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BARRIERS AND ENABLERS TO RETURN TO WORK: LITERATURE REVIEW

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ABBREVIATIONS

Abbreviation	Description
MHC	Mental Health Conditions
MSD	Musculoskeletal Disorders
RTW	Return to Work
SWA	Safe Work Australia

EXECUTIVE SUMMARY

More than half a million Australians sustain work-related injury or disease annually. Work-related injury and disease presents a significant personal, social and economic burden. Return to work (RTW) is beneficial for worker recovery. Returning injured and ill workers to safe productive work is a primary objective of Australian workers' compensation schemes. Effective action to improve RTW outcomes should be informed by knowledge of the barriers and enablers of RTW.

This report summarises international and Australian research studies in order to identify barriers and enablers of RTW at the level of the worker, the workplace, in the compensation system, in the healthcare system, and in the broader societal context. We also categorise identified barriers and enablers according to whether they are modifiable (able to be changed), not modifiable or potentially modifiable; and identify gaps in the current knowledge base where research evidence is thin.

Three literature searches were conducted. These included (1) a meta-review (review of reviews) of published international prognostic studies describing barriers and enablers of RTW; (2) a meta-review of published RTW intervention studies; and (3) A targeted review of Australian primary RTW studies, both published and unpublished.

After screening, seventy-six studies were identified through the three literature searchers and included in the evidence synthesis. Most studies examined groups of workers with musculoskeletal disorders (e.g., back pain) and mental health conditions (e.g., depression, anxiety), with a smaller amount of evidence in other conditions such as traumatic injury, cancer and chronic disease. For each barrier and enabler identified, the evidence was graded according to whether there was strong, moderate, limited or mixed evidence for the relationship between that barrier/enabler with RTW.

Sixteen barriers and enablers in the worker domain were considered to have moderate to strong evidence. These include non-modifiable factors such as worker age, pre-injury income and level of education, and a range of modifiable factors such as recovery expectations, self-efficacy and perceptions of own work ability. A total of seven barriers and enablers were considered to have moderate to strong evidence in the workplace domain. Work accommodation, RTW planning and accommodation, and early workplace contact were modifiable enablers with strong evidence in the workplace domain. Low workplace support, high physical job demands, and low job control were barriers to RTW in this domain. Work-focussed healthcare was the only identified enabler in the healthcare domain, whilst more medical intervention was found to be a barrier to RTW.

A total of five barriers and enablers were identified in the insurer domain with moderate to strong evidence. These included administrative delays, receipt of compensation, higher wage compensation, negative interactions with insurer, and lawyer involvement, all of which had negative relationship with RTW. Finally, some factors were found to operate across several domains. For example, multi-component interventions that involved the worker, workplace, and healthcare provider were enablers of RTW, while jurisdiction and industry of claim were also identified as contextual factors that are associated with RTW outcomes.

Major evidence gaps include relatively few studies on less common health conditions affecting workers; few examples of Australian RTW intervention studies; the limited number of published studies in the healthcare and insurance domains; and among the Australian literature an over-representation of some states with an absence of published evidence in some other states or territories.

Six candidate priorities for change were identified and are presented for consideration, discussion and debate. These represent areas in which there is good evidence of modifiable factors, and clear avenues to change. They include (1) Employer processes and procedures, (2) Insurer case management, (3) Worker psychological response to injury, (4) Workplace support, (5), Co-ordinated multi-party rehabilitation, and (6) Tailoring support based on worker circumstances. These opportunities are intended to prompt consideration of how stakeholders in Australian workers' compensation systems could begin to address the identified barriers and enablers, and improve RTW for Australian workers.

Strengths of this review include its breadth and the use of standardised methods for synthesising evidence and describing findings. The review was conducted in a short time frame and this limited our ability to examine study quality in detail, and meant that with the exception of Australian studies, we were unable to review the primary literature on RTW.

