Developing a comprehensive approach to the risk management of musculoskeletal disorders: A toolkit approach

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Three key questions!

1. What does the research evidence tell us about causal factors of MSDs?

2. What are we doing at La Trobe University to contribute to knowledge of management of MSDs

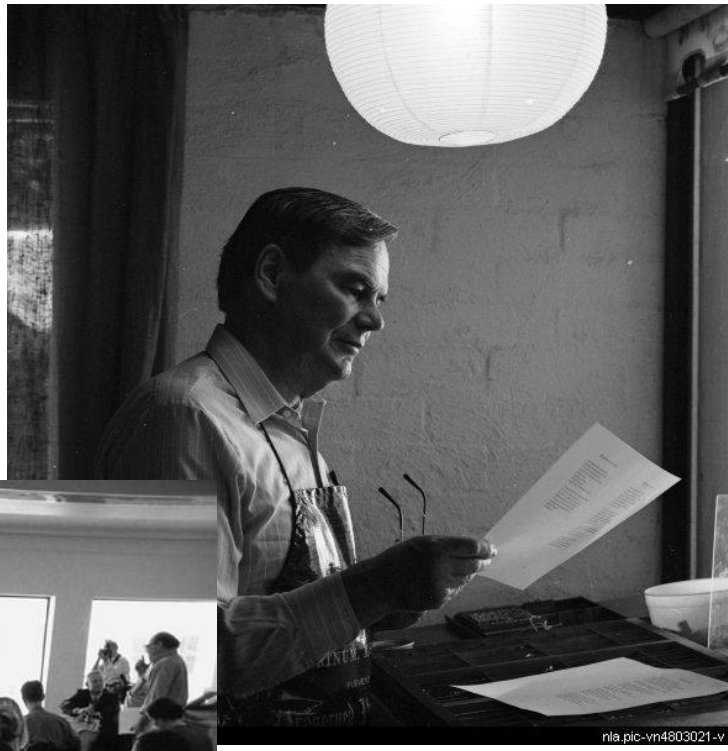
3. Are there gaps in current strategies used to manage MSDs?

Ageing population

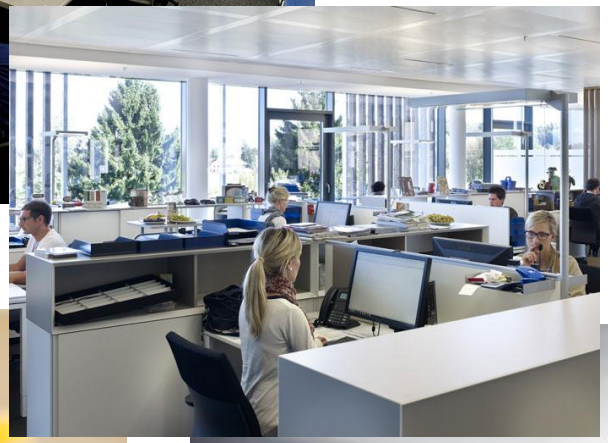
Two issues:

- Wanting to work for longer
- Being able to work for longer

Changing nature of work



And now!



1. **What are MSDs?**
2. MSDs are a major OHS problem worldwide
3. Research evidence on MSD causes and requirements for effective interventions
4. Current workplace practices
5. Workplace Toolkit for MSDs risk management

What are MSDs?

Many definitions but some consensus on versions of the following:

> Work-related musculoskeletal disorders (WRMSDs) affect tendons, tendons sheaths, muscles, nerves, bursae, and blood vessels in the body.

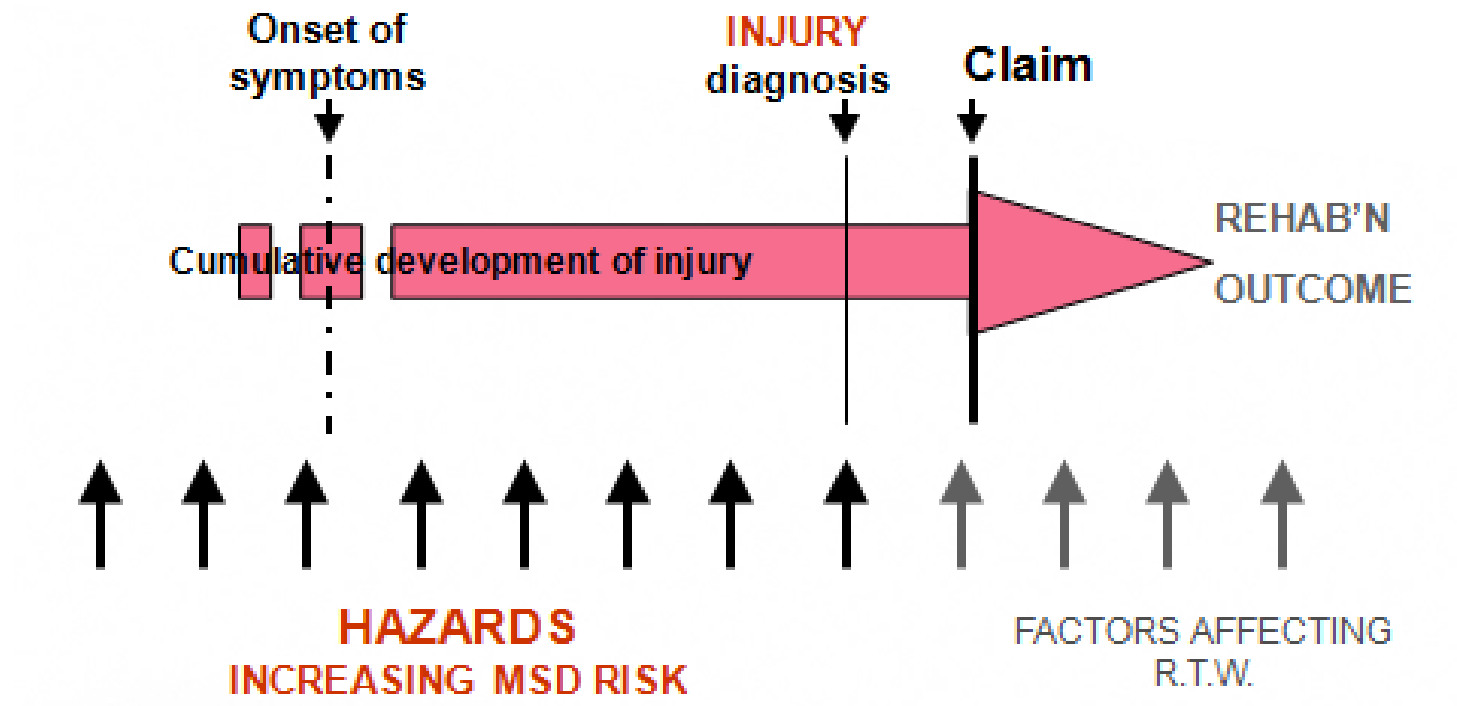
Injuries or disorders a complex issue:

- development over time
- exposure to a single event

How do we know whether an injury or a disorder?

