0.28]) and decreased diastolic blood pressure by 4.3 mm Hg (effect size, -0.51 [CI, -0.73 to -0.30]). Pooled effects of self-management interventions were statistically significant but clinically trivial for pain and function outcomes for osteoarthritis. No consistent results supported any of the 5 characteristics examined.</p> <p><b>CONCLUSIONS:</b> Self-management programs for diabetes mellitus and hypertension probably produce clinically important benefits. The elements of the programs most responsible for benefits cannot be determined from existing data, and this inhibits</p>	<p>Workplace research needs</p> <p>Status: Indirectly relevant (generic and not worksite specific)</p>

Study details	Population(s)	Main conclusions	Main Themes
		specification of optimally effective or cost-effective programs. Osteoarthritis self-management programs do not appear to have clinically beneficial effects on pain or function.	
<p>20. Engbers, L. H., M. N. M. van Poppel, et al. (2005). "Worksite health promotion programs with environmental changes: a systematic review." American Journal of Preventive Medicine 29(1): 61-70</p> <p><b>Study Aims:</b> To systematically assess the effectiveness of Workplace Health Promotion Programs with environmental modifications, on physical activity, dietary intake, and health risk indicators.</p>	<p>General – participants in 13 studies meeting reviewer inclusion criteria.</p>	<p>Thirteen relevant, mostly multicenter, trials were included. All studies aimed to stimulate healthy dietary intake, and three trials focused on physical activity. Follow-up measurements of most studies took place after an average 1-year period. Methodologic quality of most included trials was rated as poor. However, strong evidence was found for an effect on dietary intake, inconclusive evidence for an effect on physical activity, and no evidence for an effect on health risk indicators. CONCLUSIONS: It is difficult to draw general conclusions based on the small number of studies included in this review. However, evidence exists that WHPPs that include environmental modifications can influence dietary intake. More controlled studies of high methodologic quality need to be initiated that investigate the effects of environmental interventions on dietary intake and especially on physical activity in an occupational setting.</p>	<p>workplace nutrition workplace PA Report-priority</p> <p>Status: Indirectly relevant</p>
<p>21. De Croon, E. M., J. K. Sluiter, et al. (2005). "The effect of office concepts on worker health and performance: a systematic review of the literature." Ergonomics 48(2): 119-34</p> <p><b>Study Aims:</b> To examine how three office dimensions affect the office worker's job demands, job resources, short- and long-term reactions. The three dimensions were: (1) the office location (e.g. telework office versus conventional office); (2) the office lay-out</p>	<p>General – participants in 49 studies meeting reviewer inclusion criteria.</p>	<p>Using search terms related to the office concept (dimensions), a systematic literature search starting from 1972 was conducted in seven databases. Subsequently, based on the quality of the studies and the consistency of the findings, the level of evidence for the observed findings was assessed. Out of 1091 hits 49 relevant studies were identified. Results provide strong evidence that working in open workplaces reduces privacy and job satisfaction. Limited evidence is available that working in open workplaces intensifies cognitive workload and worsens interpersonal relations; close distance between</p>	<p>workplace general workplace stress</p> <p>Status: Indirectly relevant</p>



Study details	Population(s)	Main conclusions	Main Themes
<p>(e.g. open lay-out versus cellular office); and (3) the office use (e.g. fixed versus shared workplaces)</p>		<p>workstations intensifies cognitive workload and reduces privacy; and desk-sharing improves communication. Due to a lack of studies no evidence was obtained for an effect of the three office dimensions on long-term reactions. The results suggest that ergonomists involved in office innovation could play a meaningful role in safeguarding the worker's job demands, job resources and well-being. Attention should be paid, in particular, to effects of workplace openness by providing acoustic and visual protection.</p>	
<p>22. Matson-Koffman, D. M., J. N. Brownstein, et al. (2005). "A site-specific literature review of policy and environmental interventions that promote physical activity and nutrition for cardiovascular health: what works?" Am J Health Promot 19(3): 167-93</p> <p><b>Study Aims:</b> to determine whether policy and environmental interventions can increase people's physical activity or improve their nutrition.</p>	<p>Participants in 129 intervention studies across community, health care facility, school, and worksite settings.</p>	<p>The results of this review suggest that policy and environmental strategies may promote physical activity and good nutrition. Based on the experimental and quasi-experimental studies in this review, the following interventions provide the strongest evidence for influencing these behaviors: prompts to increase stair use (N = 5); access to places and opportunities for physical activity (N = 6); school-based physical education (PE) with better-trained PE teachers, and increased length of time students are physically active (N = 7); comprehensive work-site approaches, including education, employee and peer support for physical activity, incentives, and access to exercise facilities (N = 5); the availability of nutritious foods (N = 33), point-of-purchase strategies (N = 29); and systematic officer reminders and training of health care providers to provide nutritional counseling (N = 4). Further research is needed to determine the long-term effectiveness of different policy and environmental interventions with various populations and to identify the steps necessary to successfully implement these types of interventions.</p>	<p>workplace PHYSICAL ACTIVITY workplace nutrition</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
<p>23. Moher, M., K. Hey, et al. (2005). "Workplace interventions for smoking cessation.[update of Cochrane Database Syst Rev. 2003;(2):CD003440; PMID: 12804467]." Cochrane Database of Systematic Reviews(2): CD003440</p> <p><b>Study Aims:</b> To categorize workplace interventions for smoking cessation tested in controlled studies and to determine the extent to which they help workers to stop smoking or to reduce tobacco consumption.</p>	<p>General – participants in (Overall) 60 studies meeting reviewer inclusion criteria.</p>	<p>This review found: 1. Strong evidence that interventions directed towards individual smokers increase the likelihood of quitting smoking. These include advice from a health professional, individual and group counselling and pharmacological treatment to overcome nicotine addiction. Self-help interventions are less effective. All these interventions are effective whether offered in the workplace or elsewhere. Although people taking up these interventions are more likely to stop, the absolute numbers who quit are low. 2. Limited evidence that participation in programmes can be increased by competitions and incentives organized by the employer. 3. Consistent evidence that workplace tobacco policies and bans can decrease cigarette consumption during the working day by smokers and exposure of non-smoking employees to environmental tobacco smoke at work, but conflicting evidence about whether they decrease prevalence of smoking or overall consumption of tobacco by smokers. 4. A lack of evidence that comprehensive approaches reduce the prevalence of smoking, despite the strong theoretical rationale for their use. 5. A lack of evidence about the cost-effectiveness of workplace programmes.</p>	<p>workplace smoking</p> <p>Status: <b>Directly relevant</b></p>
<p>24. Katz, D. L., M. O'Connell, et al. (2005) Public health strategies for preventing and controlling overweight and obesity in school and worksite settings: a report on recommendations of the Task Force on Community Preventive Services MMWR Recomm Rep 54 1-12</p> <p><b>Study aims:</b> To identify effective strategies for weight control that can be implemented in school and worksite settings – undertaken</p>	<p>General</p>	<p>Systematic reviews of the evidence on nutrition, physical activity, combinations of these interventions, and other behavioral interventions (e.g., cognitive techniques such as self-awareness and cue recognition). Task Force recommendations are based on evidence of effectiveness, which is defined in this report as achieving a mean weight loss of &gt; or =4 pounds, measured &gt; or =6 months after initiation of the intervention program.</p> <p>The Task Force recommends multicomponent</p>	<p>Workplace nutrition PA BMI</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
<p>under auspices of the (USA) Task Force on Community Preventive Services.</p>		<p>interventions that include nutrition and physical activity (including strategies such as providing nutrition education or dietary prescription, physical activity prescription or group activity, and behavioral skills development and training) to control overweight and obesity among adults in worksite settings.</p>	
<p>25. van Poppel, M. N. M., W. E. Hoofman, et al. (2004). "An update of a systematic review of controlled clinical trials on the primary prevention of back pain at the workplace." <i>Occupational Medicine (Oxford)</i> 54(5): 345-52</p> <p><b>Study Aims:</b> To update the evidence on the effectiveness of lumbar supports, education and exercise in the primary prevention of low back pain at the workplace.</p>	<p>General – participants in a total of 16 studies meeting reviewer inclusion criteria.</p>	<p>Five new papers were identified for the update. These trials were added to the previously available trials (n = 11). The methodological quality of most studies was low. Since three of four RCTs on lumbar supports reported no effect, there is no evidence for the effectiveness of lumbar supports. No evidence for education could be found either, since all six RCTs showed negative results. The four RCTs on exercise consistently reported a positive effect, indicating limited evidence for the effectiveness of exercise. CONCLUSION: There is no evidence for the effectiveness of lumbar supports or education in the primary prevention of low back pain at the workplace. There is limited evidence for the efficacy of exercise, and the effect that can be obtained is moderate. There is still a need for methodologically sound studies and studies on the cost-effectiveness of exercise. Also the possible effect of lumbar supports in the treatment of back pain needs further investigation.</p>	<p>workplace PHYSICAL ACTIVITY</p> <p>Status: Indirectly relevant</p> <p>Other effects of physical activity</p>
<p>26. Tveito, T. H., M. Hysing, et al. (2004). "Low back pain interventions at the workplace: a systematic literature review." <i>Occup Med (Lond)</i> 54(1): 3-13</p> <p><b>Study Aims:</b> To assess the effect of controlled workplace interventions on low back pain (LBP) through a review of controlled studies.</p>	<p>General – participants in 28 interventions (31 studies) meeting the inclusion criteria.</p>	<p>Thirty-one publications from 28 interventions were found to comply with the inclusion criteria. Exercise interventions to prevent LBP among employees and interventions to treat employees with LBP have documented an effect on sick leave, costs and new episodes of LBP. Multidisciplinary interventions have documented an effect on the level of pain. CONCLUSIONS: The results show that there is good reason to be careful when considering interventions aiming to prevent LBP among employees. Of all the</p>	<p>workplace PHYSICAL ACTIVITY</p> <p>Status: Indirectly relevant (physical activity – other effects)</p>