In conclusion, there is a large volume of evidence on barriers and enablers to RTW. This evidence base is focussed on factors related to workers and employers, with some evidence of factors related to insurers and healthcare providers. Many of these factors are modifiable and present opportunities for change. There are multiple opportunities for those involved in Australian workers' compensation systems to improve RTW outcomes through programs, policies, services and strategies that seek to change these modifiable factors.

BACKGROUND

More than half a million Australians sustain work-related injury or disease annually¹. Conditions that commonly cause work disability such as back pain, depression and anxiety represent three of the five leading causes of disability in working age Australians. The annual economic cost of work-related injury and disease is estimated at \$61.8 billion², and Australia's workers' compensation systems bear direct costs of \$9 billion per annum in income support, treatment and rehabilitation and lump sum payments¹. Work-related injury and the resulting periods of time away from work may have flow on social and economic consequences such as increasing the risk of marital separation³ and negatively impacting the health of family members⁴.

Return to work (RTW) can support recovery from illness and injury, and reduce ongoing disability⁵. Supporting RTW is a central objective of Australian workers' compensation schemes. While the incidence of work-related injury and illness resulting in working time loss has decreased by up to 30% over the last decade, the duration of disability of those injured has increased¹. Improving RTW outcomes nationally requires allocation of limited resources to activities that are likely to have the greatest impact. Identifying the actions that are most likely to be effective requires knowledge of what are the important barriers and enablers of RTW and what is their ability to be modified. Ability to designing intervention strategies to improve RTW will also be supported by an understanding of who can influence a given barrier or enabler.

FACTORS AFFECTING RETURN TO WORK

Return to work is a complex biopsychosocial phenomenon in which many factors at the individual, workplace and system levels may impact on the duration of time off work and the sustainability of returns to employment. There are multiple published conceptual models describing the factors affecting RTW. These models recognise the important contribution of social and environmental factors to recovery and RTW after injury and disease. They include, for example, the Biopsychosocial model of disability and the International Classification of Functioning, Disability and Health⁶. These models present an alternative to the biomedical model that views injury recovery as primarily the product of injury and treatment modalities. They explain the divergent outcomes that are commonly observed in people with similar conditions and receiving similar treatment, but in whom social circumstances and psychological processes may differ.

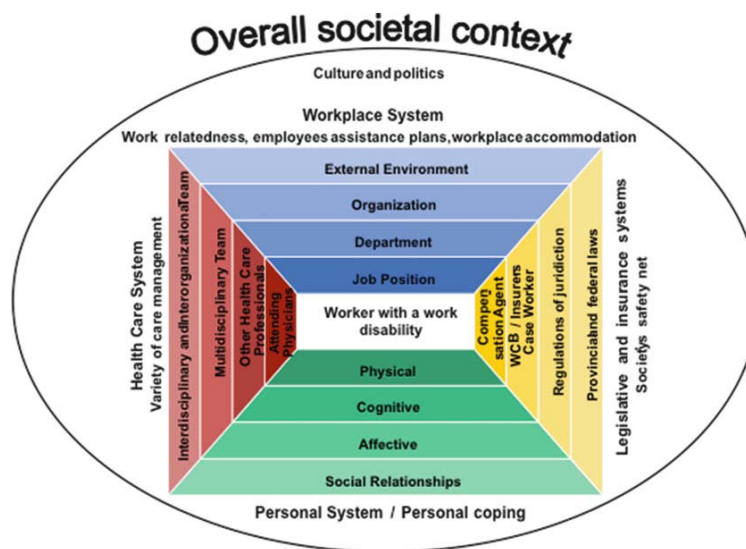
One such model developed specifically for RTW research and practice is known as the Sherbrooke Model of Work Disability (Figure 1)⁷. The model is multidisciplinary as it synthesises RTW research from a variety of medical, sociological, rehabilitative, ecological, and political fields. The model groups

individual predictors of RTW (referred to as work disability in the image) into four domains that reflect the four major participants in Australian workers' compensation systems:

1. Worker (Personal System)
2. Employer (Workplace System)
3. Healthcare Provider (Health Care System)
4. Insurer (Legislative and Insurance System)

The model also recognises the importance of societal context.