What are MSDs?

- Many clinical diagnoses
- Reliability of diagnosis often poor
- Many arise from cumulative trauma – CTDs, RSIs, OOS



Macdonald and Evans, 2006

What are MSDs?

- *Cumulative* injury lowers the threshold for *sudden onset* injury, that is people with *cumulative* injury have higher risk of *acute* injury
- ICOH* 2012 consensus statement that the goal of workplace risk management should be to prevent or reduce ***musculoskeletal discomfort that is at risk of worsening with work activities, and that affects work ability or quality of life*** – specific diagnoses are not relevant to workplace risk management

*International congress on occupational health

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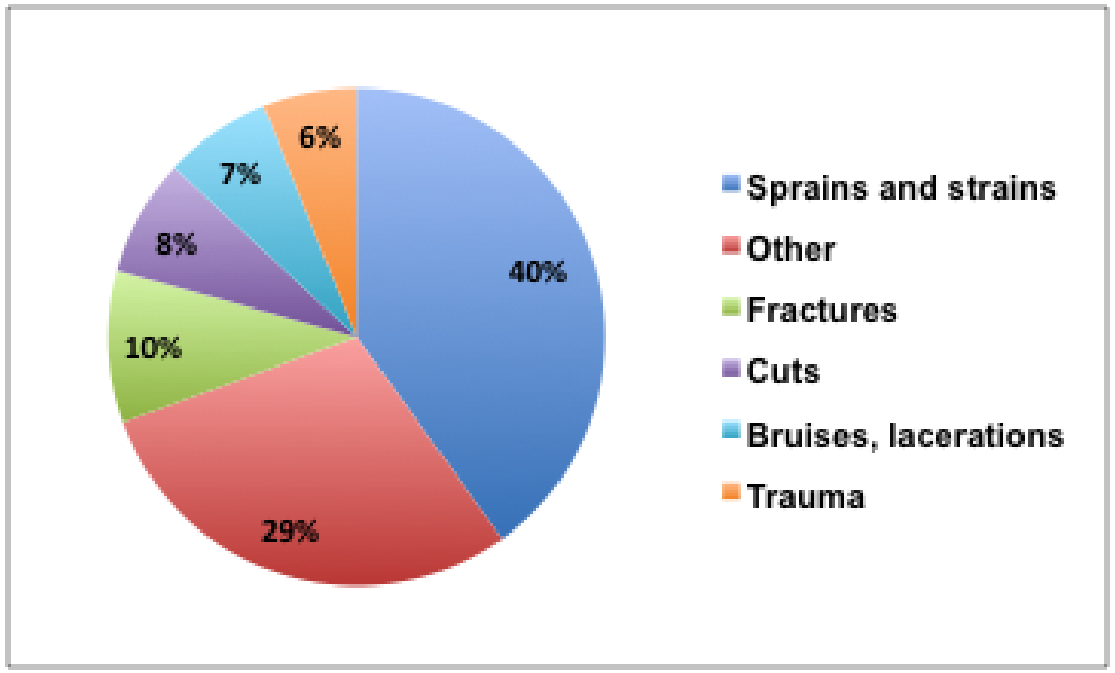
Extent of the problem: Australia

Nature of injury or disease	Number of serious claims			Percentage of serious claims		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Injury & musculoskeletal disorders						
Traumatic joint/ligament & muscle/ tendon injury	32 670	19 980	52 650	43.7%	46.3%	44.7%
Musculoskeletal & connective tissue diseases	10 355	7 605	17 955	13.9%	17.6%	15.2%
Wounds, lacerations, amputations & internal organ damage	13 265	4 640	17 900	17.8%	10.8%	15.2%
Fractures	7 435	3 360	10 795	10.0%	7.8%	9.2%
Other injuries	2 405	1 085	3 485	3.2%	2.5%	3.0%
Burn	1 300	670	1 970	1.7%	1.6%	1.7%
Intracranial injuries	320	230	550	0.4%	0.5%	0.5%
Injury to nerves & spinal cord	130	70	200	0.2%	0.2%	0.2%
Total injury & musculoskeletal disorders	**68 035**	**37 770**	**105 800**	**91.1%**	**87.6%**	**89.8%**

Extent of the problem: Australia

Nature of injury or disease	Number of serious claims			Percentage of serious claims		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Mental disorders	2 920	4 060	6 980	3.9%	9.4%	5.9%
Digestive system diseases	2 465	165	2 630	3.3%	0.4%	2.2%
Nervous system & sense organ diseases	615	610	1 225	0.8%	1.4%	1.0%
Skin & subcutaneous tissue diseases	350	185	535	0.5%	0.4%	0.5%
Infectious & parasitic diseases	125	120	245	0.2%	0.3%	0.2%
Respiratory system diseases	70	135	205	0.1%	0.3%	0.2%
Circulatory system diseases	75	25	100	0.1%	0.1%	0.1%
Other diseases	35	40	70	0.0%	0.1%	0.1%
Neoplasms (cancer)	15	5	20	0.0%	0.0%	0.0%
Total diseases	**6 670**	**5 345**	**12 015**	**8.9%**	**12.4%**	**10.2%**
Total serious claims	**74 705**	**43 115**	**117 815**	**100.0%**	**100.0%**	**100.0%**

Extent of the problem: Ontario



WSIB 2013 Injury data

MSDs are a very large OHS problem

- **Europe –** OHS data**:**
  - chronic musculoskeletal pain affects 100 million people
  - MSDs remain single biggest cause of work absences
  - up to 2 per cent of European gross domestic product (GDP) due to direct costs of MSDs (Bevan et al, 2009)

