Appendices

Workplace-based Return-to-work Interventions: A Systematic Review of the Quantitative and Qualitative Literature

Volume 3

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APPENDIX 1

Table 1.1: Terms applied in the literature search.

1: RTW or Compensation terms	2: Intervention or Strategy Terms
· return to work · re-employment · work disability · injured worker(s) · occupational diseases/rehabilitation · occupational diseases/therapy · functional limitation · physical capacity · work capacity · work limitation(s) · injury experience · workplace injury(ies) · work injury(ies) · workers compensation/ or workers compensation · compensation cost(s) · compensation claims cost(s) · time on benefit · benefit duration · sick listed · sick leave · sickness absence · sickness related absence · time loss(t) · lost time · lost workday · wage replacement	· ergonomic intervention · vocational rehabilitation · occupational rehabilitation · modified work · modified duty(ies) · job accommodation · work(place/er) accommodation · light duty(ies) · light work · graduated hours · alternative work · work(place/er) based · work site · work place · graded work · work(place/ers adj trial) · work visit · workplace linked · supervisor training · health care provider training · human resource training · early contact · co worker · supervisor · functional ability(ies) evaluation · functional capacity assessment · functional capacity evaluation · workplace intervention · work program · intervention · work adjustment · employer accommodation · work conditioning · work hardening · employer contact · flexible work(er) · case management · disability management · disability prevention

Table 1.2 - Summary of Intervention characteristics for quantitative intervention studies.

Study	OS	CS	Core DM			Additional features of DM								Education			Actors			
			Early contact	Work accomm.	HCP-Work place contact	Work site visit	Super-numerary replacement	Integrated occup-clin approach	RTW coordinator	Support to worker	Supervisor-Worker meeting	Conflict resolution	Ergonomics	HCP	Workplace	Worker	Supervisor	PT	Ergonomist	Other
Arnetz, 2003			_	_		_			_		_	_			_		_		_	_ CM, OT
Bernacki, 2000	_		_	_	_	_		_	_	_	_		_	_	_	_	_		_	_ CM
Karjalainen, 2003			_		_	_		_			_					_	_	_		_ Physician, nurse
Loisel, 1997	_	_	_	_	_	_		_			_				_		_		_	_ Physician
Scheel, 2002				_			_		_					_	_	_	_			
Verbeek, 2002			_	_	_			_ Occup. physician		_							_			
Yassi, 1995	_	_	_	_	_	_	_	_	_							_	_	_	_	_ OT

OS - Organizational structure
CS - Cultural structure
DM - Disability management
HCP - Healthcare provider
RTW - Return-to-work
PT - Physiotherapist
CM - Case manager
OT - Occupational therapist

Table 1.3 - Summary of intervention characteristics for quantitative observational studies.

Study	Organizational structure		Cultural structure			Core DM‡			Additional Features of DM‡			Education		
	Top management support for DM	Proactive RTW philosophy	People-oriented culture	Safety culture	Cooperative Labor-Management	Early contact	Work accommodation	HCP-Workplace contact	RTW coordinator	Support to worker	Ergonomic solutions	HCP	Workplace	Workers
Amick, 2000	_	_	_	_	_	_	_	_	_		_		_	
Crook, 1998							_							
Habeck, 1998	_	_	_	_		_	_	_	_		_		_	
Hogg-Johnson, 2003						_	_							

DM - Disability management
RTW - Return-to-work
HCP - Healthcare provider

Some of the observational studies discriminated more finely the distinctions within categories of organizational and cultural structures, as compared to the intervention studies. As a result, we have reflected this more discriminating approach in the organization of this table.

Table 1.4 - Summary of outcomes and costs for quantitative studies - Work disability duration, quality of life, and costs.

STUDY	DURATION					QUALITY OF LIFE							ECONOMIC ANALYSES					
	Time to 1st RTW	Duration of recurrences	# of recurrences	Total duration of work disability	Other	General physical health	Condition-specific functional status	Symptom or illness severity	Health-related QOL	von Korff (Pain)	VAS (Pain)	Other (Pain)	Compensation healthcare (HC) costs	Wage-replacement (WR) costs	Total comp. costs (HC + WR)	Other healthcare costs	Program Costs	Other
Amick, 2000					_*													
Arnetz, 2003				_		_		_					_	_	_		_	
Bernacki, 2000				_									_	_	_			_+
Crook, 1998	_																	
Habeck, 1998				_														
Hogg-Johnson, 2003	_						_		_	_								
Karjalainen, 2003				_			_		_			_				_		_++
Loisel, 1997	_			_			_	_				_	_	_	_	_	_	
Scheel, 2002	_		_	_	_**	_												
Verbeek, 2002	_	_		_		_	_				_							
Yassi, 1995				_			_				_		_	_	_			

* Primary Outcome (Other) for Amick was - Point prevalence of RTW status (yes/no) at 6 months post-surgery for carpal tunnel release patients.
** Primary Outcome (Other) for Scheel was - Long term disability (proportion of patients with absence exceeding 50 wks)
+ Economic Outcome (Other) for Bernacki was - "Administrative Costs" (second injury fund, attorney fees, compensation allocation, self-insured assessment, excess premium costs, and claims processing expenses).
++ Economic Outcome (Other) for Karjalainen was - Combined healthcare plus sick leave costs.

Table 1.5: Summary of quantitative study characteristics, methodological quality, and intervention description.

Author, Year Quality Rating	Study Design Jurisdiction	Follow-up	Participants	Control Group	Intervention/ Strategy Description	Control Intervention
Amick, 2000 Very high	Prospective cohort Maine, USA	6 months post-surgery	n = 197 carpal tunnel surgery patients working at least 20 hours per week at onset of symptoms. Ave. age=46 (sd = 9.5). 43% men.	None.	4 organizational policy and practice (OPP) scales were assessed for their predictive validity for RTW 6 months post-surgery: **People-oriented Culture** (POC), **Safety Climate** (SC), **Ergonomic Practices** (EP), and **Disability Management** (DM).	
Arnetz, 2003 Very high	Randomized controlled trial Sweden	1 year	n= 65 participants with MSK related sickness absence. Ave. age for total sample=42 (10) 40% men; 92% blue collar	n=72. 43% men; 79% blue collar.	**Proactive RTW insurance case management** with workplace ergonomic assessment promoting early offers of work accommodation to minimize sickness absence.	**Traditional case management strategies.**
Bernacki, 2000 High	Before-after study design without control group Maryland, USA	10 years	n (1989)=16,212 n (2002)=39,063. The total cohort varied in size over the 10 year -intervention period. Employees working in 2 large healthcare facilities with work-related compensable injury or illness were eligible for this study. Age, gender, and working class were not reported	None.	An **integrated on-site case management** program which included both primary and secondary disability prevention efforts involving multiple workplace parties.	
Crook, 1998	Prospective	1.75 years	n=138 workers with	None.	**Work accommodation offers.**	

Author, Year Quality Rating	Study Design Jurisdiction	Follow-up	Participants	Control Group	Intervention/ Strategy Description	Control Intervention
High	cohort Ontario, Canada		MSK lost-time claims. Ave. age= 40.6 (10.8) 53% men			
Habeck, 1998 High	Cross-sectional study Michigan, USA	Not applicable	n=220 workplaces in 7 industrial sectors, 6 of them in the 8 most hazardous industries - Food production, fabricated metals, transportation equipment, health services, furniture manufacturing, rubber and miscellaneous plastics, non-electrical machinery.	None.	8 organizational policy and practice (OPP) scales: **People-oriented culture** (POC), **safety diligence** (SD), **safety training** (ST), **active safety leadership** (ASL), **ergonomic solutions** (ES), **disability case monitoring** (DCM), **proactive return-to-work** (PRTW), **wellness orientation** (WO).	
Hogg-Johnson, 2003 Very high	Prospective cohort Ontario, Canada	1 year	n=1833 workers with MSK related lost-time claims. n=907 workers who were still off work 4 weeks post-injury Ave. age =38.8 (10.9), 49% men.	None.	Frequency and type of **work accommodation offers,** and **early contact** from the workplace to injured worker.	
Karjalainen, 2003 Very high	Randomized controlled trial Finland	1 year	Injured workers with LBP making work difficult for greater than 4 weeks but less than 12 weeks.	n=57. Ave. age=43. 40% men.	**Mini-intervention**: Injured workers were assessed by a physiatrist from the Finnish Institute for Occupational Health (FIOH) and offered a consultation focussed on explaining clinical results, providing	**Usual care** from GP and a pamphlet on back pain (as did injured workers in the other two groups).

Author, Year Quality Rating	Study Design Jurisdiction	Follow-up	Participants	Control Group	Intervention/ Strategy Description	Control Intervention
			Not all work disabled. **Mini-intervention:** n=56 . Ave. age=44. 41% men. **Work-site visit:** n=51 Ave. age=44. 43% men.		reassurance, and discussing work conditions. Results of the consultation were given in a written report to the workers' company physician and to their GPs. **Work-site visit:** In addition to receiving the mini-intervention, injured workers in this group received a work site visit by a physiotherapist, during which the supervisor, company nurse, and company physician were asked to join in. This 75-minute visit was aimed at following up on the information about good back posture habits at work and did not include an ergonomic assessment of the job.	
Loisel, 1997 Very high	Randomized controlled trial Quebec, Canada	6.4 years	Injured workers from 31 workplaces with occupational back pain: 14 workplaces in manufacturing, 7 in healthcare, 10 in the services sector. Workplaces were randomly assigned to one of four groups. **Occupational intervention:** n=22. Ave. age=44.5 (5.7). 59% men. **Clinical intervention:** n=31. Ave. age=40.2 (8.5). 58% men. **Combined**	n=26 Ave. age=41.7 (10.0). 81% men.	**Occupational Intervention:** Offered after 6 wks absence from work. Included a work site visit by ergonomist, participatory ergonomics approach involving ergonomist, worker, supervisor, labor, management, and an initial patient visit to an occupational physician. Workers also received the same components as in usual care. **Clinical Intervention:** Offered after 8 wks absence from work. Included back school, functional restoration, and cognitive-behavioural intervention offered by a back clinic. Workers also had an initial patient visit to an occupational physician. Workers also received the same components as in usual care. **Combined intervention:** Combination of both the occupational and the clinical intervention.	**Usual care** from GP plus video on back pain to injured workers, and questionnaire to supervisors.

Author, Year Quality Rating	Study Design Jurisdiction	Follow-up	Participants	Control Group	Intervention/ Strategy Description	Control Intervention
			intervention: n=25. Ave. age=37.4 (8.1). 40% men.			
Scheel, 2002 Very high	Cluster randomized controlled trial Norway	1 year	Employed back patients within 65 municipalities, absent from work for more than 16 days. **Passive intervention:** n=2045. Ave. age=39.2 (11.5). 46.4% men **Proactive intervention:** n=2232. Ave. age=40.7 (11.8), 51.7% men.	n=1902. ave. age=40.2 (11.5). 52.1% men.	**Passive Intervention:** Information package for general practitioners (GP). **Proactive Intervention:** Included the Passive Intervention with the addition of continuing education workshops for GPs and RTW resource person whose role was to facilitate communication between GPs, insurance staff, employers and injured workers, and assist with practical arrangements at the workplace.	**Usual care** from GPs.
Verbeek, 2002 High	Randomized controlled trial Netherlands	1 year	n=61 injured hospital workers with LBP on sick leave at least 10 days. Ave. age=38 (7.8). 39% men.	n=59. Ave. age=39 (8.7). 27% men.	**Training of occupational physicians** in guidelines for management of low back pain. It also included the reference group intervention: A **pamphlet for supervisors** and **access to usual medical care**.	**Pamphlet to supervisors** outlining disability management principles of low back pain, as well as access to **usual care**, and management by occupational physicians if not at work after 3 months of sick leave.
Yassi, 1995	Non-randomized controlled trial Manitoba,	1 year	n= 60 registered nurses or licensed practical nurses with compensable	n= 158. Ave. age=34.4 (8.5) Gender not reported.	**Combined occupational-clinical intervention:** Early assessment and treatment by a physiotherapist, under the direction of a physician and offer of modified	Included all other wards at the hospital. This intervention involved usual care from

Author, Year Quality Rating	Study Design Jurisdiction	Follow-up	Participants	Control Group	Intervention/ Strategy Description	Control Intervention
High	Canada		soft-tissue back injuries in a large healthcare facility. Ave. age=31.1 (8.1). gender not reported. Mix of non lost-time and lost-time claims.		work accommodation or work hardening as necessary for those participants that were unable to return to regular work. Ergonomic work site visits were also part of the intervention, as well as supernumerary replacements. Administered to targeted high-risk wards identified through an ergonomic assessment of physical demands. in a large tertiary care hospital in Manitoba.	worker's GP.

Table 1.6: Summary of confounding variables, statistical analyses, outcomes and findings for quantitative studies.

Author, Year	Confounding Variables Considered	Types of Analyses	Results		
			Duration	Quality of Life	Economic Analyses
Amick, 2000	Gender, age, and baseline carpal tunnel syndrome symptoms and functional limitations.	Logistic regression	**Positive Findings:** · All OPP scales were predictive of RTW status at 6 months post-surgery: POC: Odds Ratio (OR) =1.86; SC: OR=1.59; EP: OR=1.77; DM: OR=2.24.		
Arnetz, 2003	Physical and psychosocial work characteristics, MSK comorbidity, self-rated health status, gender, and socioeconomic factors.	t-test, chi-square, and logistic regression	**Positive Findings:** · Mean sick days for intervention group was 144.9 (Standard error of the mean (SEM)= 11.8) as compared to 197.9 (SEM 14.0) for control group (p<0.01). · OR for RTW at 12 months for intervention group was 2.5 (p<.01, 95%CI: 1.2, 5.1).	**Negative Findings:** · No significant differences between groups on self-reported general health on the following one item: "How would you rate your health today"?.	**Positive Findings:** · Wage replacement costs were lower for intervention compared to control groups (US $623,500 vs. US $878,200; p<.01). · Benefit-to-cost ratio=1.8*, based on the reduction in healthcare insurance costs ($12,197 - $9,592) divided by cost of the program per person ($1,410). · Benefit-to-cost ratio relative to cost of sick days and health insurance was 4.1*, based on reduction in wage replacement and health insurance costs ($11,874 - $8,694) + ($12,197 - $9,592) divided by program cost ($1,410). * These calculations were conducted by the IWH Literature Review group.
Bernacki, 2000	Size of departments, personnel recruiting, size of study population, job	Percent change in outcomes	**Positive Findings:** · Even as the working population increased, the number of		**Positive Findings:** · Wage replacement for temporary total disability costs per $100 of

Author, Year	Confounding Variables Considered	Types of Analyses	Results		
			Duration	Quality of Life	Economic Analyses
	assignments and tasks, injury reporting and recording mechanisms, management policy besides the managed care program, workers' compensation awards for lost-time injuries.	from before and after intervention	temporary total disability days per 100 insureds decreased from 163 days in 1992 to 37 days in 1997. No statistical analyses were conducted for this outcome.		payroll decreased 61% (1992: $0.18, 2002: $0.07). · Wage replacement for permanent partial disability costs decreased 63% (1992: $0.19, 2002: $0.07). · Medical losses per $100 payroll decreased 44% (1992: $0.27, 2002: $0.15). · Total losses per $100 payroll decreased 54% (1992 - $0.81, 2002 - $0.37).
Crook, 1998	Age, sex, pain behavior, positive symptom total, positive symptom distress, functional disability, physical independence handicap, social integration handicap	Time dependent proportional hazards regression model	**Positive Findings:** · The rate of RTW was nearly twice as high when the worker had a modified job to return to (RR=1.93; 95% CI: 1.54, 2.42).		
Habeck, 1998	Insurance administration type, loss control regulation, #of salaried vs. hourly workers, ave. wage, overtime work, rotating shifts, workforce tenure, having multiple plants, presence of safety standards, annual turnover, union representation, firm size, and industry type.	Multiple regression	**Positive Findings:** · A one-unit increase in Safety Diligence was associated with a 21% reduction in lost workdays. · A one-unit increase in Proactive Return-to-work RTW was associated with 16% fewer lost workdays.		
Hogg-Johnson, 2003	Age, gender, industrial sector, workplace size, body part injured, functional status, and	Frequency distributions, log rank chi square,	· Time receiving wage replacement was independently predicted by the following factors: 1) Condition-specific functional status (Roland-Morris: HRR=2.02, 95% CI: 1.68, 2.45, ASES: HRR=2.28, 95% CI: 1.75, 2.97, WOMAC: HRR=1.78, 3.56) 2) Body region (Lower extremity: HRR=0.39,		

Author, Year	Confounding Variables Considered	Types of Analyses	Results		
			Duration	Quality of Life	Economic Analyses
	pain.	multiple regression	95% CI: 0.20, 0.76; Upper extremity: HRR=0.63, 95% CI: 0.44, 0.89) 3) Change in pain (HRR=1.27, 95% CI: 1.11, 1.44) 4) Work accommodation offer (HRR=1.91, 95% CI: 1.48, 2.43) 5) Recovery expectations (HRR=0.65, 95% CI: 0.52, 0.81). · An interaction between change in pain and work accommodation offer was also a significant independent predictor of time receiving wage replacement (HRR=0.70, 95% CI: 0.58, 0.85). Work accommodation offers provided the largest reduction in time receiving wage replacement for workers with stable or worsening pain. For workers with improving pain, combined with poor functional status or recovery expectations, the offer of a work accommodation reduced their time receiving wage replacement. For workers with improving pain, combined with high functional status and good recovery expectations, the offer of a work accommodation made little difference in their time receiving wage replacement. · Most workers (66%) were contacted by someone from their workplace. Of those, 60% were contacted before the baseline interview. · Employer contact was not associated with shorter durations of time receiving wage replacement. · Only 35% of the respondents were offered workplace RTW accommodations. · Type of work accommodations offered were the following: Reduced hours (24%), flexible schedule (25%), lighter job (57%), change in layout or equipment (8%), other/not specified (30%).		
Karjalainen, 2003	Age, gender, education, marital status, BMI, physical activity and general health, pain, disability, functional status, working class, job satisfaction, ability to work, working in forward-bending position, physical burden of work, mental burden of work, health-related quality of life, healthcare during the past 3 months,	Generalized Estimating Equations method, Kruskal-Wallis non-parametric tests.	**Positive for Mini-Intervention;** · Both intervention groups spent fewer days on sick leave than usual care group (Mean days on sick leave - Mini: 19.; Work visit: 28, Usual care (UC): 41). (Median days on sick leave - Mini: 0; Work visit: 1; Usual care: 7). **Negative for Worksite Visit** · No significant differences between the intervention groups for time on sick leave.	**Positive for Mini-Intervention; Negative for Worksite Visit** · Both intervention groups reported less daily pain than usual care on measure of pain by Deyo (1998) (Mini vs UC, p = 0.002; Work visit vs UC, p = 0.030). · Mini-intervention group reported pain was less bothersome (p = 0.032) and interfered less with daily activities (p = 0.039) than usual care, on measure of pain by Deyo (1998). · No significant group differences	**Positive for Mini-Intervention; Negative for Worksite Visit** · Diagnostic test and radiological examinations costs were significantly smaller in the Work site visit group than in the usual care group (p=0.038). · No significant group differences for direct healthcare costs. · Total costs (wage replacement and healthcare costs) were $3552 less in the Mini-intervention group and $2927 less in the Work visit group compared with the Usual

Author, Year	Confounding Variables Considered	Types of Analyses	Results		
			Duration	Quality of Life	Economic Analyses
	satisfaction with overall medical care, expectation of not recovering, and subjective risk for not recovering.			were found for pain intensity, condition-specific functional status (Oswestry disability index), or generic health-related quality of life (15-D measure). · No significant differences were found between the intervention groups for any quality of life outcomes.	care group (p=0.075, p=0.098). · No significant differences between intervention groups for any economic outcomes.
Loisel, 1997	Age, gender, comorbidity, and body mass index.	Survival analyses, log-rank tests	**Positive Findings:** · The rate of return to regular work was 2.23 times greater in the combined intervention (95% CI: 1.04, 4.80) than in the usual care group. · The return to regular work was 1.91 times faster in the two occupational intervention groups than in the other two groups (95% CI: 1.18, 3.10). · No significant effect was found for the clinical component of the intervention. · When comparing the four intervention groups, those in the combined intervention returned to regular work 2.41 times faster than those in the usual care intervention group (95% CI: 1.19, 4.89). · For the 6.4 year follow-up, all three interventions saved days on full benefits when compared to the usual care arm. Mean duration on full benefit days: Combined - 125.6 days, Occupational - 228.0, Clinical - 178.7, Usual care -	**Mixed Findings:** · Functional status (Oswestry disability index) was significantly improved in the combined intervention as compared to the usual care group. There were no significant differences in pain level (McGill Pain questionnaire) and symptom severity (Sickness Impact Profile). · The groups receiving the occupational component showed a statistically significant improvement in symptom severity. There were no differences in pain level and functional status. · Groups receiving the clinical component showed statistically significant lower levels of pain. There were no differences in functional status and symptom severity.	**Positive Findings:** · **Cost-benefit:** Cost-benefit represented the amount of wage-replacement costs saved in each arm. It was calculated by subtracting the additional intervention costs compared to standard care, from the reductions in wage replacement costs against standard care. 1st year follow-up: the clinical and combined intervention were not cost-beneficial, while the occupational arm was moderately cost-beneficial compared to usual care. At 6.4 year follow-up, all interventions were cost-beneficial However, the difference between interventions was not statistically significant (p=0.48, Kruskal-Wallis). · **Cost-effectiveness:** At the 6.4 year follow-up, for cost effectiveness in terms of cost for each saved day on full benefits, all three interventions were cost-effective, with the occupation arm being the most cost -effective.