Study details	Population(s)	Main conclusions	Main Themes
		workplace interventions only exercise and the comprehensive multidisciplinary and treatment interventions have a documented effect on LBP. There is a need for studies employing good methodology.	
<p>27. Avenell, A., J. Broom, et al. (2004). "Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement." Health Technol Assess 8(21): iii-iv, 1-182 workplace nutrition</p> <p><b>Study Aims:</b> To undertake a systematic review of the long-term effects of obesity treatments on body weight, risk factors for disease, and disease.</p>	General – study subsumed 3 systematic reviews.	This is systematic review of the long-term effects of obesity treatments on body weight, risk factors for disease, and disease. A Markov model was also adopted to examine the cost-effectiveness of a low-fat diet and exercise intervention in adults with obesity and impaired glucose tolerance. RESULTS: The addition of the drugs orlistat or sibutramine was associated with weight loss and generally improved risk factors, apart from diastolic blood pressure for sibutramine. Metformin was associated with decreased mortality after 10 years in obese people with type 2 diabetes. Low-fat diets were associated with continuing weight loss for 3 years and improvements in risk factors, as well as prevention of type 2 diabetes and improved control of hypertension. Insufficient evidence was available to demonstrate the benefits of low calorie or very low calorie diets. The addition of an exercise or behaviour programme to diet was associated with improved weight loss and risk factors for at least 1 year. Studies combining low-fat diets, exercise and behaviour therapy suggested improved hypertension and cardiovascular disease. Family therapy was associated with improved weight loss for 2 years compared to individual therapy. There was insufficient evidence to conclude that individual therapy was more beneficial than group therapy. Weight lost more quickly (within 1 year), from the epidemiology review, may be more beneficial with respect to the risk of mortality. The effects of intentional weight loss need further investigation. Weight loss from surgical and non-surgical	<p>workplace PA workplace-BMI workplace research needs</p> <p>Status: Indirectly relevant</p> <p>(not worksite specific but important given USPSTF recommendations in 2005)</p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>interventions for people suffering from obesity was associated with decreased risk of development of diabetes, and a reduction in low-density lipoprotein cholesterol, total cholesterol and blood pressure, in the long term. Targeting high-risk individuals with drugs or surgery was likely to result in a cost per additional life-year or quality-adjusted life-year (QALY) of no more than 13,000 British pounds. There was also suggestive evidence of cost saving from treatment of people with type 2 diabetes with metformin. Targeting surgery on people with severe obesity and impaired glucose tolerance was likely to be more cost-effective at 2329 British pounds per additional life-year. Economic modelling over 6 years for diet and exercise for people with impaired glucose tolerance was associated with a high initial cost per additional QALY, but by the sixth year the cost per QALY was 13,389 British pounds. Results did not include cost savings from diseases other than diabetes, and therefore may be conservative.</p> <p>CONCLUSIONS: The drugs orlistat and sibutramine appear beneficial for the treatment of adults with obesity, and metformin for obese patients with type 2 diabetes. Exercise and/or behaviour therapy appear to improve weight loss when added to diet. Low-fat diets with exercise, or with exercise and behaviour therapy are associated with the prevention of type 2 diabetes and hypertension. Long-term weight loss in epidemiological studies was associated with reduced risk of type 2 diabetes, and may be beneficial for cardiovascular disease. Low-fat diets and exercise interventions in individuals at risk of obesity-related illness are of comparable cost to drug treatments. Long-term pragmatic RCTs of obesity treatments in populations with obesity-related illness or at high risk</p>	

Study details	Population(s)	Main conclusions	Main Themes
		of developing such illness are needed (to include an evaluation of risk factors, morbidity, quality of life and economic evaluations). Drug trials that include dietary advice, plus exercise and/or behaviour therapy are also needed. Research exploring effective types of exercise, diet or behaviour and also interventions to prevent obesity in adults is required.	
<p>28. Mimura, C. and P. Griffiths (2003). "The effectiveness of current approaches to workplace stress management in the nursing profession: an evidence based literature review." <i>Occup Environ Med</i> 60(1): 10-5 workplace stress</p> <p><b>Study Aims:</b> To conduct a systematic review of the effectiveness of current approaches to workplace stress management for nurses.</p>	Nurses – participating in 13 studies that met reviewer inclusion criteria.	The effectiveness of current approaches to workplace stress management for nurses was assessed through a systematic review. Seven randomised controlled trials and three prospective cohort studies assessing the effectiveness of a stress management programmes were identified and reviewed. The quality of research identified was weak. There is more evidence for the effectiveness of programmes based on providing personal support than environmental management to reduce stressors. However, since the number and quality of studies is low, the question as to which, if any, approach is more effective cannot be answered definitively. Further research is required before clear recommendations for the use of particular interventions for nursing work related stress can be made.	<p>Workplace stress</p> <p>Status: <b>Directly relevant</b> But limited to nursing profession</p>
<p>29. Riemsma, R. P., J. Pattenden, et al. (2002). "A systematic review of the effectiveness of interventions based on a stages-of-change approach to promote individual behaviour change." <i>Health Technol Assess</i> 6(24): 1-231</p> <p><b>Study Aims:</b> To systematically assess the effectiveness of interventions using a stage-based approach in bringing about positive changes in health-related behaviour.</p>	General: Participants in 37 RCTs that met inclusion criteria.	<p>Only studies that reported health-related behaviour change such as smoking cessation, reduced alcohol consumption or dietary intake and stage movemphasizent were included. The target population included individuals whose behaviour could be modified, primarily in order to prevent the onset, or progression, of disease. There was no limitation of study by country of origin, language or date.</p> <p>Thirty-seven RCTs were included in the review. Three studies evaluated interventions aimed at prevention (two for alcohol consumption and one for cigarette</p>	<p>Workplace general Workplace research needs</p> <p>Status: Indirectly relevant</p> <p>(not worksite specific but important given</p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>smoking). In 13 trials the interventions were aimed at smoking cessation, seven studies evaluated interventions aimed at the promotion of physical activity, and five studies evaluated interventions aimed at dietary change. Six trials evaluated interventions aimed at multiple lifestyle changes. Two studies evaluated interventions aimed at the promotion of screening mammography, and one study evaluated an intervention aimed at the promotion of treatment adherence. Four of these studies also included an economic evaluation.</p> <p>Evidence of effectiveness                      In one of the 13 trials aimed at smoking cessation the results could not be compared to a non-stage-based intervention, because only stage-based interventions were included. In four of the remaining 12 smoking cessation trials, significant differences favouring the intervention group for scores on quit rates were found; in three of these the comparator was a usual-care control group and in one a non-stage-based intervention. One study showed mixed outcomes. In the remaining seven smoking cessation trials no significant differences between groups in behavioural change outcomes were found. One of the seven trials aimed at the promotion of physical activity did not report any data on behaviour change. Three trials found no significant differences between groups in behavioural change outcomes. Two trials showed mixed effects, and one trial mainly showed significant effects in favour of the stage-based intervention. Two of the five trials aimed at dietary change reported significant effects in favour of the stage-based intervention; in one trial this was in comparison to a non-stage-based intervention and in the other to a</p>	<p>focus of some authors &amp; reviewers on stage of change approaches)</p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>usual-care control group. Two trials showed mixed effects, and in one trial no significant differences between groups in behavioural change outcomes were found. Three of the six studies aimed at multiple lifestyle changes showed no differences between groups for any outcomes included. Two studies showed mixed effects, and one study showed positive effects for all outcomes included: smoking cessation, fat intake and physical activity. One of the two trials aimed at the promotion of screening mammography found no significant differences between groups for nearly all outcomes. The other trial showed a significant difference in favour of the stage-based intervention. The trial aimed at the promotion of treatment adherence showed significant results in favour of the stage-based intervention. Two out of three trials aimed at prevention showed no significant differences between groups for any measure of behaviour change. The other trial showed mixed outcomes. Studies with low-income participants tended not to report effects favouring the stage-based intervention. Other study characteristics, such as number of respondents, age and sex of respondents, year of publication, setting and verification of outcome measures, seemphasized to have little relationship with the effectiveness of the stage-based intervention.</p> <p>Conclusions Overall there appears to be little evidence to suggest that stage-based interventions are more effective compared to non-stage-based interventions. Similarly there is little evidence that stage-based interventions are more effective when compared to no intervention or usual-care. Out of 37 trials, 17 showed no significant differences between groups, eight trials</p>	