- **Worldwide –** OHS data lacking in many countries, but ...
  - **37 percent of *all* back pain attributable to work**, resulting in huge costs – economic and personal (Nelson et al, 2005)

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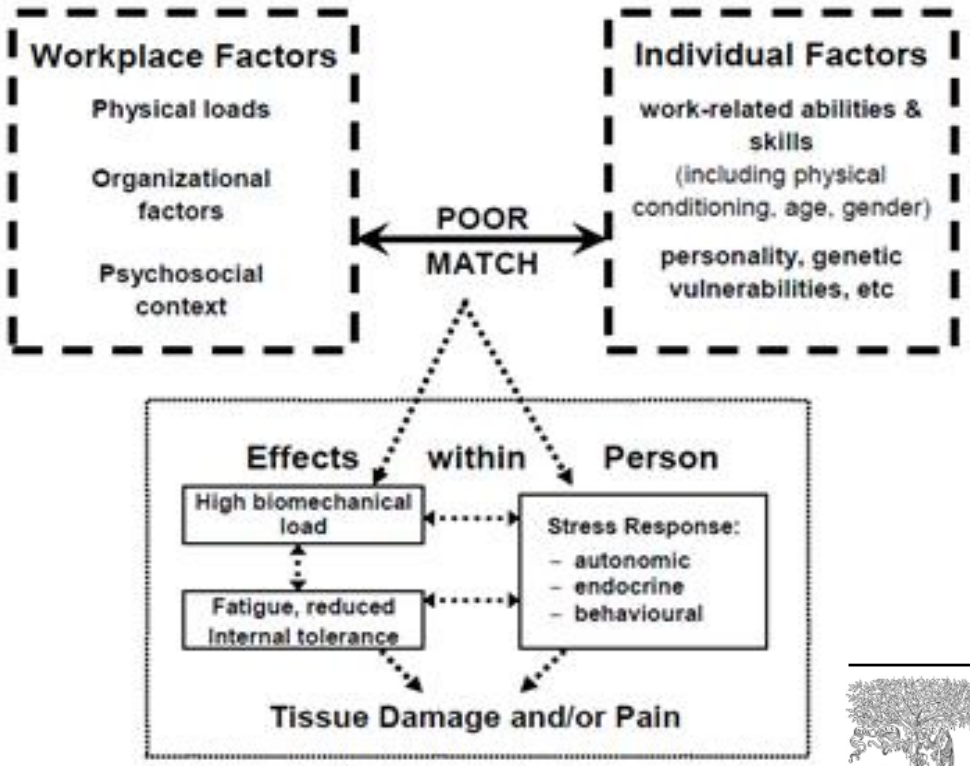
Model of work-related causes of MSDs: 2014



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Applied Ergonomics

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Developing a comprehensive approach to risk management musculoskeletal disorders in non-nursing health care sector employees

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Workplace Hazard Categories

Types of workplace hazards

(a) **Manual handling hazards** ... task specific

(b) **Psychosocial hazards** ... 2 sub-groups:

- **Organisational** – work organisation, job design
- **Social context**- support, communications, relationships with managers

Psychosocial hazards Subgroups	
Organisational	**Social Context**
Working hours	Communications with management
High workloads	Being valued
Poor job design	Health/Safety Culture
Low levels of control	Relationship with colleagues
Pace of work	Relationships with supervisors
Conflicting work demands	

Many organisational hazards are the responsibility of managers and supervisors because they arise from how work is organised and jobs designed

Overlap between the two groups managers and supervisors play a key role in creating/controlling many of them

- MSD risk is determined by MANY hazards – organisational and psychosocial hazards as well as manual handling ones

- Many of these hazards interact or are additive

But in reality, aren't manual handling hazards the *main* problem?

Johnston et al. 2003

Population: 6311, Retail material handlers

Prospective study

Results at follow up

Psychosocial hazard	Odds Ratio for new back pain
High job intensity	1.8
High scheduling demands	1.6
Job dissatisfaction	1.7
Lack of influence	1.2
Lack of job security,	1.2
Low supervisor support	1.4
Lifting 20lb at work, usually every day	1.2

Systematic Review
Lang et al. 2012

Rigorous process which reviewed 50 studies

Meta-analysis to examine the impact of psychosocial factors on MSD development

Findings:

Likelihood of developing low back pain

Psychosocial hazard	Odds Ratio
High job demands	1.42
Low social support	1.36
Low supervisor support	1.33
Low job satisfaction	1.17

Australian program on MSDs

2006: Research on the Prevention of Workrelated Musculoskeletal Disorders Stage 1 - Literature review

2007-2012: Several projects in manufacturing, logistics and health care

2012: Investigation of MSD toolkit risk and hazard measures in relation to claim rates and other indicators

2015: Workplace barriers to reducing the incidence of musculoskeletal and mental disorders

Project Method

- Occupational target groups (jobs) selected in consultation with the organisations
- Focus groups and interviews with people from each group
- Results used to modify survey tool previously developed and validated in manufacturing warehousing sectors
- Survey implementation– online/paper

Australian research 2007 – current

- 7 organisations

  2 warehousing and distribution centres, 2 manufacturers,

  2 hospital networks, 1 ambulance service

- Employee Survey – scores on ...

  ***Workplace hazards**:* physical & psychosocial hazards

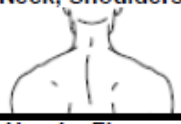
  ***Workers' hazardous states**:* stress, fatigue, low job satisfaction, poor work-life balance

  MSD risk indicator: discomfort/pain score (/60)

Ratings of Discomfort / Pain

HOW OFTEN have you felt discomfort or pain? **AND**

for each area where you've felt it (that is – where you circle '1' or higher) ... **HOW BAD** has it been?