Figure 1 Domains Framework



We have found this model a useful tool to communicate research findings to non-research audiences. In this report we categorise barriers and enablers of RTW into the domains described in this model.

Inherent in the domains model is the recognition that RTW is a dynamic process, and that predictors of RTW may be present prior to the onset of illness, illness or work absence or may be first become apparent after injury/disease onset or work absence. Strategies that are introduced after injury/disease onset or work absence can also influence RTW. To gain a full understanding of the factors affecting RTW it is necessary to examine both prognostic studies (or studies that describe barriers and enablers to RTW) as well as intervention studies (or studies that report the results of strategies aimed at improving RTW). In this report we synthesise evidence from across prognostic and intervention studies to provide a full picture of the barriers and enablers of RTW.

OBJECTIVE

This report summarises international and Australian research evidence regarding the barriers and enablers to positive RTW outcomes. The report aims to identify modifiable and non-modifiable factors at the workplace, personal, healthcare and insurance domains that have positive or negative effects on RTW.

METHODS

INFORMATION SOURCES

This reports summarises findings from three primary sources of information, being:

- A review of reviews (a meta-review) of published international reviews of prognostic studies describing barriers and enablers for RTW.
- A meta-review of published international reviews of RTW intervention studies.
- A targeted review of Australian primary RTW studies including both published and unpublished data.

META REVIEW OF PROGNOSTIC STUDIES

We conducted a meta-review of prognostic studies describing factors affecting RTW. To identify in scope reviews we conducted electronic searches of Medline and the Cochrane Database of Systematic Reviews. We supplemented this with reviews identified through manual searching reference lists of previous meta-reviews, and with reviews contained in the author's personal reference libraries. We included systematic reviews, narrative reviews, meta-analyses, and other reviews of qualitative and quantitative research literature. These reviews collate and grade the evidence acquired through primary studies. Reviews were included if they:

- described prognostic factors (barriers and enablers) affecting RTW outcomes. Return to work was conceptualised broadly to include work, sickness absence, return to work, or employment outcomes;
- were published in English;
- were focused on people of working age with health conditions that resulted in time off work or restrictions in work capacity, and who were in paid employment when they acquired the health condition.

Primary studies were excluded, as were reviews of interventions and any other non-review study. As most reviews in the field include primary studies of both work-related and non-work-related conditions, we included studies regardless of whether the condition could be attributed specifically to the circumstances of employment.

META REVIEW OF INTERVENTION STUDIES

We conducted a meta-review of intervention studies for RTW. To identify in scope reviews we conducted electronic searches of Medline and the Cochrane Database of Systematic Reviews. We supplemented this

with reviews contained in the author's personal reference libraries. We included systematic reviews, narrative reviews, meta-analyses, and other reviews of quantitative studies. Reviews were included if they:

- described the findings of multiple interventions studies; and
- reported return to work as an outcome. Return to work was conceptualised broadly to include work, sickness absence, return to work, or employment outcomes;
- were published in English since the year 2010;
- were focused on people of working age with health conditions that resulted in time off work or restrictions in work capacity, and who were in paid employment when they acquired the health condition.

Primary studies were excluded, as were qualitative studies, reviews of qualitative studies, and any other non-review study. As most reviews in the field include primary studies of both work-related and non-work-related conditions, we included studies regardless of whether the condition could be attributed specifically to the circumstances of employment.

TARGETED REVIEW OF AUSTRALIAN STUDIES

We augmented these two meta-reviews with a targeted search of Australian studies in which RTW was the outcome, and that were conducted in people with work-related injury and disease. To identify studies we conducted electronic searches of Medline, and supplemented this with primary studies identified through manual searching of reference lists, and with studies contained in the author's personal reference libraries. We also included unpublished studies where a report was available to the authors. We included both quantitative and qualitative studies if:

- they described factors affecting work, sickness absence, return to work or employment outcomes;
- where participants were Australian's with work-related injury or disease or where studies included samples drawn from employers, insurers or healthcare practitioners within Australian workers' compensation systems; and
- were published in the academic literature or where there was a report or presentation available (for unpublished studies).