Author, Year	Confounding Variables Considered	Types of Analyses	Results		
			Duration	Quality of Life	Economic Analyses
			418.3. · For *return to any work*, no statistically significant benefit was found in any group of combination of groups.		
Scheel, 2002	Age, gender, presence of sciatica, previous sick leave episodes, physical work demands.	Rank sum test and parametric t-tests.	**Negative Findings:** · No significant differences between groups for 1) average days on sick leave for the first episode of work disability; 2) average days on sick leave for all episodes; and 3) the proportion of workers returning to work within 50 weeks after injury. · Post-hoc comparisons for those workers using Active Sick Leave (ASL) found: 1) Proactive group used ASL 24.2 days earlier than the control group (p=.04); 2) median sick leave in Proactive group was significantly shorter than Control group (p<0.01), but not significantly different than Passive group.	**Negative Findings:** · No significant differences between groups were found for both the Physical Functioning and Bodily Pain scales on the SF-36 measured at 3 months follow-up. **Other Outcomes of Interest:** · Impact of intervention on ASL implementation: Use of ASL increased by 50% (from 11.5% in Control and Passive groups to 17.7% in Proactive group) by the use of the Proactive intervention (p=0.018).	
Verbeek, 2002	Age, gender, low back pain-related diagnosis, history of low back pain, pain intensity, functional disability, general health perception, work-related demands, mean working hours, and work experience.	Cox regression analyses, chi-square tests, and Mann-Whitney U tests	**Negative Findings:** · Time to first RTW was not significantly different between groups at 3 mths and 12 mths. · At 12 months, the RTW rates were high for both groups. · The mean duration of work disability due to low-back pain and due to all causes did not differ between the two groups. · At 12 months, the recurrence rate was 25% in control group and 51% in intervention group. The HRR	**Negative Findings:** · No group differences for pain intensity (Visual Analog Scale), condition-specific functional disability (Roland-Moris disability questionnaire), and general health perception (Nottingham Health Profile).	

Author, Year	Confounding Variables Considered	Types of Analyses	Results		
			Duration	**Quality of Life**	**Economic Analyses**
			was 2.4 (95% CI, 1.2 - 4.7).		
Yassi, 1995	Prior back injury, pain, disability, whether injury occurred during patient lifting or patient transfers.	Between group comparisons and multiple regression	**Positive Findings:** · The total time lost per 100 000 paid hours dropped by 29% in study group, while there was a 51% increase in control group. · Participation in early RTW intervention program was predictive of shorter duration of time-loss claims during the study by as much as 45 days (p<0.016).	**Positive Findings:** · At 6 months follow-up, study ward nurses reported significantly lower disability scores (Oswestry disability index) than control ward nurses (p=0.008).	**Positive Findings:** · Total WC costs decreased 8% in study group, while increasing 42% in control group. · Study wards had higher medical costs than control wards ($845 vs. $728) for lost-time claims. · Study wards had lower wage replacement costs than control wards ($3 822 vs. $4 270) for lost time claims.

Table 1.7: Work site visit characteristics by study for quantitative studies.

Study	Description of the work site visit	Timing of intervention	Discipline of person conducting the visit	Other individuals attending the visit	Sample
Arnetz, 2003 (Sweden) Very high quality	· Ergonomic assessment of physical and psychosocial stressors, followed by appropriate ergonomic improvements	· 2 weeks after claim registration	· Occupational therapist/ ergonomist	· Employee · Insurance case manager · Employer	· Lost-time claimants with MSK condition
Bernacki, 2000 (American) High quality	· Visit to determine the tasks that the injured employee can perform given the medical restrictions. · If supervisor indicated that a work accommodation could not be offered, a more in depth job analysis was conducted.	· The program began within 24 hours of the injury. The timing of the visit was not specified.	· Industrial hygienist	· For the job analyses, a joint meeting was held with the industrial hygienist, supervisor, injured employee, and case manager.	· Employees in two large American healthcare institutions with a work-related injury resulting in a filed worker's compensation claim
Karjalainen2003 (Finland) Very high quality	· 75 minute visit aimed at following up on information given at medical visit regarding good back habits, involving the supervisor and company health care professionals · Written report sent to company physician, and worker's GP.	· Not specified	· Physiotherapist	· Employee · Supervisor · Company nurse · Company physician These individuals were asked to join in the session.	· Injured workers presenting at primary healthcare centers with limiting low back pain lasting between 4 to 12 weeks, but not necessarily resulting in absence from work.
Loisel, 1997 (Canadian)	· Ergonomic assessment of job demands based on task description from employee and	· 6 weeks after injury	· Ergonomist from back pain clinic	· Employee · Employer	· Injured workers with occupational back pain with

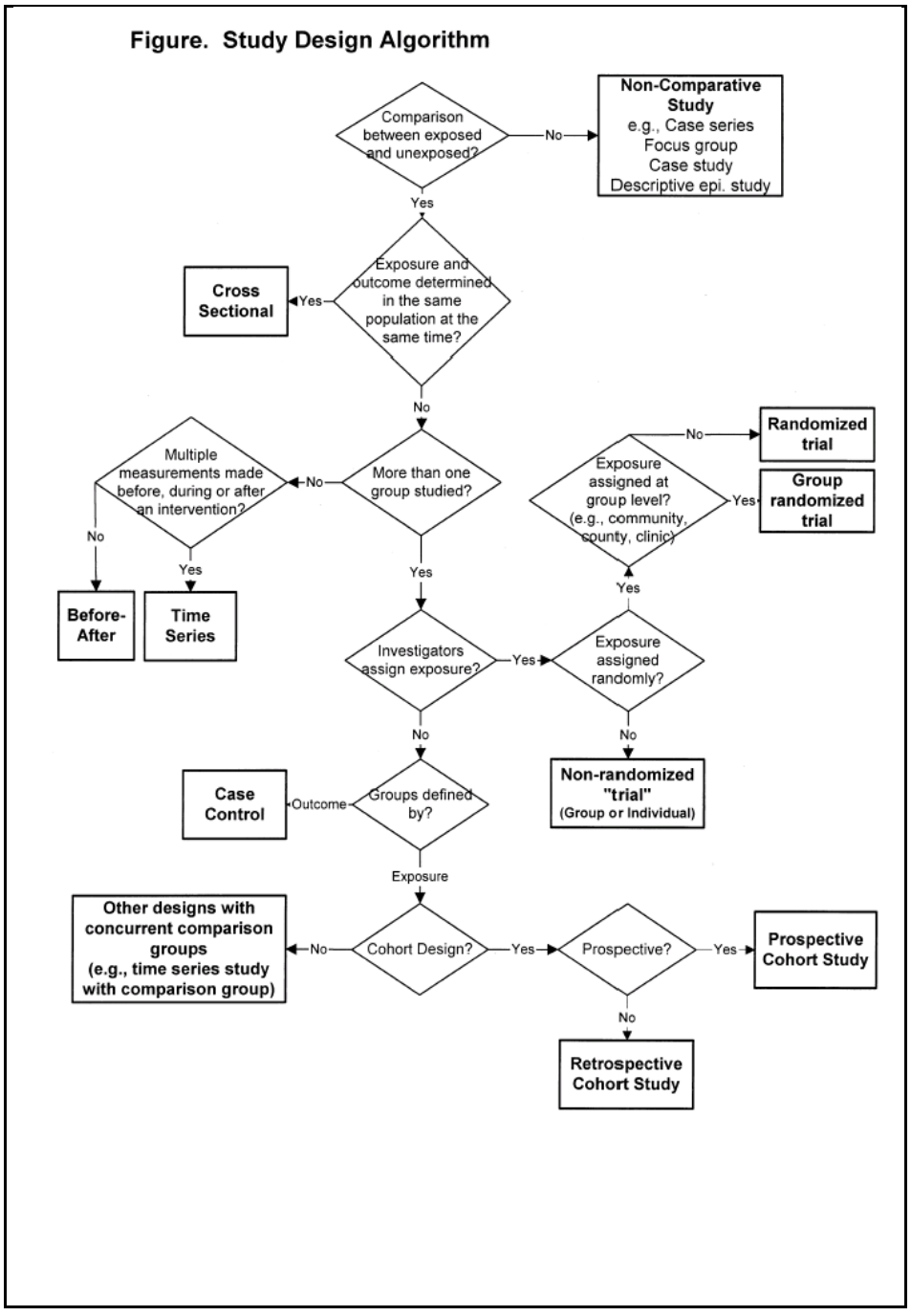
Study	Description of the work site visit	Timing of intervention	Discipline of person conducting the visit	Other individuals attending the visit	Sample
Very high quality	employer, as well as direct observation · Solutions are proposed to management, who decide if they can implement the solution or not.			· Union rep	work disability for a duration of 4 to 12 weeks. Sectors included manufacturing, healthcare, and services.
Yassi, 1995 (Canadian) High quality	· Ergonomic evaluation of the target wards was done prior to the beginning of the study to determine the physical demand of nursing tasks on those wards. This information was used to established criteria for RTW and to identify wards suitable for modified work. · When a nurse in the work hardening program met the criteria for modified work, the nurse was assessed weekly on site to assess suitability of the modified work.	· The program began within one week of the injury and lasted a maximum of 7 weeks. The timing of the visit varied.	· Occupational therapist	· Employee	· Nurses with lost-time and non lost-time claims for a work-related and compensable back injury.

Table 1.8: Key concepts found in qualitative studies.

APPENDIX 2

Figure 2.1: Application of search strategy

Figure 2.2: Study design algorithm applied for quantitative studies (From Zaza et al., 2000).

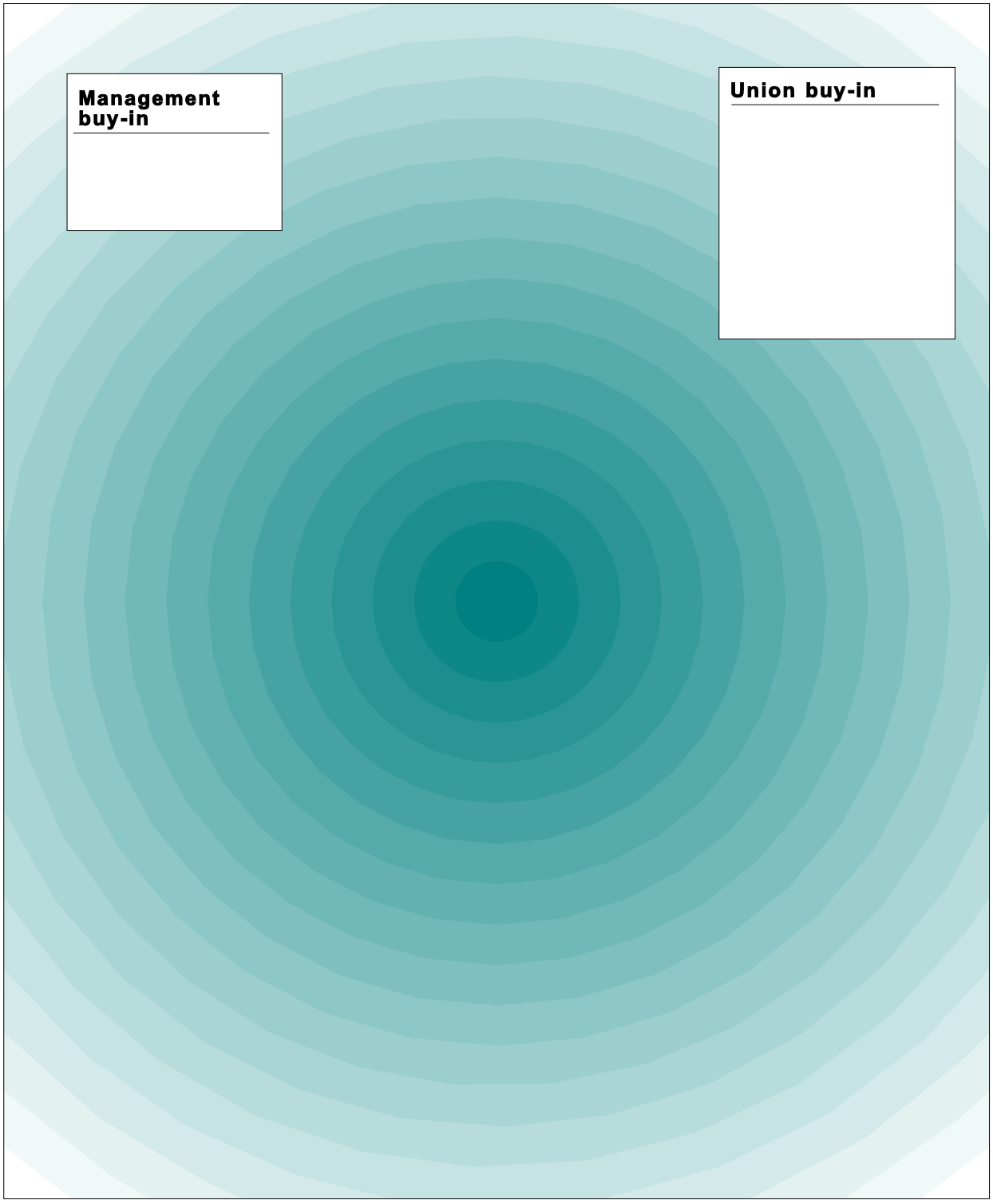


Zaza S, Wright-De Aguero LK, Briss PA, Truman BI, Hopkins DP, Hennessy MH et al. Data collection instrument and procedure for systematic reviews in the Guide to Community Preventive Services. Task Force on Community Preventive Services. Am J Prev Med 2000; 18(1 Suppl):44-74.

Figure 2.3: Flowchart of studies in literature review.

Figure 2.4: Conceptual model of interventions found in the quantitative studies.

Figure 2.5: Trust and goodwill in RTW in qualitative studies.



APPENDIX 3

Quality of the Research in the Area of Workplace-based RTW Interventions for Quantitative Studies

A primary objective of the literature review was to provide an assessment of the methodological strengths and limitations of studies conducted in the area of workplace-based return-to-work (RTW) interventions. This will provide guidance for future research to improve the overall quality of studies conducted in this field.

In this section, we will first outline our approach in developing criteria to assess the methodological quality of the quantitative studies relevant to this systematic review. This will be followed by a summary of the methodological strengths and weaknesses of the 35 studies reviewed, and of the 11 studies retained for data extraction. We will then discuss the following special issues related to the quality of research in this field: Consideration of phase specificity; Measurement and control of confounding variables; Impact of study design on quality of the study; Implementation of intervention issues. We close this section with special recommendations regarding future research in the area of workplace-based RTW research.

Development of methodological quality criteria

Systematic reviews often restrict inclusion criteria for studies to one or two specific study designs such as randomized controlled trials (RCT). However, it is now well recognized that it is often not feasible or optimal to conduct research in the intervention area using only experimental designs (21). The primacy of the RCT as the gold standard study design to evaluate interventions is being challenged due to the difficulty of conducting an RCT to evaluate a complex intervention, the high cost of RCTs, the difficulty in interpreting negative RCT results (e.g. failure to demonstrate underlying effectiveness vs good evidence of ineffectiveness), and the tendency to underestimate the evidence generated by observational studies (44). Quasi-experimental designs with nonrandom control groups or longitudinal data collection offer the next best option (11;21;28). In view of the heterogeneity of study designs in the area of RTW research, we chose to widen our inclusion criteria to the majority of study designs used, which included cross-sectional and cohort observational designs.

The conceptualization of our quality appraisal system included both quality appraisal systems typically found in systematic reviews which are design-specific (7;14;42) and newly emerging systems from the literature focusing on interventions (56). Our quality appraisal system sought to avoid reducing the quality rating of studies on the basis of study design alone. Quality criteria were adjusted to be more "flexible" in their fit to study design. For instance, the concept of *"Control for confounding variables*" could be met if "*Important confounding variables and co-interventions were controlled for statistically*" as would be the case in a cohort design or if "*Important confounders and co-interventions are measured and distributed equally between groups*" as in a controlled trial.

In addition, when a criterion was "not applicable", due to the design of the study, this was factored in our calculation of overall number of studies meeting each criterion.

Using this system, we appraised the quality of the 35 quantitative studies assessed to be relevant for the literature review.

Summary of quality appraisals for the 35 studies relevant to the literature review

The designs of the 35 studies relevant to the literature review were very heterogeneous. We grouped the study designs in the following categories: 1) Randomized and non-randomized controlled studies (Controlled trials) 2) Prospective or retrospective cohort studies 3) Quasi-experimental designs 4) Cross-sectional studies: Before-after studies, with and without comparison group. The number of studies found in each category is found in Table 3.1 at the end of this appendix.

The methodological strengths of studies will now be discussed. As described in the Methods section of the full report, the team of reviewers had determined, by consensus and prior to reviewing any study, the criteria which were most critical to ensure internal validity of the study. Those critical criteria are the methodological strength criteria referred to as "MS criteria". Some of them, such as whether the source population was adequately defined or if inclusion/exclusion criteria were specified, also impacted on the external validity of the studies. The non-MS criteria were quality criteria which were assessed but not considered critical to ensure internal validity.

A summary of how each study met each MS criteria is found in Table 3.1. In Figure

3.1, we find the percentage of the 35 studies which met each MS criteria.