	HOW OFTEN					**For each body area where there's been *some* discomfort or pain** (i.e. *marked as '1' or higher*) circle a number below to show **HOW *BAD***		
	Never	*Occasionally*	*Sometimes*	*Often*	*Almost always*			
Neck, Shoulders 	0	1	2	3	4	Neck, Shoulders 	*Mild*	1
							Moderate	2
							Severe discomfort	3
Hands, Fingers 	0	1	2	3	4	Hands, Fingers 	*Mild*	1
							Moderate	2
							Severe discomfort	3
Arms 	0	1	2	3	4	Arms 	*Mild*	1
							Moderate	2
							Severe discomfort	3
Middle to Lower Back 	0	1	2	3	4	Middle to Lower Back 	*Mild*	1
							Moderate	2
							Severe discomfort	3
Hips, Bottom, Legs, Feet 	0	1	2	3	4	Hips, Bottom, Legs, Feet 	*Mild*	1
							Moderate	2
							Severe discomfort	3

Score out of 60

Main workplace factors measured

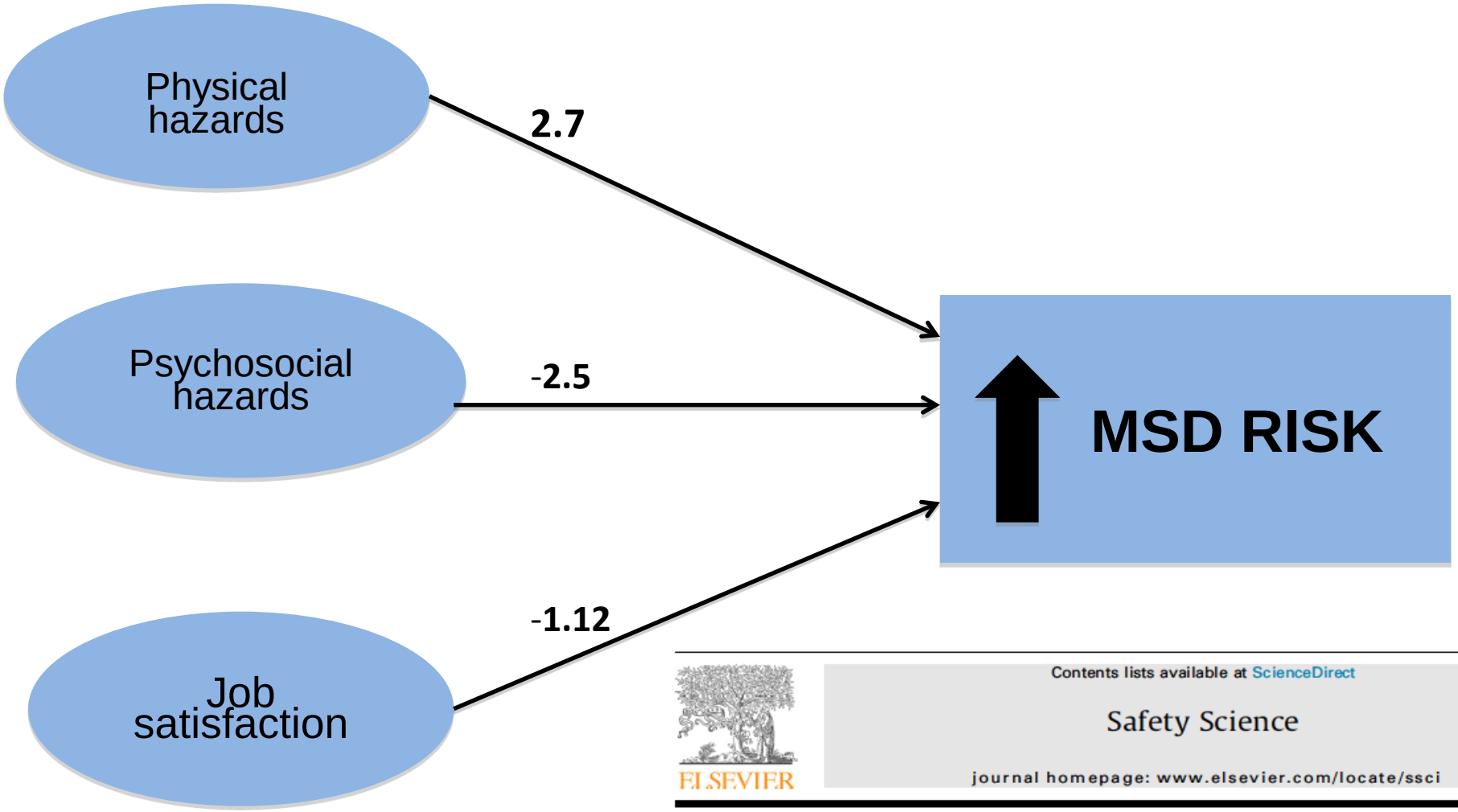
- Manual handling hazards (for each of 12 items – frequency of substantial exposure)

- **WOAQ** (Work Organisation Assessment Questionnaire):
  - Relationships with management
  - Reward / Recognition
  - Workload
  - Relationships with colleagues
  - Physical environment

Analysis of Discomfort Scores with GLAMM

Fixed Effects	Coefficient	95% C.I
Age*	0.08	0.04 – 0.12
WOAQ *	-2.50	-3.23 – -1.76
Physical hazards *	2.70	2.11 – 3.28
Job satisfaction *	-1.12	-1.67 – -0.58
Balance	-0.48	-0.96 – 0.00
Job		
1: PSA (Reference)	Reference	Reference
2: FS	-0.34	-3.07 – 2.39
3: AH	-1.96	-4.20 – -0.27
4: ES	2.81	-1.70 – -7.38
5: SPS	3.15	-1.41 – 7.71
6: Logistics *	-4.26	-6.65 – -1.88
7: Manufacturing *	-4.03	-6.13 – 1.93
8: Paramedic*	-3.46	-5.31 – -1.60

^ multi-level random-intercept generalised linear and latent mixed model



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Risk management: Where should we target strategies to reduce work-related musculoskeletal disorders?

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Aged Care sector

Methods

- Semi structured Interviews with managers and supervisors at each site, numbers depended on size of site and positions
- Collection of relevant policies and procedures
- Survey administered to all employees at each site

Survey Measures

Demographic characteristics (age, gender, employment duration, hours worked)

Stages of change (questionnaire)

Pain and discomfort measures

Physical hazards

Job satisfaction (single item)

