

***Chapter 2***

***A Comprehensive Review of the Job Stress  
Intervention Evaluation Literature:  
Assessing the Evidence of Effectiveness for a  
Systems Approach***

**A/Prof Anthony D. LaMontagne, Lead Investigator**  
**Amber Louie, Research Assistant**  
**Tessa Keegel, Research Fellow**  
Centre for the Study of Health & Society  
School of Population Health, University of Melbourne 3010  
Tel 03-8344-0708; fax 03-8344-0824; [alamonta@unimelb.edu.au](mailto:alamonta@unimelb.edu.au)

**A/Prof Aleck Ostry, Co-Investigator**  
Department of Healthcare & Epidemiology  
University of British Columbia, Vancouver  
CANADA  
[ostry@interchange.ubc.ca](mailto:ostry@interchange.ubc.ca)

**Andrea Shaw, Co-Investigator**  
Director, Shaw Idea Pty Ltd  
15 Fletchers Lane  
Mt Egerton, VIC  
[shawidea@cbl.com.au](mailto:shawidea@cbl.com.au)

## INTRODUCTION

Job stress intervention activity has grown rapidly over the last two decades, paralleling the growth in recognition and acceptance of the far-reaching impacts of job stress on individual and organisational health (reviewed in chapter 1). This has been reflected in the rapid growth in the job stress intervention research literature, which has been reviewed in various ways from a range of perspectives over the last decade.<sup>1-19</sup>

Our goal in this study was to comprehensively review the international job stress intervention literature to identify models of international best practice. In so doing, we have built from the most recent comprehensive review,<sup>13</sup> and included assessment of the degree to which a systems approach was applied, hypothesising that systems approaches yield the best results both for individual and organisational health. Systems approaches in public health and occupational health—as elaborated in further detail below and represented pictorially in Figure 1—emphasise primary prevention (problems at their source), integrate primary prevention with other levels (secondary and tertiary), include meaningful participation of groups targeted by intervention, and are context-sensitive.<sup>1</sup>

Job stress interventions can be classified as primary, secondary, or tertiary.<sup>20-23</sup> In brief, **primary preventive interventions are proactive**, aiming to prevent the occurrence of illness among healthy individuals. These address sources of stress in the workplace, or stressors, through alterations in physical or psychosocial work environment, or through organizational changes.<sup>24</sup> Examples include changes in work pacing and job redesign, and the formation of joint labour/management health & safety committees. Primary preventive interventions may also be referred to as ‘stress prevention.’<sup>13 25</sup> **Secondary interventions are ameliorative**, aiming to modify an individual’s response to stressors, targeting the individual with the underlying assumption that focusing on individuals’ responses to stressors should be done in addition to—or in preference to—removing or reducing stressors. Examples of secondary prevention interventions include stress management classes to help employees to either modify or control their appraisal of stressful situations, such as the development of muscle relaxation or meditation skills. Finally, **tertiary interventions are reactive**, aiming to minimize the effects of stress-related problems once they have occurred, through ‘treatment’ or management of symptoms or disease. These include efforts to help employees to cope more effectively with reactions to stressful conditions, counselling (such as in the form of employee assistance programs), and return-to-work and other rehabilitation programs. ‘Stress management’ generally refers to secondary and tertiary interventions.<sup>13 25</sup>

In occupational health, the ‘hierarchy of controls’ is another articulation of these same principles for the prevention and control of occupational exposure and disease. The ‘hierarchy’ states in brief that the further upstream one is from an adverse health outcome, the greater the prevention effectiveness.<sup>26 27</sup> Accordingly, the physical work environment and other aspects of the organisation have greater preventive potential as intervention targets than individual employees. Hence, primary prevention is more effective than secondary, and secondary is more effective than tertiary. Importantly, however, these are not mutually exclusive and can be used combination.<sup>28</sup> For occupational stress, primary prevention through improvements in the work environment is complemented by secondary prevention to address individual factors and detect any effects of work stress in a timely fashion such that rehabilitation or tertiary intervention programs can be maximally effective.<sup>9</sup> At the organisational level or above, stress-related problems identified through secondary or tertiary-level programs should feed back to primary prevention efforts on job stressors. In

summary, systems approach job stress intervention principles are consonant with broader public health and occupational health principles.

Finally, a fundamental premise of public health—and the ‘new public health’ in particular—is that in addressing public health problems, the participation of those most affected in the formulation and implementation of responses is essential.<sup>29</sup> This principle is also specifically incorporated into the WHO’s Ottawa charter on health promotion<sup>30</sup> as well as other workplace health-specific charters and declarations, such as the WHO’s Health Workplace Guidelines<sup>31</sup> and the European Network for Workplace Health Promotion’s Luxembourg Declaration.<sup>32</sup> Further, participation addresses some of the core constructs of job stress, such as job control, organisational justice, and mutual respect and support across various levels within an organisation.<sup>4</sup> Participation is a particularly important principle in job stress intervention.<sup>25</sup>

Participation also helps to optimise the fit of the intervention to the context at hand, and provides a means for integrating participants’ context expertise with the content expertise of the OHS or other professionals or researchers who usually direct the intervention. This is crucial because organisations usually require unique solutions to job stress problems, even if the process of intervention may be more generic.<sup>25</sup> More traditional and complementary means of tailoring an intervention to context include needs assessment or risk assessment, through which information about the problem and appropriate intervention strategies are determined through systematic data collection.

The systems approach typology described is broadly synonymous with most other ‘best practice’ models, all of which acknowledge the need to address both work organisational and individual levels.<sup>3 4 6 8-10 12-14 25 33</sup> Some use ‘systems’ terminology.<sup>1 4 34</sup> Others describe similar approaches as ‘comprehensive’,<sup>16</sup> ‘comprehensive stress prevention and management’,<sup>13</sup> combined ‘work-directed’ and ‘worker-directed’,<sup>19</sup> ‘health promotion settings or determinants’,<sup>35-37</sup> and ‘healthy’ or ‘learning organisations’.<sup>38 39</sup>

This paper details how we translated our definition of a systems approach into a method for assessing the extent to which such an approach was applied in a given intervention study, how we conducted a comprehensive search and critical review, our review findings, and implications for policy and practice.

**Figure 1. A Systems Approach to Job Stress**

Intervention Level		Addresses/Targets:		Examples	Historical Tradition	Systems Integration
Definition & Description	Effectiveness		I/O/E			
<b>1° --Primary</b> <ul style="list-style-type: none"> <li>• <b>Preventive, proactive</b></li> <li>• <u>Goal</u>: reducing potential RFs or altering the nature of the stressor before ee experience stress-related symptoms or disease</li> </ul>	+++	<ul style="list-style-type: none"> <li>• Stressors at their source; organisation of work; working conditions</li> </ul>	E O O	<ul style="list-style-type: none"> <li>• Job redesign, workload reduction, improved communication</li> </ul>	OHS, PH	
<b>2° -- Secondary</b> <ul style="list-style-type: none"> <li>• <b>Ameliorative</b></li> <li>• <u>Goal</u>: To help equip people with knowledge, skills, and resources to cope with stressful conditions</li> </ul>	++	<ul style="list-style-type: none"> <li>• Employee responses to stressors (perceived stress or strain)</li> </ul>	O O I	<ul style="list-style-type: none"> <li>• Cognitive behavioural therapy, coping classes, anger management</li> </ul>	Psych, OHS	
<b>3° -- Tertiary</b> <ul style="list-style-type: none"> <li>• <b>Reactive</b></li> <li>• <u>Goal</u>: To treat, compensate, and rehabilitate ee with enduring stress-related symptoms or disease</li> </ul>	+	<ul style="list-style-type: none"> <li>• Enduring adverse health effects of job stress</li> </ul>	I	<ul style="list-style-type: none"> <li>• WC system, Return-to-work programs, occupational therapy, medical therapy</li> </ul>	Clinical	

## REVIEW METHODOLOGY

### Search Strategy

Our search was designed to complement, extend, and update the most recent comprehensive job stress intervention review, the 2003 *Beacons of Excellence* review from the UK.<sup>13</sup> The *Beacons of Excellence* searches were conducted in September of 2001. These authors searched Medline and PsychInfo databases using key words ‘stress management’, ‘stress prevention’, ‘stress intervention’, and ‘anxiety management’, and restricted the search to post-1990 studies. This yielded 629 studies to which were added studies obtained from several review articles. After applying their selection criteria, most of which we have adapted below, they ended up with 75 job stress intervention studies suitable for detailed review.

