



Hazardous manual handling and return on investment: Scoping review

**Prof Jodi Oakman
Dr Victoria Weale
Dr Samantha Clune
La Trobe University
2023**

Outline

1. Scoping review on ROI or business benefits of controlling risks associated with HMH and MSDs
2. Grey Literature review on ROI tools
3. Existing Australian/International OHS regulator guidelines and protocols
4. Conclusions and Discussion

Background

- MSDs are a major OHS problem with significant costs to employers and employees
- Investment in mitigation strategies problematic with unclear return on investment
- Evidence required to synthesise available peer reviewed and grey literature on Return on Investment for prevention of MSDs due to HMH
- Rigorous, systematic approach used to identify what are the business benefits in terms of ROI
- WSV to use evidence to develop campaign materials to motivate employers to participate in the Building Blocks education campaign
- Evidence review will include existing tools for potential use by employers to calculate ROI of proposed OHS investment

Aims of the project



Identify the Return on Investment (ROI) or business benefits of controlling the risks associated with Hazardous manual handling (HMH)

- Summarise the existing peer reviewed and grey literature
- Identify existing Australian OHS regulator guidance which included explanations of business benefits of preventing musculoskeletal disorders (MSDs) due to HMH or case study illustrations
- Provide recommendations for future research to address gaps in knowledge or translation to practice

Literature review methods

Stage 1: Plan	Parameters for the review <ul style="list-style-type: none">• Databases• Search terms• Inclusion and exclusion criteria
Stage 2: Screen	Title and abstract screen Full text screen
Stage 3: Analyse	Data extraction Data analysis Write up

Cost and consequences in economic evaluation studies

Type of study	Measurement/valuation of costs in both alternatives	Indication of consequences	Measurement/valuation of consequences
Cost analysis	Monetary units	None	None
Cost-effectiveness analysis	Monetary units	Single effect of interest, common to both alternatives, but achieved to different degrees	Natural units (e.g., life-years gained, disability-days saved, etc.)
Cost-utility analysis	Monetary units	Single or multiple effects, not necessarily common to both alternatives	Healthy years (typically measured as quality-adjusted life years)
Cost-benefit analysis	Monetary units	Single or multiple effects, not necessarily common to both alternatives	Monetary units
Return on investment (ROI)	Monetary units		Ratio between net benefit and the incremental costs

Adapted from: Drummond, M. F., Sculpher, M., Torrance, G. W., O'Brien, B. J., & Stoddart, G. L. (Eds.). (2005). *Methods for the economic evaluation of health care programmes* (3rd ed.). Oxford Medical Publications and Gaillard A, Sultan-Taieb H, Sylvain C, Durand M-J. *Economic evaluations of mental health interventions: A systematic review of interventions with work-focused components. Safety Science.* 2020;132:104982

Definitions

Key distinction between CBA, CEA / CUA, and ROI:

CBA:

- Can assess whether a program is worthwhile, without reference to external standards
- Can assess whether the budget should be expanded to accommodate new program
- Grounded in welfare economic theory

CEU / CUA:

- Assumes decision-maker seeks to maximise achievement of defined objective by using given budget
- Assessments of whether program is worthwhile must be made by reference to external standard (e.g., budget constraint or threshold cost-effectiveness ratio)
- Decisions on expansion of budget require consideration of opportunity cost that are likely to fall outside industry sector

ROI

- Can calculate gains at three levels:
 - Financial: savings to commissioner for every \$ spent
 - Societal (exc. Productivity): savings to commissioner plus any QALY gains
 - Societal (inc. productivity): savings to commissioner plus QALY gains and productivity gains

What is a scoping review?

- Preliminary assessment of potential size and scope of available literature. Used to identify nature and extent of research evidence
- Parameters are set to limit the scope of the review – timeframe. May include research in progress
- Our plan
 - To limit the databases searched (EMBASE, PsychINFO, Web of Science, and CINAHL)
 - Limit grey literature search to major reports readily available online
 - Maximise specificity rather than sensitivity
 - Register scoping review with Open Science Framework



Scoping review methods

A scoping review of the peer-reviewed and grey literature was conducted that included the following stages:

- Step 1: Clarify with WSV the aims and expected outcomes
- Step 2: Rapid evidence assessment of the identified themes, with regular checks within the review team and occasional checks with WSV
- Initial database searches conducted June 2023. Given OHS focus of the project, relevant OHS focused databases were systematically searched
- Grey literature identified using grey literature libraries of the following organisations:
 - SafeWork NSW
 - Public Health England
 - European Agency for Safety and Health at Work
 - The Work Foundation – Lancaster University
- Searches limited to literature published from January 2000 to July 2023 from all countries with comparable workplace OHS policy contexts
- Peer reviewed literature loaded into initial screening and data extraction software Covidence to help ensure rigour and reproducibility. Each citation screen by a member of research team, with conflicts and queries assessed via discussion and consensus.