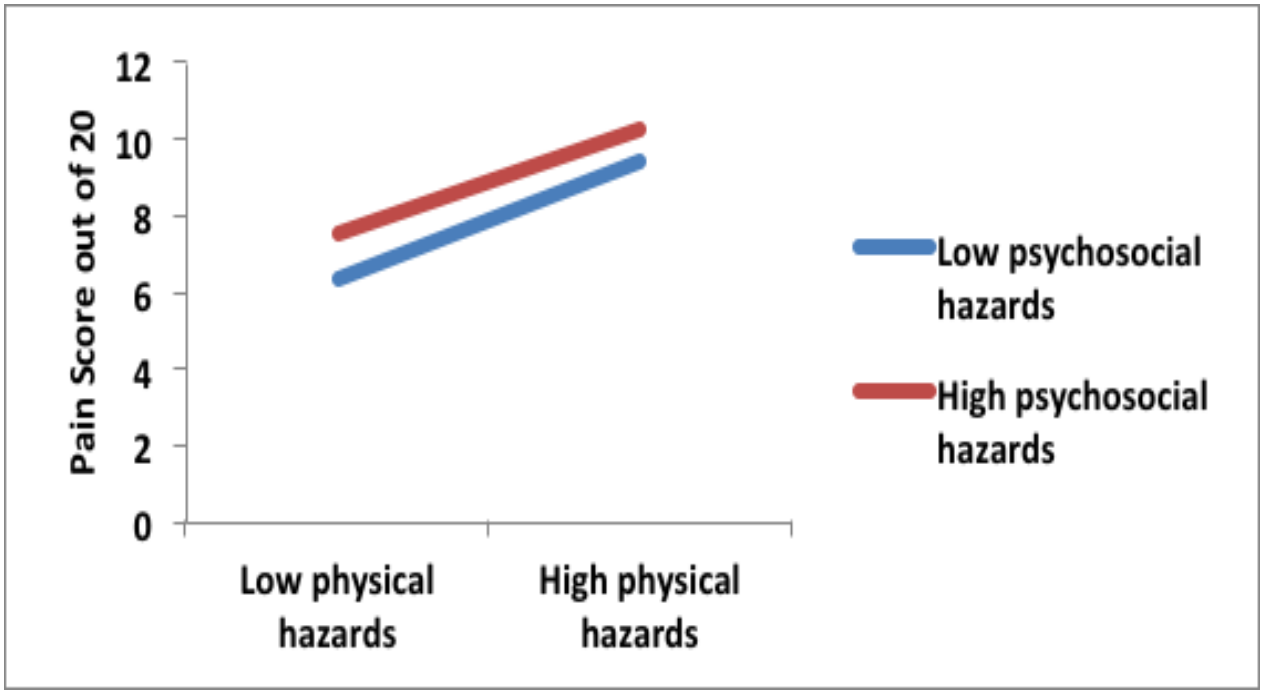
Work-life balance (single item)

Work Organisation Assessment Questionnaire

Sample Characteristics

	All sites (N= 426)
Gender	
Female	84.5% (350)
Male	15.5% (64)
Missing	2.8% (12)
Age in years (SD)	42.8 (13.6)
Length of service in Aged Care (months, SD)	104.1 (1-540)

		Number of interviews	Number of Survey Responses	Response Rate
Org 1	Site 1	5	25	54.3%
	Site 2	5	16	69.6%
Org 2	Site 1	6	56	39.7%
	Site 2	9	55	52.8%
Org 3	Site 1	8	67	50.0%
	Site 2	10	57	40.7%
Org 4	Site 1	8	90	61.3%
	Site 2	7	60	50.0%
Total		58	426	52.3%



Additive effects of physical and psychosocial hazards on discomfort levels

Policy Review

- Coding framework developed for documentation
- Review of documentation in relation to coverage of MSD risk management
- Looking for evidence of identification, assessment and controls of a wide range of hazards and risk in relation to MSDs
- A range of criteria drawn from conceptual framework, coded in relation to coverage
- All coding done by two members of the research teams

(Organisation 1)	Organisation value and vision statement	OHS Mission and or Policy statement	Sick Leave/absenteeism policy	Incident reporting policy	No lift and manual handling policy	Mental health risk management policy
Document provided	Y	Y	Y	Y	Y	N
Initial ID/Assessment of Injury Problem		-		✓✓✓	✓✓✓	
Hazard ID and Risk Assessment		✓✓✓		✓✓✓	✓✓✓	
Physical Task Demands		-		-	-	
Overall Job Demands		-		-	-	
Psychosocial Hazards		-		-	-	
Interactions		-		-	-	
Employee Characteristics		-		-	-	
Hazard and Risk Control						
Process		✓✓✓		✓✓✓	✓✓✓	
Control Hazards – Physical		✓		-	✓✓✓	
Control – Overall Job Demands		-		-	-	
Control – Psychosocial Environ.		-		-	-	
Interactions		-		-	-	
Consider Employee Characteristics		-		-	-	
Managing MSDs		-		✓	✓✓✓	
Evaluation of controls		✓✓		✓✓	✓✓	
Reference to OHS		✓✓✓		✓✓✓	✓✓✓	

✓✓✓ extensive coverage, ✓✓ moderate coverage, ✓ minimal coverage, - zero coverage, N does not exist , Y provided

Measures		Org 1		Org 2		Org 3		Org 4	
		Site 1	Site 2	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Policy Review	Phys-ical	✓✓		✓✓ ✓		✓✓ ✓		✓ ✓	
	Psycho-social	zero		✓		✓✓ ✓		zero	

Themes from interview data

- Supportive Management
- Communication
- General Interest in OHS
- Social Support and teamwork
- Difficulties in the aged care sector

Comments

Difficult sector

structural issues that make things difficult, buildings and overall costing framework for the sector

Fixed Infrastructure

Buildings, not necessarily designed for current procedures

Over reliance on training for MSD as a risk management strategy across the participating organisations

Reflected in results, organisations believe that they are doing something and they are but the question needs to be about effectiveness

Implications for MSD risk management

It is clear that:

- assessment and management of psychosocial hazards is essential, not optional

- severity of exposure to any *single* hazard is not necessarily a good indicator of *overall* MSD risk

- output of tools for assessing adverse postures and/or biomechanical loads indicates severity or 'riskiness' *of the particular hazard(s)* … DOES NOT necessarily indicate overall MSD risk

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4. **Current workplace practices**
5. Workplace Toolkit for MSDs risk management

Real world: What is happening?

- Little published evidence of actual practices
- A strong focus on physical hazards exists, not much evidence to support the management of psychosocial hazards in relation to MSDs

Some examples:

2003: Survey of Australian Certified Professional Ergonomists (CPE)

2004: Study of Ergonomics Consultants in the UK

2008-20013: Documented routine MSD risk management procedures in Australia (9 organisations, unpublished)

A systematic review

"It is apparent that there is no one simple way to introduce the measures in an individual workplace but that programmes must be tailored according to local needs.