We have revised the search strategy to be more suitable for the occupational health and medicine literature as well as the psychological and social science literature (*Beacons* search terms seemed more suited to these). First, we used the search terms “occupational stress,” “job stress,” “work stress,” “stress management,” “intervention,” and “evaluation,” limiting results to articles (excluding reviews) published in the English language from 1990 through 2005. We searched Medline (to cover occupational health and medicine, and other public health sources) and ISI Web of Science (to cover psychological and social sciences). While there can be overlap between these two databases, they have specific complementarities beyond covering different disciplinary bases (e.g., a prominent journal in the field, *Work & Stress*, is not covered by Medline but is covered by ISI).<sup>40</sup>

Medline and ISI Web of Science searches were conducted in April 2005, limiting results to articles published in the English language between 1990-2005, using the terms “occupational stress,” “job stress,” “work stress,” “stress management,” “intervention,” and “evaluation.” The combination of occupational stress, job stress and work stress was limited by the combination of intervention, evaluation, and stress management. This generated 51 results in ISI and 116 results in Medline. The Medline search was then limited to exclude review articles, leaving 91 results. When combined with the Medline search, 7 duplicates were found, leaving 135 results (Table 1).

**Table 1: Electronic Search Results for Peer-Reviewed Journal Articles**

	ISI search	Medline search
<u>Search term Group 1:</u>		
Occupational stress	982	338
Job stress	756	325
Work stress	549	323
<u>Search term Group 2:</u>		
Intervention	91 479	77474
Evaluation	>100 000	174192
Stress management	845	680
Combining search term groups	51	116
Removal of reviews from Medline	51	91
Merge ISI and Medline	142	
Removal of duplicates	135	
Articles to review	135	

These articles were then reviewed manually to determine whether they were intervention studies or not (detailed in ‘Inclusion Criteria’ section below). Qualifying intervention studies were then crossed with the 75 job stress intervention studies identified in the *Beacons of Excellence* review (also included in this review), and complemented by other studies identified by investigators, their professional networks, and in other published job stress intervention reviews.

### Inclusion Criteria

This review focused on job stress intervention studies that reported on some form of intervention evaluation. We defined job stress intervention (JSI) studies as those expressly aiming to alter the sources of, responses to, or effects of job stress.<sup>1</sup> In addition, much has been learned—in most cases about interventions that *increase* work stress—from natural experiments documenting the impacts of changes in job stressors or job stress over time (such as company downsizing or restructuring).<sup>9,41</sup> While natural experimental studies were not comprehensively reviewed, we include discussion of some exemplary studies providing valuable intervention insights under a separate heading in the Results section.

The full list of studies from electronic searches and other sources was subjected to the following qualifying criteria:

- Reported on a job stress intervention (many etiologic studies turned up in electronic searches that had to be culled);
- Reported on intervention evaluation of some sort, including qualitative and action research studies, and those without control or comparison groups (further detail below under Causal Inference Rating section). While we had hoped to also include developmental intervention studies<sup>42,43</sup> in order to capture intervention development insights gleaned from careful and systematic problem characterisation (e.g., in arriving at justification for a systems approach), we found that we needed to limit the scope of the review for feasibility reasons;
- Minimum sample size of 30 individuals;

- Interventions including employees or contractors independent of pre-existing susceptibilities, complaints, or illnesses (e.g., Firth-Cozens et al., 1992<sup>44</sup> excluded patient populations, van der Klink et al., 2001<sup>11</sup> included only employees reporting stress-related symptoms).

Intervention studies that meet these inclusion criteria were reviewed in detail, and summarised in table form. As such, we included studies with a very wide range of designs and outcomes measured—from qualitative case studies to quantitative randomised controlled trials. Further, non-peer reviewed reports, books, book chapters, etc. were reviewed as well as peer-reviewed journal articles.

### **Critical Review & Assessment of JSI Studies**

Each study was critically reviewed as described below by at least two reviewers, and in some cases three (where needed to resolve differences in assigned ratings, or to help distill findings).

Interventions are briefly summarised in tabular form in two ways: a “Systems Approach Rating,” and description of “Intervention Level(s)” and “Duration”. Studies were assigned a simple High/Moderate/Low rating of the degree to which a systems approach was applied. “High” was assigned to those studies where primary prevention was the predominant approach, and this was integrated with either secondary (e.g., based on risk assessment or other needs assessment, primary preventive interventions are directed at the organisation and environment, and secondary interventions are included where risk assessment suggests they are likely to arise) or tertiary prevention (e.g., using Workers’ Compensation experience to help direct and tailor primary preventive activities). In addition, as employee and other stakeholder participation and the conduct of needs or risk assessment are key elements of a systems approach, these are noted in the same column in addition to the H/M/L rating. A “Moderate” Systems Approach rating was assigned to those studies conducting primary prevention activities, but nothing else. Finally, a rating of “Low” was assigned to studies that included little or no primary preventive interventions.

We also assessed and tabulated intervention targets.<sup>22 23 45</sup> “Intervention Level(s)” were tabulated as addressing aspects of the physical work environment (E) (e.g., noise levels), the organization (O) (e.g., job redesign, workload reduction), the individual worker (I) (e.g., coping skills training, Employee Assistance programs), or the interface of the organisation with individual workers (O/I) (e.g., mechanisms for employee participation, co-worker support groups). These are related, but not equivalent to, primary/secondary/tertiary intervention levels, and thus provide complementary intervention description. The duration of the intervention and timing of evaluation data collection were also noted where available.

Evaluation features were summarised in terms of comparison or control groups and measures used, the degree to which study design enabled attribution of observed effects to intervention, and principal findings. We rated the degree to which causal inference is supported by study design (i.e., the degree of confidence in attributing observed effects to the intervention and not other factors) using criteria adapted from Kompier & Cooper 1999<sup>6</sup> and Murphy 1996.<sup>2</sup> As applied by Jordan et al. in the recent Beacons of Excellence Review,<sup>13</sup> we have included only those studies that report evaluation of some sort, thus requiring a 3-star or higher rating:

\* = evidence that is descriptive, anecdotal, or authoritative;

\*\* = evidence obtained without intervention but that might include long-term or dramatic results from general dissemination of information or medical agent into a population;

\*\*\* = evidence obtained without a control group or randomization but with evaluation;

\*\*\*\* = evidence obtained from a properly conducted study with pre and post measures and a control group but without randomization;

\*\*\*\*\* = evidence obtained from a properly conducted study with pre and post measures and a randomized control group.

Finally, principal findings were summarized in narrative form.

## RESULTS & DISCUSSION

In total, 95 intervention studies were included, critically reviewed, and summarised in Appendix Tables I and II. Appendix Table III summarises four studies reporting (in seven publications<sup>38 39 46-49</sup>) on interventions across multiple independent worksites or organisations. These were tabulated separately because the various worksites applied varying degrees of systems approaches that could not be distinguished from each other in the publications.

Many studies identified in the electronic searches were excluded due to recommending (but not including) intervention evaluation, not conducting systematic evaluation (less than 3 star study design rating), focusing on patient or other restricted populations, and sample sizes less than 30. For those studies that were excluded at the retrieval and review stage, a table summarising reasons for their exclusion is available from the authors.

Across the included studies as a whole, we observed a wide range of intervention targets (physical work environment, organisation, organisation/individual interface, and individual) and durations (ranging from hours to years). Evaluation measures or outcomes also ranged widely, including stressors (e.g., job control, workload), short-term impacts (symptoms), and longer-term impacts (e.g., depression, sickness absence rates). The greatest concentration of studies comes from Europe and the UK.