The following MS criteria were **met frequently** by the 35 studies assessed :

- 70% of studies had participation rates of 40% or over or no difference between participants and non-participants (criterion 3)
- 69% had follow-up rates over 50% or no difference between participants and drop-outs (criterion 4)
- 74% had outcomes which were adequately defined and measured (criterion 7)

Other MS criteria[1] were **met less frequently**:

- 63% of studies had adequate identification of source population (criterion 1)
- 63% had inclusion/exclusion criteria described and appropriate (criterion 2)
- 66% had adequate description of interventions or strategies (criterion 5)
- 40% had important confounders controlled for statistically or distributed equally between groups (criterion 6)
- 60% had adequate study design to answer the literature reviews' question about primary outcomes (criterion 8)

Regarding non-MS quality criteria (Figure 3.1), the following non-MS criteria were **met frequently** by the 35 studies assessed :

- 91% of studies used prospective designs, or the temporal relationship between exposure and outcome was clear and correct (criterion 10)
- 89% had a clearly defined research question (criterion 11)
- 84% provided adequate descriptions of theoretical constructs underlying the workplace interventions (criterion 18)

Other non-MS criteria were **met less frequently**:

- 57% of studies had participants in similar and well-defined point in the course of their condition (criterion 12)

[1] It should be noted that criteria #9 - No other serious flaw identified by reviewers - is not considered in our summary of criteria due to its unspecified nature. Reviewers used this criteria to indicate a serious flaw otherwise not captured by other criteria.

- 47% had participants in a similar and well defined point in the course of their condition (criterion 13a)
- 43% of studies with participants who had MSK conditions only, had classified participants by phase (acute, subacute, chronic) (criterion 13b)
- 51% had baseline characteristics measured for all study participants (criterion 14)
- 34% had adequate statistical power (criterion 15)
- 29% had measured exposure to interventions adequately (criterion 16)
- 8% had monitored participation compliance in all study groups (criterion 17)
- 40% had measured at least one of the following confounding variables: Functional status, pain, comorbidity, or physical demands (criterion 19)
- 46% had appropriate statistical analyses (criterion 20)

Overall, the quality of studies in this area was poor and indicative of low internal validity.

Quality appraisal of the 11 studies proceeding to data extraction

The quality of the 11 studies meeting our quality criteria to proceed to data extraction as compared to studies not meeting the criteria was significantly improved, as expected. Studies proceeding to data extraction were clearly superior to those which didn't, on all MS criteria (Figure 3.2). Regarding other non-MS criteria, the most striking differences where studies proceeding to data extraction were clearly superior to those which didn't, were found for the following criteria: Source population is comparable for participants exposed and not exposed to the intervention; Participants were in similar and well-defined point in the course of their condition; Participants with MSK conditions were classified by phase (acute, subacute, chronic); Baseline characteristics were measured for all study participants; Statistical analyses had sufficient power; Exposure to interventions or strategies were measured adequately; One of the following confounding variables was measured: Functional status, pain, comorbidity, or physical demands; Statistical analyses were appropriate; and Phase-specificity was considered in statistical analyses when participants had MSK conditions.

It should be noted that only one study (33-37) had a follow-up period longer than one year. In order to assess the sustainability of return to work, we need to conduct

studies with longer follow-up periods.

Special issues - Consideration of phase specificity

Given the practical implications of the phase-specific aspects of MSK conditions, we were interested in examining how well studies of participants with MSK conditions addressed the issue of phase-specificity.

As a first step, in all 35 studies, we examined how homogeneous the participants were with respect to course in their condition with the following question: *" All study participants are in a similar and well-defined point in the course of their condition".* Possible responses were: *Yes, No, Unclear, Not reported, Not Applicable - unit of analysis not injured workers.* When this information was unclear or not reported, the study did not meet our criterion. For 17% of the studies, this criterion was evaluated to be not applicable due to the nature of the unit analysis (e.g. claim rates) (Figure 3.3). For the rest of the studies, we observed that approximately half of the studies did meet this criteria and half did not. This reflects a high degree of heterogeneity in the course of the conditions of study participants.

We then examined how well the 30 studies of MSK conditions addressed the issue of phase-specificity, both in terms of classification of participants and of statistical analyses. This criterion was not applicable for 14% of studies, as they did not examine MSK conditions only (see Figure 3.4). Thirty-seven percent of the studies included only one phase of MSK condition(s) which was clearly identified. However, 17% of studies had multiple phases of the condition but did not identify the phases. In 31% of the studies, no information was provided on phases. This absence of information is mirrored in the degree to which statistical analyses addressed phase-specificity (Figure 3.5). Thirty-seven percent of studies had only one phase of the condition represented in the sample, so that phase-specific analyses were not possible. A total of 42% of studies did not consider phase-specificity in the statistical analyses (11%) or did not provide any information about it (31%). Six percent of studies included duration since injury as a variable in statistical analyses.

The aspects of sample description, and control for course in condition in statistical analyses are clearly areas which warrants improvement in future studies. Heterogeneity

in course of condition prevents one from making meaningful inferences about the particular group of participants if they are not statistically controlled for. The absence of information on course of disorder, phase classification, and of statistical control for phase, present important limitations in studies of workplace-based RTW interventions.

Special issue: Measurement and control for confounding variables

The control for potential confounding variables, such as pain and functional status, is essential in the study of RTW behavior and general recovery for individuals with pain-related conditions. In only 40% of the 35 studies were confounding variables measured, and in only 37% of studies were confounding variables either controlled for statistically or found to be comparable in study groups.

In order to investigate this methodological weakness, we focused more narrowly on each category of confounders: Functional status, pain, comorbidity, and physical demands. In Figure 3.6, we observe parallel patterns for measurement and control of confounding variables. The confounding variable most frequently taken into consideration is functional status, followed by pain levels, physical demands of work, and finally by comorbidity, which was measured and controlled in only 9% of studies assessed.

Measurement and control of confounding variables appears to be a methodological area in need of improvement.

Special issue - Types of conditions included in the study sample

In 83% of the 35 studies, participants were exclusively individuals with MSK conditions. Other studies included workers' compensation claimants, or in European countries, claimants of state insurance providing benefits for sick leave. None of the studies included a homogeneous group of individuals with a pain-related condition other than MSK.

This focus on claimants and MSK conditions may be associated with the source of funding for the research projects. Insurance companies and workers' compensation boards fund projects which will advance our knowledge in the area of return to work for claimants, who in 70% of the case have a MSK condition. However, the exclusive focus on claimants and individuals with MSK conditions seems to signal that other funding

agencies should consider funding research projects focusing on return to work in a wider set of populations.

Special issues - Impact of study design and of unit of analysis on quality appraisal of the study

Given the heterogeneity of study designs found in the area of workplace-based RTW interventions, we were interested in examining the impact of study designs on quality appraisal. We examined how well the studies in each study design category met our MS quality criteria (see Figure 3.7). It can be observed that while the overall quality of controlled trials and of cohorts was good, the quality of cross-sectional and quasi-experimental designs was lower. The fact that certain MS criteria were not met in cross-sectional and quasi-experimental studies did not appear to be attributable to an inherent aspect of the nature of the design: Inclusion/exclusion criteria clearly defined and appropriate; Important confounders controlled for or distributed equally between groups.

For the non-MS criteria (Figure 3.8), again controlled trials and cohort studies demonstrated higher methodological quality. And, in parallel to the MS criteria, the fact that the following non-MS criteria were not met by the cross-sectional and quasi-experimental studies could not be attributed to the nature of those designs: Comparability of source population; Similarity in point in course of condition; Information on phase of MSK condition; Information on baseline characteristics; Adequate statistical power; Measurement of exposure/intervention; Measurement of participation compliance; Measurement of confounding variables; Adequate statistical analyses.

We found that unit of analysis used was confounded with study designs. Many of the cross-sectional and quasi-experimental studies used claim rates rather than individuals workers as their main unit of analysis (Table 3.3). Of the 15 studies using quasi-experimental and cross-sectional designs, 10 of them (67%) used workplace claim or absence rates as their main unit of analysis, as compared to 3 of the 20 studies (15%) using controlled trials or cohort designs.

Studies using claim or absence rates as units of analysis often did not have ready access to individual characteristics of the claimants, which would explain the absence of information on inclusion/exclusion criteria, baseline characteristics, and individual confounding variables. These studies were often conducted in one single

workplace,(3-6;8;22;25;41;43;52) or across multiple workplaces, (23;24;26;31;32;38-40;48;49) or wards, (12;13;50;53-55). The studies either involved the implementation of a large program, or recorded if certain strategies or interventions were available, based on employer reporting. They were therefore conducted in some sense at a further “distance” to their subject than a controlled trial in one workplace. As such, it was often less feasible to measure exposure to the intervention, or compliance to the intervention.

It appears that unit of analysis are closely tied to the type of study design used, and they can be an obstacle to collecting a comprehensive set of information at multiple levels - worker, workplace, claims.

Special issue - Implementation of intervention

It is critical to address implementation and feasibility issues when conducting intervention research, if one hopes to achieve wide-based implementation of an intervention with sustainability. We examined how many of the 11 studies entering the data extraction phase addressed issues of feasibility and implementation of the intervention.

Only 69% of studies addressed any feasibility or implementation issue of the intervention (Figure 3.9). Thirty -one percent documented the cost of the intervention. No study mentioned any potential harm of intervention.

Approximately half of the studies (46%) addressed in some way implementation aspects of the intervention. Some studies included verifications of implementation such as number of ergonomic recommendations which were actually implemented by the employer (33-37), number of job analyses conducted (3-6), number of recommendations made by intended providers (27), time between first day of work absence and initiation of RTW process (2). Other studies included proxy measures of implementation such as worker satisfaction with employer role (2;45-47), insurance role (2;45-47), healthcare provider (27)(45-47), and general RTW process (45-47).

Thirty-one percent of studies addressed barriers to implementation of interventions: Low participation rates of targeted providers to education programs (45-47), poor compliance of targeted providers (51), lack of information provided to middle management regarding the research conducted (33-37), and low involvement of

top management in implementation of intervention (33-37).

Facilitative coalitions or roles were also noted in 15% of studies: The presence of a RTW coordinator (45-47), the presence of third-party ergonomists (3-6), and the involvement of unions (33-37) were identified as important facilitators of implementation of interventions. The Loisel study (33-37) was particularly detailed in its documentation of implementation issues of a participatory ergonomic workplace intervention. It identified the following facilitators: Initial agreements from employers and unions to participate in the research project, ensuring availability of paid time for worker and supervisor for multiple meetings, ensuring availability of paid time for two workplace staff to attend training sessions. As well, in the study conducted by Bernacki (3-6), when encountering difficulties in enrolling supervisors in training to provide work accommodations, the introduction of third-party ergonomists greatly facilitated the implementation of the work accommodation protocol.

Overall, information regarding implementation of studies was presented very inconsistently. Rarely was data collected regarding implementation aspects. Implementation was most commonly discussed in the discussion section of the main paper, but at times was also the focus of a separate paper (3-6;33-37)(45-47).

Recommendations

Based on our review of the quality criteria of the 35 studies relevant to our literature review, we propose the following recommendations to improve the quality of research in this area:

- **Improve documentation and description of source population and sampling frame.** Many of the methodological flaws found in the 35 studies examined can be attributed to a lack of information regarding the source population and sampling frame. In some instances, this reflects an oversight on the part of the researchers or a lack of appreciation of the importance of that documentation. As well, part of the explanation lies in the fact that many studies used workplace claims data as the primary outcome and consequently their unit of analysis was the workplace, not the worker. Different units of analyses such as workers, workplaces, wards, and supervisors reflect the fact that interventions can be aimed at different levels of action

(10), from workplace policies such as disability management to worker-based interventions, such as job analysis. However, despite the fact that accessing individual data can present certain challenges, greater efforts should be made in future studies to do so, which would facilitate the documentation and description of the source population and inclusion/exclusion criteria. This will allow the replication of the study to assess robustness of findings.

- **Increase participation and follow-up rates.** Intervention research presents many challenges in terms of obtaining adequate participation rates and follow-up rates. These challenges were evident when we examined the quality of the research in the 35 studies considered. Many studies had participation rates below 40% and/or follow-up rates below 50%, with no information on potential differences between participants and non-participants, or on continuers and discontinuers. The question of generalizability of findings in this area is of critical importance and researchers need to make serious efforts in increasing participation and follow-up rates. When faced with unsatisfactory participation and follow-up rates, it is important to proceed to the systematic analysis of selection bias and attrition bias. Key elements facilitating increased participation and retention may include developing a collaborative relationship with the involved workplaces throughout the complete course of a study (20) and using well-established methods of recruitment (17).
- **Address the impact of confounding factors**. The impact of potential confounding variables, which are known to have important influences on return to work, was rarely addressed in the studies reviewed: Functional status, levels of pain, comorbidity, and physical demands of work were rarely considered. This represents one of the most serious methodological weaknesses.

It should be kept in mind however, that one can not ever control for all potential confounding variables. One should choose the variables to examine as potential confounding variables judiciously, using both empirical and theoretical information. In the area of return to work, one should strive to also consider social variables such as gender, jurisdiction, size and sector of the workplace. As well, organizational factors, such as high turnover, or varying economic climates, need to be considered when examining the impact of workplace-based RTW interventions

over time.

- **Ensure adequate statistical power.** Many studies suffered from being underpowered statistically. The very nature of outcome variables in the area of RTW research requires very large sample size to achieve adequate statistical power. The distribution of duration of claims and claims costs is clustered and consequently violates assumptions of normality. The dichotomous nature of RTW rates can also require large sample size - the longer the period over which sustainability of RTW is assessed, the larger the sample size required since an increasingly smaller proportion of workers over time will be work-disabled. Conducting a priori power analyses along with feasibility pilot studies would ensure that adequate sample size can be accrued.
- **Use adequate control groups and adequate study designs.** Poor study designs were often due to inadequate control groups. In one controlled trial, the “Usual care” control group in fact included the provision of a new intervention present in all arms of the study (51). The new intervention may have had unsuspected effects, which could not be assessed due to the nature of the design of the study. As well, certain control groups were not similar in inclusion/exclusion criteria to the intervention arm group (55). Contamination can pose a threat to internal validity when experimental and control groups are offered within the same workplace. It is often not feasible to provide a “usual care” control group, due to desire on the part of the workplace to move away from the usual care model - in that regard, carefully designed before-after or time-series designs provide an option to examine effectiveness of interventions.
- **Ensure that participants are in a well-defined point in the course of their condition.** If there are multiple points in the course of the condition represented, these points should be identified and taken into consideration in statistical analyses. If these relate to MSK conditions, the phase classification described below should be used.
- **Use phase-specific classification and analyses.** Two criteria considered in our quality appraisal were specific to studies conducted with MSK conditions - the classification of participants by phase (acute/subacute/ chronic) (19;30) and the consideration of phase-specific effects in the statistical analyses. In view of previous

studies finding phase-specific effects (16), future studies would benefit from incorporating this aspect of MSK conditions in their study designs when recruiting participants from more than one phase of the condition. Using a phase-specific approach can uncover significant effects in, what at first glance, appears to be a null effect due to a lack of differentiation of phases. The finding of phase-specific effects have important implications for the clinician and for the employer, in terms of the timing of their interventions.

- **Measure intermediate variables.** Three quality criteria considered were specific to the area of intervention research: Description of exposure/intervention; Measurement of exposure/intervention; Participation compliance of participants in intervention. Adequate description of interventions is of course essential to the transferability of the evidence regarding a given intervention. Interventions used in the 35 studies were generally well described in terms of type, intensity, and setting. However, few studies measured the intervention or, stated differently, measured whether the intervention was implemented as intended. Compliance of participants was also rarely monitored.

  In the last few years, increased attention in intervention research has been given to the importance of these "intermediate variables" (20;57). Intermediate variables refer to the processes related to the implementation, feasibility, and compliance aspects of interventions, and to variables believed to "mediate" effects observed in primary outcomes (e.g. changes in attitudes and beliefs). For stakeholders intending to implement an intervention, intermediate variables are of critical importance since they address the real issues of how easily an intervention can be implemented and how well received is the intervention. We have seen that of the 11 studies entering data extraction, only about half addressed implementation issues, and this was done in an unsystematic way.

  The two criteria of measurement of intervention and compliance address internal validity aspects; If intervention and compliance are not measured but simply assumed, it is not possible to assess what the observed effects are truly due to. Intermediate variables are now increasingly being incorporated in research designs (1;18) and their importance should be reflected in future research in this area.
- **Increase access to individual worker variables.** We found a relationship between

types of designs and quality of research which, on closer examination, appeared to be associated with the primary unit of analysis used in the studies. Fewer cross-sectional and quasi-experimental studies met our quality criteria as compared to controlled trials and cohort studies. However, the majority of cross-sectional and quasi-experimental studies used workplace claims and absence rates as units of analysis. When using these units of analyses, it is more arduous, although not impossible in all cases, to access individually-based data such as baseline worker characteristics and confounding variables related to demographics and health status of participants. The data may simply not be available in the administrative databases used, or there are additional ethical hurdles in terms of obtaining consent for access to this data. Nevertheless, in view of the importance of access to such data to address generalizability, external validity, and internal validity aspects of studies, future research should attempt to go the "extra mile" to obtain such important data, possibly with a subgroup of participants in large trials. In addition, it is well-known that regarding return to work, claim data from administrative databases overestimate the rate of return to work as compared to self-report data (15;29), and that this discrepancy increases over time. Consequently, future research on return to work would benefit from using both administrative and self-report data on return to work.

- **Conduct studies with longer follow-up periods in order to assess sustainability of return to work.** Sustainability of return to work is of primary concern when examining the impact of work disability on workers. A first return to work is far from being sustainable as a study of Ontario workers with permanent partial impairments has established (9).
- **Increase the amount of research conducted with workers with conditions other than MSK conditions**. All studies were focused on either claimant or individuals with MSK conditions. It is important to begin to examine return to work in individuals with other types of causes of work disability.

In summary, our quality appraisal of the 35 studies of workplace-based RTW interventions points to a high degree of heterogeneity regarding study designs and units of analysis. Many methodological weaknesses were observed, the majority of which are

remediable. Implementation of the recommendations for future research rely in fact on better planning of studies and increased collaboration with workplaces and insurance companies involved in interventions and data collection, with minimal increased costs.