… a participative approach that includes the workers in the intervention process is beneficial."

European Agency for Safety & Health at Work, 2008, p.32

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5. **Workplace Toolkit for MSDs risk management**

Why this toolkit is needed?

- Current MSD risk management strategies don’t reflect research evidence as depicted in our framework model
- Barriers to more effective MSD risk management :
  - Usual approach is too narrowly focused on just a subset of hazards usually physical
  - Common concepts of ‘a hazard’ focuses attention on a single event or object as the problem, rather than several interacting agents or events

Psychosocial hazards: What is the problem?

- Challenging to manage
- Hazard may not be proximal to the outcome
- Perceptions of being difficult to manage

However, we need to assess and control these hazard in the same way we would any other OHS hazard (Way, 2012)

Where are we at?

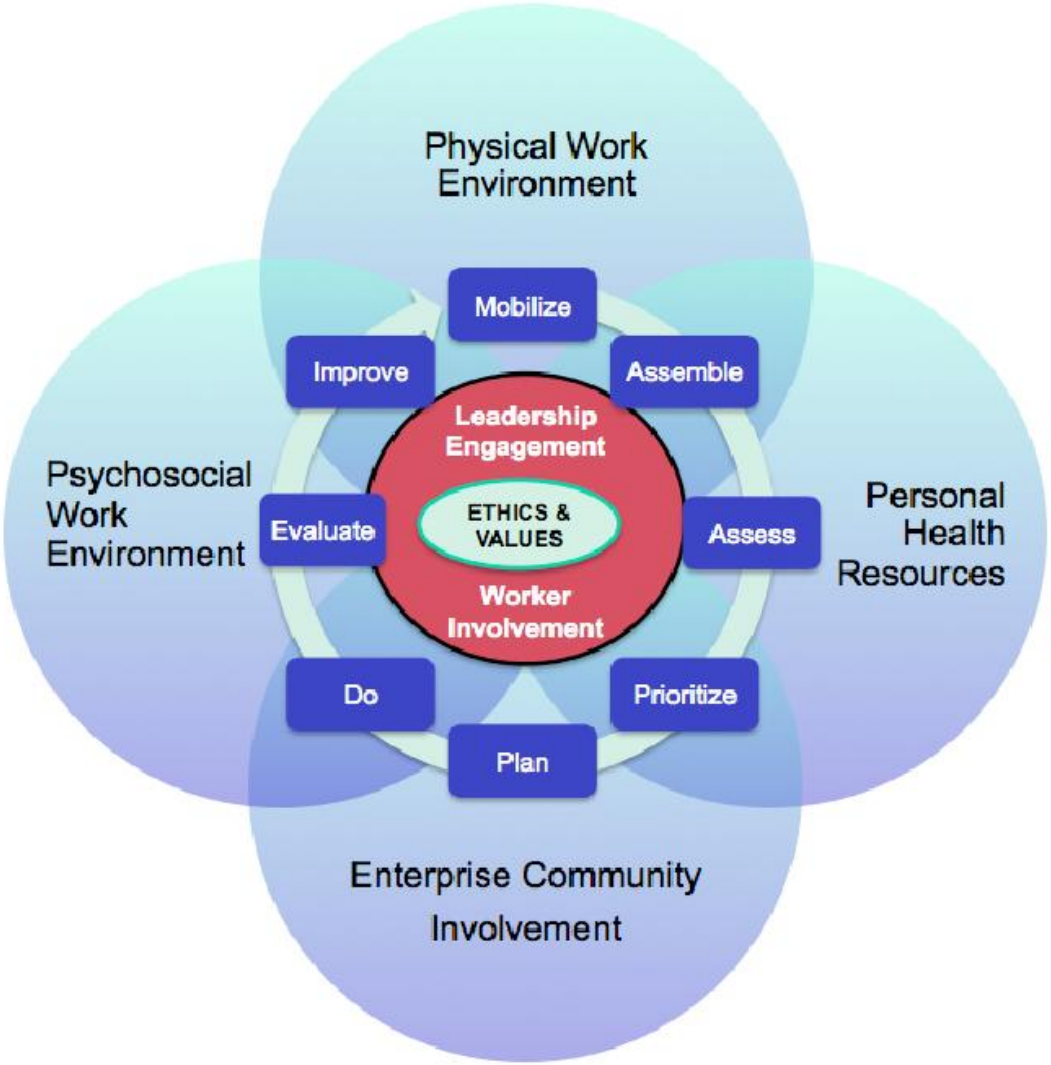
- A MSDs risk management toolkit must address psychosocial hazards as well as physical hazards
- Targeting of risk management needs to be at job level
- Results very useful in recent participative workshops in each organisation – involving employee reps, supervisors, OHS reps, Union reps, Managers, OHS personnel – together they identified potentially cost-effective interventions.

But … toolkit needed to achieve sustainability

WHO framework for all toolkits

Based on WHO Healthy Workplace Model

WHO Healthy Workplace Model (2010)