### Comparison of High to Low Systems Approaches

We rated 31 studies as having a *High* systems approach (31/95 = 33%), versus 15 *Moderate* (16%), and 49 *Low* (51%). In comparison to previous reviews, this indicates a growing percentage of *High* systems approaches. The *Beacons of Excellence* study rated only 9 of 75 (12%) studies as demonstrating best practice ‘comprehensive stress prevention and management’ (a designation similar to our *High* systems approach).

*Conclusion 1: Studies of interventions using High systems approaches represent a growing proportion of the job stress intervention evaluation literature, possibly reflecting growing application of such approaches in practice internationally.*

Comparing *High* versus *Low*-rated studies shows that *High* studies tend to have longer intervention and evaluation follow-up times, usually on the order of months to years versus hours to months (Appendix Tables I-III). Evaluation outcome measures tend to reflect intervention targets (Table 2). Thus, studies rated *High* more often targeted and measured organisational or environmental outcomes (93%), and *Low* rated studies more often targeted and evaluated outcomes at the individual level (88%). Participation in intervention development or implementation, needs assessment before intervention, and integration of job stress intervention with health promotion were more often features of *High*-rated studies in comparison to *Low* (Appendix Tables I-III).

**Table 2. Individual- versus Organisational-Level: Outcomes Assessed and Favourable Findings, by Systems Rating Level**

<b>Systems Rating</b>	<b>N</b>	<b>One or More Outcome Assessed at Individual Level* (# of studies)</b>	<b>Percent Reporting Favourable Changes in Individual Outcomes of Those Where Measured</b>	<b>One or More Outcome Assessed at Organisational Level**</b>	<b>Percent Reporting Favourable Org Outcomes of Those Where Measured)</b>
<b>HIGH</b>	31	22 22/31 = 71%	17 17/22 = 77%	29 29/31 = 93%	27 27/29 = 93%
<b>MODERATE</b>	15	8 8/15 = 53%	6 6/8 = 75%	15 15/15 = 100%	10 10/15 = 67%
<b>LOW</b>	49	43 43/49 = 88%	37 37/43 = 86%	21 21/49 = 43%	8 8/21 = 38%
<b>TOTALS</b>	95	73	60/73 = 82%	65	45/65 = 67%

\***Individual Level** corresponds roughly to secondary prevention targets (such as coping skills, physical and mental health measures, and health behaviours)

\*\***Organisational-Level** corresponds roughly to primary prevention targets, including working conditions (e.g., demand/control model job stress measures), physical work environment (noise levels), and those more widely known as ‘organisational’ outcomes (see Chapter 1, Table 3: these include job satisfaction, absenteeism, turnover, productivity, job performance, accident and injury rates, Workers’ Compensation costs/rates, healthcare expenditures)

**Causal Inference Ratings:** Taken as a whole, the level of causal inference ratings for the studies reviewed was fairly balanced across the three rating levels (Table 3, bottom row). In studies rated *High*, the most common rating was three stars (usually longitudinal with pre- and post-intervention measures), with controlled (non-random assignment to intervention versus control—four stars) studies intermediate in frequency, and experimental (random assignment to intervention versus control—5 stars) studies the least common. This pattern was reversed in *Low*-rated studies (Table 3), most likely reflecting the relative feasibility challenges of each (far more feasible to randomly assign individuals than organisations to treatment groups). It should be noted that there were some 3 star rated studies with very low causal inference (for examples, three studies that reported after-only evaluations without pre-intervention assessment<sup>50-52</sup>). Nevertheless, these patterns (Table 3) indicate that the evidence base for *High* systems approaches is both smaller and lower in terms of causal inference than for *Low* rated studies.

**Table 3: Causal Inference Ratings by Level of Systems Approach**

	3-*** (No comparison groups)	4-*** (Quasi- experimental)	5-*** (Experimental)	Totals
HIGH	13	11	7	31
MODERATE	6	4	5	15
LOW	14	16	19	49
	33	31	31	95

Relative effectiveness of varying systems level approaches: We now turn to a comparison of evaluation findings between *High* and *Low* studies. The third row of Table 2 shows that *Low*-rated studies usually assess individual-level outcomes (88%), and usually report favourable changes in one or more of these outcomes (86% of those including individual level measures). Further, the evidence base here is fairly strong, supported by a larger literature and stronger study designs (higher causal inference ratings than for *High* systems approaches). This general pattern has also been observed in previous reviews. Examples of individual-focussed interventions include progressive muscle relaxation, meditation, and cognitive behavioural skill training. Examples of individual-level outcomes include somatic symptoms, physiological changes (e.g., blood pressure, cholesterol levels), skills (e.g., coping ability), and psychological outcomes (e.g., general mental health, anxiety).

Conclusion 2: *Individually-focused, Low systems approaches are effective at the individual level, favourably affecting a range of individual-level outcomes.*

*Low*-rated studies tended not to evaluate organisational-level outcomes (43%), and tended not to have favourable impacts at that level (38% of those evaluating organisational-level measures) (Table 2). Organisational level in our usage includes working conditions as well as those traditionally referred to as such (e.g., absenteeism, employee turnover, injury rates, and productivity—as summarised in Table 3, Chapter 2). For example, in a randomised controlled study, Peters et al. observed some favourable changes in health behaviours, but no effects on absenteeism or a combined measure of job morale, job satisfaction, and productivity (Appendix Table II, page 36).<sup>53</sup> Further, in those studies where favourable individual-level impacts have been observed and followed up some time after intervention, the effects can backslide over time. For example, Pelletier et al. in a randomised controlled study of a telephone-based stress management intervention found that intervention-associated decreases in somatization and anxiety that were evident at 6 months were no longer evident at one year follow-up.<sup>54</sup> This may, in part, be explained by return of favourably affected employees to unchanged (i.e., still stressful) work environments, resulting in the beneficial effects of individual intervention being eroded.<sup>20 55</sup> Further, in some cases, evidence of the benefits of individual approaches is mixed. For instance, in a critical review of individually-focused job stress management interventions measuring blood pressure as an outcome (20 studies), Murphy found that 1/3 of participants failed to learn relaxation or other techniques, and that benefits were observed in both intervention and control groups: average decrease among intervention groups was 7.8 mm Hg, versus 4.9 in controls.<sup>2</sup>

Conclusion 3: *Individually-focused, Low systems approach job stress interventions tend not to have favourable impacts at the organisational level.*

This conclusion is supported by numerous other comprehensive job stress intervention reviews.<sup>2 4 5 9 12-14 17 19 55</sup>

*High*-rated studies are less likely to assess individual-level outcomes than *Low*, but not markedly so (71% versus 88%, Table 2). More importantly, *High*-rated studies are similar to *Low* with respect to favourable impacts at the individual level (77% versus 88% of those studies in which individual-level outcomes measured, Table 2). *Moderate*-rated studies also show comparable likelihood of favourable impacts at the individual level. Sharper differences emerge when comparing organisational level evaluation and effectiveness (right side of Table 2). Most *High*-rated studies measured (93%) and found favourable impacts (93% of those where measured) at the organisational level. Similarly, *Moderate*-rated studies invariably measured (15 of 15 studies) and often found favourable impacts (67% of those where measured). This indicates a sharp contrast arises between *High/Moderate* versus *Low*-rated studies in relation to organisational impacts.

Conclusion 4: *Organisationally-focused High and Moderate systems approach job stress interventions have favourable impacts at both the individual and the organisational levels.*

The most common organisation outcome measured was absenteeism or sickness absence. Of the *High* studies in which this was measured (n = 10, either as an organisational rate or self-reported), almost all reported decreases during or following intervention (9 of 10). For one, the finding was ambiguous—absence rate ‘not decreasing’ in an uncontrolled study of nurses.<sup>56</sup> This finding must be interpreted cautiously, however, as many of the relevant studies had low causal inference ratings or provided only minimal information on this outcome. However, the same finding persists after restricting controlled and experimental studies (4 and 5 star ratings), with 5 of 5 studies reporting favourable changes.<sup>57-61</sup> Given the high relevance of absenteeism to organisation leaders (see economic evaluation section below), this represents an important outcome for additional study.