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Table 3.1. Design of 35 studies selected for quality appraisal

	Controlled Trials	Cohort Studies	Quasi-experimental	Cross-sectional studies
24 studies not meeting quality appraisal criteria	7	4	8	5
11 studies meeting quality appraisal criteria and entering data extraction	6	3	1	1
Total of quantitative studies (n=35)	13 (37%)	7 (20%)	9 (26%)	6 (17%)

Table 3.2: Methodological criteria met by all studies entering quality appraisal (n=35)

First Author, Year	Methodological Strength Criteria*									# of Criteria met by Study
	1	2	3	4	5	6	7	8	9	
Studies proceeding to Data Extraction										
Amick, 2000	+	+	+	+	+	+	+	+	+	9
Arnetz, 2003	+	+	+	+	+	+	+	+	+	9
Bernacki, 2000	+	?	NA	+	+	-	+	+	+	6
Crook, 1998	+	+	+	?	-	+	+	+	+	7
Habeck, 1998	+	+	+	NA	+	-	+	+	+	7
Hogg-Johnson, 2003	+	+	+	+	+	+	+	+	+	9
Karjalainen, 2003	+	+	+	+	+	+	+	+	+	9
Loisel, 1997	+	+	+	+	+	+	+	+	+	9
Scheel, 2002	+	+	+	+	+	+	+	+	+	9
Verbeek, 2002	+	+	+	+	+	+	+	+	-	8
Yassi, 1995	+	+	+	+	+	+	+	-	+	8
Studies not proceeding to Data Extraction										
Baldwin, 1996	+	?	?	NA	+	-	+	+	+	5
Bronner, 2003	+	+	+	+	+	+	+	+	-	8
Durand, 2001	-	+	+	+	+	+	-	+	-	6
Feuerstein, 2003	+	+	+	-	+	-	+	-	+	6
Green-McKenzie, 2002	+	+	NA	+	+	-	+	-	+	6
Greenwood, 1990	+	+	+	+	?	+	+	?	+	7
Habeck, 1991	+	+	+	NA	-	-	+	?	+	5
Haig, 1990	-	+	NA	-	-	-	+	+	+	4
Hazard, 2000	?	?	+	+	?	+	+	+	+	6
Hochandel, 1993	-	?	-	?	-	-	?	?	+	1
Jensen, 1998	+	+	+	+	+	-	+	-	+	7
Kenny, 1998	+	-	+	NA	-	-	+	-	-	3
Lancourt, 1992	+	+	-	+	-	+	+	+	+	7
Lemstra, 2003	-	+	NA	+	+	-	+	+	+	6
Linton, 1991	?	-	-	NA	+	-	-	-	+	2
McLellan, 2001	-	-	NA	-	+	-	-	-	+	2
Mobley, 2000	-	-	?	+	+	-	?	-	+	3
Nordstrom-Bjorverud, 1998	+	+	?	+	?	-	-	?	+	4
Perry, 1996	?	-	?	?	+	-	?	?	+	2
Selander, 1999	-	-	?	+	-	-	-	+	+	3
Shaw, in press	-	-	NA	?	+	-	+	+	+	4
Symonds, 1995	+	-	+	-	-	-	+	+	-	4
Wiesel, 1994	?	?	?	?	+	-	?	?	-	1
Williams, 1991	-	+	+	NA	-	-	+	+	+	5
# studies meeting criteria:	22	22	20	20	23	14	26	22	29	

+ Study met this criteria
- Study did not meet this criteria
? Unclear as to whether or not study met this criteria
NA Not applicable

*** Methodological strengths criteria:**

1. Source population is identified
2. Inclusion and exclusion criteria are described and appropriate.
3. Participation rate is greater than 40%, OR
6. Important confounding variables (including functional status, pain, comorbidity, or physical demands) and co-interventions are controlled for, OR are distributed equally among groups

there are no major differences between participants and non-participants.
4. Follow-up is reported and loss to follow-up is less than 50%, OR there are no major differences between drop-outs and participants remaining in the analyses.
5. The intervention(s) or strategies are sufficiently described to allow reasonable replication.
7. Outcome is defined and measurable.
8. Design of the study is appropriate to answer the study question about the literature review's primary outcomes.
9. No other serious flaws were identified by the reviewers of the study.

Table 3.3. Types of units of analysis used in quantitative studies.

	Controlled trials	Cohort studies	Quasi-experimental studies	Cross-sectional studies
Individual workers	10	7	1	4
Supervisors	0	0	1	1
Hospital ward claim or absence rates	1	0	0	0
Workplace claim or absence rates	2	1	8	2
Total of studies *	13	7	9	6

* Since some studies used more than one type of unit of analysis, the total number of studies is lower than the sum of units of analysis.

APPENDIX 4

Methods Used in Quality Assessment of Qualitative Studies

Qualitative research methods are increasingly utilized in the medical and social service fields - areas which have traditionally been firmly embedded within quantitative research tradition and world view. The interpretive methods used in qualitative research depend on a different type of engagement with the data than is the case with quantitative research, and different standards - for example, trustworthiness, credibility, transferability (15), and plausibility (16) - are used to judge methodological quality.

The increase in the number of qualitative research papers published in healthcare journals, and the attendant need for assessment of their methods, has spawned a proliferation of checklists (9;19) used in judging submissions for publication. Because they are often operating in contexts strongly influenced by quantitative research, the tendency has been to apply criteria which are influenced by that paradigm. Recently, voices from within the qualitative disciplines have countered this tendency. For example, Barbour and Barbour (1) argue against the over-prescriptive utilization of checklist items in evaluating qualitative papers, and that more engagement with the concepts "could yield a distinctive approach more appropriate for this type of work. They cite Mason's (17) distinction between 'collecting' and 'generating' data; this underlines the centrality of the researcher's role, which involves interpretation of the data, and building an argument while providing a description of how the findings were reached.. Eakin and Mykhalovskiy (6) argue for a more "substantive" orientation that centres on the relationship between research practices and substantive findings and interpretation.

The methods which were used to assess quality

In this review, we used a modified version of a framework that had recently been developed by researchers based at the National Centre for Social Research in the United Kingdom (22) to guide assessments of the quality of qualitative research evaluations. The framework involved 17 questions (Table 4.1), these being based on four principles, i.e. that the research should be:

- contributory in advancing wider knowledge or understanding;

- defensible in design by providing a research strategy which can address the questions posed;
- rigorous in conduct through the systematic and transparent collection, analysis and interpretation of qualitative data;
- credible in claim through offering well-founded and plausible arguments about the significance of the data generated (22).

Our modification of the original framework eliminated a question that pertained specifically to evaluation research, and provided space in which reviewers recorded their answers to each question, including comments and impressions of the study under review, based partially on the "possible features for consideration" and partially on their own professional judgment and experience.

All papers that passed the initial judgment as to study relevance (which included the same elements as those in the quantitative section, plus a judgment that the research was qualitative) were evaluated using the above-mentioned framework. The several studies that had been authored or co-authored by the reviewers were given to external reviewers, who conducted the quality assessment, and recommended the papers' inclusion or exclusion from the systematic review.

The final decision on inclusion of the papers in the review and on their rating involved several additional considerations. The first was a judgment of whether the authors had achieved the study objectives, as described in the paper. In addition to this, we rated studies as to their credibility and depth of the analysis:

- studies rated "low", included cases where the data were too invariable, due to inadequate analysis and/or sampling strategy, where the data did not "ring true" and it appeared that the authors had superimposed their own set of ideas on the data;
- studies rated "medium" were those in which the analysis was descriptive in nature, and which were somewhat "thin" in their description of the reality, for example where detail was limited, where consideration of context of the research or the participants' situation was lacking, where the picture presented was relatively superficial;

- studies that were categorized as “high” were also descriptive but included a more adequate level of analysis, with consideration of context, presentation of a more nuanced picture of study participants and the complex environment in which they functioned;
- the category “very high” required a theoretical focus, with consideration of the internal processes involved in creating the situation which was being described, (for example, links to macro structures), and with explanatory value which could be transferred to other research arenas.

Two studies which were categorized as “low” were excluded. The quality appraisal summary of the 13 studies that remained in the final analysis is found in Table 4.2. Critical appraisal of the 13 qualitative studies reviewed resulted in one study (7) being rated as of “very high” quality; five (3;5;8;11;21) being rated as “high”, and seven (2;4;10;12;14;18;20) being rated as “medium”.

Strengths and limitations of the papers

All of the studies used qualitative methods of inquiry to build a broader understanding of the RTW process, introducing the voices of the different participants in the process, describing their experiences and (in some cases) the meanings they attribute to these. They developed a variety of themes relating to the RTW process. At best, they developed theoretical the foundations which may be applied more broadly in other research. In general, however, we found that there is considerable room for improvement in the overall body of research in this area.

Many of the studies are situated firmly within positivist framework, i.e., describing a “reality” which exists independent of the context in which the research was done, and in which the participants live their lives. While these studies do make a contribution, and help build a picture of RTW programs as they exist today, they often miss the opportunity to consider the broader forces which shape these perceptions, and the multiple “realities” that exist. They may present a relatively flat, un-nuanced picture, or one which seems arranged in a preconceived pattern, and which foregoes the richness and texture which well done qualitative research can provide. We recommend that future studies include more consideration of contextual factors, and engagement with the

data - for example, analysis and interpretation where there is consideration of how the nature of the sample itself bears on the data collected and the interpretations made of them, and presentation of data that enhances readers' capacity of "feel" the texture of the account being put forward and understand the logic of the conclusions being put forth.

Page limits and the readership focus of most of the journals that publish applied research on RTW articles govern the amount of detail which can be included, and the level of complexity of theoretical arguments which are appropriate. We recommend that applied health journals wishing to incorporate high-quality qualitative articles consider longer page limits for these, in order to allow for more comprehensive description of both methods and findings. We recommend, also, that future studies use not only qualitative methods (e.g., interviews, focus groups) in data collection, but also strive to adopt a more qualitative stance in their analysis of data and generation of conclusions, including more reflexivity (deliberation on how the researcher and the research methods may have influenced the data), and more integration of contextual considerations into the analysis.

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(3) Baril R, Clarke J, Friesen M, Stock S, Cole D, Bombardier C et al. Management of return-to-work programs for workers with musculoskeletal disorders: A qualitative study in three Canadian provinces. Social Science & Medicine 2003; 57(11):2101-2114.

(4) Baril R, Martin J-C, Lapointe C, Massicotte P. Etude exploratoire des processus de reinsertion sociale et professionnelle des travailleurs en readaptation. RR-082, 1-17. 1994. Montreal. Ref Type: Report

(5) Clarke J, Cole D, Ferrier S. Working Paper #127 Return to work after a soft tissue injury: A qualitative report. Toronto: Institute for Work & Health, 2002.

(6) Eakin JE ME. Reframing the evaluation of qualitative health research: reflections on a review of appraisal guidelines in the health sciences. Journal of Evaluation in Clinical Practice 2003; 9(2):187-194.

(7) Eakin JM, 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 and Practice in Health and Safety 2004; 1(2):19-41.

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(20) Roberts-Yates C. The concerns and issues of injured workers in relation to claims/injury management and rehabilitation: The need for new operational frameworks. Disability & Rehabilitation 2003; 25(16):898-907.

(21) Shaw L, Segal R, Polatajko H, Harburn K. Understanding return to work behaviours: promoting the importance of individual perceptions in the study of return to work. Disability & Rehabilitation 2002; 24(4):185-195.

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Table 4.1: Questions Used in Quality Assessment of Qualitative Papers

1. How credible are the findings?
2. How has knowledge/understanding been extended by the research?
3. How well does the study address the original aims and purpose?
4. Scope for drawing wider inference - how well is this explained?
5. How defensible is the research design?
6. How well defended is the sample design/target selection of cases?
7. Sample composition/case inclusion - how well is coverage described?
8. How well was the data collection carried out?
9. How well was the approach to/formulation of the analysis conveyed?
10. Contexts of data sources - how well are they retained/portrayed?
11. How well has diversity of perspective and content been explored?
12. How well has detail, depth and richness of data been conveyed?
13. How clear are the links between data, interpretation and conclusions?
14. How clear and coherent is the reporting?
15. How clear are the assumptions/theoretical perspectives/values that shaped form and output of the study?
16. What evidence is there of attention to ethical issues?
17. How adequately has the research process been documented?

Table 4.2 : Quality Assessment of Qualitative Papers	
Eakin JM, MacEachen E & Clarke J. 2003 QA: Very high	Paper achieved its objectives, and contributes to the understanding of the phenomena studied, demonstrating clear ability to link micro RTW experiences and macro policy and discourse processes. The qualitative data were theorized well and showed attention to depth and detail. Well written and clear. Although methodological discussion was limited, and alternative interpretations not given, the findings are very credible.
Baril R, Clarke J, Friesen M, Stock S, Cole D & the Work-Ready group. 2003 QA: High	The major contribution of this paper is its illustration of the complexity of return to work through multiple perspectives. The reporting of methods is limited. The findings were internally coherent and the quotes illustrative of the claims being made. Additional information is needed to ascertain the "building blocks" for analysis and conclusions. Authors do not discuss limitations of design, capacity for drawing wider inferences.
Clarke J, Cole D, Ferrier S., 2002 QA: High	This paper is contributory to advancing wider knowledge of RTW stakeholders by describing emerging themes, and presenting data in an insightful way in order to illustrate these. The design addresses the questions posed. Report is well written, and sufficiently analytical, although some areas lack depth, with some important observations (e.g. trust) undervalued.
Friesen MN, Yassi A, Cooper J. 2001 QA: High	This paper contributes to understanding of Return to work. Good design, involving multiple stakeholders. The findings are credible, the article is written clearly and coherently, and study meets the aim of identifying challenges associated with return to work. However, the article stays at descriptive level, and data lose some value because they don't always fit well into stated categories, which seem pre-conceived.
Innes E & Straker L. 2002; QA: High	This study contributes to the advancement of knowledge in the area of assessment of physical function in injured workers, and ties this in to the workplace. It is credible, in that its design addresses its objective well, and study is well-researched and well-written, with systematic and transparent methods and analysis.
Shaw WS, Robertson MM, Pransky G & McLellan RK. 2003; . QA: High	This paper achieves its objective, and expands our understanding by explicitly seeking workers' views on the role of supervisors. It includes a clear and comprehensive description of study methods, which involve the somewhat unusual "affinity mapping" technique. Although method did not involve consideration of contextual factors, the findings and recommendations seem credible and

	well-founded, and make sense.
Baril & Berthelette (2000): QA: Medium	This paper was a summarized and a translated version of a lengthy French-language report from the IRSST in Quebec. The description of the study methods was very brief, and did not give us a good sense of the research process. It is likely that fuller details are available in the longer version, to which we did not have access for the present review. Although description of the analysis was lacking, the findings showed depth and sensitivity to data, incorporation of contextual elements, openness to new ideas and contradictory findings. Thus, they are credible, and contribute to the knowledge base around RTW.
Baril R, Martin J-D, Lapointe C & Massicotte P. (1994) QA: Medium	This French-language paper is the summary of a 413-page report from the IRSST, which likely included a fuller description of the methodology, involving both qualitative and quantitative investigation. The description of the study methods and rationale in this version of the paper is very limited. The literature review, although brief, appears to reflect the state of knowledge when the study was carried out. Although only a minor portion of the results related to workplace issues, these appeared well-founded, and offer an early view of people's perceptions of RTW issues.
Habeck RV, Scully SM, VanTol B, Hunt HA. 1998 QA: Medium	The analysis is this study is described as "verification" of self-report data. The study appears to be comprehensive and carefully done; however, although the article states that "qualitative analysis" was done, the description given is limited. This paper presented credible information on organizational aspects of successful and unsuccessful RTW processes and procedures.
Larsson A & Gard G. 2003 QA Medium	The paper is laid out clearly and coherently, but the description of both methods and findings is very brief. The findings make sense, but the authors touch upon complex issues (e.g. the nature of "better results") and then do not develop these ideas. This applied research study, while neither comprehensive nor theoretical , is descriptive, systematically conducted, and accessible for an audience of employers/rehabilitation practitioners
Nordqvist D, Holmqvist C, Alexanderson K. 2003; QA: Medium	This paper is well laid out, and the methods used for data collection clearly described. The authors' description of the analysis as using grounded theory, is not borne out by the data presentation and analysis. Findings are presented in a very brief format, and would benefit from fuller explication and greater depth of analysis. Findings, however, are credible.
Kenny D. 1995;	This paper includes a limited description of the methods used

QA: Medium	and/or analysis of data, little reflection on the nature of the sample (workers from an advocacy organization, so likely relatively politicized). Although described by the authors as an "in-depth" examination of workers' experiences, it focuses mostly on workers' descriptions of employer and medical practices and legal compliance with RTW requirements. Findings do resonate with findings from other papers, and contribute to our understanding by the identification of some interesting process variables.
Roberts-Yates C. 2003 QA: Medium	The methods in this paper are not well documented, and report gives a relatively un-nuanced picture of participants' views. The author presents a mostly negative picture, listing the problems encountered by the participants in her study. Although the paper does not convey the potential diversity of the data, it is clearly written, and the findings resonate with those in other papers in this review, and includes suggestions which may be useful for the purposes of the review. Thus, it does contribute to the knowledge base, and is credible within the limits described above.

APPENDIX 5

5.1 STUDIES PROCEEDING TO DATA EXTRACTION (n=33)

Quantitative Studies (n=11)

1. Amick BCI, Habeck RV, Hunt A, Fossel AH, Chapin A, Keller RB et al. Measuring the impact of organizational behaviors on work disability prevention and management. Journal of Occupational Rehabiliation 2000; 10(1):21-38.
2. Arnetz BB, Sjogren B, Rydehn B, Meisel R. Early workplace intervention for employees with musculoskeletal-related absenteeism: A prospective controlled intervention study. J Occup Environ Med 2003; 45(5):499-506.
3. Bernacki EJ, Guidera JA, Schaefer JA, Tsai S. A facilitated early return to work program at a large urban medical center. J Occup Environ Med 2000; 42(12):1172-1177.

   Supplemental and Related Papers:

   A. Bernacki EJ, Tsai SP. Managed care for workers' compensation: Three years of experience in an 'employee choice' state. J Occup Environ Med 1996; 38(11):1091-1097.

   B. Green-McKenzie J, Parkerson J, Bernacki E. Comparison of workers' compensation costs for two cohorts of injured workers before and after the introduction of managed care. J Occup Environ Med 1998; 40(6):568-572.

   C. Bernacki EJ, Guidera JA, Schaefer JA, Lavin RA, Tsai SP. An ergonomics program designed to reduce the incidence of upper extremity work related musculoskeletal disorders. Journal of Occupational & Environmental Medicine 1999; 41(12):1032-1041.

   D. Bernacki EJ, Tsai SP. Ten years' experience using an integrated workers' compensation management system to control workers' compensation costs. Journal of Occupational & Environmental Medicine 2003; 45(5):508-516.
4. Crook J, Moldofsky H, Shannon H. Determinants of disability after a work related musculoskeletal injury. J Rheumatol 1998; 25:1570-1577.
5. Habeck RV, Hunt HA, VanTol B. Workplace factors associated with preventing and managing work disability. Rehab Counselling Bull 1998; 42(2):98-143.

   Supplemental Paper:

   A. Hunt HA, Habeck RV. The Michigan disability prevention study. 1993. Kalamazoo,Michigan, WE Upjohn Institute for Employment Research. Ref Type: Report
6. Hogg-Johnson S, Cole DC. Early prognostic factors for duration on temporary total benefits in the first year among workers with compensated occupational soft tissue injuries. Occupational & Environmental Medicine 2003; 60(4):244-253.

   Related Paper:

   A. Brooker A-S, Cole DC, Hogg-Johnson S, Smith J, Frank JW. Modified work: Prevalence and characteristics in a sample of workers with soft-tissue injuries. J Occup Environ Med 2001; 43(3):276-284.
7. Karjalainen K, Malmivaara A, Pohjolainen T, Hurri H, Mutanen P, Rissanen P et al. Mini-intervention for subacute low back pain: A randomized controlled trial. Spine 2003; 28(6):533-540.

   Supplemental Paper:

   A. Pransky G. Mini-intervention for subacute low back pain: A randomized controlled

trial: Point of view. Spine 2003; 28(6):540-541.

8.Loisel P, Abenhaim L, Durand P, Esdaile JM, Suissa S, Gosselin L et al. A population-based, randomized clinical trial on back pain management. Spine 1997; 22(24):2911-2918.

Supplemental and Related Papers:

A. Loisel P, Durand P, Abenhaim L, Gosselin L, Simard R, Turcotte J et al. Management of occupational back pain: the Sherbrooke model. Results of a pilot and feasibility study. Occup Environ Med 1994; 51:597-602.

B. Loisel P, Gosselin L, Durand P, Lemaire J, Poitras S, Abenhaim L. Implementation of a participatory ergonomics program in the rehabilitation of workers suffering from subacute back pain. Applied Ergonomics 2001; 32(1):53-60.

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Supplemental and Related Papers:

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B. Scheel IB, Hagen KB, Herrin J, Oxman AD. A call for action: A randomized controlled trial of two strategies to implement active sick leave for patients with low back pain. Spine 2002; 27(6):561-566.

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Supplemental and Related Papers:

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C. Cooper JE, Tate RB, Yassi A. Components of initial and residual disability after back injury in nurses. Spine 1998; 23(19):2118-2122.