Study details	Population(s)	Main conclusions	Main Themes
		<p>showed mixed effects, and ten trials showed effects in favour of the stage-based intervention(s). One trial presented no data on behavioural outcomes, and another included stage-based interventions only. Twenty trials compared a stage-based intervention with a non-stage-based intervention, ten trials reported no significant differences between groups, five reported mixed effects and five reported significant effects in favour of the stage-based intervention.</p> <p>There does not seem to be any relationship between the methodological quality of the study, the targeted behaviour or quality of the implementation (both in terms of exposure and in terms of full use of the model) and effectiveness of the stage-based intervention.</p> <p>The methodological quality of studies was mixed, and few studies mentioned validation of the stages-of-change instrument. In addition, there was little consistency in the types of interventions employed once participants were classified into stages and little knowledge about the types of interventions needed once people were classified. It was unclear in a number of trials whether the intervention was properly stage-based.</p> <p>Given the limited evidence for the effectiveness of interventions tailored to the stages-of-change approach practitioners and policy makers need to recognise that this approach has a status which appears to be unwarranted when it is evaluated in a systematic way.</p>	

Study details	Population(s)	Main conclusions	Main Themes
		<p>Recommendations for research</p> <p>There is a need for well-designed and appropriately implemented RCTs that are characterised by tailored interventions derived from accurate stage measurement, and which involve frequent reassessment of readiness to change in order to permit evolving, stage-specific interventions.</p>	
<p>30. Norris, S. L., P. J. Nichols, et al. (2002). "Increasing diabetes self-management education in community settings. A systematic review." <i>Am J Prev Med</i> 22(4 Suppl): 39-66</p> <p><b>Study Aims:</b> To conduct a systematic review of the effectiveness and economic efficiency of self-management education interventions for people with diabetes.</p>	<p>General - various sites/ settings including worksites.</p>	<p>This report presents the results of a systematic review of the effectiveness and economic efficiency of self-management education interventions for people with diabetes and forms the basis for recommendations by the Task Force on Community Preventive Services. Data on glycemic control provide sufficient evidence that self-management education is effective in community gathering places for adults with type 2 diabetes and in the home for adolescents with type 1 diabetes. Evidence is insufficient to assess the effectiveness of self-management education interventions at the worksite or in summer camps for either type 1 or type 2 diabetes or in the home for type 2 diabetes. Evidence is also insufficient to assess the effectiveness of educating coworkers and school personnel about diabetes.</p>	<p>workplace nutrition workplace PA workplace-BMI</p> <p>Status: <b>Directly relevant</b> (Diabetes)</p>
<p>31. Pelletier, K. R. (2001). "A review and analysis of the clinical- and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: 1998-2000 update." <i>American Journal of Health Promotion</i> 16(2): 107-16</p> <p><b>Study Aims:</b> One of a series of critical reviews of the clinical effectiveness and cost-effectiveness studies of comprehensive, multifactorial health promotion and disease management programs conducted in worksites (see above)</p>	<p>Studies conducted among worksite populations in USA</p> <p>(participants in 15 studies)</p>	<p>Findings are summarized in a table format that extracts and describes each study by the following: (1) study author(s); (2) corporate site; (3) purpose of the evaluation; (4) employee population; (5) percentage of program participants; (6) number of employees included in the evaluation; (7) brief description of the intervention; (8) evaluation design; (9) evaluation period; (10) outcomes; (11) research rating; and (12) findings. Based on these 15 studies, a methodological critique was conducted with brief reference to appropriate prior studies. Conclusions regarding study quality and new trends over the time</p>	<p>Workplace general</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>period of 1998 to 2000 are discussed. MAJOR CONCLUSIONS: Results from randomized clinical trials and quasi-experimental designs suggest that providing individualized risk reduction for high risk employees within the context of comprehensive programming is the critical element of worksite interventions. Despite the many limitations of the current methodologies of the 15 new studies, the vast majority of the research to date indicates positive clinical and cost outcomes.</p>	
<p>32. Leboeuf-Yde, C. (2000). "Body weight and low back pain. A systematic literature review of 56 journal articles reporting on 65 epidemiologic studies." Spine 25(2): 226-37 workplace-BMI</p> <p><b>Study Aims:</b> To establish if body weight is truly associated with low back pain (LBP) and whether the link may be causal.</p>	<p>General population participating in 65 studies meeting reviewers' inclusion criteria.</p>	<p>Thirty-two percent of all the studies report a statistically significant positive weak association between body weight and LBP. Studies that fulfilled the post hoc criteria never report a rate ratio above 2, but there is possibly a positive biological gradient. These studies had no information on temporality or reversibility and there was no obvious consistency of findings. CONCLUSIONS: Due to lack of evidence, body weight should be considered a possible weak risk indicator, but there is insufficient data to assess if it is a true cause of LBP.</p>	<p>Workplace BMI</p> <p>Status: Indirectly relevant (link of bmi to other conditions)</p>
<p>33. Hulshof, C. T., J. H. Verbeek, et al. (1999). "Evaluation research in occupational health services: general principles and a systematic review of empirical studies." Occup Environ Med 56(6): 361-77 workplace general workplace research needs</p> <p><b>Study Aims:</b> To study the nature and extent of evaluation research in occupational health services (OHSs)</p>	<p>General – participants in 52 studies that met reviewers' (lenient) inclusion criteria.</p>	<p>On the basis of a conceptual model of OHS evaluation, empirical studies are categorised into aspects of input, process, output, outcome, and OHS core activities. RESULTS: Many methods to evaluate OHSs or OHS activities exist, depending on the objective and object of evaluation. The amount of empirical studies on evaluation of OHSs or OHS activities that met the non-restrictive inclusion criteria, was remarkably limited. Most of the 52 studies were more descriptive than evaluative. The methodological quality of most studies was not high. A differentiated picture of the evidence of effectiveness of OHSs arises. Occupational health consultations and occupational rehabilitation are hardly studied despite much time spent on the consultation by occupational physicians in most</p>	<p>Workplace general Workplace research needs</p> <p>Status: Indirectly relevant</p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>countries. The lack of effectiveness and efficiency of the pre-employment examination should lead to its abandonment as a means of selection of personnel by OHSs. Periodic health monitoring or surveillance, and education on occupational health hazards can be carried out with reasonable process quality. Identification and evaluation of occupational health hazards by a workplace survey can be done with a high output quality, which, however, does not guarantee a favourable outcome. CONCLUSIONS: Although rigorous study designs are not always applicable or feasible in daily practice, much more effort should be directed at the scientific evaluation of OHSs and OHS instruments. To develop evidence-based occupational health care the quality of evaluation studies should be improved. In particular, process and outcome of consultation and rehabilitation activities of occupational physicians need to be studied more.</p>	
<p>34. Harden, A., G. Peersman, et al. (1999). "A systematic review of the effectiveness of health promotion interventions in the workplace." <i>Occup Med (Lond)</i> 49(8): 540-8 workplace general</p> <p><b>Study Aims:</b> To identify and critically review evaluations of the effectiveness of health promotion programmes in the workplace.</p>	<p>General – participants in 110 studies</p>	<p>The aim of this study was to identify and critically review evaluations of the effectiveness of health promotion programmes in the workplace. In line with guidelines for 'good practice' within the literature on workplace health promotion, this study aimed to assess the extent to which evaluated interventions considered employees' expressed needs or involved employee-employer partnerships. Overall, 110 outcome evaluations were located. Only a quarter of these reported that interventions were implemented in response to the explicit needs and/or views of the employees and very few involved partnerships. Most of the programmes targeted individual behaviour and supportive organizational change was limited. The majority of the outcome evaluations were not sufficiently rigorous to make a strong case for the</p>	<p>Workplace general</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>effectiveness of workplace health promotion. However, some pointers to success were identified. It was concluded that there seems to be a wide disparity between what counts as 'good practice' within workplace health promotion and what is reported in the evaluation of effectiveness literature. This is not to say that 'good practice' does not exist, but that either such programmes are not rigorously evaluated for their effectiveness and/or that many of the evaluation findings remain outside the public domain.</p>	
<p>35. Pelletier, K. R. (1997) Clinical and cost outcomes of multifactorial, cardiovascular risk management interventions in worksites: a comprehensive review and analysis. <i>Journal of Occupational &amp; Environmental Medicine</i> 39 1154-69</p> <p><b>Study Aims:</b> One of a series of critical reviews of the clinical effectiveness and cost-effectiveness studies of comprehensive, multifactorial health promotion and disease management programs conducted in worksites (see above).</p>	<p>General – participants in 12 studies that met inclusion criteria.</p>	<p>Critical review of the clinical and cost outcome evaluation studies of multifactorial, comprehensive, cardiovascular risk management programs in worksites. A comprehensive international literature search Of 12 research studies, only 8 utilized the worksite as both the unit of assignment and as the unit of analysis. None of the studies analyzed adequately for cost effectiveness. Given this limitation, this review briefly considers the relevant worksite research that has demonstrated cost outcomes. Worksite-based, multifactorial cardiovascular intervention programs reviewed for this article varied widely in the comprehensiveness, intensity, and duration of both the interventions and evaluations. Results from randomized trials suggest that providing opportunities for individualized, cardiovascular risk reduction counseling for high-risk employees within the context of comprehensive programming may be the critical component of an effective worksite intervention. Despite the many limitations of the current methodologies of the 12 studies, the majority of the research to date indicates the following: (1) favorable clinical and cost outcomes; (2) that more recent and more rigorously designed research tends to support rather than refute</p>	<p>Workplace general Workplace research needs</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>earlier and less rigorously designed studies; and (3) that rather than interpreting the methodological flaws and diversity as inherently negative, one may consider it as indicative of a robust phenomena evident in many types of worksites, with diverse employees, differing interventions, and varying degrees of methodological sophistication. Results of these studies reviewed provide both cautious optimism about the effectiveness of these worksite programs and insights regarding the essential components and characteristics of successful programs.</p>	