The finding on absenteeism is further strengthened by the comparative studies reporting on job stress intervention evaluations across multiple independent—which could not be included in Table 2 (summarised in Appendix Table III). In a study comparing intervention evaluation results across 217 workplaces, Lindstrom found that sickness absence was favourably associated with organisational more participatory and customer service-oriented interventions (Appendix Table III, page 44).<sup>39</sup> Similarly, in a comparative intervention study of 52 worksites, Nielsen et al. found that those workplaces that did the most to improve the psychosocial work environment (more primary intervention focused) achieved the highest drop in absence rates.<sup>48 62</sup>

Economic Evaluations: Of the six *High* systems approach studies that reported economic evaluations of some sort, all six reported favourable results.<sup>58 60 61 63-65</sup> Four of these were controlled studies (4 or 5 stars), but not all included statistical analysis of intervention versus controls. Economic evaluation was rare in *Moderate* and *Low*-rated studies (one in each, both reporting favourable economic outcomes<sup>66 67</sup>). Economic evaluation was usually centred on costs of sickness absence, with some including productivity. Notably, positive organisational-level findings are paralleled by favourable

changes at the individual level. These findings, however, must be interpreted cautiously due to moderate causal inference ratings. Three are detailed below.

- In an intervention with customer services and sales representatives, Munz et al. found a greater increase in sales revenue (23% versus 17% increase) and a greater decrease in absenteeism (24% versus 7%) in the intervention versus control groups; this was paralleled by significant improvements in perceived stress levels, depressive symptoms, and negative affectivity;<sup>60</sup>
- In an integrated job stress and physical activity intervention for Dutch manufacturing workers, Maes et al. found a significant drop in sickness absence in intervention (15.8% to 7.7%) versus control (14.3% to 9.5%) groups, which by the company's determination yielded a positive financial return on its investment in the project study.<sup>58</sup> This study also found significantly greater favourable changes in cardiovascular health risks (decrease), psychological job demands (decrease), job control (increase), and ergonomic risks (decrease) in the intervention group versus control. The known interaction between psychosocial and ergonomic exposures<sup>68</sup> may have played a role in the marked success of this intervention;
- In an integrated intervention study for Dutch hospital workers, Lourijzen et al. observed a significant difference in absenteeism percentage in intervention versus a control hospital after 3 years (4.0 versus 6.6).<sup>61</sup> There was also a greater decline over 4 years in intervention (8.9 to 4.0) than control (7.1 to 5.4) against steady rate averaged across all Dutch hospitals (6.5 to 6.6). Estimated benefits (1.6 million Guilders) exceeded costs (1.2 million Guilders) at the intervention hospital 2 years into the intervention. Once again, this finding was paralleled by favourable changes at the individual level.

Intervention mechanisms: Some studies have integrated process and effectiveness evaluation, providing insights into pathways through which observed changes in outcomes are made.<sup>42</sup> Some intervention evaluation evidence supports hypothesized physiological mechanisms from observational epidemiology studies, such as cardiovascular disease risk factors. Orth-Gomer et al. (*High*) found improvements in lipid profiles in association with improvements in psychosocial work environment in a randomised-controlled study (Appendix Table I, page 15).<sup>69</sup> Erikson et al. (*High*) made a similar finding in a controlled study (Appendix Table I, page 4).<sup>70</sup> Finally, Rydstedt et al. (*Moderate*) found significant improvements in blood pressure and heart rate to be correlated with changes in job hassles for inner city bus drivers (Appendix Table I, page 21).<sup>71</sup> Thus, job stress interventions affect cardiovascular disease risk factors, which epidemiologic study has shown to be on the causal pathway linking job stress to cardiovascular disease (see Chapter 2).

Other studies illustrate how *High* and *Moderate* systems approaches can favourably affect both individual and organisational level outcomes. Bond & Bunce 2001 (*Moderate*) found in a randomised-controlled study that favourable effects on mental health, sickness absence, and performance were mediated by increased employee job control through work re-organisation (Appendix Table I, page 18).<sup>72</sup> In a longitudinal comparative study of 81 Dutch workplaces, Taris et al. found that work-directed (primary prevention-focused), but not other, interventions are linked to job stress reduction (Appendix Table III, page 47).<sup>49</sup>

The importance of employee participation—central to *High* systems approaches—is highlighted in other studies. In a comparative longitudinal study of 40 work groups, Eklof et al. found that high employee participation and integration of occupational health with traditional core organisational concerns was consistently associated with decreases in work

demands, improvements in social support, and decreases in stress levels (Appendix Table III, page 43).<sup>38 46</sup> In another longitudinal comparative study, Lindstrom found that a collaborative/participatory approach applied in the intervention correlated significantly with many changes in organisational climate, and most of all with an increase in continuous improvement practices (Appendix Table III, page 44).<sup>39</sup> ‘Health Circles’, as developed in Germany, provide a systematic means of conducting participatory needs assessment and intervention development.<sup>16 73 74</sup>

Integrated OHS/HP Interventions: There is a growing interest in intervention strategies that integrate occupational health and workplace health promotion.<sup>75</sup> We identified eight studies<sup>53 58 61 63 65 76-78</sup> in this review that integrated job stress intervention with health promotion of some sort (e.g., physical activity,<sup>58</sup> smoking,<sup>61</sup> alcohol consumption<sup>77</sup>).

Most of these studies (5 of 8) had *High* systems approach ratings. Health behaviour outcomes were evaluated, however, in only two of these studies. In one, a significant increase in physical activity was reported,<sup>58</sup> and the other showed a decrease in smoking, but did not test this change for statistical significance. Three studies had *Low* systems approach ratings. One reported a significant decrease in alcohol and cigarette use,<sup>77</sup> one reported ‘more health behaviour changes’ in intervention versus control groups,<sup>53</sup> and the third reported increases in physical fitness.<sup>78</sup> The two latter studies included organisational-level outcomes, and findings in each echoed our conclusion above that that individual approaches can be effective at the individual level (including health behaviours as well as health outcomes) but are less likely to be so at the organisational level: Peters et al. found no impacts of the intervention on any of the several organisational level outcomes examined,<sup>53</sup> and Eriksen et al. found no effects on sick leave.<sup>78</sup> Integration with primary prevention in such interventions would both enable effectiveness at the organisational level and increase effectiveness at the individual level.

Though there are only a handful of integrated job stress and health promotion studies to date, there is great potential for improving worker health through integrated approaches, as reflected in the European Network for Workplace Health Promotion’s 2002 Barcelona Declaration on Developing Good Workplace Health in Europe.<sup>79</sup> This Declaration links the increase in mental disorders in Europe to increasing psychosocial stressors and strain in the workplace, and declares that smoking and alcohol consumption are also work-related, and “can only be tackled through health promoting workplaces.” Closer to home, the Tasmanian Workplace Safe agency has prepared excellent guidance material for employers and workers on ‘hidden hazards’, including specific linking of job stress with misuse of tobacco, alcohol, and other drugs.<sup>80</sup>

## CONCLUSIONS

Conclusion 1: *Studies of interventions using High systems approaches represent a growing proportion of the job stress intervention evaluation literature, possibly reflecting growing application of such approaches in practice internationally.*

Conclusion 2: *Individually-focused, Low systems approaches are effective at the individual level, favourably affecting a range of individual-level outcomes.*

Conclusion 3: *Individually-focused, Low systems approach job stress interventions tend not to have favourable impacts at the organisational level.*

Conclusion 4: *Organisationally-focused High and Moderate systems approach job stress interventions have favourable impacts at both the individual and the organisational levels.*

The observed growth in *High* systems approach studies in the job stress intervention evaluation literature in comparison to previous reviews is hopeful sign. This suggests that *High* systems approaches are likewise growing in practice—at least internationally. But there likely remains a long way to go before *High* systems approaches represent the norm in job stress intervention. Most previous reviews and authoritative declarations indicate that individually-focused (*Low*) approaches continue to dominate.<sup>6 13 17 25 36 81 82</sup>

Our main conclusion can be summarised (from Conclusions 2-4 above) as follows: the available evidence indicates that *High* systems approaches are the most effective in addressing the organisational and individual impacts of job stress. This is consistent with several other reviews that have applied similar lenses to the job stress intervention literature (described in Introduction above), all of which acknowledge the need to address both the causes and consequences of job stress.<sup>3 4 6 8-10 12-14 25 33</sup> In addition, addressing job stress using systems approaches is supported by leading authoritative statements and declarations.<sup>32 79 82 83</sup>

Our conclusions must also be qualified by the following limitations.