D. Yassi A. Utilizing data systems to develop and monitor occupational health programs in a large Canadian hospital. Methods of Information in Medicine 1998; 37(2):125-129.

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Qualitative Studies (n=13)

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management and rehabilitation: The need for new operational frameworks. Disability & Rehabilitation 2003; 25(16):898-907.

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Systematic Reviews (n=9)

1.Cohen JE, Goel V, Frank JW, Bombardier C, Peloso P, Guillemin F et al. Group education interventions for people with low back pain: An overview of the literature. Spine 1994; 19(11):1214-1222.

2.Karjalainen K, Malmivaara A, Van Tulder M, Roine R, Jauhiainen M, Hurri H et al. Multidisciplinary biopsychosocial rehabilitation for subacute low back pain in working-age adults: A systematic review within the framework of the cochrane Collaboration Back Review Group. Spine 2001; 26(3):262-269.

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5.Scheer SJ, Radack KL, O'Brien DR, Jr. Randomized controlled trials in industrial low back pain relating to return to work. Part 1. Acute interventions. Arch Phys Med Rehabil 1995; 76(10):966-973.

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7.Schonstein E, Kenny DT, Keating J, Koes BW. Work conditioning, work hardening and functional restoration for workers with back and neck pain. The Cochrane Library, (Oxford) ** (2):2003 (CD001822) 2003;(Oxford):2003.

8.Teasell RW, Bombardier C. Employment-related factors in chronic pain and chronic pain disability. [Review] [59 refs]. Clinical Journal of Pain 2001; 17(4:Suppl):S39-S45.

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5.2 STUDIES REJECTED AFTER QUALITY APPRAISAL (n=32)

Quantitative Studies (n=24)

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    Related Paper:
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    Related Paper:
    a. Lincoln AE, Feuerstein M, Shaw WS, Miller VI. Impact of case manager training on worksite accommodations in workers' compensation claimants with upper extremity disorders. J Occup Environ Med 2002; 44(3):237-245.
14. Green-McKenzie J, Rainer S, Behrman A, Emmett E. The effect of a health care management initiative on reducing workers' compensation costs. Journal of Occupational & Environmental Medicine 44(12):1100-5, 1118, 2002 Dec (17 ref) 2002;(12):1100-1105.
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16. Habeck RV, Leahy MJ, Hunt HA, Chan F. Employer factors related to workers' compensation claims and disability management. Rehabilitation Counseling Bulletin 1991; Special Issue: Disability management and industrial rehabilitation. 34(3):210-226.
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22. Lancourt J, Kettelhut M. Predicting return to work for lower back pain patients receiving workers' compensation. Spine 1992; 17(6):629-640.
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24. Linton SJ. The managers role in employees' return to work following back injury. Work and Stress 1991; 5(3):189-195.
25. McLellan RK, Pransky G, Shaw WS. Disability management training for supervisors: A pilot intervention program. Journal of Occupational Rehabiliation 2001; 11(1):33-41.
26. Mobley EM, Linz DH, Shukla R, Breslin RE, Deng C. Disability case management: An impact assessment in an automotive manufacturing organization. J Occup Environ Med 2000; 42(6):597-602.
27. Nordstrom-Bjorverud G, Moritz U. Interdisciplinary rehabilitation of hospital employees with musculoskeletal disorders. Scandinavian Journal of Rehabilitation Medicine 1998; 30(1):31-37.
28. Perry MC. An alternative early return to work program. AAOHN J 1996; 44(6):294-298.
29. Selander J, Marnetoft S-U, Bergroth A, Ekholm J. The effect of vocational rehabilitation on later sick leave. Disability & Rehabilitation 1999; 21(4):175-180.
30. Shaw WS, Robertson MM, McLellan RK, Verma S, Pransky G. A controlled study of supervisor training to optimize injury response in the meatpacking industry. Applied Ergonomics 2003.

Supplemental and Related Papers:

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B. Pransky G, Shaw W, McLellan R. Employer attitudes, training, and return-to-work outcomes: A pilot study. Assistive Technology 2001; 13(2):131-138.

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2. Wiesel SW, Boden SD, Feffer HL. A quality-based protocol for management of musculoskeletal injuries: a ten-year prospective outcome study. Clin Orthop & Rel Res 1994; 301:164-176.
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2. Strunin L, Boden LI. Paths of reentry: Employment experiences of injured workers. Am J Ind Med 2000; 38(4):373-384.

Systematic Reviews (n=6)

1. Di Fabio RP. Efficacy of comprehensive rehabilitation programs and back school for patients with low back pain: a meta-analysis. Phys Ther 1995; 75(10):865-878.
2. Elders LA, van der Beek AJ, Burdorf A. Return to work after sickness absence due to back disorders--a systematic review on intervention strategies. Int Arch Occup Environ Health 2000;

73(5):339-348.
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4. Feuerstein M, Burrell LM, Miller VI, Lincoln A, Huang GD, Berger R. Clinical management of carpal tunnel syndrome: a 12-year review of outcomes. [Review] [65 refs]. American Journal of Industrial Medicine 1999; 35(3):232-245.
5. Klingenstierna U. Back schools: a review. Crit Rev Phys Rehab Med 1991; 3(2):155-171.
6. Staal JB, Hlobil H, Van Tulder MW, Koke AJ, Smid T, Van Mechelen W. Return-to-work interventions for low back pain: a descriptive review of contents and concepts of working mechanisms. Sports Med 2002; 32(4):251-267.

APPENDIX 6
Synthesis of Evidence from Systematic Reviews

As a first step in the literature review, we sought to evaluate what systematic reviews of workplace-based RTW interventions had already been conducted. Our search yielded15 systematic reviews meeting inclusion criteria, with nine meeting quality appraisal criteria to move to data extraction (1-9).

In the selection process of the systematic reviews, we were not restricted to reviews that were exclusively workplace-based. Instead, we were more inclusive and considered reviews that examined interventions or strategies with a workplace-based component **or** that could potentially be implemented in a workplace setting. As such, of the nine systematic reviews, only two (4;8) were largely focused on workplace-based interventions, namely modified work (4) and general employment factors (8).

The nine systematic reviews covered the following interventions: Modified work (4;8), back schools (1;3;5;6;9), physical conditioning programs and exercise (5-7), multidisciplinary rehabilitation (2) and case management methods (5).

The outcomes of interest across the systematic reviews varied from return to work to outcomes such as pain, function and disability (secondary outcomes of interest in our review). Each of the reviews evaluated the evidence on their respective interventions of interest in terms of its effectiveness or effect on the outcome of interest. Given the multiple outcomes of interest in some reviews, effectiveness was loosely defined in these reviews to enable the synthesis of evidence. Consequently, for such reviews, it was not possible to interpret the effectiveness of the intervention in terms of a particular outcome.

Modified work

In the nine systematic reviews that were selected, two reviewed the evidence on modified work (4;8). Both reviews concluded that modified work programs are effective in facilitating return to work, with the review by Teasell and Bombardier being specific to chronic pain patients. Krause et al. reported that modified work programs have shown a two-fold increase in the rate of return to work and resulted in direct cost savings of up to 90%. Modified work programs vary widely. Hence, Krause et al. recommend that it is important to study the effectiveness of the different types of modified work to determine

the type that is most effective.

Back schools

In the nine systematic reviews that were selected, five reviewed the evidence on back schools (1;3;5;6;9). Back schools generally include the following: An educational component with regard to lifting and handling material and proper posture, skills program including exercise and lessons which are supervised by a paramedical therapist or a medical specialist.

Of the five reviews, two reviews, focusing on acute and chronic back pain respectively concluded that back school was not effective for faster return to work (5;6). It is of note that the second of these two reviews was based on a single study. One review concluded that there was insufficient evidence with regard to the effectiveness of back schools (1) while two reviews supported the positive effects of back schools in occupational settings(3;9). However, even within the latter two reviews, the former had more general conclusions while the latter had more specific conclusions due to stratification of results. Specifically, Koes et al. (3) concluded that “back schools may be effective in occupational settings acute, recurrent or chronic conditions” whereas Van Tulder et al. (9) reported moderate evidence that back schools may be more effective in the short-term and in those with chronic LBP in comparison to other treatments. In addition, both studies noted that none of the studies had evaluated the cost-effectiveness of back schools.

Reasons for differences in conclusions

There are several explanations for why the reviews on back schools have reached different conclusions. These explanations include that the five reviews used different databases over different time periods in their literature search. As a result, although there was some overlap, different studies were included in each of the reviews. In addition, each review used different validity criteria for appraising the methodological quality of their studies and different methods for synthesizing their results.

Synthesis

It is a challenge to synthesize the evidence on back schools given the differences between the five reviews. The review by Van Tulder et al. (9) is the most recent review

and is comprehensive, provides stratified analyses according to the comparison group, course of disorder and treatment settings and also has sensitivity analyses based on its chosen quality cutoff scores. This review recommends that back schools in occupational settings are effective in the short-term and in those with chronic LBP. Based on the strength of this review, this is a reliable recommendation. However, in general, the five reviews share the view that the methodological quality of the existing back school literature is low. Hence, this warrants attention when considering the results from any of the reviews.

Physical conditioning programs and exercise

In the nine systematic reviews that were selected, three reviewed the evidence on exercise (5-7) with Schonstein also reviewing the evidence on physical conditioning programs (which includes exercise) (7). Two reviews concluded that the evidence was inconsistent for the effects of physical conditioning programs and exercise for acute back pain (5;7). For chronic patients, Scheer et al. (6) concluded that there was insufficient evidence for the effectiveness of exercise due to the low quality and other methodological flaws of the studies identified. Schonstein et al. (7) agreed with Scheer (6) and concluded that there was insufficient evidence to support the effectiveness of exercise but reported that physical conditioning programs, that include a cognitive-behavioral approach, are effective for workers with chronic back pain.

Synthesis

There is inconsistent evidence that physical conditioning programs (that include exercise) and exercise are effective for acute back pain. For workers with chronic back pain, there is insufficient evidence that exercise is effective for reducing duration of absence from work. In addition, Schonstein et al. (7) conclude that physical conditioning programs with a cognitive behavioral approach are effective for reducing the duration of work absence for workers with chronic back pain. Similar to the back school literature, the methodological quality of the exercise/physical conditioning programs literature is low. This warrants attention when considering the results from any of the reviews.

Multidisciplinary rehabilitation

In the nine systematic reviews that were selected, only one reviewed the evidence

on multidisciplinary rehabilitation (2). Based on the two studies that were identified in the review, the authors concluded that there is moderate evidence that multidisciplinary rehabilitation is effective for subacute low back pain and the effectiveness is increased by worksite visits. Furthermore, the authors recommended that further research is needed to examine the effectiveness of the specific components involved in multidisciplinary rehabilitation programs.

Case management methods

In the nine systematic reviews that were selected, only one reviewed the evidence on case management methods (5). Two studies were identified for this intervention. The authors reported that the evidence was inconclusive as there were major methodological weaknesses in both the studies.

Summary

Each of the nine reviews examined the effectiveness of one or more specific types of RTW interventions. Only two reviews focused exclusively on workplace-based interventions, namely modified work and work conditioning. This absence of a wider coverage of RTW interventions highlights the need for a comprehensive review in this area. The following recommendations regarding future reviews were made in the nine reviews:

1. To examine the effectiveness of various components of work modification such as ergonomic and organizational modifications (4)
2. To examine the effectiveness of specific components of multidisciplinary rehabilitation e.g. work site visits (2)
3. To examine the cost effectiveness of interventions (3;9).

Our review adds to previous reviews in several ways. It focuses on a wide array of workplace-based interventions, and in that sense is comprehensive. We also incorporated the recommendations that emerged from the previous systematic reviews.

Reference List

(1) Cohen JE, Goel V, Frank JW, Bombardier C, Peloso P, Guillemin F et al. Group education interventions for people with low back pain: An overview of the literature. Spine 1994; 19(11):1214-1222.

(2) Karjalainen K, Malmivaara A, van Tulder M, Roine R, Jauhiainen M, Hurri H et al. Multidisciplinary Biopsychosocial Rehabilitation for Subacute Low Back Pain in Working-Age Adults: A Systematic Review Within the Framework of the Cochrane Collaboration Back Review Group. Spine 2001; 26(3):262-269.

(3) Koes BW, Van Tulder MW, Van Der Windt DAWM, Bouter LM. The efficacy of back schools: a review of randomized clinical trials. J Clin Epidemiol 1994; 47(8):851-862.

(4) Krause N, Dasinger LK, Neuhauser F. Modified work and return to work: a review of the literature13793. J Occup Rehab 1998; 8(2):113-139.

(5) Scheer SJ, Radack KL, O'Brien DR, Jr. Randomized controlled trials in industrial low back pain relating to return to work. Part 1. Acute interventions9637. Arch Phys Med Rehabil 1995; 76(10):966-973.

(6) Scheer SJ, Watanabe TK, Radack KL. Randomized controlled trials in industrial low back pain. Part 3. Subacute/chronic pain interventions. [Review] [65 refs]. Archives of Physical Medicine & Rehabilitation 1997; 78(4):414-423.

(7) Schonstein E, Kenny DT, Keating J, Koes BW. Work conditioning, work hardening and functional restoration for workers with back and neck pain. Cochrane Database Syst Rev 2003;(1):CD001822.

(8) Teasell RW, Bombardier C. Employment-related factors in chronic pain and chronic pain disability. [Review] [59 refs]. Clinical Journal of Pain 2001; 17(4:Suppl):S39-S45.

(9) Van Tulder MW, Esmail R, Bombardier C, Koes BW. Back schools for non-specific low back pain (Cochrane review). Cochrane Library 1999;(3):1-15.

APPENDIX 7

Systematic review data extraction summary tables (n=9).

Study: Cohen JE, Goel V, Frank JW, Bombardier C, Peloso P, Guillemin F. Group education interventions for people with back pain: An overview of the literature. Spine 1994; 19(11): 1214 -1222.

Objective	
To make a recommendation regarding the effectiveness of group education as an intervention for people with low back pain.	
Methods	
Primary Sources	MEDLINE (from 1986), Health (from 1975), ERIC (from 1983), PsycLIT (from 1987). All databases were searched until July 1992.
Additional sources	References of articles that were identified in the database searches and personal communications.
Type of studies included	Only published studies in either English or French
Outcome of interest	Short-term outcomes: Pain intensity, pain duration, initial sick leave duration, functional status, knowledge, and spinal mobility. Long-term outcomes: number of pain recurrences, pain intensity, total pain duration, total sick leave duration, functional status, spinal mobility, and number of contacts with healthcare providers.
Intervention of interest	Group education on back pain (primary component of study intervention) [The following types of group education were considered: education with no additional treatment, education which included instruction in exercises and encouragement to do them at home, education plus the practice of exercises or education plus access to a physiotherapeutic service.] The reviews includes a primary study that has implemented the intervention in a workplace setting.
Validity assessment	
Two reviewers independently assessed the studies according to the modified criteria published by Chalmers and Koes. Reviewers were blinded to the author and source of the primary studies. The following five categories were rated: Description of participants and setting, group assignment and description of study interventions, measurement of outcomes, analysis, and overall study quality. Each category was judged as poor, good, or very good and was later assigned 0,1, or 2 points, respectively. To obtain an overall score for each paper, these points were summed across categories, giving a maximum score of ten. A final quality score for the study was calculated as the mean of the two raters' overall scores. A weighted kappa statistic was calculated for each of the 5 categories that were used in rating study quality to determine rater agreement. In addition, a weighted kappa statistic was calculated for the overall study quality after assigning ratings of poor, good and very good to studies with overall scores of less than 5, 5 to 7, and above 7 respectively. A score of 5 was chosen as the cut-off for adequately well-designed and executed studies. The quality of the group education interventions was also rated in a similar process as mentioned above.	
Results	

The search identified 89 articles, of which 13 met the inclusion criteria. Of the 13 studies, 6 studies had quality scores of 5 or greater.

Conclusions

Overall, there is insufficient evidence to recommend group education for people with low back pain. In the six studies that were well designed and executed, four were based on chronic back pain subjects. Of these four studies, only one (5) found a positive short-term effect on one of the outcome measures considered (pain intensity). In the two studies with acute cases, group education was found by one of the studies (1) to reduce pain duration and initial sick leave duration in the short-term. The educational program in this study was conducted in the workplace and included work-site visits. At 1-year follow-up, there was no evidence in the six studies of clinically important benefits on any of the outcome measures. The finding that group education fares better when compared to a passive (placebo or no treatment) rather than an active (exercise or physiotherapy) control group suggests that a combination of interventions, including exercise, may have significantly beneficial effects.

In general, studies varied widely in terms of the frequency and duration of the group education interventions as well as type of control groups (passive versus active). The authors reported that interventions were not sufficiently described in the studies included and suggest that future studies should include more detail. It was acknowledged that this review method might suffer from bias in terms of studies not identified in the literature search, those published in languages other than English or French, or those for which the journal could not be obtained.

Studies included in data extraction

Studies with quality scores 5 or greater (good and very good studies):

1. Bergquist-Ullman M, Larsson U. Acute low back pain in industry. A controlled prospective study with special reference to therapy and confounding factors. Acta Orthop Scand (Suppl) 1977; 170:1-117.

2. Berwick DM, Budman S, Feldstein M. No clinical effect of back schools in an HMO. A randomized prospective trial. Spine 1989;14(3):338-44.

3. Donchin M, Woolf O, Kaplan L, Floman Y. Secondary prevention of low-back pain: a clinical trial. Spine 1990; 15(12):1317-1320.

4. Hurri H. The Swedish back school in chronic low back pain. Part I. Benefits. Scand J Rehabil Med 1989; 21:33-40.

5. Lankhorst GJ, Van de Stadt RJ, Vogelaar TW, Van der Korst JK, Prevo AJH. The effect of the Swedish back school in chronic idiopathic low back pain - a prospective controlled study. Scand.J.Rehab.Med. 1983; 15:141-5.

6. Spinhoven P, Linssen AC. Education and self-hypnosis in the management of low back pain: a component analysis. Br J Clin Psychol 1989; 28:145-53.

Studies with quality scores less than 5 (poor studies):

1. Aberg J. Evaluation of an advanced back pain rehabilitation program. Spine 1984; 9:317-8.

2. Dehlin O, Berg S, Andersson GBJ, Grimby G. Effect of physical training and ergonomic

counselling on the psychological perception of work and on the subjective assessment of low-back insufficiency. Scand J Rehab Med 1981; 13(1):1-9.

3. Keijsers JF, Groenman NH, Gerards FM, van Oudheusden E, Steenbakkers M. A back school in the Netherlands: evaluating the results. Patient Educ Couns 1989; 14 (1):31-44.

4. Klaber Moffett JA, Chase SM, Portek I, Ennis JR. A controlled, prospective study to evaluate the effectiveness of a back school in the relief of chronic low back pain. Spine 1986; 11(2):120-122.

5. Kvien TK, Nilsen H, Vik P. Education and self-care of patients with low back pain. Scandinavian Journal of Rheumatology 1981;10:318-20.

6. Morrison GE, Chase W, Young V, Roberts WL. Back pain: treatment and prevention in a community hospital. Arch Phys Med Rehabil 1988; 69(8):605-609.

7. Stankovic R, Johnell O. Conservative treatment of acute low-back pain. A prospective randomized trial: McKenzie method of treatment versus patient education in "mini back school". Spine 1990;15:120-3.