## APPENDIX 2: TABULATION OF SELECTED META-ANALYTIC REVIEWS

Study details	Population(s)	Main conclusions	Main Themes
<p>1. Richardson, K. M. and H. R. Rothstein (2008) Effects of occupational stress management intervention programs: a meta-analysis J Occup Health Psychol 13 69-93</p> <p><b>Study Aims:</b> A meta-analysis was conducted to determine the effectiveness of stress management interventions in occupational settings.</p>	<p>General – participants in 36 studies meeting the inclusion criteria, representing 55 interventions. Total sample size was 2,847. Of the participants, 59% were female, mean age was 35.4, and average length of intervention was 7.4 weeks.</p>	<p>The overall weighted effect size (Cohen's d) for all studies was 0.526 (95% confidence interval = 0.364, 0.687), a significant medium to large effect.</p> <p>Interventions were coded as cognitive-behavioral, relaxation, organizational, multimodal, or alternative. Analyses based on these subgroup suggested that intervention type played a moderating role. Effects were based mainly on psychological outcome variables, as opposed to physiological or organizational measures.</p>	<p>workplace stress</p> <p>Cognitive-behavioral programs consistently produced larger effects than other types of interventions, but if additional treatment components were added the effect was reduced. Within the sample of studies, relaxation interventions were those most frequently used.</p> <p>Status: <b>Directly relevant</b></p>
<p>2. Parks, K. M. and L. A. Steelman (2008) Organizational wellness programs: a meta-analysis J Occup Health Psychol 13 58-68</p> <p><b>Study Aims:</b> The authors conducted a meta-analysis on studies that examined the effects of participation in an organizational wellness program (fitness or comprehensive) on absenteeism and job satisfaction.</p>	<p>Organizational wellness programs are on or off-site services sponsored by organizations which attempt to promote good health or to identify and correct potential health related problems</p>	<p>The results revealed that participation in an organizational wellness program was associated with decreased absenteeism and increased job satisfaction. The type of wellness program (fitness only or comprehensive) and the methodological rigor of the primary studies were examined as moderators; however, no moderating effects were found.</p>	<p>workplace PA workplace general</p> <p>These results provide some empirical support for the effectiveness of organizational wellness programs.</p> <p>Status: Indirectly relevant</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>3. Williams, N. H., M. Hendry, et al. (2007) Effectiveness of exercise-referral schemes to promote physical activity in adults: systematic review British Journal of General Practice 57 979-</p> <p><b>Study Aims:</b> To assess whether exercise-referral schemes are effective in improving exercise participation in sedentary adults.</p>	<p>General – participants in 18 studies meeting the inclusion criteria These comprised six RCTs, one non-randomised controlled study, four observational studies, six process evaluations and one qualitative study. In addition, two of the RCTs and two of the process evaluations incorporated a qualitative component.</p>	<p>Results from five RCTs were combined in a meta-analysis. There was a statistically significant increase in the numbers of participants doing moderate exercise with a combined relative risk of 1.20 (95% confidence intervals = 1.06 to 1.35). This means that 17 sedentary adults would need to be referred for one to become moderately active. This small effect may be at least partly due to poor rates of uptake and adherence to the exercise schemes.</p>	<p>workplace PA</p> <p>Exercise-referral schemes have a small effect on increasing physical activity in sedentary people. The key challenge, if future exercise-referral schemes are to be commissioned by the NHS, is to increase uptake and improve adherence by addressing the barriers described in these studies.</p> <p>Status: Indirectly relevant (worksite relevant but not worksite specific)</p>
<p>4. Kim, J. H. (2007) [A meta-analysis of effects of job stress management interventions (SMIs)] Taehan Kanho Hakhoe Chi 37 529-39</p> <p><b>Study Aims:</b> This quantitative meta analysis sought to determine the effectiveness of Stress Management Interventions.</p>	<p>General – participants in 46 experimental studies meeting inclusion criteria. Six intervention types were distinguished: cognitive-behavioral intervention(CBT), relaxation techniques(RT), exercise(EX), multimodal programs 1 and 2(MT1, 2), and organization focused interventions (OTs).</p>	<p>Effect sizes were calculated for the 4 outcome categories across intervention types: psycho-social outcome, behavioral-personal resources, physiologic, and organizational outcome. The interventions involving CBT and RT appeared to be the preferred means of reducing worker's psycho-social and organizational outcomes. With regard to physiologic outcomes, RT appeared to be most effective. CBT appeared to be most effective in reducing psycho-social outcomes. The effects of OT were non-significant, except for the psycho-social outcomes.</p>	<p>workplace stress</p> <p>SMIs are effective. Interventions involving RT and CBT are more effective than other types.</p> <p>Individual worker-focused interventions(ITs) were more effective than OTs. A small but significant overall effect was found. A moderate effect was found for RT, and small effects were found for other ITs. The effect size for OTs was the smallest.</p> <p>Status: <b>Directly relevant</b></p>