Comprehensive approaches for psychosocial hazards

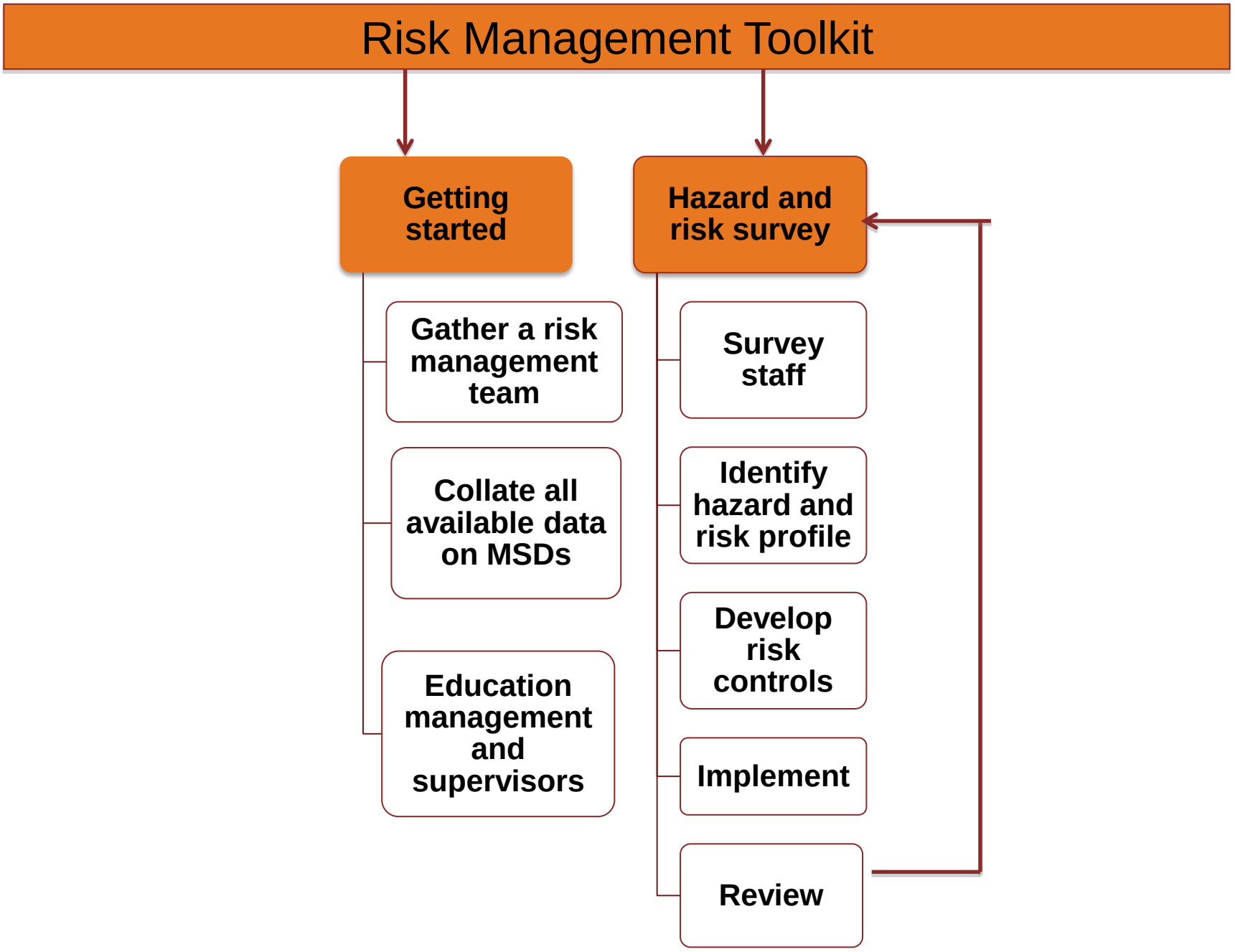
EUROPE:	PRIMA EF
UK:	PAS 1010
CANADA:	Psychological health and safety in the workplace-Prevention, promotion, and guidance to staged implementation
AUSTRALIA:	Reducing stress in the workplace

Key requirements for toolkits

- Practicable and easy to use … clear guidance
- Can be implemented by the employer, workers, or their representatives (and others)
- Applicable in most settings
- Cost-effective
- Support integrated approach to risk management
- Assist stakeholders to work through the full **risk management cycle** – in accord with WHO Healthy Workplace Model

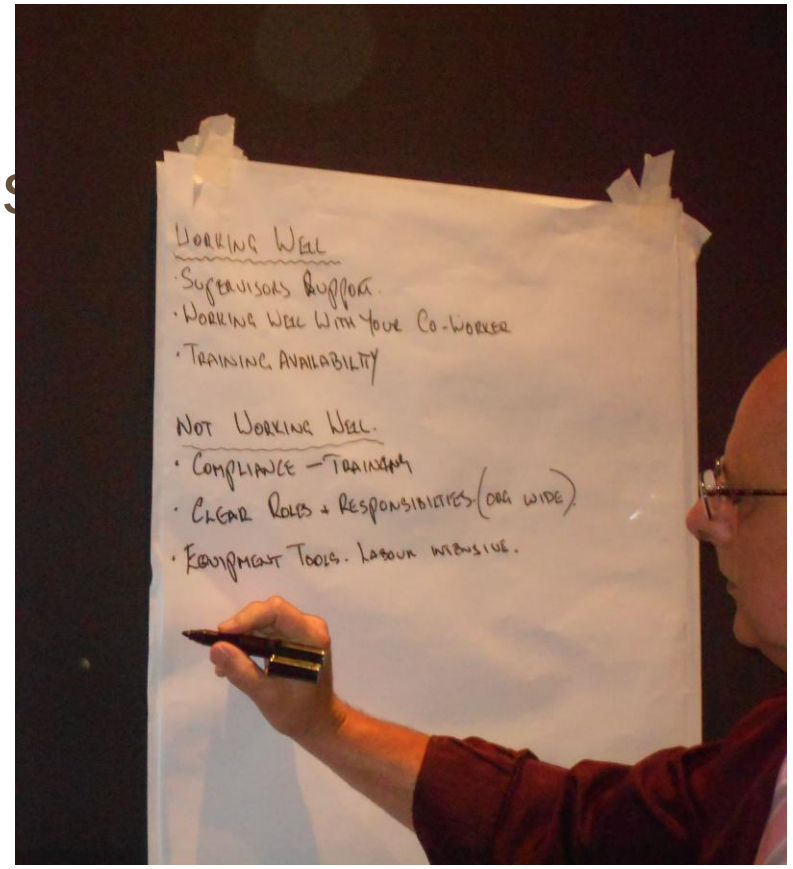
Evidence-based principles

- **A multi-pronged approach**
  - Address psychosocial hazards as well as manual handling hazards.
- **Participation by workers** and their reps, plus other stakeholders including supervisors and key managers
  - Workers are best source of information about the hazards of their jobs, and about possible ways of reducing risk from these hazards.
  - Meaningful participation in risk management process
- **Commitment by senior management**
  - Time available for people to participate
  - Agreed risk control interventions implemented to full extent practicable.