Case reports and opinion pieces were excluded, as were studies where the outcome was not RTW. For example studies of RTW processes that included worker experience or health as the outcome were not included.

DEFINING RTW OUTCOMES

Return to work can be measured in multiple ways. The most common methods in the research literature are via questionnaires administered directly to workers and through insurance claims administrative data. The former can include simple questions such as "are you currently working?" and "have you been back to work since your injury/illness?" but also can include measures of work function or work ability that include multiple

questions and from which aggregate scores are derived. The latter is typically used to measure the duration of time away from work (also called disability duration) by counting the number of days for which an income payment has been made. Both approaches have advantages and disadvantages, which have been described elsewhere (reference). For this review we have chosen to be inclusive and describe studies using either of these RTW measurement techniques. For consistency of terminology we refer to RTW as the outcome throughout the report.

DATA EXTRACTION

Data from included papers were extracted and entered into evidence tables by a single reviewer. Appendix A includes information from the meta-review of prognostic studies. Appendix B includes information from the meta-review of intervention studies. Appendix C includes information from the targeted review of Australian studies. The data extracted for each of these included (1) first author and year of publication (2) study design including type of review or type of primary study; (3) population; and (4) authors conclusions regarding prognostic factors for RTW and the direction of effect. Some studies reported outcomes other than RTW, such as health or clinical outcomes, however we only extracted information relating to RTW.

DATA SYNTHESIS

We determined the strength of evidence using a best evidence synthesis methodology⁸⁹ that assessed the quantity and consistency of evidence in included studies, based on the study authors' conclusions (Table 1). Quality evaluation was not included in the evidence synthesis approach due to time constraints. This approach was applied to the total pool of information and evidence collected through the three sources of information described above, meaning that equal weight was applied to each of the included studies, regardless of whether they were a systematic review or a primary Australian study.

Table 1. Description of strength ratings

Level of Evidence	Description
Strong evidence	Findings provided by at least five included studies (international reviews or primary Australian studies). The direction of effect on RTW is consistent between all studies.
Moderate evidence	Findings provided in at least three included studies (international reviews or primary Australian studies) in which the direction of effect on RTW is consistent; OR Findings provided in at least four included studies in which the direction of effect on RTW is consistent in $\frac{3}{4}$ of studies.
Limited evidence	Findings provided by two or fewer included studies in which the direction of effect is consistent.
Mixed evidence	Findings provided by multiple included studies in which the direction of effect on RTW is consistent in less than $\frac{3}{4}$ of included studies.

MODIFIABILITY

For those barriers and enablers identified as having strong or moderate evidence, we also characterised their ability to be modified. A determinant of RTW can be considered modifiable if “it is possible to change the influence [of the determinant] in a healthful direction” (Booth et al., 2001). The determinant should thus be “susceptible to change through either broad-based individual choices or public policy choices” (Johnson-Taylor & Everhart, 2006). In addition we add to this that the change should be able to take place within a reasonable time frame (i.e. it should not be observable only after many years). Our rating of modifiability is a qualitative judgement that takes into account these aspects of ability to change, availability of a mechanism for change to occur, and the timeliness of change (Table 2).

Table 2. Description of modifiability ratings

Modifiability	Description
Modifiable	Clear mechanism/s through which change can occur; few barriers to change; change can be made quickly.
Potentially modifiable	Mechanism of change less clear; multiple barriers to change; change may take some time to achieve.
Not modifiable	Change is not possible.

IDENTIFYING STRATEGIC OPPORTUNITIES FOR CHANGE

The meta-review process provided a list of factors for which there is moderate to strong evidence of an impact on RTW and the degree to which each of those factors can be modified. We used this information to develop a candidate set of strategic opportunities for change. The purpose of this step was to develop evidence-based opportunities to change processes, behaviour, policy or practice that if effectively delivered will improve RTW outcomes. The research team worked through a three step process to identify priority areas.