- The conclusions are necessarily generalisations;
- The inclusion of non-peer reviewed studies and those with low causal inference ratings (some 3-star studies) limits the confidence with which observed effects can be attributed to interventions alone. However, this inclusiveness affords a more representative picture of prevalent practice, as internally-initiated interventions (i.e., not researcher or evaluator-driven) tend to have less-developed evaluations and lower causal inference ratings, and are more often published in the grey literature;
- Our systems approach rating scheme was fairly crude, and was based only on information provided in publications. The published literature tends to focus more on evaluation and often provides only limited description of the intervention. For example, there is likely to be a wide range of degrees of participation among those interventions noted in the Tables as including participation;
- Our review was limited to interventions including employees or contractors independent of pre-existing susceptibilities, complaints, or illnesses (i.e., excluded patient populations, only employees reporting stress-related symptoms). Other reviews have taken complementary approaches and reached different conclusions. For example, a meta-analysis conducted by Van der Klink et al.<sup>11</sup> only included

participants recruited from working populations because of imminent or already-manifested stress-related psychologic problems. From this meta-analysis, it was concluded that stress management interventions are effective for such a target population, with cognitive-behavioural interventions being more effective than other types;

- We identified very few<sup>63</sup> intervention studies that integrated tertiary-level intervention with primary and/or secondary (see Figure 1). This suggests (but does not necessarily show) that this is also the case in prevalent practice. This represents a disconnect between tertiary level and other intervention research and practice at the organisational level (though Workers Compensation agencies often target primary or secondary prevention efforts on sectors with high job stress claims rates). Most literature in this area focuses on (early) return-to-work programs for employees who have filed job stress claims.<sup>84</sup> There are opportunities for building constructive links between tertiary and other intervention levels,<sup>11 44 84 85</sup> but also numerous pitfalls that are largely attributable to the challenges of integrating public health and insurance concerns.<sup>84 86</sup>

## RELEVANT LITERATURE NOT COMPREHENSIVELY REVIEWED

The scope of the comprehensive job stress intervention literature review was restricted to interventions expressly aiming to alter the sources of, responses to, or effects of job stress.<sup>1</sup> We also recognise, however, the relevance of other studies of planned or observed changes in job stress and associated outcomes, including developmental studies, natural experiments, and policy analyses. Summary discussions of each of these are provided below along with explanation of insights provided for job stress intervention.

Developmental Studies: Developmental intervention research provides an important complement to evaluation studies.<sup>42</sup> The following examples illustrate their utility. Cottrell outlines an in-depth survey-based needs assessment to develop focussed job stress interventions for community mental health nurses in a semi-rural area of North Wales.<sup>87</sup> Applying a systems approach, a range of specific and tailored interventions are developed for the individual, group ('team perspective'), and organisational levels ('systems perspective'). Such developmental research optimises the chances of success, and provides compelling justification for investment in intervention effectiveness evaluation studies.

In an Australian study of a medium-sized public sector agency, Noblet strategically assessed two barriers to adopting a 'settings' or public health approach to job stress: the lack of information on how job stress can influence health, and the lack of understanding of organisational-level aspects of this problem.<sup>35</sup> The goal was to stimulate a broader approach to job stress than prevalent lifestyle-oriented strategies. Using a comprehensive job stress audit, Noblet was able to show that job control and workplace social support accounted for large proportions of the variance in job satisfaction and psychological health, and that several job-specific stressors were predictive of the strain experienced by employees. These findings were used to advocate for a systems approach to job stress within the organisation under study. Such study is often necessary to prepare organisations for change, and to convince managements to adopt a systems approach over a narrower individual focus.

To optimally develop systems approaches to job stress, it is important to involve all aspects of the system. We noted above the particular disconnect between tertiary level players (e.g., return-to work coordinators, claims managers) and those engaged at the primary and secondary levels. Because job stress is a contentious issue, however, it is important to frame discussions as forward-looking in order to avoid defensiveness, issues of blame and fault, etc. A method for achieving this efficiently and effectively has been developed and tested by A Shaw and V Blewett and was used in a current project being undertaken for NSW WorkCover on job stress in the health and community services sector (MF Dollard, AD LaMontagne, A Shaw, and V Blewett). This method, called *Future Inquiry*, has the added benefit that it embodies the principles of participation and respect that underpin systems approaches. The method adapts existing participative planning techniques, building on appreciative inquiry<sup>88</sup> and future search<sup>89</sup> methodologies. This method aims to examine new directions for action by looking for fresh ideas and acknowledging what works well at present. A focus on positive stories and ideas generates respect for what has been done well, identifies the parts that individuals play in their organisations, articulates accepted values, and invites an affirmation and expansion of ideas. This approach yields insights that are grounded in the experience of stakeholders, reflecting the reality of everyday working life, and identifying existing strengths as well as needs.

*Future Inquiry* consists of a day-long workshop involving representatives of key stakeholder groups. The NSW event involved over 60 participants, including unions; employer representatives; health and safety representatives; workers and managers; treatment providers; OHS coordinators and consultants; rehabilitation coordinators and consultants; the OHS regulator; and the workers' compensation regulator. A particular strength of this approach is that it brings together of tertiary intervention stakeholders along with those focused more on primary and secondary strategies. The workshop alternates between small group work and plenary discussions. Activities identify stakeholder positions and needs, and progressively integrate those into intervention development. *Future Inquiry* also builds commitment to prevention strategies from the beginning. It provides a means for differences between stakeholders to be acknowledged without causing conflict. In the NSW workshop, there was remarkable congruence between normally opposed stakeholders on what the issues are and ways forward (e.g., the need to address stigma associated with stress claims in order to get people back to work). *Future Inquiry* supports the development of concrete actions and intervention strategies in a way that builds acceptance and commitment across the full range of relevant stakeholder and system levels.

Natural Experiments: 'Natural experiments' do not expressly aim to address job stress, and thus were not reviewed in detail in this report. However, they provide an important complement to the intervention evaluation literature, as demonstrated by the examples below. Dodd-McCue et al. provide an account of 'unintended consequences' of stress reduction (measured as role ambiguity, role conflict, and role overload) for critical care nurses resulting from a protocol change to improve communications during potential organ donation cases.<sup>90</sup> This small but valuable descriptive study illustrates how improvements in healthcare service provision and psychosocial work environment can go hand in hand.

Another study reviewed the impact of the growth in 'lean production' management methods with respect to associated effects on job stress.<sup>91</sup> Landsbergis et al. found little evidence that lean production "interventions" empower industrial workers or reduce their stress. To the contrary, they appear to intensify work pace and demands. Increases in decision authority and skill are very modest and/or temporary, and decision latitude remains low. Therefore, the expansion of "lean" work principles (e.g., an understaffed, flexible labour force, little job security, overtime) throughout the labour force could produce dramatic increases in the incidence of stress-related physical (e.g., hypertension, CVD) and mental health (e.g., depression) outcomes.

Finally, the Cornell Worksite Ambulatory Blood Pressure (AmBP) study is another example of a 'natural experiment' showing indirect benefits of job stress intervention.<sup>92 93</sup> This prospective study followed 285 healthy men aged 30-60 at eight New York city worksites. Data were collected at years 0, 3, and 6. Job strain was positively related to AmBP at each time point (cross-sectionally). Changes in job strain predicted changes in AmBP, after controlling for 10 other potential confounding factors. Most notably, decreasing job strain was associated with higher smoking quit rates.<sup>94</sup> These results demonstrate that decreasing job strain—from whether due to purposeful intervention or not—results in decreased AmBP as well greater success in quitting smoking, both of which decrease the risk of heart and other diseases. The quitting result is a valuable complement to the integrated intervention studies reviewed in this report (detailed above), demonstrating the potential for improvements in psychosocial work environment to result in improvements in health behaviours.