Search strategy – peer reviewed

Research Question

Return on investment tools used in workplaces to evaluate OHS interventions: A scoping review

Research question:

1. What evidence exists about return on investment tools used in workplaces to evaluate OHS interventions?

1. What return on investment tools are available for workplaces to evaluate OHS interventions?

Concept 1	Concept 2	Concept 3
<ul style="list-style-type: none"> • Worker (MeSH) • Worker* • Employee (MeSH) • Employee* • Workplace (MeSH) • Workplace* OR "work place*" • Enterprise* • Paramedic 	<ul style="list-style-type: none"> • OHS • Occupational health (MeSH) • "manual handling" • WHS • (Occupational ADJ3 (health OR safety)) • (work* ADJ3 (health or safety)) • ((health or safety OR occupational OR work*) ADJ2 (intervention* OR program*)) 	<ul style="list-style-type: none"> • Return on investment • Cost benefit analysis (MeSH) • Cost effectiveness analysis (MeSH) • "cost effective*" OR "cost benefit*" • "Financial analysis" OR "cost analysis" • savings • ((economic* OR financial* ADJ2 (impact* OR valu* OR effective* OR benefit* OR tool* OR productivity OR evaluat*))

Inclusion Criteria

- 2000-

English only

Exclusion Criteria

Databases

- Embase

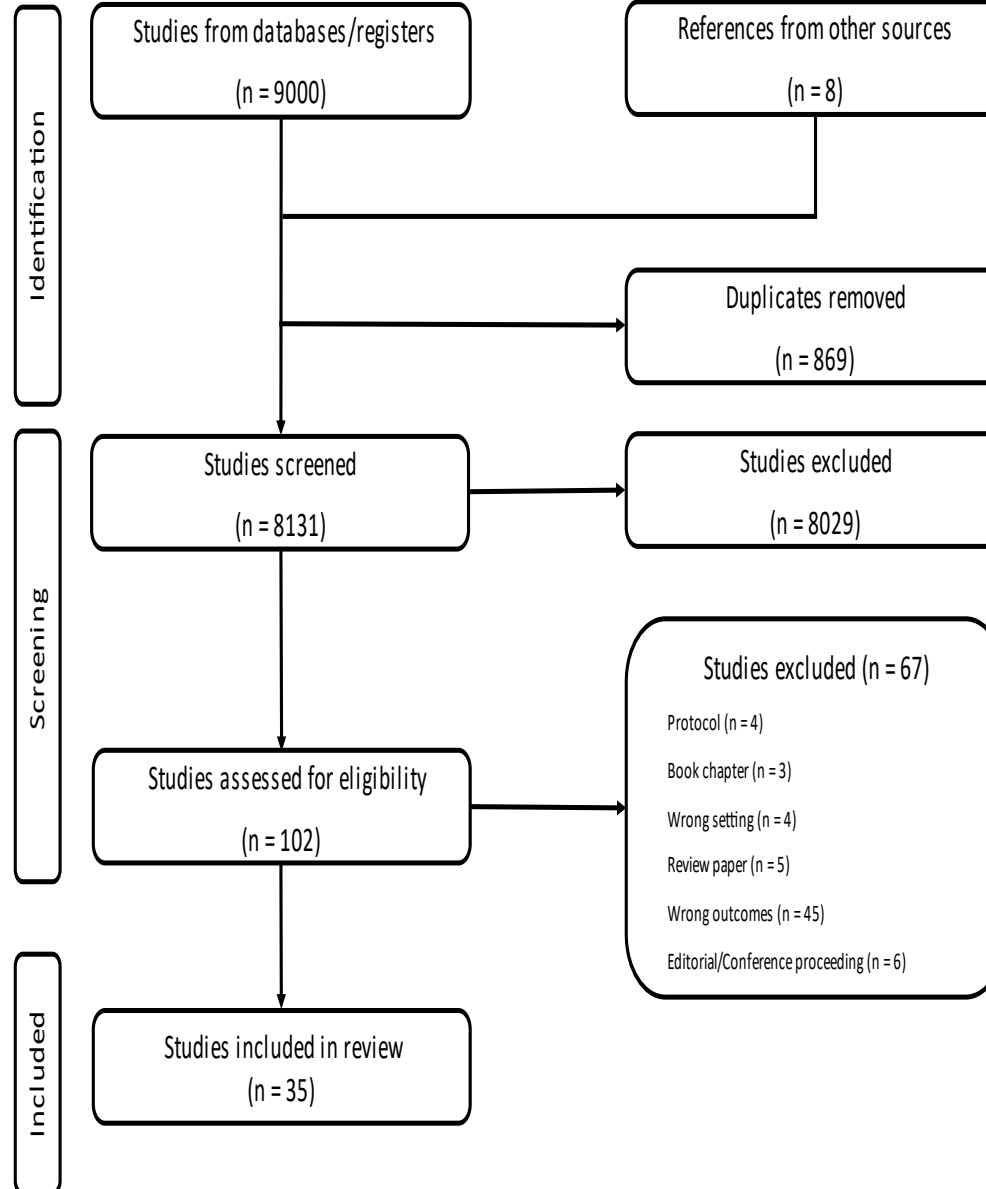
- PsycINFO

- CINAHL

Web of Science

Database	Total articles
Embase	3963
PsycINFO	1473
CINAHL	1528
Web of Science	1770
Additional database scan	266
Total before duplicates removed	9000
Total articles	8131

PRISMA



Findings – Peer reviewed

Name of ROI tool used*	
Net Cost Model	2
Human Resources Costing and Accounting Approach	1
Cost Effectiveness Ratio	1
Drummond cost – benefit analysis tool	1
Economic Assessment of the Work Environment tool	1
Office of Public Management economic assessment tool	1
The Dutch Method	1
The Productivity Assessment Tool	1
Study specific ROI tool	1
The Washington State Ergonomics Benefit Calculator	1
Truven Health Analytics Model	1

* Not all studies used a named tool

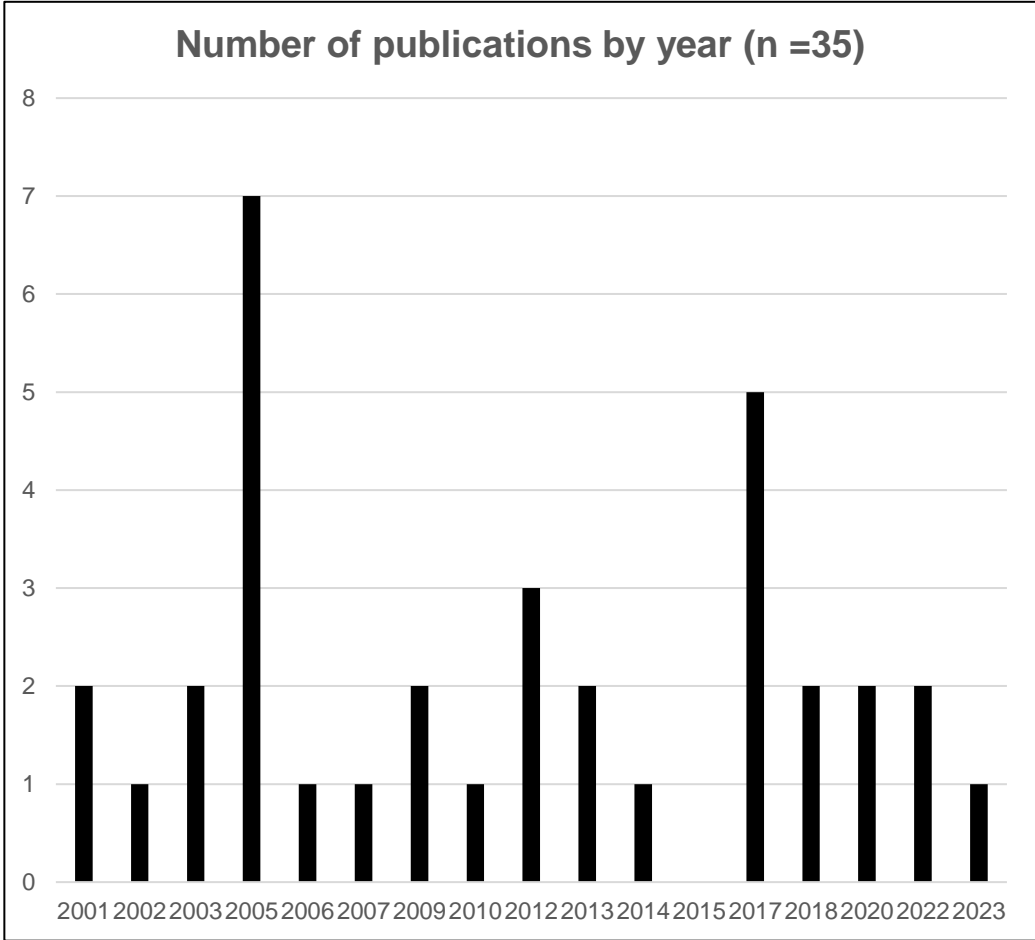
Organisational level at which intervention is targeted	
Multiple	9
Task/equipment/Individual	7
Individual	5
Task/Equipment	5
Organisational/task/equipment/individual	5
Not stated	3
Organisational	1