Study: Karjalainen K, Malmivaara A, Van Tulder M, Roine R, Jauhiainen M, Hurri H, Koes B. Multidisciplinary biopsychosocial rehabilitation for subacute low back pain in working-age adults. Spine 2001; 26(3):262-269

Objective	
To evaluate the effectiveness of multidisciplinary biopsychosocial rehabilitation for subacute low back pain among working-age adults.	
Methods	
Primary Sources	Medline (1966 - April 1998), PsycLIT (1967 - April 1998), EMBASE (1988 - April 1998)
Additional sources	Cochrane library CD-ROM, references from identified articles and reviews, studies published in Finland from 1978 to 1998 screened using Medic (Finish Medical database), Science Citation Index search, and consultation with 24 experts in field of rehabilitation.
Type of studies included	Randomized controlled trials (RCTs) and nonrandomized controlled trials (if at least 3 RCTs were identified, nonrandomized controlled trials were not included). Studies reported in English, Dutch, Finnish, Swedish, Norwegian, German, French, and Spanish were included.
[illegible]	[illegible]
[illegible]	[illegible]
Validity assessment	
[illegible]	
Results	
[illegible]	
Conclusions	
During recent years, interest in the subacute phase has increased. This phase has been conceptualized as the period during which biopsychosocial impairments	

begin to develop for patients who do not recover from the acute low back pain phase. Despite an extensive search, only two randomized controlled trials were found that were relevant. Both studies had low methodologic quality but indicated a positive effect of multidisciplinary biopsychosocial rehabilitation with workplace visitation or more comprehensive occupational intervention in terms of return to work, sick leaves, and subjective disability. There is moderate evidence showing that multidisciplinary rehabilitation for subacute low back pain is effective, and that work site visits increase the effectiveness. However, the analyzed studies had some methodologic shortcomings. Some of these shortcomings included the absence of blinding the therapists, patients, and observers and report on cointerventions. Although the authors acknowledge that the former might be difficult, they suggest evaluation of patient and therapist expectations prior to the rehabilitation. In addition, only one of the two studies used an intention-to-treat analysis. Hence, there is still a need for high-quality trials assessing the effectiveness and cost-effectiveness of comprehensive multidisciplinary biopsychosocial rehabilitation programs as well as the effectiveness of specific components involved in rehabilitation.

Studies included in data extraction

1. Lindstrom I, Ohlund C, Eek C, Wallin L, Peterson LE, Nachemson AL. Mobility, strength, and fitness after a graded activity program for patients with subacute low back pain - a randomized prospective clinical study with a behavioural therapy approach. Spine 1992; 17(6):641-52.

2. Lindstrom I, Ohlund C, Eek C, Wallin L, Peterson LE, Fordyce WE et al. The effect of graded activity on patients with subacute low back pain: a randomized prospective clinical study with an operant-conditioning behavioural approach. Physical Therapy 1992; 72(4):279-93.

3. Lindstrom I, Ohlund C, Nachemson A. Physical performance, pain, pain behaviour and subjective

disability in patients with subacute low back pain. Scand J Rehabil Med 1995; 27:153-60.

4. Loisel P, Abenhaim L, Durand P, Esdaile JM, Suissa S, Gosselin L et al. A population-based, randomized clinical trial on back pain management. Spine 1997; 22:2911-8.

Study: Koes BW, Van Tulder MW, Van der Windt DAWM, Bouter LM. The efficacy of back schools: A review of randomized clinical trials. Journal of Clinical Epidemiology 1994; 47(8); 851-862.

Objective	
To assess the efficacy of back school programmes for low-back pain.	
Methods	
Primary Sources	Medline (1966 to 1992)
Additional sources	References in relevant publications
Type of studies included	Randomized clinical trial (published studies only)
Outcome of interest	No specific outcome of interest
Intervention of interest	Back school type of intervention. This intervention could potentially be implemented in a workplace setting.
Validity assessment	
Methodological quality of each study was independently assessed by 2 reviewers and included the following criteria: Homogeneity, comparability of relevant baseline characteristics, adequacy of randomization procedure, drop-outs described for each study group separately, <20% loss to follow-up, <10% loss to follow-up, <50 subjects in the smallest group, >100 subjects in the smallest group, interventions standardized and described, control group adequate, co-interventions avoided, compliance measured and satisfactory in all study groups, blinding of patients, relevance of outcome measures, blinding of outcome assessments, adequate follow-up, intention-to-treat analysis, frequencies of most important outcomes presented for each treatment group. Different weighting systems were applied for the criteria.	
Results	
16 trials from 21 publications met the selection criteria.	
Conclusions	

There is a large variation in methodological quality of randomized trials of back schools. Most studies have small sample sizes and lack the following: A clear description of an adequate randomization procedure, number of and reason for drop-outs in each study group, measurement of compliance and blinding of patients and assessor. Furthermore, none of the studies included cost-effectiveness analyses. In cases where the observed differences are minimal, the relative cost-effectiveness may be important when deciding which intervention, if any, to offer.

In general, there appeared to be a clear relationship between the methodological quality of the studies and their outcome. Studies reporting positive results tended to have higher methodological scores. This is clearly illustrated by the finding that 57% of the positive studies have a methodological score of 45 points or higher out of a total score of 100 whereas none of the negative trials scored more than 45 points.

The best studies (with a quality score of $\geq$ 45 out of 100) indicated that back schools may be effective in occupational settings in acute, recurrent or chronic conditions. The most promising type of interventions were modifications of the 'Swedish back school' and were quite intensive (a 3 to 5-week stay in a specialized centre). Future research efforts should focus on the identification of patients who would benefit most from back schools. In addition, more attention should be paid to the cost-effectiveness of back schools.

Studies included in data extraction

Presented according to quality score (highest to lowest):

1a. Harkapaa K et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part I. Pain, disability, compliance, and reported treatment benefits three months after treatment. Scand J Rehabil Med 1989; 21:81-9.

1b. Harkapaa K et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part III. Long-term follow-up of pain, disability, and compliance. Scand.J.Rehab.Med. 1990; 22:181-8.

1c. Mellin G et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part II. Effects on physical measurements three months after treatment. Scand.J.Rehab.Med. 1989; 21(2):91-5.

1d. Mellin G et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part IV. Long-term effects on physical measurements. Scand.J.Rehab.Med. 1990; 22(4):189-94.

2a. Hurri H. The Swedish back school in

chronic low back pain. Part II. Factors predicting the outcome. Scand.J.Rehab.Med. 1989; 21(1):41-4.

2b. Hurri H. The Swedish back school in chronic low back pain. Part I. Benefits. Scand J Rehabil Med 1989; 21:33-40.

3. Bergquist-Ullman M, Larsson U. Acute low back pain in industry. A controlled prospective study with special reference to therapy and confounding factors. Acta Orthop Scand (Suppl) 1977; 170:1-117.

4. Linton SJ et al. The secondary prevention of low back pain: a controlled study with follow-up. Pain 1989; 36(2):197-207.

5. Berwick DM, Budman S, Feldstein M. No clinical effect of back schools in an HMO. A randomized prospective trial. Spine 1989;14(3):338-44.

6. Stankovic R, Johnell O. Conservative treatment of acute low-back pain. A prospective randomized trial: McKenzie method of treatment versus patient education in "mini back school". Spine 1990;15:120-3.

7. Lankhorst GJ et al. The effect of the Swedish back school in chronic idiopathic low back pain - a prospective controlled study. Scand.J.Rehab.Med. 1983;15:141-5.

8. Lindequist S et al. Information and regime at low back pain. Scand.J.Rehab.Med. 1984;16:113-6.

9. Klaber Moffett JA et al. A controlled, prospective study to evaluate the effectiveness of a back school in the relief of chronic low back pain. Spine 1986;11(2):120-2.

10. Keijsers JFEM et al. The efficacy of the back school: a randomized trial. Arthritis Care Research 1990;3(4):204-9.

11. Aberg J. Evaluation of an advanced back pain rehabilitation program. Spine 1984;9:317-8.

12. Herzog W, Conway PJ, Willcox BJ. Effects of different treatment modalities on gait symmetry and clinical measures for sacroiliac joint patients. Journal of Manipulative and Physiological Therapeutics 1991;14:104-9.

13. Donchin M et al. Secondary prevention of low-back pain: a clinical trial. Spine 1990;15(12):1317-20.

14. Postacchini F, Facchini M, Palieri P. Efficacy of various forms of conservative treatment in low back pain. A comparative study. Neuro Orthopedics. 1988;6(1):28-35.

15. Morrison GE et al. Back pain: treatment and prevention in a community hospital. Archives of Physical Medicine and Rehabilitation 1988;69(8):605-9.

16a. Keijsers JF et al. A back school in the Netherlands: evaluating the results. Patient Education & Counseling 1989;14 (1):31-44.

16b. Oudheusden van E et al. De Maastrichtse

rugschool. Een onderzoek naar de effecten.
Tijdschr. Psychotherapie 14, 234-246. 1988.

Study: Krause N, Dasinger LK & Neuhauser F. Modified work and return to work: A review of the literature. Journal of Occupational Rehabilitation 1998; 8(2):113-139

Objective	
To synthesize and critically appraise the research on modified work, and, specifically, to assess the effectiveness of modified work programs.	
Methods	
Primary Sources	Medline, PsycInfo, ABI. All databases were searched from 1975 to March 1997
Additional sources	First author's personal library and references of retrieved articles
Type of studies included	Empirical studies and reviews published in English
[illegible]	[illegible]
[illegible]	[illegible]: light duty, graded work exposure, work trial, supported employment, sheltered employment
Validity assessment	
[illegible]	
Results	
[illegible]	
Conclusions	

Modified work programs facilitate return to work for temporarily and permanently disabled workers. Nearly all 21 studies that were reviewed showed positive results for the effectiveness of modified work programs in returning injured workers to the workplace. Specifically, higher quality studies show that for injured employees with access to modified work, return to work occurs about twice as often as employees without access to any form of modified duty. The number of lost days per disabling injury was also cut in half when companies implemented modified work programs. In higher

quality studies that report cost data, savings in direct costs ranging from 8% to 90% were shown.

There are considerable differences in the design of the modified work programs. In many cases, it is part of a broader RTW program. Most studies do not separately assess the effectiveness of modified work programs from other concurrent interventions or separately evaluate the effectiveness of different provisions of modified work. Future studies need to determine which type of work modification is most effective. In particular, organizational and ergonomic modifications need to be examined. There were a number of methodological shortcomings that need to be addressed in future research. These include standardizing and quantifying modified work programs, use of concurrent external control groups, measurement and multivariate analyses of potential confounding factors, and sufficient follow-up time to assess sustained return to work over longer periods.

Outcomes such as sustained return to work, wage loss, physical functioning, psychosocial functioning, and quality of life are also reflective of the success of modified RTW programs and need to be evaluated along with other conventional outcome measures.

Studies included in data extraction

1. [illegible] 1996; 29:632-41.

2. [illegible] 1995; 48:452-69.

3. [illegible] 1982; 51(2):24-6.

4. [illegible] 1983; 52:52-4.

5. [illegible], 1989; 4:237-43.

6. [illegible] 1994;19(18):2033-7.

7. [illegible] 1987; 9:49-54.

8. [illegible] 1992;17(6):629-40.

9. [illegible] 1997; 22:2911-8.

10. [illegible] 1995; 76:950-4.

11. [illegible] 1995; 9:301-13.

12. [illegible] 1994; 301:164-76.

13. [illegible] 1995; 45:209-14.

Study: Scheer SJ, Radack KL, O'Brien Jr DR. Randomized controlled trials in industrial low back pain relating to return to work. Part 1. Acute interventions. Archives of Physical and Medical Rehabilitation 1995; 76:966-973.

Objective	
To identify interventions that are associated with successful return to work (RTW) in subjects with acute low back pain (LBP).	
Methods	
Primary Sources	MEDLINE, PsycINFO, Rehabdata, Nursing and Allied Health, and Dissertation Abstracts. All databases were searched from 1975 to 1993.
Additional sources	Source not reported for one additional study published in 1973.
Type of studies included	Randomized controlled trials (RCT) with any concurrent reference comparison group, with the only exception being historical control studies. Only published studies in English. This review focussed on subjects with acute LBP.
Outcome of interest	RTW outcomes: Days of sickness absence (initial episode), days off work (1 year follow-up or successive 2-week intervals), costs of worker compensation paid (not specified if this referred to wage replacement or healthcare costs or both).
Intervention of interest	Back school, case management methods and exercise. The review also included bedrest and manipulation which will not be covered in this summary as they are not workplace-based. The intervention of interest could potentially be implemented in a workplace setting.
Validity assessment	
	The methodological quality of the RCTs was independently assessed by 2 reviewers. A 26-point quality system was developed for rating the studies. A higher quality 'score' did not necessarily signify a better performed study as the methodological criteria for quality appraisal were not weighted. The 26 methodological criteria are listed below: Patient characteristics: Description of inclusion/exclusion criteria, comparability between exposure and control group on the following variables: Mean age (≤ 7 years), percentage working prior to injury and on workers' compensation (≤ 5%), percentage with back surgery and prior LBP (≤ 10%), duration of symptoms (≤ 5 days), severity (visual

analog scale or similar measure), comorbidity, physician exams (straight leg raise, neurological signs), and referral sources.

Interventions:
Intervention compliance, cointerventions (ruled out), study reproducibility (equipment, personnel, setting), description of treatment for treatment and control group, use of blinding for clinician/patient, report or implication of clinician's qualifications, and control for placebo effect.

Outcome assessment and statistical methods:
Accountability and minimization (≤ 20%) of drop-outs, assessment of outcome blinded (if relevant), full description of job duty outcome that includes at least 6 months follow-up, description/justification of statistical methods or sample size, report of study power and method to evaluate hypothesis (e.g. p value).

Results

More than 4000 citations were identified with 600 citations concerning interventions for LBP. Of the 600 citations, 35 were RCTs that included return to work as an outcome measure. This review focussed on 10 of the 35 studies dealing with acute LBP. A number of the 10 studies looked at more than one intervention. Of the 10 studies, there were 4 RCTs relevant to back school, 2 relevant to case management methods and 4 relevant to exercise. Bedrest and manipulation were examined by two RCTs each, that are not covered in this summary as they were not workplace-based interventions. The quality scores ranged from 10 to 19 for the studies relevant to back school, case management and exercise. Data were extracted on all studies irrespective of their quality score.

Conclusions
Limited conclusions can be drawn from the studies that were identified in this review. Back schools did not expedite return to work in acute LBP whereas no conclusions could be drawn with regard to case management. Exercise has shown inconsistent evidence with respect to faster return to work. Back schools generally consist of a series of discussions about anatomy, biomechanics, lifting and material handling, postural changes related to work, and exercise instruction. Given that exercise instruction, particularly muscle strengthening types, is commonly included in back schools, it was difficult to separate the pure effect of instruction from exercise. Back schools also varied highly in their time utilization, ranging from one 45-minute session to four 45-minute sessions. Four RCTs were identified for this intervention. Of the four studies, three did not indicate that the back school was beneficial for return to work and one supported the benefits of the back school in the short-term. Across the four studies, variability was noted in the treatment methods, symptom acuity, and control group interventions. The authors concluded that although an ergonomic education made inherent sense, there was a lack of published evidence that back school was more efficacious than placebo. For case management, only two RCTs were identified. Both studies, based on different populations, had major methodological weaknesses including treatment contamination and confounding. The case management in the two RCTS were provided by physicians and a private rehabilitation firm respectively. Hence, no definitive conclusions were drawn with regard to the case management approach.

The common use of combined interventions and different exercise programs make it difficult to demonstrate the efficacy of exercise. Four RCTs were identified for this intervention. Two RCTs showed positive effects of exercise for RTW while two RCTS did not report any benefits of exercise over that of the control group. Despite study limitations, long-term exercise, particularly when reinforced at work, appears to be beneficial for prevention of backache. Further research is needed to support this result.

Studies included in data extraction

Back schools:

1. Bergquist-Ullman M, Larsson U. Acute low back pain in industry. A controlled prospective study with special reference to therapy and confounding factors. Acta Orthop Scand (Suppl) 1977;170:1-117.

2. Berwick DM, Budman S, Feldstein M. No clinical effect of back schools in an HMO. A randomized prospective trial. Spine 1989;14(3):338-44.

3. Lindequist S et al. Information and regime at low back pain. Scand.J.Rehab.Med. 1984;16:113-6.

4. Stankovic R, Johnell O. Conservative treatment of acute low-back pain. A prospective randomized trial: McKenzie method of treatment versus patient education in "mini back school". Spine 1990;15:120-3.

Case management methods:

1. Fordyce WE et al. Acute back pain: a control-group comparison of behavioral vs traditional management methods. J Behav Med 1986;9(2):127-41.

2. Greenwood JG et al. Early intervention in low back disability among coal miners in West Virginia: negative findings. Journal of Occupational Medicine 1990;32(10):1047-52.

Exercise:

1. Bergquist-Ullman M, Larsson U. Acute low back pain in industry. A controlled prospective study with special reference to therapy and confounding factors. Acta Orthop Scand (Suppl) 1977; 170:1-117.

2. Waterworth RF, Hunter IA. An open study of diflunisal, conservative and manipulative therapy in the management of acute mechanical low back pain. NZ Med J 1985; 98(779):372-375.

3. Stankovic R, Johnell O. Conservative treatment of acute low-back pain. A prospective randomized trial: McKenzie method of treatment versus patient education in "mini back school". Spine 1990; 15(2):120-123.

4. Kellett DM, Kellett DA, Nordholm LA. Author Response. Phys Ther 1991; 71:293.

Bedrest:

1. Wiesel SW, Cuckler JM, Deluca F, Jones F, Zeide MS, Rothman RH. Acute low-back pain: an objective analysis of conservative therapy. Spine 1980; 5(4):324-330.

2. Deyo RA, Diehl AK, Rosenthal M. How many days of bed rest for acute low back pain? A randomized clinical trial. N Eng J Med 1986; 315(17):1064-1070.

Manipulation:

1. Bergquist-Ullman M, Larsson U. Acute low back pain in industry. A controlled prospective study with special reference to therapy and confounding factors. Acta Orthop Scand (Suppl) 1977; 170:1-117.

2. Waterworth RF, Hunter IA. An open study of diflunisal, conservative and manipulative therapy in the management of acute mechanical low back pain. NZ Med J 1985; 98(779):372-375.

Study: Scheer SJ, Watanabe TK, Radack KL. Randomized controlled trials in industrial low back pain. Part 3. Subacute/chronic pain interventions. Archives of Physical and Medical Rehabilitation 1997; 78: 414-423.

Objective	
To identify interventions that are associated with successful return to work in subjects with subacute/chronic low back pain (LBP).	
Methods	
Primary Sources	MEDLINE, PsycINFO, Rehabdata, Nursing and Allied Health, and Dissertation Abstracts. All databases were searched from 1975 to 1993.
Additional sources	Source not reported for one additional study published in 1973.
Type of studies included	Randomized controlled trials (RCT) with any concurrent reference comparison group, with the only exception being historical control studies. Only published studies in English. This review focussed on subjects with subacute/chronic LBP.
Outcome of interest	Return to work outcomes: Days of sickness absence (initial episode), days off work (1 year follow-up or successive 2-week intervals), costs of worker compensation paid (not specified if this referred to wage replacement or healthcare costs or both).
Intervention of interest	Back school and exercise. The review also reported on the following interventions that will not be covered in this summary as they are not workplace-based: cognitive and behavioral strategies, lumbar facet injections, and a rigid stay inside a lumbar-abdominal binder. The intervention of interest could potentially be implemented in a workplace setting.
Validity assessment	
	The methodological quality of the RCTs was independently assessed by 2 reviewers. A 26-point quality system was developed for rating the studies. A higher quality 'score' did not necessarily signify a better performed study as the methodological criteria for quality appraisal were not weighted. The 26 methodological criteria are listed below: Patient characteristics: Description of inclusion/exclusion criteria, comparability between exposure and control group on the following variables: Mean age (≤ 7 years), percentage working prior to injury and on workers' compensation (≤ 5%), percentage with back surgery and prior LBP (≤ 10%), duration of symptoms (≤ 5 days), severity (visual analog scale or similar measure), comorbidity, physician exams

(straight leg raise, neurological signs), and referral sources.