## Policy Interventions

Various legal, legislative, and other approaches to job stress issues are emerging across the industrialized world.<sup>95 96</sup> The concept of policy level intervention includes governmental regulatory policy, voluntary best practice guidelines published by non-governmental organizations, collective bargaining agreements, company policies, and more.<sup>42</sup> The European Union provides an example of a recent broad-based effort to address job stress, with its dedicated European Union OHS week 2002 on *Working on Stress - Preventing Psychosocial Risks at Work* (<http://osha.eu.int/ew2002/>).

There is little evaluation information to date on job stress policy interventions, but the limited studies to date in this area demonstrate the potential of policy interventions to stimulate systems approaches to job stress.<sup>96 97</sup> For example, the Swedish Working Life Fund was set up by government to promote and fund programs to improve work environments and work organization, to enhance productivity, and to improve rehabilitation.<sup>98</sup> Evaluation using a random sample of 7,500 of the 25,000 major programs funded showed increases in productivity, decision latitude, and job satisfaction, and decreases in physical job strain.<sup>98</sup> Notably, ratings by management and labour union representatives were almost equal.

There is also a number of policy precedents emerging, most notably from Europe and the UK.<sup>96 99</sup> The Management Standards approach exemplifies of how a national authority may introduce and implement organisational strategies for job stress prevention through a three stage process: entailing the development of (1) management standards, (2) risk assessment, and (3) risk indicator tools.<sup>99</sup> In the UK, this approach is embedded in a Health and Safety Executive (HSE) Stress Priority Programme, giving priority to collective over individual protective measures and emphasizing employee, employer, and researcher participation (approximating a systems approach). Problematic points of this approach relate to the clarity of the standards and their relation to the risk indicator tool, the validity of the risk indicator tool, and the scientific basis for standard threshold points.<sup>99</sup>

Another example of Management Standards, the Covenants on Health and Safety at Work in the Netherlands, were initiated as sectoral agreements with respect to stress management among representatives of the Dutch Ministry of Social Affairs and Employment, trade unions and employers organizations.<sup>99</sup> The Dutch Work Environment Act (WEA) applies to both the physical and psychosocial work environment with concern for safety, health and well-being at work being the clear responsibility of the employer.<sup>97</sup> The WEA states that employees should have the possibility of organizing their own work in accordance with their own professional qualifications, sufficient opportunity to determine their own work pace and keep in contact with their colleagues, and that monotonous and repetitive jobs should be avoided. The Dutch working conditions policy is linked to social security policy regulation in an attempt to reduce absenteeism; however, there is great bureaucratic segregation between social and industrial policies. The Ministry of Social Affairs and Employment introduced a national monitoring instrument, 'Work stress and physical work load,' in 1994.

In most OECD countries (e.g., those above), the responsibility for managing the relationship between work and mental health is divided between Ministries of Health and of Labour, rather than clearly residing with the former.<sup>100</sup> In these countries, overall

responsibility for public health resides with the Ministries of Health while responsibility for occupational health is placed within the Ministry of Labour or an independent agency (e.g., Victorian WorkCover Authority). This structural arrangement can be seen as an organizational form of 'role ambiguity' and is a barrier to effective action. Yet job stress is both an occupational health and a public health problem—requiring primary, secondary, and tertiary intervention efforts from all relevant stakeholders. There is an urgent need in the Victorian example of this situation for leadership in raising awareness of the seriousness of the problem among the various government (e.g., Victorian WorkCover Authority, DHS) and non-government stakeholder groups (e.g., unions, *beyondblue*, healthcare providers), advocating for systems approaches, and coordinating action among stakeholders.

## **IMPLICATIONS FOR RESEARCH, POLICY, & PRACTICE**

Further study is needed to develop the job stress intervention evidence base to guide policy and practice. Studies that include organisational outcomes, such as absenteeism and economic measures, will be particularly valuable for encouraging organisations to adapt systems approaches. The growing evidence base for systems approaches to job stress provides a timely opportunity for advocacy and information dissemination. Europe and the UK are providing international leadership on taking a systems approach to job stress. Translation of their policy and practice insights to Victoria—where systems approaches are not the norm in prevalent practice and policy (as outlined in subsequent chapters of this report)—would be valuable.

## LITERATURE CITED

1. Israel BA, Baker EA, Goldenhar LM, Heaney CA, Schurman SJ. Occupational stress, safety, and health: conceptual framework and principles for effective prevention interventions. *Journal of Occupational Health Psychology* 1996;1(3):261-286.
2. Murphy LR. Stress management in work settings: A critical review of the health effects. *Am J Health Promot* 1996;11:112-135.
3. Parkes KR, Sparkes T. Organizational interventions to reduce work stress: are they effective? A review of the literature. Contract Research Report 193/1998. Norwich, UK: Health & Safety Executive Books, 1998:52.
4. Karasek RA. An analysis of 19 international case studies of stress prevention through work reorganization using the demand/control model. *Bulletin of Science and Technology* 2004;24:446-456.
5. van der Hek H, Plomp HN. Occupational stress management programmes: a practical overview of published effect studies. *Occupational Medicine* 1997;47(3):133-141.
6. Kompier M, Cooper C. *Preventing Stress, Improving Productivity : European Case Studies in the Workplace*. London ; New York: Routledge, 1999.
7. Kompier M, Kristensen TS. Organizational work stress interventions in a theoretical, methodological and practical context. In: Dunham J, editor. *Stress in the Workplace: Past, Present and Future*. London: Whurr, 2001:164-190.
8. Kompier MA, Aust B, van den Berg AM, Siegrist J. Stress prevention in bus drivers: evaluation of 13 natural experiments. *Journal of Occupational Health Psychology*. 2000;5(1):11-31.
9. Kristensen TS. Workplace intervention studies. In: Schnall PL, Belkic K, Landsbergis P, Baker D, editors. *State of the Art Reviews in Occupational Medicine: The Workplace and Cardiovascular Disease*. Philadelphia: Hanley & Belfus, Inc., 2000:293-306.
10. Kompier MAJ, Geurts SAE, Grundemann RWM, Vink P, Smulders PGW. Cases in stress prevention: The success of a participative and stepwise approach. *Stress Medicine* 1998;14:155-168.
11. Van der Klink J, Blonk R, Schene A, van Dijk F. The benefits of interventions for work-related stress. *American Journal of Public Health* 2001;91:270-276.
12. Giga SI, Noblet AJ, Faragher B, Cooper CL. The UK perspective: A review of research on organisational stress management interventions. *Australian Psychologist* 2003;38:158-164.
13. Jordan J, Gurr E, Tinline G, Giga SI, Faragher B, Cooper CL. Beacons of Excellence in Stress Prevention: Research Report 133. London: UK Health & Safety Executive Books, 2003:194.
14. Michie S, Williams S. Reducing work related psychological ill health and sickness absence: a systematic literature review. *Occup Environ Medicine* 2003;60:3-9.
15. Mimura C, Griffiths P. The effectiveness of current approaches to workplace stress management in the nursing profession: An evidence based literature review. *Occupational Environmental Medicine* 2003;60:10-15.
16. Aust B, Ducki A. Comprehensive health promotion interventions at the workplace: experiences with health circles in Germany. *Journal of Occupational Health Psychology* 2004;9(3):258-270.
17. Caulfield N, Chang D, Dollard MF, Elshaug C. A review of occupational stress interventions in Australia. *International Journal of Stress Management* 2004;11:149-166.
18. LaMontagne AD. Evaluation of occupational stress interventions: An overview. In: NOHSC, editor. *Briefing Papers for Australian National Occupational Health &*