Study details	Population(s)	Main conclusions	Main Themes
<p>5. Humphrey, S. E., J. D. Nahrgang, et al. (2007) Integrating motivational, social, and contextual work design features: a meta-analytic summary and theoretical extension of the work design literature J Appl Psychol 92 1332-56</p> <p><b>Study Aims:</b>                      Authors developed and meta-analytically examined hypotheses designed to test and extend work design theory by integrating motivational, social, and work context characteristics.</p>	<p>General - 219,625 participants in 259 studies that met inclusion criteria.</p>	<p>14 work characteristics explained, on average, 43% of the variance in the 19 worker attitudes and behaviors examined.</p> <p><b>Motivational characteristics</b> explained 25% of the variance in subjective performance, 2% in turnover perceptions, 34% in job satisfaction, 24% in organizational commitment, and 26% in role perception outcomes.</p> <p><b>Social characteristics</b> explained incremental variances of 9% of the variance in subjective performance, 24% in turnover intentions, 17% in job satisfaction, 40% in organizational commitment, and 18% in role perception outcomes.</p> <p><b>Work context characteristics</b> explained incremental variances of 4% in job satisfaction and 16% in stress.</p>	<p>workplace research needs                      workplace general                      workplace stress</p> <p>The results of this study suggest numerous opportunities for the continued development of work design theory and practice.</p> <p><b>work context characteristics</b> explained incremental variances of 4% in job satisfaction and 16% in stress.</p> <p>Status:                      Indirectly relevant</p> <p>(stress examined as part of study)</p>
<p>6. Duijts, S. F., I. Kant, et al. (2007) A meta-analysis of observational studies identifies predictors of sickness absence J Clin Epidemiol 60 1105-15</p> <p><b>Study Aims:</b>                      A meta-analysis to quantify the association between predictive</p>	<p>General – participants in 20 prospective studies meeting reviewer inclusion criteria.</p>	<p>Significant Summary Odds Ratios (SORs) for sick leave &gt;3 days were found for being unmarried, 1.37 (95% confidence interval [CI]=1.15-1.64), experiencing psychosomatic complaints, 1.79 (95% CI=1.54-2.07), using medication, 3.13 (95% CI=1.71-5.72), having a burnout, 2.34</p>	<p>workplace stress                      workplace research needs</p> <p>This study shows that predictors of sickness absence can be identified in a homogeneous manner. The results provide leads to public health interventions to successfully</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>factors and psychosocial sickness absence and to assess clinical outcomes and heterogeneity.</p>		<p>(95% CI=1.59-3.45), suffering from psychological problems, 1.97 (95% CI=1.37-2.85), having low job control, 1.28 (95% CI=1.23-1.33), having low decision latitude, 1.33 (95% CI=1.16-1.56), and experiencing no fairness at work, 1.30 (95% CI=1.18-1.45).</p>	<p>improve psychosocial health and to reduce sickness absence.</p> <p>Status: Indirectly relevant (stress)</p>
<p>7. Stansfeld, S. and B. Candy (2006) Psychosocial work environment and mental health--a meta-analytic review Scand J Work Environ Health 32 443-62</p> <p><b>Study Aims:</b> Meta-analysis of psychosocial work stressors and common mental disorders (using longitudinal studies) to clarify the associations between psychosocial work stressors and mental ill health.</p>	<p>General – participants in 11 longitudinal studies which fulfilled inclusion criteria for a meta-analysis.</p>	<p>Job strain, low decision latitude, low social support, high psychological demands, effort-reward imbalance, and high job insecurity predicted common mental disorders despite the heterogeneity for psychological demands and social support among men. The strongest effects were found for job strain and effort-reward imbalance.</p>	<p>workplace stress This meta-analysis provides robust consistent evidence that (combinations of) high demands and low decision latitude and (combinations of) high efforts and low rewards are prospective risk factors for common mental disorders and suggests that the psychosocial work environment is important for mental health. The associations are not merely explained by response bias. The impact of work stressors on common mental disorders differs for women and men.</p> <p>Status: <b>Directly relevant</b></p>
<p>8. Kivimaki, M., M. Virtanen, et al. (2006) Work stress in the etiology of coronary heart disease--a meta-analysis Scand J Work Environ Health 32 431-42</p> <p><b>Study Aims:</b> A systematic review and meta-analysis of prospective cohort</p>	<p>General - 83 014 employees participating in 14 prospective cohort studies which met inclusion criteria.</p> <p>There was little standardization in the assessment of work stress within all three stress models, and significant heterogeneity in</p>	<p>The age- and gender-adjusted relative ratio of CHD for high versus low job strain was 1.43 [95% confidence interval (95% CI) 1.15-1.84], but the ratio decreased to 1.16 (95% CI 0.94-1.43) after adjustment for risk factors and potential mediators. The age- and gender-adjusted</p>	<p>workplace stress workplace research needs</p> <p>Observational data suggest an average 50% excess risk for CHD among employees with work stress. Further research is needed to confirm that a</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>studies were carried out focused on estimating the relative risk of coronary heart disease (CHD) in association with work stress, as indicated by the job-strain model, the effort-reward imbalance model, and the organizational injustice model.</p>	<p>the effects of stress was observed between studies. Few studies were available for female samples.</p>	<p>risk ratio for a combination of high efforts and low rewards was 1.58 (95% CI 0.84-2.97) for 11 528 employees, and no reduction in the risk ratio was seen after further adjustments. For organizational injustice, the age- and gender-adjusted, and multiple-adjusted relative risks were 1.62 (95% CI 1.24-2.13) and 1.47 (95% CI 1.12-1.95), respectively, for a population of 7246 men and women. There was little standardization in the assessment of work stress within all three stress models, and significant heterogeneity in the effects of stress was observed between studies. Few studies were available for female samples.</p>	<p>reduction in work stress will lead to a reduction in CHD risk.</p> <p>Status: <b>Directly relevant</b></p>
<p>9. Chapman, L. S. (2005) Meta-evaluation of worksite health promotion economic return studies: 2005 update Am J Health Promot 19: 1-11</p> <p><b>Study Aims:</b> Meta-evaluation to assess the overall validity of the worksite health promotion economic return studies.</p>	<p>General - 483,232 participants in 56 studies that met inclusion criteria.</p>	<p>This meta-evaluation illustrates the general lack of standardization in the methodology used in economic analysis of worksite health promotion programs. Different measurement methods, varying categories of economic variables used for measuring economic return, and use of alternative research designs and statistical tests all highlight the lack of methodological consensus within the field for the evaluation of</p>	<p>Report-priority workplace economics</p> <p>The more recent and larger studies receive the most weight in the meta-evaluation methodology and reflect the most important research efforts. The recent studies also tend to use newer prevention technologies, including: use of the TTM, Internet-provided health information, tailoring, benefits-linked financial</p>