Interventions:
Intervention compliance, cointerventions (ruled out), study reproducibility (equipment, personnel, setting), description of treatment for treatment and control group, use of blinding for clinician/patient, report or implication of clinician's qualifications, and control for placebo effect.

Outcome assessment and statistical methods:
Accountability and minimization (≤ 20%) of drop-outs, assessment of outcome blinded (if relevant), full description of job duty outcome that includes at least 6 months follow-up, description/justification of statistical methods or sample size, report of study power and method to evaluate hypothesis (e.g. p value).

Results

More than 4000 citations were identified with 600 citations concerning interventions for LBP. Of the 600 citations, 35 were RCTs that included return to work as an outcome measure. This review focussed on 12 of the 35 studies dealing with subacute/chronic LBP. There was only 1 RCT on back school with a quality score of 14 and four RCTs on exercise with quality scores that ranged from 1 to 19. The remaining RCTs covered interventions that were not workplace-based and hence were not included in this summary. Data were extracted on all studies irrespective of their quality score.

Conclusions

Based on the single RCT identified, there was no effect of the back school on the duration of absence or the absolute number of sick leaves among subjects with chronic low back pain. However,

there was a significant effect on subjective pain and disability. Some of the methodological limitations of the study included differences between the intervention and control groups on comorbidity and physician exams, possibility of cointerventions**,** and lack of compliance reporting. Additional research is needed to evaluate the effectiveness of back schools in subjects with chronic low back pain.

No conclusions could be drawn for the effect of exercise on return to work. Of the four RCTs that were related to exercise, two were of too low quality to permit inferences on effects of exercise on RTW while the third RCT included a very small sample of subjects who were off work and the fourth RCT reported a reduction in disability days that could not be explained (prolonged effect over one year from only 4 weeks of individualized exercise).

Studies included in data extraction

Back school:

1. Hurri H. The Swedish back school in chronic low back pain. Part I. Benefits. Scandinavian Journal of Rehabilitation Medicine 1989;21:33-40.

Exercise:

1. Aberg J. Evaluation of an advanced back pain rehabilitation program. Spine 1984; 9:317-318.

2. Davies JE, Gibson T, Tester L. The value of exercises in the treatment of low back pain. Rheumatol and Rehab 1979; 18:243-247.

3. Hansen FR, Bendix T, Skov P, Jensen CV, Kristensen JH, Krohn L et al. Intensive, dynamic back-muscle exercises, conventional physiotherapy, or placebo-control treatment of low-back pain: a randomized, observer-blind trial. Spine 1993; 18(1):98-108.

4. Manniche C, Asmussen K, Lauritsen B, Vinterberg KH, Abildstrup S, et al. Intensive dynamic back exercises with or without hyperextension in chronic back pain after surgery for lumbar disc protrusion. Spine 18, 560-567. 1993.

Cognitive/Behavioral Strategies:

1. Altmaier EM, Lehmann TR, Russell DW, Weinstein JN, Kao CF. The effectiveness of psychological interventions for the rehabilitation of low back pain: a randomized controlled trial evaluation. Pain 1992; 49(3):329-335.

2. Harkapaa K, Jarvikoski A, Mellin G, Hurri H. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part I. Pain, disability, compliance, and reported treatment benefits three months after treatment. Scand J Rehabil Med 1989; 21(2):81-89.

2b. Harkapaa K et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part III. Long-term follow-up of pain, disability, and compliance. Scand.J.Rehab.Med. 1990;22:181-8.

2c. Mellin G et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part II. Effects on physical measurements three months after treatment. Scand.J.Rehab.Med. 1989;21(2):91-5.

2d. Mellin G et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part IV. Long-term effects on physical measurements. Scand.J.Rehab.Med. 1990;22(4):189-94.

3. Lindstrom I, Ohlund C, Eek C, Wallin L, Peterson LE, Fordyce WE et al. The effect of graded activity on patients with subacute low back pain: a randomized prospective clinical study with an operant-conditioning behavioral approach. Phys Ther 1992; 72(4):279-293.

4. Linton SJ, Bradley LA, Jensen I, Spangfort E, Sundell L. The secondary prevention of low back pain: a controlled study with follow-up. Pain 1989; 36(2):197-207.

5. Turner JA. Comparison of group progressive-relaxation training and cognitive-behavioral group therapy for chronic low back pain. J Consult Clin Psychol 1982; 50 (5):757-765.

Lumbar facet injections:

1. Lillius G, Laasonen EM, Myllynen P, Harilainen A, Gronlund G. Lumbar facet joint syndrome. J Bone Joint Surg 71, 681-684. 1989.

Rigid stay inside a lumbar-abdominal binder:

1. Million R, Nilsen KH, Jayson MIV, Baker RD. Evaluation of low back pain and assessment of lumbar corsets with and without back supports. Ann Rheum Dis 1981; 40:449-454.

Study: Schonstein E, Kenny DT, Keating J, Koes BW. Work conditioning, work hardening, and functional restoration for workers with back and neck pain (Cochrane Review). Cochrane Database Syst Rev 2003; (1): CD001822.

Objective	
To compare the effectiveness of physical conditioning programs with management strategies that do not include physical conditioning programs, for workers with back and neck pain, in reducing lost time from work and increasing functional status.	
Methods	
Primary Sources	Medline (from 1966), EMBASE (from 1980), CINAHL (from 1982), Biomedical Collection: I (from 1993), II (from 1995), III (from 1995), IV (from 1995), PsycINFO (from 1967), the Cochrane Central Register of Controlled Trials, PEDro. All databases were searched up to 31 May 2000.
Additional sources	Communication with coordinator of Cochrane Collaboration Back Review Group to obtain additional studies from hand searches conducted by the Cochrane Collaboration, citations from reference lists of identified studies, consultation with domain experts
Type of studies included	Randomized controlled trials. There were no language restrictions.
[illegible]	[illegible]
[illegible]	[illegible]
Validity assessment	

[illegible]

[illegible]:
[illegible],
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[illegible]

[illegible]

[illegible]:
[illegible]

[illegible]. [illegible] ‘[illegible]’ [illegible] ‘[illegible]’ [illegible] ‘[illegible]’. [illegible] 8) [illegible] 9) [illegible].

Results

[illegible] 1995 [illegible]. [illegible] 39 [illegible]. [illegible] 18 [illegible] 20 [illegible]. [illegible] 18 [illegible] 3 [illegible] 8). [illegible] 18 [illegible].

Conclusions

There is a wide variation in the content and duration of interventions that are currently labelled as physical conditioning, work conditioning, work hardening or functional restoration programs and types of outcome assessments used in clinical trials investigating effectiveness of interventions. This limits the ability to pool results across studies. Other limitations include overall poor methodological quality, inadequate reporting of results, small sample sizes and variations in timing

of the outcome assessments and subjects studied. For internal validity, compliance in the intervention group was measured in only 56% of studies. In addition, two descriptive items, consideration of adverse effects and similarity in distribution of symptoms between groups, were poorly addressed by many studies.

There is evidence that physical conditioning (functional restoration/work conditioning/hardening) programs that include a cognitive-behavioural approach can reduce the number of sick days lost in comparison to usual care. This evidence, limited to workers with chronic back pain, was based on studies that included physical conditioning programs, comprised of intensive physical training (specific to the job or not) that included aerobic capacity, muscle strength and endurance and coordination; were in some way work-related (although there was no specific information as to how they were work-related); and were given and supervised by a physiotherapist or a multidisciplinary team. For workers with acute back pain, the evidence is inconsistent. Furthermore, there is insufficient evidence that specific exercises, that are not accompanied by a cognitive-behavioral approach, are effective in reducing sick days lost for workers with either acute or chronic back pain. This might be the result of underpowered studies or true absence of treatment effect.

Studies included in data extraction

1. Alaranta H, Rytokoski U, Rissanen A, Talo S, Ronnemaa T, Puukka P et al. Intensive physical and psychosocial training program for patients with chronic low back pain: a controlled clinical trial. Spine 1994; 19:1339-49.

2. Altmaier EM, Lehmann TR, Russell DW, Weinstein JN, Kao CF. The effectiveness of psychological interventions for the rehabilitation of low back pain: a randomized controlled trial evaluation. Pain 1992; 49:329-35.

3. Bendix AF, Bendix T, Vaegter K, Busch E, Kirkbak S, Ostenfeld S. Intensive work rehabilitation [Intensiv tvaerfaglig rygbehandling]. Videnskab og praksis 1994; 156:2388-5.

4. Bendix AF, Bendix T, Lund C, Kirkbak S, Ostenfeld S. Comparison of three intensive programs for chronic low back pain patients: a prospective, randomized, observer-blinded study with one-year follow-up. Scand J Rehab Med 1997; 29:81-89.

5. Bentsen H, Lindgarde F, Manthorpe R. The effect of dynamic strength back exercise and/or a home training program in 57-year-old women with chronic low back pain. Results of a prospective randomized study with a 3-year follow-up period. Spine 1997;22:1494-500.

6. Corey DT, Koepfler LE, Etlin D, Day HI. A limited functional restoration program for injured workers: a randomized trial. J Occup Rehab 1996; 6(4):239-249.

7. Dettori JR, Bullock SH, Sutlive TG, Franklin RJ, Patience T. The effects of spinal flexion and extension exercises and their associated postures in patients with acute low back pain. Spine 1995; 20(21):2303-2312.

8. Faas A, Van Eijk JTM, Chavannes AW, Gubbels JW. A randomized trial of exercise therapy in patients with acute low back pain: efficacy on sickness absence. Spine 1995; 20(8):941-947.

9. Friedrich M, Gittler G, Halberstadt Y, Cermak T, Heiller I. Combined exercise and motivation program: effect on the compliance and level of disability of patients with chronic low back pain: a randomized controlled trial. Arch Phys Med Rehabil 1998; 79(5):475-487.

10. Hansen FR, Bendix T, Skov P, Jensen CV, Kristensen JH, Krohn L et al. Intensive, dynamic back-muscle exercises, conventional physiotherapy, or placebo-control treatment of low-back pain: a randomized, observer-blind trial. Spine 1993; 18(1):98-108.

11. Kellet KM, Kellet DA, Nordholm LA. Effects of an exercise program on sick leave due to back pain. Research Report 1991;71(40:283-93.

12. Lindstrom I, Ohlund C, Eek C, Wallin L, Peterson LE, Nachemson AL. Mobility, strength, and fitness after a graded activity program for patients with subacute low back pain - a randomized prospective clinical study with a behavioral therapy approach. Spine 1992; 17(6):641-652.

13. Lindstrom I, Ohlund C, Eek C, Wallin L, Peterson LE, Fordyce WE et al. The effect of graded activity on patients with subacute low back pain: a randomized prospective clinical study with an operant-conditioning behavioral approach. Phys Ther 1992; 72(4):279-293.

14. Lindstrom I, Ohlund C, Nachemson A. Physical performance, pain, pain behaviour and subjective disability in patients with subacute low back pain. Scand J Rehabil Med 1995;27:153-60.

15. Loisel P, Abenhaim L, Durand P, Esdaile JM,

Suissa S, Gosselin L et al. A population-based, randomized clinical trial on back pain management. Spine 1997; 22(24):2911-2918.

16. Malmivaara A, Hakkinen U, Aro T, Heinrichs M-L, Koskenniemi L, Kuosma E et al. The treatment of acute low back pain - bed rest, exercises, or ordinary activity? N Eng J Med 1995; 332(6):351-355.

17. Mitchell RI, Carmen GM. The functional restoration approach to the treatment of chronic pain in patients with soft tissue and back injuries. Spine 1994;19:633-42.

18. Moffett JK, Torgerson D, Bell-Syer S, Jackson D, Llewlyn-Phillips H, Farrin A et al. Randomised controlled trial of exercise for low back pain: clinical outcomes, costs, and preferences. Br Med J 1999; 319:279-283.

19. Seferlis T, Nemeth G, Carlsson AM, Gillstrom P. Conservative treatment in patients sick-listed for acute low-back pain: a prospective randomised study with 12 months' follow-up. Eur Spine J 1998; 7(6):461-470.

20. Torstensen TA, Ljunggren AE, Meen HD, Odland E, Mowinckel P, af Geijerstam S. Efficiency and costs of medical exercise therapy, conventional physiotherapy, and self-exercise in patients with chronic low back pain: a pragmatic, randomized, single-blinded, controlled trial with 1-year follow-up. Spine 1998; 23(23):2616-2624.

Comments

Study: Teasell RW, Bombardier C. Employment-related factors in chronic pain and chronic pain disability. The Clinical Journal of Pain 2001; 17(4); S39-S45

Objective	
To evaluate if employment-related factors predict chronic pain and chronic pain disability.	
Methods	
Primary Sources	Medline (from 1966), EMBASE (from 1980), CINAHL (from 1982), HealthSTAR (from 1975), PsycINFO (from 1887), Dissertation Abstracts International (from 1861), EconLit (from 1969), and NIOSH [including LABOR] (from 1973). These databases were searched up to Aug 31, 1998. Cochrane Library (3:1998), and Pain Relief Database (1950 - 1994).
Additional sources	Reviewers asked colleagues for additional references, hand searched recent publications, other task force reports, and articles currently under review.
Type of studies included	Observational studies
[illegible]	[illegible]
[illegible]	[illegible]
Validity assessment	
[illegible] 2 [illegible]: [illegible] [illegible] [illegible] 1: [illegible] [illegible] 2: [illegible] [illegible] 3: [illegible] [illegible] 4[illegible]: [illegible] [illegible] 4: [illegible]	
Results	
[illegible] review. Data extraction was done on 15 observational studies that were appraised as being of high-quality.	
Conclusions	

There is limited evidence that job dissatisfaction or the perception of difficult job conditions and demands is associated with the development of chronic pain disability.

There is limited evidence that the physical demands of the job play a role in the development of chronic pain disability.
There is moderate evidence that the availability of modified work or work autonomy is associated with less disability in chronic pain patients (RTW and staying at work)
There is limited evidence that factors such as work history (job changes and periods of unemployment), public sector employer (more likely than private sector employer), current work status (not returning to work in acute stage), and lack of varied work are associated with chronic pain disability as defined by RTW.
There is contradictory evidence that the number of years employed with a firm predicts chronic pain disability as defined by non-RTW.
There is limited evidence that lower social class and level of education are associated with chronic pain disability.

Studies included in data extraction

Job satisfaction:

1. Cats-Baril WL, Frymoyer JW. Identifying patients at risk of becoming disabled because of low back pain: the Vermont Rehabilitation Engineering Center predictive model. Spine 1991;16(6):605-7.

2. Hasenbring M, Marienfeld G, Kuhlendahl D, Soyka D. Risk factors of chronicity in lumbar disc patients: a prospective investigation of biologic, psychologic, and social predictors of therapy outcome. Spine 1994; 24:2759-2765.

3. Hazard RG, Haugh LD, Reid S, Preble JB, MacDonald L. Early prediction of chronic disability after occupational low back injury. Spine 1996; 21(8):945-951.

4. Fishbain DA, Cutler RB, Rosomoff HL, Khalil T, Steele-Rosomoff R. Impact of chronic pain patients' job perception variables on actual return to work. Clin J Pain 1997; 13(3):197-206.

Type of work:

1. Cats-Baril WL, Frymoyer JW. Identifying patients at risk of becoming disabled because of low back pain: the Vermont Rehabilitation Engineering Center predictive model. Spine 1991;16(6):605-7.

2. Fishbain DA, Cutler RB, Rosomoff HL, Khalil T, Steele-Rosomoff R. Impact of chronic pain

patients' job perception variables on actual return to work. Clin J Pain 1997; 13(3):197-206.

3. Hazard RG, Haugh LD, Reid S, Preble JB, MacDonald L. Early prediction of chronic disability after occupational low back injury. Spine 1996; 21(8):945-951.

4. Miedema HS, Chorus AMJ, Wevers CWJ, et al. Chronicity of back problems during working life. Spine 23, 2021-2029. 1998.

5. Milhous RL, Haugh LD, Frymoyer JW, Ruess JM, Gallagher RM, Wilder DG et al. Determinants of vocational disability in patients with low back pain. Arch Phys Med Rehabil 1989; 70:589-593.

6. Van den Hoogen HJ, Koes BW, Devile W, et al. The prognosis of low back pain in general practice. Spine 22, 1515-1521. 1997.

Return to modified work and work autonomy:

1. Butler RJ, Johnson WG, Baldwin M. Managing work disability: Why first return to work is not a measure of success. Industrial and Labor Relations Review 1995; 48:452-69.

2. Hall H, McIntosh G, Melles T, Holowachuk B, Wai E. Effect of discharge recommendation on outcome. Spine 1994; 19(18):2033-2037.

3. Crook J, Moldofsky H, Shannon H. Determinants of disability after a work related musculoskeletal injury. Journal of Rheumatology 1998; 25:1570-7.

4. Crook J, Moldofsky H. The clinical course of musculoskeletal pain in empirically derived groupings of injured workers. Pain 1996; 67:427-33.

5. Infante-Rivard C. Prognostic factors for return to work after a first compensated episode of back pain. Occupational and Environmental Medicine 1996; 53:488-94.

6. Johnson WG, Baldwin ML, Butler RJ. Back pain and work disability: the need for a new paradigm. Industrial Relations 1998; 37:9-34.

7. Oleinick A, Gluck JV, Guire K. Factors affecting first return to work following a compensable occupational back injury. Am.J Ind.Med 1996; 30:540-55.

Other employment-related factors:

1. Cats-Baril WL, Frymoyer JW. Identifying patients at risk of becoming disabled because of low back pain: the Vermont Rehabilitation Engineering Center predictive model. Spine 1991; 16(6):605-7.

2. Infante-Rivard C. Prognostic factors for return to work after a first compensated episode of back pain. Occupational and Environmental Medicine 1996; 53:488-94.

3. Haldorsen EMH, Indahl A, Ursin H. Patients

with low back pain not returning to work: a 12-month follow-up study. Spine 1998; 23:1202-8.

4. Ohlund C, Lindstrom I, Eek C, Areskoug B, Nachemson A. The causality field (extrinsic and intrinsic factors) in industrial subacute low back pain patients. Scandinavian Journal of Medicine & Science in Sports 1996; 6:98-111.

Socioeconomic status:

1. Cats-Baril WL, Frymoyer JW. Identifying patients at risk of becoming disabled because of low back pain: the Vermont Rehabilitation Engineering Center predictive model. Spine 1991;16(6):605-7.

2. Andersson HI, Ejlertsson G, Leden I, Rosenberg C. Characteristics of subjects with chronic pain, in relation to local and widespread pain report. A prospective study of symptoms, clinical findings and blood tests in subgroups of a geographically defined population. Scand J Rheumatol 1996; 25(3):146-154.

Study: [illegible] (Cochrane Review). In: The Cochrane Library 1999;1-15.

Objective	
To determine if back schools are more effective than other treatments or absence of treatment for patients with non-specific low back pain.	
Methods	
Primary Sources	Medline (from 1966) and EMBASE (from 1988). Databases were searched up to 1997.
Additional sources	References of relevant reviews and identified randomized controlled trials. Screening the Cochrane library issue [4 (update), 1998], using the search terms 'back pain' and 'low back pain'.
Type of studies included	Randomized controlled trials (RCT). Studies published in English, Dutch, French, and German were included. In studies where the intervention of interest [illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Validity assessment	

[illegible]

[illegible]

[illegible] 6 [illegible]. [illegible]: [illegible] 5 [illegible], [illegible] 7 [illegible].