- Safety Commission (NOSHC) Symposium on the OHS Implications of Stress.*  
 Canberra: Australian National Occupational Health & Safety Commission, 2001:82-97.
19. Kobayashi Y, Takeuchi K. Stress management in European countries and US. *Sangyo Eiseigaku Zasshi* 2002;44(1):1-5.
  20. Cahill J. Psychosocial aspects of interventions in occupational safety and health. *Am J Ind Med* 1996;29(4):308-313.
  21. Cooper CL, Dewe PJ, O'Driscoll MP. Organizational interventions. *Organizational Stress. A Review and Critique of Theory, Research, and Applications.* Thousand Oaks: Sage Publications, 2001:187-251.
  22. Hurrell JJJ, Murphy LR. Occupational stress intervention. *Am J Ind Med* 1996;29(4):338-341.
  23. Melamed S, Froom P. Screening and management of the workplace for CVD risk: the clinician's role. *State of the Art Reviews: Occupational Medicine* 2000;15(1):238-245.
  24. Landsbergis PA. The changing organization of work and the safety and health of working people: a commentary. *Journal of Occupational and Environmental Medicine* 2003;45(1):61-72.
  25. Hurrell JJ, Murphy LR. Occupational stress intervention. *American Journal of Industrial Medicine* 1996;29:338-341.
  26. OTA. Hierarchy of controls. *Preventing Illness and Injury in the Workplace.* Washington, DC: US Congress, Office of Technology Assessment, 1985:175-185.
  27. LaMontagne AD, Youngstrom RA, Lewiton M, Stoddard AM, Perry MJ, Christiani DC, et al. An exposure prevention rating method for intervention needs assessment and effectiveness evaluation. *Appl Occup Environ Hyg* 2003;18:523-534.
  28. Halperin WE. The role of surveillance in the hierarchy of prevention. *American Journal of Industrial Medicine* 1996;29(4):321-323.
  29. Baum F. Health development and empowerment: communities and individuals. *The New Public Health.* Second Edition ed. New York: Oxford University Press, 2002:342-379.
  30. Noblet A, Murphy C. Adapting the Ottawa charter for health promotion to the workplace setting. *Health Promot J Aust* 1995;5(3):18-22.
  31. WHO. *Regional Guidelines for the Development of Healthy Workplaces.* 1999 ed: WHO, Regional Office for the Western Pacific, 1999.
  32. ENWHP. Luxembourg Declaration on Workplace Health Promotion in the European Union: European Network for Workplace Health Promotion, 1997.
  33. Bond FW. Getting the balance right: the need for a comprehensive approach to occupational health. *Work & Stress* 2004;18(2):146-148.
  34. Israel BA, Schurman SJ, Hugentobler MK, House JS. A participatory action research approach to reducing occupational stress in the United States. *Conditions of Work Digest* 1992;11(2):152-163.
  35. Noblet A. Building health promoting work settings: identifying the relationship between work characteristics and occupational stress in Australia. *Health Promotion International* 2003;18(4):351-9.
  36. Noblet A. Workplace health. In: Keleher H, Murphy B, editors. *Understanding Health : A Determinants Approach.* South Melbourne, Vic.: Oxford University Press, 2004:305-311.
  37. Polanyi MFD, Frank JW, Shannon HS, Sullivan TJ, Lavis JN, Bertera RL, et al. Promoting the determinants of good health in the workplace. In: Poland B, Green

- LW, Rootman I, editors. *Settings for Health Promotion: Linking Theory and Practice*. Thousand Oaks, CA: Sage Publications, 2000:138-174.
38. Eklof M, Ingelgard A, Hagberg M. Is participative ergonomics associated with better working environment and health? A study among Swedish white-collar VDU users. *International Journal of Industrial Ergonomics* 2004;34(5):355-366.
  39. Lindstrom K, Schrey K, Ahonen G, Kaleva S. The effects of promoting organisational health on worker well-being and organisational effectiveness in small and medium-sized enterprises. In: Murphy L, Cooper CL, editors. *Healthy and Productive Work: An International Perspective*. London: Taylor & Francis, 2000.
  40. ISI T. Master Journal List: Thomson ISI, 2005.
  41. Kristensen TS. Challenges for research and prevention in relation to work and cardiovascular diseases. *Scandinavian Journal of Work, Environment & Health* 1999;25(6):550-557.
  42. Goldenhar LM, LaMontagne AD, Katz T, Heaney C, Landsbergis P. The intervention research process in occupational safety & health: an overview from the NORA Intervention Effectiveness Research Team. *J Occup Environ Med* 2001;43(7):616-622.
  43. LaMontagne AD, Shaw A. Evaluating OHS Interventions: A Worksafe Victoria Intervention Evaluation Framework. Melbourne: University of Melbourne & Worksafe Victoria, 2004.
  44. Firth-Cozens J, Hardy GE. Occupational stress, clinical treatment and changes in job perceptions. *Journal of Occupational and Organisational Psychology* 1992;65:81-88.
  45. Cooper CL, Dewe PJ, O'Driscoll MP. Stress. In: Publications S, editor. *Organizational Stress. A Review and Critique of Theory, Research, and Applications*. Thousand Oaks: Sage Publications, 2001:20-26.
  46. Eklof M, Hagberg M, Toomingas A, Tornqvist EW. Feedback of workplace data to individual workers, workgroups or supervisors as a way to stimulate working environment activity: a cluster randomized controlled study. *International Archives of Occupational and Environmental Health* 2004;77(7):505-514.
  47. Nielsen M. The intervention project on absence and well-being (IPAW)--Denmark. In: EASHW, editor. *How to Tackle Psychosocial Issues and Reduce Work-Related Stress*. Luxembourg: European Agency for Safety and Health at Work (EASHW), 2002:52-58.
  48. Nielsen M, Kristensen T, Smith-Hansen L. The Intervention Project on Absence and Well-being (IPAW): Design and results from the baseline of a 5-year study. *Work and Stress* 2002;16(3):191-206.
  49. Taris T, Kompier M, Geurts A, Schreurs P, Schaufeli W, de Boer E, et al. Stress management interventions in the Dutch domiciliary care sector: findings from 81 organizations. *International Journal of Stress Management* 2003;10(4):297-325.
  50. Elliott T, Maples S. Stress management training for employees experiencing corporate acquisition. *Journal of Employment Counselling* 1991;28:107-114.
  51. Hyman RB. Evaluation of an intervention for staff in a long-term care facility using a retrospective pretest design. *Evaluation & the Health Professions* 1993;16(2):212-24.
  52. Teasdale EL, Heron RJL, Tomenson JA. Bringing health to life. In: Murphy LR, Cooper CL, editors. *Healthy and productive work: An international perspective*. London: Taylor & Francis, 2000.
  53. Peters K, Carlson J. Worksite stress management with high-risk maintenance workers: a controlled study. *International Journal of Stress Management* 1999;6(1):21-45.