Risk Management Toolkit
Getting started
Hazard and risk survey
Gather a risk management team
Collate all available data on MSDs
Education management and supervisors
Survey staff
Identify hazard and risk profile
Develop risk controls
Implement
Review

Participation

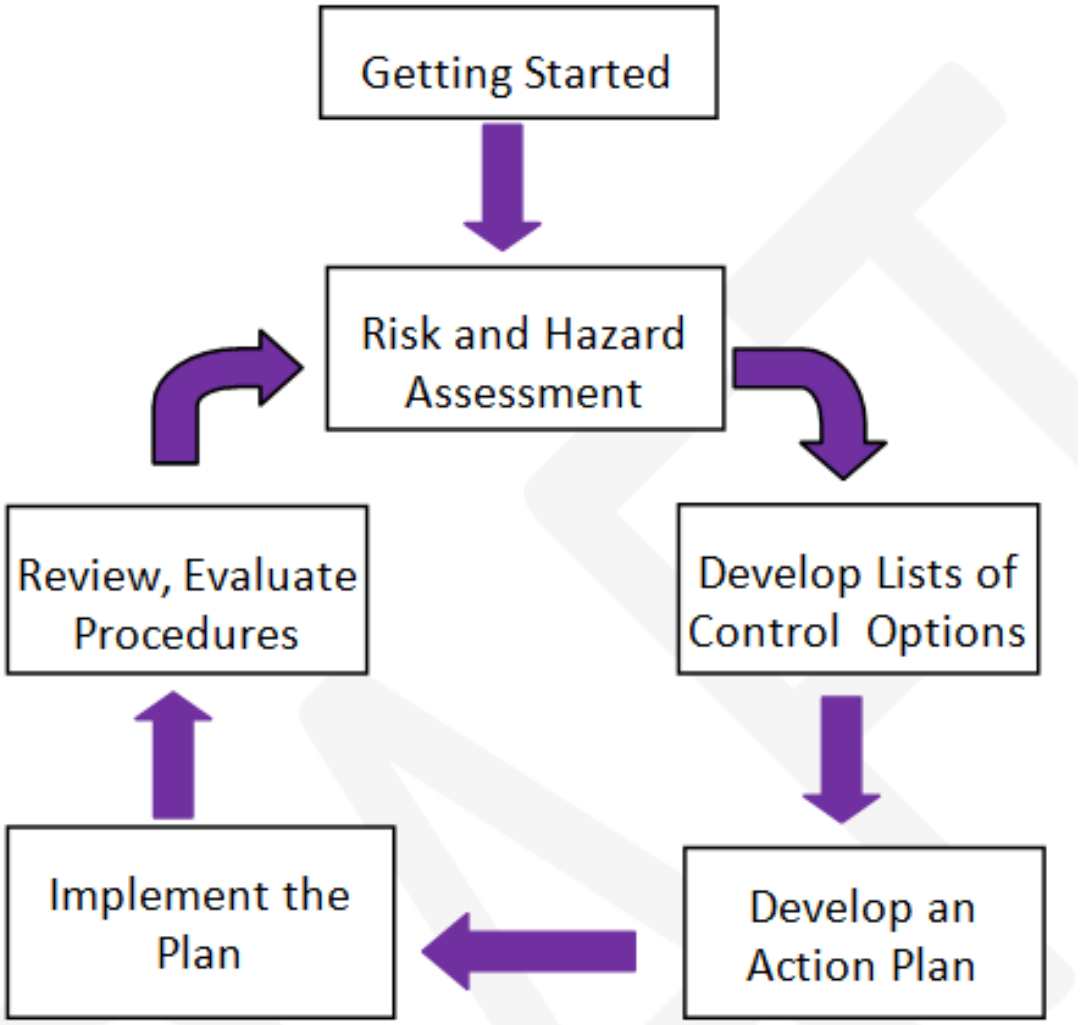
- Might use hazard surveillance results to develop controls
- Most recent project used a workshop approach to do this



SPS: Organisational Factors	Average score (1=major problem), (5=very good)	% Respondents saying "major problem", "slight problem"	% Respondents saying "very good", "good"
How well you work with your co-workers (as a team)	**3.6**	**19.0**	**61.9**
How you get on with your co-workers (personally/socially)	**3.8**	**9.5**	
Facilities for taking breaks *(places for breaks, meals)*	**3.4**	**21.4**	
Communication with supervisor	**3.2**	**23.8**	
Support from supervisor	**3.1**	**33.3**	
Clear roles and responsibilities	3.2	31.0	
Appreciation or recognition of your efforts by supervisors	2.9	31.0	
Clear reporting lines	2.9	31.0	
Flexibility of working hours	3.0	33.3	
Feedback on your performance	2.9	33.3	
Opportunities to use your skills	2.8	35.7	
Pace of work	2.9	38.1	
Sufficient training for this job	2.8	38.1	
Senior management attitudes	2.9	38.1	
Amount of variety in the work you do	2.8	38.1	
Clear company objectives, values, procedures	2.7	40.5	
Consultation about changes in your job	2.6	42.9	
Equipment, tools, I.T. or software that you use	2.7	42.9	
Opportunities for learning new skills	2.8	45.2	
Your status / recognition in the company	2.6	45.2	
Work stations and work space	2.5	45.2	
Work surroundings *(noise, light, temperature, etc*	**2.7**	**50.0**	
Exposure to physical danger	**2.6**	**50.0**	
Health and Safety at work	**2.6**	**52.4**	
Opportunities for promotion	**2.3**	**52.4**	
Your workload	**2.3**	**54.7**	**19.0**

SPS: Physical Hazards	Never/Rarely	Often/Almost always
Work sitting still, with little or no moving	76.2	11.9
Work with your arms raised above shoulder level	33.3	19.0
Work so hard or fast that you get a little out of breath	38.1	19.1
Squat or kneel while you work	21.4	21.4
Work standing in one position, without moving around	47.6	28.6
Use your hands or fingers to hold or grip things	11.9	28.6
Work in twisted or awkward postures	16.7	33.3
Work with your body bent forward	23.8	33.4
Have to make very precise movements to place things accurately	**19.0**	**42.9**
You lift or carry things that are moderately (or very) heavy?	**7.1**	**61.9**
You do very repetitive work	**14.3**	**64.3**
You push or pull things, using some force	**0.0**	**73.8**

MSDs risk management framework



What will our toolkit look like?

- Currently in early stage of development – working with organisations to customise toolkit to their existing OHS management systems
- Will be interactive, allowing users to customise further, and to enter their own workplace data to obtain guidance on risk control options
- Future work will entail implementation, evaluation and comparison of data across different sectors

Three key questions!

1. What does the research evidence tell us about causal factors of MSDs?

2. What are we doing at La Trobe University to contribute to knowledge of management of MSDs

3. Are there gaps in current strategies used to manage MSDs?


THANK YOU
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