Study details	Population(s)	Main conclusions	Main Themes
		<p>economic impact. There is wide variation in methods and approaches used for the determination of economic impact and return, however the results nonetheless show a surprising amount of congruence.</p>	<p>incentives, telephonic high-risk intervention coaching, self-directed change, and annual required morbidity-based health risk appraisals (HRAs) used for individual targeting of interventions. The newer prevention technologies are also associated with higher levels of economic impact and return. Their use in the studies that have been published in the last 10 years have resulted in slightly more than double the average cost/benefit ratio reported in studies of traditional program models; in other words, instead of the typical 1:3.0 cost/benefit ratio, they report a ratio of 1:6.3.  <b>Status: Directly relevant</b></p>
<p>10. Wantland, D. J., C. J. Portillo, et al. (2004) The effectiveness of Web-based vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes J Med Internet Res 6 e40</p> <p><b>Study Aims:</b>                      Meta-analysis undertaken to provide further information on patient/client knowledge and behavioral change outcomes after (general and not worksite</p>	<p>(Note: This is a general and not worksite specific Review) 11,754 participants (5,841 women and 5,729 men). In 22 studies meeting inclusion criteria. The average age of participants was 41.5 years. In those studies reporting attrition rates, the average drop out rate was 21% for both the intervention and control groups.</p> <p>For the five Web-based studies that reported usage statistics,</p>	<p>Effect sizes were calculated to ascertain a standardized difference between the intervention (Web-based) and control (non-Web-based) groups by applying the appropriate meta-analytic technique.</p> <p>The effect sizes for the studied outcomes ranged from -.01 to .75. Broad variability in the focus of the studied outcomes precluded the calculation of an overall effect size for the</p>	<p>General and not workplace specific – included because technology is relevant to setting. PA                      nutrition                      BMI</p> <p>The effect size comparisons in the use of Web-based interventions compared to non-Web-based interventions showed an improvement in outcomes for individuals using Web-based interventions to achieve the</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>specific) Web-based interventions as compared to outcomes seen after implementation of non-Web-based interventions.</p>	<p>time spent/session/person ranged from 4.5 to 45 minutes. Session logons/person/week ranged from 2.6 logons/person over 32 weeks to 1008 logons/person over 36 weeks. The intervention designs included one-time Web-participant health outcome studies compared to non-Web participant health outcomes, self-paced interventions, and longitudinal, repeated measure intervention studies. Longitudinal studies ranged from 3 weeks to 78 weeks in duration.</p>	<p>compared outcome variables in the Web-based compared to the non-Web-based interventions. Sixteen of the 17 studied effect outcomes revealed improved knowledge and/or improved behavioral outcomes for participants using the Web-based interventions. Five studies provided group information to compare the validity of Web-based vs. non-Web-based instruments using one-time cross-sectional studies. These studies revealed effect sizes ranging from -.25 to +.29. Homogeneity statistic estimation again revealed widely differing study parameters (<math>Q(w4) = 18.238, P &lt; or = .001</math>).</p>	<p>specified knowledge and/or behavior change for the studied outcome variables. These outcomes included increased exercise time, increased knowledge of nutritional status, increased knowledge of asthma treatment, increased participation in healthcare, slower health decline, improved body shape perception, and 18-month weight loss maintenance.</p> <p>Status: Indirectly relevant (web-based interventions)</p>
<p>11. Smedslund, G., K. J. Fisher, et al. (2004) The effectiveness of workplace smoking cessation programmes: a meta-analysis of recent studies Tob Control 13 197-204</p> <p><b>Study Aims:</b> This review uses meta-analytic procedures to compare the effectiveness of more recent controlled trials of worksite smoking cessation during the 1990s with a previous meta-</p>	<p>A total of 4960 control subjects were compared with 4618 intervention subjects participating in 19 studies conforming to the inclusion criteria.</p> <p>Note: Disappointingly, this review found methodological inadequacies and insufficient reporting of key variables that were similar to those found in the earlier meta-analysis. This prevented reviewers from</p>	<p>Interventions included self help manuals, physician advice, health education, cessation groups, incentives, and competitions. The adjusted random effects odds ratio was 2.03 (95% confidence interval 1.42 to 2.90) at six months follow up, 1.56 (95% CI 1.17 to 2.07) at 12 months, and 1.33 (95% CI 0.95 to 1.87) at more than 12 months follow up. Funnel plots were consistent with strong publication bias at the first two</p>	<p>workplace research needs workplace smoking</p> <p>workplace smoking cessation interventions showed initial effectiveness, but the effect seemed to decrease over time and was not present beyond 12 months. Compared to the Fisher (1990) analysis, the effectiveness was higher for the six month follow up. It is advisable for researchers conducting studies in the future</p>

Study details	Population(s)	Main conclusions	Main Themes
<p>analysis of programmes conducted in the 1980s</p>	<p>determining much about the most effective components of interventions.</p>	<p>follow ups but not the third. In Fisher et al's 1990 study, the corresponding ORs were 1.18, 1.66, and 1.18.</p>	<p>to report data on attrition and retention rates of participants who quit, because these variables can affect ORs. Status: <b>Directly relevant</b></p>
<p>12. Fichtenberg, C. M. and S. A. Glantz (2002) Effect of smoke-free workplaces on smoking behaviour: systematic review Bmj 325 188</p> <p><b>Study Aims:</b> To quantify the effects of smoke-free workplaces on smoking in employees and compare these effects to those achieved through tax increases.</p>	<p>Participants in 26 studies on the effects of smoke-free workplaces in the United States, Australia, Canada, and Germany. Employees were in unrestricted and totally smoke-free workplaces.</p>	<p>Totally smoke-free workplaces are associated with reductions in prevalence of smoking of 3.8% (95% confidence interval 2.8% to 4.7%) and 3.1 (2.4 to 3.8) fewer cigarettes smoked per day per continuing smoker. Combination of the effects of reduced prevalence and lower consumption per continuing smoker yields a mean reduction of 1.3 cigarettes per day per employee, which corresponds to a relative reduction of 29%. To achieve similar reductions the tax on a pack of cigarettes would have to increase from \$0.76 to \$3.05 (0.78 euro to 3.14 euro) in the United States and from 3.44 pounds sterling to 6.59 pounds sterling (5.32 euro to 10.20 euro) in the United Kingdom. If all workplaces became smoke-free, consumption per capita in the entire population would drop by 4.5% in the United States and 7.6% in the United Kingdom, costing the tobacco industry \$1.7 billion and 310 million pounds</p>	<p>workplace smoking workplace economics</p> <p>Smoke-free workplaces not only protect non-smokers from the dangers of passive smoking, they also encourage smokers to quit or to reduce consumption.</p> <p>Status: <b>Directly relevant</b></p>

Study details	Population(s)	Main conclusions	Main Themes
		sterling annually in lost sales. To achieve similar reductions tax per pack would have to increase to \$1.11 and 4.26 pounds sterling.	
<p>13. van der Klink, J. J., R. W. Blonk, et al. (2001) The benefits of interventions for work-related stress Am J Public Health 91: 270-6</p> <p><b>Study Aims:</b> This quantitative meta-analysis sought to determine the effectiveness of occupational stress-reducing interventions and the populations for which such interventions are most beneficial.</p>	<p>General 3736 participants in the 48 experimental studies which met inclusion criteria. Four intervention types were distinguished: cognitive-behavioral interventions, relaxation techniques, multimodal programs, and organization-focused interventions.</p>	<p>A small but significant overall effect was found. A moderate effect was found for cognitive-behavioral interventions and multimodal interventions, and a small effect was found for relaxation techniques. The effect size for organization-focused interventions was nonsignificant. Effects were most pronounced on the following outcome categories: complaints, psychologic resources and responses, and perceived quality of work life.</p>	<p>workplace stress</p> <p>Stress management interventions are effective. Cognitive-behavioral interventions are more effective than the other intervention types.</p> <p>Status: <b>Directly relevant</b></p>