54. Pelletier KR, Rodenburg A, Vinther A, Chikamoto Y, King AC, Farquhar JW. Managing job strain: a randomized, controlled trial of an intervention conducted by mail and telephone. *Journal of Occupational & Environmental Medicine* 1999;41(4):216-23.
55. Nowack KM. Screening and management of the workplace for CVD risk: individual stress management--effective or not? *State of the Art Reviews: Occupational Medicine* 2000;15(1):231-233.
56. Griffiths A, Randall R, Santos A, Cox T. Senior nurses: Interventions to reduce work stress. In: Dollard M, Winefield A, Winefield H, editors. *Occupational Stress in the Service Professions*. London: Taylor & Francis, 2003:169-191.
57. Kawakami N, Araki S, Kawashima M, Masumoto T, Hayashi T. Effects of work-related stress reduction on depressive symptoms among Japanese blue-collar workers. *Scandinavian Journal of Work, Environment & Health* 1997;23(1):54-59.
58. Maes S, Verhoeven C, Kittel F, Scholten H. Effects of a Dutch wellness--health program: The Brabantia Project. *Am J Public Health* 1998;88(7):1037-1041.
59. Michie S, Wren B, Williams S. Reducing absenteeism in hospital cleaning staff: pilot of a theory based intervention. *Occupational and Environmental Medicine* 2004;61(4):345-349.
60. Munz D, Kohler J, Greenberg C. Effectiveness of a comprehensive worksite management program: combining organisational and individual interventions. *International Journal of Stress Management* 2001;8(1):49-62.
61. Lourijssen E, Houtman L, Kompier MAJ, Grundemann R. The Netherlands: A hospital, "Healthy working for health". In: Kompier MAJ, Cooper CL, editors. *Preventing stress, improving productivity: European case studies in the workplace*. London: Routledge, 1999:86-120.
62. Nielson KT. Organization theories implicit in various approaches to OHS management. In: Frick K, Jensen P, L, Quinlan M, Wilthagen T, editors. *Systematic Occupational Health and Safety Management; Perspectives on an International Development*. Amsterdam: Pergamon Press, 2000:99-123.
63. Adkins J, Quick J, Moe K. Building world-class performance in changing times. In: Murphy L, Cooper C, editors. *Healthy and Productive Work: An International Perspective*. London: Taylor & Francis, 2000:107-131.
64. Matrajt M. Using ergonomic analysis and group discussion to identify and prevent stress in managers and assembly-line workers. *Conditions of Work Digest* 1992;11(2):152-163.
65. Nijhuis FJ, Lendfers M, de Jong A, Janssen P, Ament A. Stress-related interventions in construction work. In: Cooper CL, Liukkonen P, Cartwright S, editors. *Stress Prevention in the Workplace: Assessing the Costs and Benefits to Organisations*. Dublin: European Foundation for the Improvement of Living and Working Conditions, 1996.
66. Terra N. The prevention of job stress by redesigning jobs and implementing self-regulating teams. In: Murphy L, Hurrell J, Sauter SL, Keita GP, editors. *Job Stress Interventions*. Washington: American Psychological Association, 1995.
67. Smoot SL, Gonzales JL. Cost-effective communication skills training for state hospital employees. *Psychiatric Services* 1995;46(8):819-22.
68. Huang GD, Feuerstein M, Sauter SL. Occupational stress and work-related upper extremity disorders: concepts and models. *American Journal of Industrial Medicine* 2002;41:298-314.
69. Orth-Gomer K, Eriksson I, Moser V, Theorell T, Fredlund P. Lipid lowering through work stress reduction. *International Journal of Behavioral Medicine* 1994;1:204-214.

70. Eriksson I, Moser V, Unden A, Orth-Gomer K. Using knowledge and discussion to decrease stress in Swedish public administration officials. *Conditions of Work Digest* 1992;11(2):214-219.
71. Rydstedt LW, Johansson G, Evans GW. The human side of the road: improving the working conditions of urban bus drivers. *Journal of Occupational Health Psychology*. 1998;3(2):161-71.
72. Bond R, Bunce D. Job control mediates change in a work reorganization intervention for stress reduction. *Journal of Occupational Health Psychology* 2001;6:290-302.
73. Beermann B, Kuhn K, Kompier MAJ. Germany: Reduction of stress by health circles. In: Kompier MAJ, Cooper CL, editors. *Preventing stress, improving productivity: European case studies in the workplace*. London: Routledge, 1999:222-241.
74. Kuhn K. Health circles for foremen at Volkswagen (Germany). *Conditions of Work Digest* 1992;11(2):220-222.
75. LaMontagne AD. Integrating health promotion and health protection in the workplace. In: Moodie R, Hulme A, editors. *Hands-on Health Promotion*. Melbourne: IP Communications, 2004:285-298.
76. Sastry G. Using training to prevent or reduce stress in a coalmining company in India. *Conditions of Work Digest* 1992;11(2):268-275.
77. Alexander C, GC S, Rainforth M, Carlisle T, Todd C, Oates J. Effects of the transcendental meditation program on stress reduction, health, and employee development: a prospective study in two occupational settings. *Anxiety, Stress and Coping* 1993;6:245-262.
78. Eriksen HR, Ihlebaek C, Mikkelsen A, Gronningsaeter H, Sandal GM, Ursin H. Improving subjective health at the worksite: a randomized controlled trial of stress management training, physical exercise and an integrated health programme. *Occupational Medicine-Oxford* 2002;52(7):383-391.
79. ENWHP. Barcelona Declaration on Developing Good Workplace Health in Europe: European Network for Workplace Health Promotion, 2002.
80. Workplace Safe Tasmania. Stress, Bullying, Alcohol, & Other Drug Misuse: Hidden Hazards. Hobart: Workplace Standards Tasmania, 2003:47.
81. Giga S, Noblet A, Faragher B, Cooper CL. The UK perspective: a review of research on organisational stress management interventions. *Australian Psychologist* 2003;38(2):158-164.
82. EASHW. How to Tackle Psychosocial Issues and Reduce Work-Related Stress. Luxembourg: European Agency for Safety and Health at Work (EASHW), 2002.
83. The Tokyo Declaration on Work-Related Stress and Health in three post-industrial settings--the European Union, Japan, and the United States of America. *J Occup Health Psychol* 1999;4(4):397-402.
84. Franche R, Cullen K, Clarke J, MacEachen E, Frank J, Sinclair S, et al. Workplace-based Return-to-Work Interventions: A systematic Review of the Quantitative and Qualitative Literature. Toronto: Institute for Work & Health, 2004.
85. Nieuwenhuijsen K, Verbeek J, de Boer A, Blonk R, van Dijk F. Supervisory behaviour as a predictor of return to work in employees absent from work due to mental health problems. *Occup Environ Med* 2004;61:817-823.
86. Eakin J, MacEachen E, Clarke J. 'Playing it smart' with return to work: small workplace experience under Ontario's policy of self-reliance and early return. *Policy & Practice in Health & Safety* 2003;1(2):19-41.
87. Cottrell S. Occupational stress and job satisfaction in mental health nursing: focused interventions through evidence-based assessment. *Journal of Psychiatric & Mental Health Nursing* 2001;8(2):157-64.

88. Whitney D, Cooperrider D. The appreciative inquiry summit: overview and applications. *Employment Relations Today* 1998;25(2):17-28.
89. Weisbord M, Janoff S. *Future Search*. San Francisco: Berrett-Koehler Publishers, 2000.
90. Dodd-McCue D, Tartaglia A, Myer K, Kuthy S, Faulkner K. Unintended consequences: the impact of protocol change on critical care nurses' perceptions of stress. *Progress in Transplantation* 2004;14(1):61-7.
91. Landsbergis PA, Cahill J, Schnall P. The impact of lean production and related new systems of work organization on worker health. *Journal of Occupational Health Psychology*. 1999;4(2):108-30.
92. Schnall PL, Schwartz JE, Landsbergis PA, Warren K, Pickering TG. A longitudinal study of job strain and ambulatory blood pressure: results from a three-year follow-up. *Psychosom Med* 1998;60(6):697-706.
93. Schnall PL. Screening and management of the workplace for CVD risk: hypertension--could lowering job strain be a therapeutic modality? *State of the Art Reviews: Occupational Medicine* 2000;15(1):233-238.
94. Landsbergis PA, Schnall PL, Dietz DK, Warren K, Pickering TG, Schwartz JE. Job strain and health behaviors: results of a prospective study. *Amer J Health Promotion* 1998;12(4):237-245.
95. Levi L, Fine L, Steenland K, Warren N, Shimomitsu T, Odagiri Y, et al. Legislative and legal issues. In: Schnall PL, Belkic K, Landsbergis P, Baker D, editors. *The Workplace and Cardiovascular Disease. State of the Art Reviews in Occupational Medicine*. Philadelphia: Hanley & Belfus, Inc., 2000:269-292.
96. Landsbergis P. Legal and legislative issues: collective bargaining to reduce CVD risk factors in the work environment. *State of the Art Reviews: Occupational Medicine* 2000;15(1):287-290.
97. Kompier M, DeGier E, Smulders P, Draaisma D. Regulations, policies, and practices concerning work stress in five European countries. *Work & Stress* 1994;8(4):296-318.
98. Levi L. Legal and legislative issues: legislation to protect worker CV health in Europe. *State of the Art Reviews: Occupational Medicine* 2000;15(1):269-273.
99. Kompier M. Does the 'Management Standards' approach meet the standard? *Work & Stress* 2004;18(2):137-139.
100. Cox T, Leka S, Ivanov I, Kortum E. Work, employment and mental health in Europe. *Work & Stress* 2004;18(2):179-185.