[illegible]:
[illegible]: [illegible].
[illegible]: [illegible].
[illegible]: [illegible] 1 [illegible] ([illegible]) [illegible].
[illegible]: [illegible].

Results

[illegible] 271 [illegible]. [illegible] 21 [illegible] 15 [illegible] quality appraised. [illegible]. [illegible] ([illegible] 6 [illegible]).

Conclusions

There is moderate evidence that back schools are more effective than other treatments for chronic low back pain and moderate

evidence that back schools in an occupational setting are effective. However, the positive effects of back schools have been reported for short-term follow-up only. Six of the seven studies that reported a follow-up measurement after 12 months or more did not show any long-term benefits of back schools. The heterogeneity among studies with regard to study populations, content of back schools, type of control interventions and outcome measures makes it difficult to identify which type of back school is effective to what type of patients. The most promising interventions consisted of a modification of the Swedish back school and were quite intensive (a 3 to 5-week stay in a specialized centre).

Generally there were significant improvements in mean pain and functional disability scores in those who attended the back schools compared to other or placebo treatments. In one study that examined time to return to work (2), no difference was noted between the back school group and reference groups.

None of the randomized trials of back schools evaluated the cost-effectiveness of the back schools. Most studies did not report characteristics of the study population, such as duration of symptoms (acute, subacute, or chronic), type of symptoms (with or without radiation), which were needed to perform relevant subgroup analyses. The most prevalent methodological shortcomings appeared to be the lack of blinding of patients, observers and care providers, an appropriate method of randomization, inadequate concealment of treatment allocation, co-interventions were not avoided, and unsatisfactory compliance of interventions.

There is a need for future

high quality randomized controlled trials which should aim to determine which type of back schools is the most effective for chronic low back pain in occupational settings.

Studies included in data extraction

Studies that were of high quality (fulfilled 6 or more of the validity criteria):

1. Klaber Moffett JA et al. A controlled, prospective study to evaluate the effectiveness of a back school in the relief of chronic low back pain. Spine 1986;11(2):120-2.

2. Leclaire R et al. Back school in a first episode of compensated acute low back pain: a clinical trial to assess efficacy and prevent relapse. Archives of Physical Medicine and Rehabilitation 1996;77:673-9.

3. Linton SJ et al. The secondary prevention of low back pain: a controlled study with follow-up. Pain 1989;36(2):197-207.

4a. Stankovic R, Johnell O. Conservative treatment of acute low-back pain. A prospective randomized trial: McKenzie method of treatment versus patient education in "mini back school". Spine 1990;15:120-3.

4b. Stankovic R, Johnell O. Conservative treatment of acute low back pain: A five-year follow-up study of two methods of treatment. Spine 1995;20:469-72.

Studies that were of low quality and fulfilled 5 of the quality criteria:

1. Bergquist-Ullman M, Larsson U. Acute low back pain in industry. A controlled prospective study with special reference to therapy and confounding factors. Acta Orthop Scand (Suppl) 1977; 170:1-117.

2. Donchin M et al. Secondary prevention of low-back pain: a clinical trial. Spine 1990;15(12):1317-20.

3a. Harkapaa K et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part I. Pain, disability, compliance, and reported treatment benefits three months after treatment. Scand J Rehabil Med 1989;21:81-9.

3b. Harkapaa K et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part III. Long-term follow-up of pain, disability, and compliance. Scand.J.Rehab.Med. 1990;22:181-8.

3c. Mellin G et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part II. Effects on physical measurements three months after treatment. Scand.J.Rehab.Med. 1989;21(2):91-5.

3d. Mellin G et al. A controlled study on the outcome of inpatient and outpatient treatment of low back pain. Part IV. Long-term effects on

physical measurements. Scand.J.Rehab.Med. 1990;22(4):189-94.

4. Lankhorst GJ et al. The effect of the Swedish back school in chronic idiopathic low back pain - a prospective controlled study. Scand.J.Rehab.Med. 1983;15:141-5.

Studies that were of low quality and fulfilled fewer than 5 of the quality criteria:

1. Berwick DM, Budman S, Feldstein M. No clinical effect of back schools in an HMO. A randomized prospective trial. Spine 1989;14(3):338-44.

2. Herzog W, Conway PJ, Willcox BJ. Effects of different treatment modalities on gait symmetry and clinical measures for sacroiliac joint patients. Journal of Manipulative and Physiological Therapeutics 1991;14:104-9.

3a. Hurri H. The Swedish back school in chronic low back pain. Part I. Benefits. Scand J Rehabil Med 1989;21:33-40.

3b. Hurri H. The Swedish back school in chronic low back pain. Part II. Factors predicting the outcome. Scand.J.Rehab.Med. 1989;21(1):41-4.

3c. Julkunen J, Hurri H, Kankainen J. Psychological factors in the treatment of chronic low back pain. Follow-up study of a back school intervention. Psychotherapy and Psychosomatics 1988;50:173-81.

4. Keijsers JF et al. A back school in the Netherlands: evaluating the results. Patient Education & Counseling 1989;14 (1):31-44.

5. Keijsers JFEM et al. The efficacy of the back school: a randomized trial. Arthritis Care Research 1990;3(4):204-9.

6. Lindequist S et al. Information and regime at low back pain. Scand.J.Rehab.Med. 1984;16:113-6.

7. Postacchini F, Facchini M, Palieri P. Efficacy of various forms of conservative treatment in low back pain. A comparative study. Neuro Orthopedics. 1988;6(1):28-35.

APPENDIX 8

Quantitative study data extraction summary tables (n=11).

Study: Amick III BC, Habeck RV, Hunt A, Fossel AH, Chapin A, Keller RB, Katz JN. Measuring the impact of organizational behaviours on work disability prevention and management. J Occup Rehab. 2000; 10 (1): 21-38.

Study Characteristics	
Study design:	Prospective cohort study This study used a revised version of the Habeck (1998) occupational policies and practices questionnaire to examine injured workers' perspectives on the involvement of their workplaces with respect to disability prevention and disability management.
Study objectives:	The primary objective of this study was to reduce the number of items on the original Occupational Policies and Practices questionnaire without compromising the reliability and validity of the measure for use with injured workers. The predictive validity of the instrument was tested by examining the ability of the scale to predict return to work status in the cohort of carpal tunnel surgery patients at 6 months post surgery.
Jurisdiction:	Maine, USA
Study time frame:	1997 to 1998
Length of follow-up:	1 year
QA Rating	Very high
Participant characteristics:	
Sample n:	197 carpal tunnel surgery patients
Sample source:	Injured workers, at least 18 years of age, with carpal tunnel symptoms were eligible for inclusion in this study if they met the following criteria: 1) presented to 1 of 15 participating surgeons with the following symptoms lasting at least 1 month: numbness or tingling in at least 2 of the first 4 fingers 2) Diagnosis of carpal tunnel syndrome with confirmation on nerve conduction testing 3) Working at least 20 hours per week at the time the symptoms developed Exclusion criteria included: previous carpal tunnel surgery, pregnancy, retirement, or full-time student status.
Age:	Mean (sd): 46 (9.5) years
Gender:	43% men, 57% women
Occupational status:	Not reported
Workplace unionized:	Not reported

Condition:	Participants were all scheduled for carpal tunnel release surgery.
Baseline differences between intervention and control groups:	Not applicable.
Unit of analysis	Worker
Intervention Type: Note - this was not an intervention study. This was a prospective cohort that asked injured workers to rate their workplaces on their involvement in several occupational policies and practices that are related to disability prevention and management. The following workplace-based strategies were included in the survey, according to the four scales in the questionnaire: · People-oriented culture (POC) · Safety climate (SC) · Ergonomic practices (EP) · Disability management (DM)	
☒ Organizational factors	· Top management support (SC) · Organizational culture (POC) - People-oriented culture (POC) - Safety Culture (SC) · Other Factors: - Safety diligence (SC) - Cooperative labour-management efforts for RTW (DM)
☐ Psychosocial factors	
☒ Disability management	· Early contact with injured worker (DM) · Presence of in-house RTW coordinator (DM) · Contact between healthcare provider and workplace staff (DM) · Ergonomic practices (EP) · Disability case management (DM) · Type of work accommodation (DM) - Changed or modified duties - Changed workstation - Special equipment provided to work station
☒ Education for workplace staff	· Safety training for staff (SC)
☐ Education for insurance case management staff	
☐ Education for healthcare providers	
☐ Other Intervention(s)	
Control Intervention (as applicable):	
☒ No control group	
Other design characteristics:	
Confounding variables considered	Gender, age, and baseline carpal tunnel syndrome symptoms were considered in the analysis. Functional limitations was recorded, but not included in analyses.

Types of analyses conducted	A logistic regression analysis was conducted to examine the predictive ability of four scales from the questionnaire: People-oriented culture, safety climate (a combination of safety diligence, safety training, and active safety leadership from the original questionnaire), ergonomic practices, and disability management (a combination of disability case monitoring and proactive RTW from the original questionnaire) to predict return-to-work status at 6 months post-surgery.
Outcomes of interest to Literature Review:	
Primary outcome(s)	Return to work status (yes/no) at 6 months post-surgery

Main results

Table 1: Logistic Regression of 6-Month RTW Status on Organizational Policies and Practices Scales (n=140)

	Adjusted Odds Ratio	Standard Error	P-value
People-oriented Culture (POC)	1.86	0.22	0.006
Safety Climate (SC)	1.59	0.214	0.0298
Ergonomic Practices (EP)	1.77	0.239	0.0163
Disability Management (DM)	2.24	0.267	0.0025

After adjustments for age, gender, and baseline carpal tunnel syndrome symptom severity, all four occupational policy and practice scales were predictive of return-to-work status at 6 months post-surgery. The odds ratio for return-to-work are shown above for each of the four scales.

Main Conclusions:

The authors successfully reduced the length of a previously validated instrument measuring workplace occupational policies and practices while retaining the instrument's reliability and validity for use with injured workers. The four scales (POC, SC, EP, DM) were predictive of RTW status 6 months post-surgery, with adjusted odds ratio varying between 1.77 and 2.24 (see Table 1). The greater the workers' agreement that their workplace performs these various occupational policies and practices, the greater the likelihood of the worker having returned to work six months post-surgery.

IWH Reviewers' comments:

This prospective cohort study examined the impact of organizational practices on work status 6 months post-operatively in a sample of 197 American workers with carpal tunnel syndrome. A strength of the study lies in the superior development of the instrument measuring organizational factors. As well, confounding variables were well controlled. This study developed a reliable and valid instrument to assess injured worker perceptions of employer policies and practices. The limitations of this study are that only injured workers with carpal tunnel syndrome were assessed; and the workers were all in a chronic phase of injury (only workers scheduled for surgery were included in this sample).

Study: Arnetz BB, Sjögren B, Rydéhn B, Meisel R. Early workplace intervention for employees with musculoskeletal-related absenteeism: A prospective controlled intervention study. J Occup Environ Med. 2003; 45(5): 499-506

Study Characteristics	
Study design:	Randomized controlled trial Participants were randomly assigned to one of two groups: 1. **Occupational intervention:** This intervention was initiated by the insurance agency and involved a proactive case management strategy with a workplace ergonomic assessment promoting early offers of work accommodation to minimize sickness absence for claimants with MSK injuries. First contact with worker was planned to occur within the first week following the registration of their claim. 2. **Control intervention:** This involved traditional case management strategies from the insurance carrier. Following insurance regulations, first contact with worker is planned to occur within the 8 weeks following the registration of their claim. However, the authors state that this occurred only very rarely in the traditional case management approach - individuals were usually contacted much later than 8 weeks. What differentiated the occupational intervention program from the control intervention: 1) its initiation in the first week after the first day on sick leave 2) its focus on return-to-work 3) its inclusion of a worksite visit conducted by an occupational therapist or ergonomist 4) a minimum of one meeting between worker, supervisor, case manager, and occupational therapist/ergonomist.
Study objectives:	The objective of the study was to compare the effects on sickness absenteeism of a more proactive occupational case management intervention for workers with MSK injuries with that of traditional case management. The occupational intervention involved proactive case management of claimants by the insurance company as well as a workplace ergonomic assessment.
Jurisdiction:	Sweden
Study time frame:	12 month intervention (time period not reported).
Length of follow-up:	1 year.
QA Rating	Very high
Participant characteristics:	
Sample n:	137 (Intervention: 65; Control: 72)
Sample source:	Consenting participants with sickness absence due to an MSK injury were randomly assigned to either the intervention or control group and were enrolled in the program within 1 week after registering their claim with the Swedish National Insurance Agency Forsakringskassan (FK)
Age:	Mean (SD): 42 (10)
Gender:	42% men; 58% women

Occupational status:	Blue collar 85%; White collar 15%
Workplace unionized:	Not reported
Condition:	1st or recurrent MSK condition (including neck, shoulder, back, joint disorders/rheumatics, other MSK).
Baseline differences between intervention and control groups:	No differences were noted between the two groups on any of the following variables: Age, gender, occupational class, mean working hours, amount of sick leave pay per day, and type of injury.
Unit of analysis	Worker
Intervention Type: Occupational Intervention	
☐ Organizational factors	
☒ Psychosocial factors	· Conflict resolution between employee and employer
☒ Disability management	· Early contact with injured workers (within 1 week) · Presence of 3rd party RTW coordinator (case manager) · Meeting between supervisor and worker with 3rd party present · Onsite visit (ergonomist and other intervention team members such as case manager) · Work accommodation offer · Work accommodation included (as needed): - Changed or modified duties - Gradual increase in hours - Changed workstation - Special equipment provided to work station
☒ Education for workplace staff	· Case manager from FK and ergonomist facilitated employer's compliance with regulation to conduct a rehabilitation intervention plan.
☐ Education for insurance case management staff	
☐ Education for healthcare providers	
☒ Other Intervention(s)	· Contact between case manager and physician as needed
Control Intervention (as applicable): Traditional case management	
☐ No control group	
☐ Organizational factors	
☐ Psychosocial factors	
☐ Disability management	
☐ Education for workplace staff	
☐ Education for insurance case management staff	

☐ Education for healthcare providers	
☒ Other Intervention(s)	· Traditional medical care from GP and traditional FK case management practices (no worksite visits or improvements to work station offered).
Other design characteristics:	
Confounding variables considered	Physical and psychosocial work characteristics, MSK comorbidity, self rated health status, gender, and socioeconomic factors.
Types of analyses conducted	Continuous variables were compared between groups using t tests, Discrete variables were compared between groups using chi square tests, Logistic regression used for more complex modelling. Statistical significance tested at p <.05 (two sided test).
Outcomes of interest to Literature Review:	
Primary outcomes	· Total duration of work disability (1st and recurrent episodes) at 6 months and 12 months
Secondary outcomes	· Self reported general health on the following one item: "How would you rate your health today?". Very good/ Fairly good/ Reasonable/ Rather poor/ Very poor.
	· Wage replacement costs, healthcare costs, and program costs were used to determine the cost-benefit ratio for the intervention program. Only direct costs of the intervention were available including: occupational therapist/ergonomist expenses, vocational and occupational training costs, worksite ergonomic improvement and alternate tool costs.
Main results	

Mean sick day, reimbursement costs from the health insurance system, and wage replacements

	Intervention group Mean (SEM)	Reference group Mean (SEM)	P value
Sick days 0 - 12 months	144.9 (11.8)	197.9 (14.0)	p<0.01
Average total reimbursement from the health insurance system in US dollars*	$ 9, 592 (754)	$ 12,197 (970)	p<0.05
Cost of wage replacement (wage replacement cost of $60.00/day X average sick days per person) *	$8,694	$11,874	

* These calculations were completed by the IWH literature review group and based on values provided by the authors in the paper reviewed.

· For the 12 month period, total mean number of sick days for intervention group was 144.9 (SEM 11.8) days/person as compared to 197.9 (SEM 14.0) days/person for control group. The likelihood (odds ratio) of RTW at 6 months for intervention group was 1.9 times that of control group (p=0.06, 95% CI: 1.0, 3.6) and at 12 months was 2.5 times that of control group (p<0.01, 95% CI: 1.2, 5.1).

· Only 1 in 5 participants reported that they felt healthy and recovered when they returned to work, with

twice as many participants in the intervention group reporting this as compared to the control group (22% vs. 9% of participants, p<.05).

· At the 6 month follow-up, there were no significant group differences between groups in their ratings of their health. For both groups combined, only 7.4% reported their health was "very good", 28.7% "fairly good", 28.7% "reasonable", 17.0% "rather poor", and 18.1% "very poor". Therefore, only 35% of participants rated their health as very good or fairly good. This compares unfavourably with the general population where approximately 80% rate their health as very good or fairly good[1].

· The authors report a benefit to cost ratio of 6.8, for which there is not explanation. Our own analyses of their results suggests that this benefit-to-cost ratio is simply the per person reimbursement ($9, 592) divided by the per person cost of the program ($1,410). A more realistic benefit-to-cost ratio is 1.8, based on the incremental benefit per person ($12,197 - $9,592) divided by the incremental cost of the program ($1,410). Another benefit-to-cost ratio can be calculated relative to the cost of wage replacement and health insurance combined: Incremental benefit for cost of wage replacement and of health insurance ($11,874 - $8,694) + ($12,197 - $9,592) divided by average cost of intervention ($1,410) = 4.1.

· Compared with the control group, employers in the intervention group complied with regulations to complete a rehabilitation intervention plan significantly more often (84% vs. 27%) and the time for completing this plan was reduced by half (59.4 days (SEM=5.2) vs. 126.8 days (SEM=19.2), p<.01) as a result of active support from FK case managers.

· Participants in the intervention group were significantly more favourable in their view of the FK case management process as compared with the control group. There were no differences between groups in ratings of the role of the healthcare system (high) and of the employers (low medium) in their RTW process. The ratings of the role and commitment of the employer were rated low.

Main Conclusions:

This study demonstrated that the occupational case management intervention program was effective in reducing work disability duration and associated healthcare and wage replacement costs. It did not result in improvements in perceived health at 6 months follow-up.

Allowing the case managers to play a more proactive role in facilitating RTW as well as involving an ergonomist in workplace adaptation meetings appears to be beneficial to reduce work disability duration and improve worker general health at the time of RTW.

IWH Reviewers' comments:

This study compared the effectiveness of an early occupational intervention program provided by insurance case managers with standard insurance case management. What differentiated the early occupational intervention program from standard case management was: 1) its initiation in the first week after the first day

on sick leave 2) its focus on return-to-work 3) its inclusion of a worksite visit conducted by an ergonomist 4) a minimum of one meeting between worker, supervisor, case manager, occupational therapist/ergonomist. In this population with a long mean duration of sick leave, the intervention led to a 25% reduction in duration of sick leave for individuals with an MSK condition. Participants in the intervention group were also more than twice as likely to be back at work at the 6 months follow-up as compared to those in the reference group. Of note is the fact that the occupational case management intervention led to significant decreases in delays in the establishment of a rehabilitation plan. The randomized trial nature of the design, combined with an appropriate control group, provides a good assessment of a program involving the critical components of disability management for the work disabled injured worker. It is also of direct relevance to WSIB activities as it involved provision of an intervention by insurance case managers.

1. Cott, CA, Gignac, MAM, Badley, EM. Determinants of self rated health for Canadians with chronic disease and disability. J Epidemiol Community Health. 1999; 53:731-736.

Study: Bernacki, E.J., Guidera, J.A., Schaefer, J.A., & Tsai, S. A facilitated early return to work program at a large urban medical centre. Journal of Occupational and Environmental Medicine. 2000; 42: 1172-1177.