## APPENDIX 3: SOURCE MATERIAL FOR CASE STUDIES

### The European Network for Workplace Health Promotion <http://www.enwhp.org>

The European Network for Workplace Health Promotion is an informal network of national occupational health and safety institutes, public health, health promotion and statutory social insurance institutions. In a joint effort, all the members and partners aim to improve workplace health and well-being and to reduce the impact of work related ill health on the European workforce. The ENWHP promotes good practice in workplace health promotion and advocates the adoption of such practice in all European workplaces. With the support of the European Commission, the ENWHP has carried out a number of important European initiatives over the past decade which have established workplace health promotion (WHP) as a field of action for public health at European and national level. The website provides links to all of the ENWHP initiatives which are listed below:

- 1st initiative: Quality Criteria and Success Factors of Workplace Health Promotion
- 2nd initiative: Workplace Health Promotion in Small and Medium-Sized Enterprises
- 3rd initiative: Workplace Health Promotion in the Public Administration Sector  
Special project: WHP in Latin and Southern European Countries
- 4th initiative: The Implementation of Infrastructures for Promoting Workplace Health
- 5th initiative: Healthy Work in an Ageing Europe
- 6th initiative: Disseminating Good Workplace Health in Eastern European Countries
- 7th initiative: Move Europe - A Campaign for the Improvement of Lifestyle-Related Workplace Health Promotion in Europe

#### **The ENWHP Seventh Initiative (2007 - 2009)**

The current so called "7th initiative" focuses on life-style related Workplace Health Promotion (WHP), and especially on the combination of physical activity, healthy diet, mental health and smoking prevention.

Under the leadership of the National Contact Office (NCO) in Italy (ISPESL/University of Perugia), the ENWHP has developed its 7th initiative on life-style related Workplace Health Promotion (WHP), focusing on the combination of the following 4 fields: physical activity, healthy diet, mental health and smoking prevention.

The initiative is designed as a campaign which sets quality standards for Good Practice in WHP, identifies complying models and disseminates these results throughout Europe.

1. Based on an intensive review of other quality models and existing literature, the ENWHP members have developed together a high level quality standard ("quality model"), which results in the production of corresponding tools.
2. Companies from participating countries can fill out an online questionnaire for the "Company Health Check" available in their national languages, and assess the quality of lifestyle-related health promotion programmes.



3. A gradual status and selection model enables companies to participate and identifies good models on different levels: Companies can participate as "Move-Europe Companies" and can qualify for selection as Models of Good Practice. Exemplary Models which are considered particularly suitable for transfer in other countries will be invited to present their activities in health promotion on a European Conference to be held in Rome in the beginning of 2009.

4. An advocacy and alliance building strategy will tie national interest and expert groups to the campaign and thus increase its impact. Using a dual-level-partnership model, with opening meetings in every country and on European level, relevant stakeholders and experts will be recruited, helping to further widen the scope for participation and to deepen the penetration in national WHP markets.

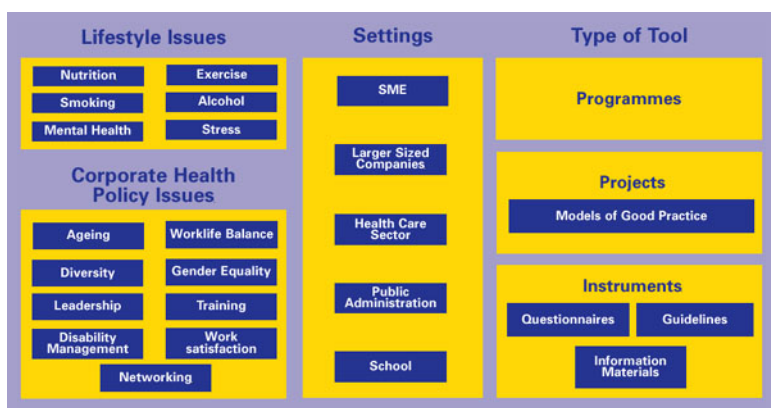
5. Marketing and PR instruments (e.g. contest, "labels", media work, and concluding conference) will be employed to create added value for participating companies, members and partners, helping to raise the campaign's awareness.

6. National dissemination symposiums in every country, (organised by the NCOs with national stakeholder communities) and a European conference (organised by the secretariat) will facilitate the process of a Europe-wide exchange of knowledge and experiences, support the dissemination process.

The results of the campaign will be thoroughly documented, evaluated, elaborated and made accessible in all countries via reports and distribution, translated and adapted recommendations, fact sheets and guidelines.

**The European Toolbox for Workplace Health Promotion**  
<http://www.enwhp.org/index.php?id=7>

This toolbox contains effective WHP methods and instruments which are being used in practical context in all European countries. The collection therefore represents a true European 'exchange pool' for WHP practitioners and decision makers in the fields of human resource management, occupational health and safety and public health.



The inventory consists of programmes, projects (Models of Good Practice) or instruments (such as questionnaires, guidelines and information materials), suitable for improving or promoting health at the workplace, and provides solutions for tackling health related problems at the workplace such as ageing workforce, disability

management, alcohol abuse, smoking, unhealthy eating habits, mental health and stress. At organisational level a tool can be used on a participatory basis, or for establishing processes. They can be integrated in company management and the daily routines and structures of the organisation and used to induce organisation change, etc. All tools in this toolbox are

- used on a company level;
- used more than once (multi-use);
- transferable to different working situations and companies and accessible to various user groups.

**Workplace interventions to promote smoking cessation: costing template (simplified business case for employers) National Institute for Health and Clinical Excellence (UK)**

**<http://www.nice.org.uk/nicemedia/pdf/PHI5SimplifiedBusinessCase.htm>**

Costing tools have been produced by NICE to support the implementation of the public health intervention - workplace health promotion: how to help employees to stop smoking.

As part of this work, a business case costing tool has been developed in several formats. These business cases indicate the potential costs and savings to employers from encouraging and supporting employees to quit smoking using effective and evidence-based interventions.

This version is presented as a webpage and will work with internet explorer. It may be of particular interest to smaller organisations or to employers who are not familiar with excel. The assumptions can be altered to better reflect local circumstances.

To support implementation a slide set and implementation advice have also been produced

**The WHO Collaborating Centre for Health Promotion in Hospitals and Health Care**  
**<http://www.hph-hc.cc/>**

Knowledge Centre for Health Promotion in Hospitals and Health care

The Centre provides publications, guidelines and recommendations for supporting the implementation of health promotion in hospitals and health care. These include:

- Standards for health promoting hospitals (hph)
- Core strategies for hph
- Health Promoting Hospitals in Practice: Developing Projects and Networks
- Pathways to a Health Promoting Hospital. Experiences from the European Pilot Project 1993-1997
- Feasibility, Effectiveness, Quality and Sustainability of Health Promoting Hospital Projects

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**Australian Government: Employment & workplace relations services**  
**[www.workplace.gov](http://www.workplace.gov)**

**<http://www.workplace.gov.au/workplace/Programmes/WorkFamily/Factsheets.htm>**

**Fact sheets on flexible/ family friendly work practices**

Flexible work practices are of benefit to all employees in the workplace, including those with family and caring responsibilities, mature age workers and people with disabilities. A series of (web based) fact sheets provides information on the importance of a flexible workplace and assistance in developing and implementing supportive workplace policies.

- Why family friendly policies are good for business
- Why flexible work arrangements are good for business
- Developing a work and family policy in your workplace
- Negotiating a family friendly agreement
- Evaluating work and family strategies in your workplace
- 20 cheap and easy family friendly ideas

Another series of fact sheets provide information on different types of flexible working arrangements which may assist in accommodating work and personal needs.

- Teleworking or Home based work
- Job sharing
- Regular part-time work
- Pregnancy at work
- Parental leave
- Child care
- Breastfeeding in the workplace
- Carer's leave
- Elder care
- Father friendly workplaces

A further noteworthy resource on this site is:

Work and Family: The importance of workplace flexibility in promoting balance between work and family (2006)

<http://www.workplace.gov.au/NR/rdonlyres/B2C64166-2538-4892-BE1E-10112F798C8D/0/IssuesPaperFINALPDF.pdf>

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**Australian Chamber of Commerce and Industry and Business Council of Australia  
National Work and Family Awards**  
<http://www.workplace.gov.au/workplace/Programmes/WorkFamily/>

The National Work and Family Awards began in 1992 as a joint government and business partnership to recognise excellence in work and family initiatives. The Awards promote the business benefits of helping employees balance their work and family responsibilities and give national recognition to organisations that create a flexible and family friendly work culture. The Awards focus on outcomes and not just on policies. They acknowledge organisations that:

- recognise the business benefits in responding to the work–life needs of their employees;
- make efforts to ensure that managers, supervisors and employees accommodate work-life needs as appropriate; and
- demonstrate a commitment to continuous improvement in the development and implementation of work-life policies, practices and initiatives.