Economic evaluation method

Type of economic assessment used to evaluate intervention	No. of studies (%)
Cost – Benefit Analysis	19 (54)
Cost-Effectiveness and ROI	5 (13)
Cost – Effectiveness Analysis	4 (11)
Return on Investment	2 (6)
Cost benefit and Cost effectiveness	2 (5)
Cost – Utility Analysis	1 (3)
No method expressed	2 (5)

Findings:

Country of study location	
United States	9
Canada	8
Netherlands	6
Australia	2
United Kingdom	3
Portugal	1
Brazil	1
Central America and the Dominican Republic	1
Denmark	1
International	1
Malaysia	1
Turkey	1
Grand total	35



Findings

Not all included citations demonstrated effectiveness

- Yes: 26
- No: 7
- Mixed: 2

Studies that conducted ROIs included similar factors when building internal assumptions:

- Cost factors:
 - Inputs: money; staff; equipment; supplies; facilities
 - Activities: training; investment; maintenance; interventions
- Economic Benefit factors:
 - Direct: Reduced insurance premiums, litigation costs, sick pay costs; improved production/productivity rates; reduced product and material damage; lower accident costs/production delays
 - Indirect: reduced absenteeism, staff turnover; improved corporate image, chances of winning contracts, and job satisfaction/morale (European Agency for Safety and Health at Work, 2009)

Cost factors and Economic benefits

- Data was extracted from each study on the cost factors and the economic benefits, the number of studies where the factor was identified is shown.
- For costs factors, personnel was the most common cost factor followed by equipment, intervention and then training
- For economic benefits productivity, absenteeism and compensation claims were the most commonly used economic benefits

Economic Evaluation Factors

Cost Factors	Frequency (n=35*)
Personnel	25
Equipment	21
Intervention	16
Training	16
Consultant	14
Operating and maintenance	6
Medical	4
Accidents	1
Health Care	1
Admin	1

Economic Benefits	All studies (n=35*)
Productivity	20
Absenteeism	21
Compensation claims (number and/or costs)	16
Turnover	7
Incidence (inc. WMSD report/injuries)	6
Presenteeism	6
Quality	2
WMSD cost	3
QALYS	2
Intangible benefits	2
Morale	1
Musculoskeletal Pain	1
Administration	1

*multiple factors identified per study

Findings: grey literature

Websites of various government regulatory bodies were searched for literature related to economic evaluation or cost-benefit analyses that were in line with the research aim. As such, six grey literature documents were included in this search and were from the following countries:

- Australia: 2
 - SafeWork NSW
 - WorkSafe QLD
- The European Union: 3
 - European Agency for Safety and Health at Work
- The United Kingdom: 1
 - Public Health England

Key findings include:

- Cost and economic factors consistent with peer-reviewed literature
- Appreciation for varying perspectives when constructing ROI formula: societal or organisational.
- See Appendix One for tables of evidence

Case study examples

Five case studies are provided in separate appendix which include:

- examples of application of economic evaluation of OHS interventions for WMSD
- examples of development of OHS specific economic evaluation tool
- Case studies are from
 - Canada 2
 - Australia 1
 - United States 1
 - United Kingdom 1
- Three of the five case studies demonstrated return on investment or positive impact on economic activity of organisation

Limitations of this scoping review

- The heterogenous nature of the evaluation tools and indicators used and economic outcomes required some assumptions to be made for categorisation of data
- We adopted an inclusive approach to ensure we captured a range of studies aimed at reducing MSD risk. Three studies were focussed on reduced sitting time.
- We did not capture the specifics of the interventions, but did assess the level at which the interventions were targeted
- 27 studies reported a positive outcome of cost effectiveness which may reflect a publication bias. We did not formally assess this risk of bias given this was a scoping review

Future research to address identified gaps

Broader range of country examples required

- *Most studies undertaken in the US, Canada and the Netherlands (n=23), with only three Australian examples two of which were the development of tools, one of which is no longer available*
- *More examples are needed in an Australian workplace context, given the local nature of many of the relevant variables*

Expanded set of indicators and benefits beyond financial

- *the multifactorial nature of MSD causation is not reflected in the current suite of tools and the indicators and benefits costs, capture of psychosocial factors as costs was not identified in the review.*

Use of qualitative data to support more in-depth analysis

- to undertake a more in-depth analysis of the effectiveness of an intervention and subsequent economic benefits, inclusion of qualitative data would be of benefit

Overall conclusions

- The current scoping review was undertaken using a rigorous and systematic process
- Two independent reviewers for screening processes
- Multifaced analysis of the economic evaluations to explore the type of analysis being used and the range of indicators and benefits provides breadth and depth to the understanding of economic evaluation tools
- Several gaps were identified in the types of economic evaluations being used and suggestions for future research needs have been proposed.