In 2007 a Community Sector Award was introduced for the first time to recognise the achievements of community sector organisations that respond to the work-life needs of their employees and volunteers. These organisations provide valuable services to the Australian community in areas such as fundraising, training and employment of people with disability, as well as counselling and youth outreach activities. In addition, a Carer Support Commendation was presented in 2007 to acknowledge the outstanding efforts of organisations which take steps to identify and respond to the specific needs of employees with caring responsibilities.

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**Australian Human Rights and Equal Opportunity Commission (HREOC):  
Good Practice, Good Business**  
[http://www.hreoc.gov.au/info\\_for\\_employers/index.html](http://www.hreoc.gov.au/info_for_employers/index.html)

HREOC affirms that “putting effective anti-discrimination and anti-harassment strategies in place in your workplace is good practice, which is good for business”. The Commission has developed a range of useful resources for use in Australian workplaces including the Good practice, Good business CD-Rom and a range of fact sheets and brochures.

## CASE STUDY

### Canadian Case Studies of healthy settings

[http://www.hc-sc.gc.ca/ewh-semt/pubs/occup-travail/healthy-settings\\_cadres-sains/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/occup-travail/healthy-settings_cadres-sains/index-eng.php)

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## CASE STUDY

**Twelve case studies on innovative workplace health initiatives : summary of key conclusions (Canada - Canadian Labour and Business Centre)** <http://www.clbc.ca>

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## CASE STUDY

**Examples of Comprehensive Healthy Workplace Change Strategies (Lowe Report for Health Canada – page 20)**

<http://www.grahamlowe.ca/documents/93/Hlthy%20wkpl%20strategies%20report.pdf>

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## CASE STUDY

**Healthy Working Lives (HWL) / Scotland's Health at Work (SHAW)**  
<http://www.shaw.uk.com>

Early in 2007, the Healthy Working Lives (HWL) Award Programme was launched. Building on the success of Scotland's Health at Work (SHAW) the scheme encompasses a wide range of topics enabling organisations to select those that are most relevant to the workforce, including health promotion, occupational health and safety, health and the environment, mental health and well-being, community involvement and employability.

For each level there is a set of core and additional criteria. Workplaces must fulfill all of the core criteria and select one or more of the additional criteria to achieve an award. This gives workplaces the flexibility to choose topics which will most interest their staff.

### **BRONZE AWARD**

**Core Criteria** - The workplace must:

- (i) Provide information on relevant health issues on a regular basis.
  - (ii) Raise awareness of health issues through appropriate activity.
  - (iii) Establish a health promotion working group which represents staff from all levels of the organisation
- or
- Provide evidence that an existing group within the organisation, e.g. quality circles, health and safety, regularly includes health on its working agenda
- or
- Demonstrate that there is an appropriate means to address staff health needs.
- (iv) Implement a stated policy on smoking that promotes a smoke-free environment and provides smoking cessation support.
  - (v) Meet the relevant legal obligations for health and safety at work.

**Additional Criteria** - The workplace must also undertake ONE of the following:

- (i) Provide all employees with an opportunity to have a health check that includes a review of lifestyle behaviour and the giving of personal health advice.
- (ii) Promote physical activity
  - or
  - Alcohol awareness
  - or
  - Stress handling among staff.
- (iii) Provide healthy food choices/facilities in the workplace where appropriate.
- (iv) Take action to assess staff health needs. This should focus on environmental, organisational and individual lifestyle issues.

### **SILVER AWARD**

The workplace must have fulfilled the criteria stipulated for the Bronze Award

**Core Criteria** - The workplace must:

- (i) Have implemented a stated policy and procedures on the following:
  - Alcohol or drugs misuse in the workplace which includes education on sensible drinking and support.
  - The provision and promotion of healthy food choices/facilities in the workplace.
  - The promotion of physical activity.
- (ii) Take formal action to assess staff health needs. This should focus on environmental, organisational and individual lifestyle issues.
- (iii) Provide all employees with an opportunity to have a health check that includes a review of lifestyle behaviour and the giving of personal health advice.

**Additional Criteria** - The workplace must also undertake ONE of the following:

- (i) Provide all employees with an opportunity to have a fitness assessment.
- (ii) Provide a seminar/workshop for staff on a least two health topics appropriate to the needs of the workforce, e.g.
  - stress/mental health
  - healthy eating
  - alcohol/drugs
  - HIV/AIDS and sexual health
  - dental/oral health
  - physical activity
- (iii) Have a system in place which regularly reviews and records health activities to inform future planning.
- (iv) Demonstrate active participation in a local or national health campaign.

### **GOLD AWARD**

The workplace must have fulfilled the criteria stipulated for the Bronze and Silver Awards.

**Core Criteria** - The workplace must:

- (i) Have a three-year strategy and one-year action plan for health based on identified needs.
- (ii) Demonstrate activities that promote health in each of the following areas:

- smoking
- alcohol/drugs
- healthy eating
- physical activity
- HIV/AIDS and sexual health
- stress/mental health
- dental/oral health

(iii) Demonstrate active participation in a local or national health campaign  
or  
demonstrate active commitment to the health of the local community.

The Scotland's Health at Work Gold Award is awarded for three years with progress reviewed annually. A local SHAW carries out an annual review to confirm that the workplace continues to meet the Gold Criteria and to highlight any areas where additional input may be required.

### **COMMENDATION AWARD**

Any activities carried out within the past 3 years can be considered as evidence, although more weight should be given to recent/current actions.

In all cases the workplace must have achieved the Bronze award standard prior to being eligible for the commendation award.

The following criteria must be met prior to the workplace achieving the commendation award. Please refer to the relevant section for more information on what is required for each criterion. A SHAW Advisor is available to provide further advice and guidance.

To be assessed for the award the workplace is required to submit the evidence detailed below and must agree to a site audit being carried out by a SHAW Assessor. Once achieved the award is reassessed on an annual basis.

**Core Criteria** - The workplace must:

- (i) Implement a workplace mental health and wellbeing policy. Evidence Required:
    - A copy of the workplace mental health and wellbeing policy
    - A copy of any additional policies referred to in the mental health and wellbeing policy
  - (ii) Consult with staff during policy development and communicate the policy to all employees. Evidence Required:
    - Completed Policy Consultation and Communication Proforma
  - (iii) Conduct a stress risk assessment/stress audit and produce an annual action plan to tackle any organisational issues. Evidence Required:
    - Completed Stress Risk Assessment Proforma
    - A copy of the annual Action Plan
  - (iv) Provide mental health awareness activities for all staff and specific training for managers. Evidence Required:
    - Completed Education and Information Proforma
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## **CASE STUDY**

**<http://www.uclan.ac.uk/facs/health/hsdu/settings/workplace.htm>**

### **Healthy workplaces in the North West of England**

The Department of Health and the North West Development Agency (NWDA) are currently funding the Healthy Settings Development Unit (at the University of Central Lancashire) to co-ordinate and develop work around healthy workplaces across the NW region of England. The focus of the work includes:

- strategic level collaboration with key agencies such as the Health & Safety Executive, NWDA, Government Office for the North West, strategic health authorities, Groundwork, Health@Work - with a view to joining up public health, health and safety, occupational health and corporate social and environmental responsibility agendas and formulating a strategic plan
- support and networking for practitioners specialising in workplace health within PCTs, local authorities and other sectors
- development of links to topic-focused work programmes (e.g. tobacco control, physical activity, mental health, food).

**Healthy Settings Development Unit – HSC Case Studies/ 4 N. England Case Studies**

***NB Returns on Investment table on this website***