First, a long-list of opportunities was developed by the first author. These were single or logical groupings of barriers and enablers that met the following criteria:

- There is strong/moderate evidence that the barrier or enabler (or grouping) has an effect on RTW.
- The barrier or enabler is modifiable.
- A change method (i.e., an approach to intervene to modify the barrier or enabler) could be identified based on theory, evidence or knowledge.

Second, each opportunity on the long-list was characterised according to whether it was feasible or infeasible to change that barrier/enabler. A priority area was considered feasible if (a) the parties involved in making the change were readily identifiable and were commonly involved in return to work processes or in Australian workers' compensation systems; and (b) the change could reasonably occur within the timeframe of a strategic plan. For this exercise we assumed the strategic plan had a 10 year horizon.

Third, for those opportunities identified as feasible, a qualitative description of the change method was developed. This included a justification for identification as an opportunity, identification of the group/s or individual/s that can effect change, the method or methods through which change could occur, and notation of any relevant implementation factors.

FINDINGS OF LITERATURE REVIEW

SEARCH RESULTS

The database search for systematic reviews of prognostic studies yielded 311 potentially relevant studies. Authors contributed one further systematic review that was not identified in database searching from their personal collection. These were screened for inclusion by two authors. A total of 28 reviews were included in the final sample.

The Medline database search for systematic reviews of intervention studies yielded 86 potentially relevant studies. Authors contributed a further two reviews from their personal collection. A further six reviews were identified through searching of the Cochrane database. These were screened for inclusion by a single author. A total of 21 reviews were included in the final sample.

Database search of Medline for primary Australian studies yielded 113 potentially relevant studies. A further 3 published and 12 unpublished primary Australian studies were identified by the authors from their personal collections. These were screened for inclusion by a single author. A total of 27 primary studies were included in the final sample. In total 76 studies were included in the evidence synthesis.

PROGNOSTIC STUDIES

Summary tables of data extracted from the included studies are included in Appendix A, B and C. Overall, the included studies reported many more barriers and enablers in the personal and workplace domains than in the healthcare and compensation domains. The majority of studies focussed on workers with MSD or MHC, with fewer studies reporting findings from studies of traumatic injury, respiratory conditions, following spinal surgery, in workers with chronic disease, and in populations with general health complaints defined in the basis of the duration of sickness absence. Studies of MSD include workers with conditions such as back pain, neck pain and upper body musculoskeletal conditions, or a mixture of these conditions. Studies of MHC include workers with conditions such as depression, anxiety, post-traumatic stress or a combination of these, sometimes referred to as 'common mental disorders' in the RTW literature.

The included systematic reviews of prognostic studies were published between 2000 and 2017, with many of the included reviews published in the five year period since 2013 (N=16). The included primary Australian studies were published or completed (for unpublished studies) between 2011 and 2018. Once again, the majority of the included studies were published or completed in the most recent five year period from 2013 (N=23). All of the included systematic reviews of RTW interventions had been published since 2010. These

observations suggest that there has been a substantial recent growth in the RTW evidence base, and provide confidence that the included studies are likely to reflect current approaches.

The following section describes the main findings of the report. Specifically we identify barriers and enablers that have moderate or strong evidence supporting their effect on RTW and their degree of modifiability.

PERSONAL / WORKER DOMAIN

The literature review identified a total of sixteen barriers and enablers in the personal domain in which there was moderate to strong evidence of an effect on RTW. These are described in Table 3. Five of these were considered modifiable, a further five were categorised as potentially modifiable, and the remaining six were considered not to be modifiable.

The non-modifiable factors included demographic and injury or pre-injury characteristics of the worker such as their age, level of education, income or socio-economic status, and their history of prior sickness absence. Modifiable factors can be broadly categorised as the workers' psychological response to the injury or disease and includes recovery expectations, self-efficacy, and perceived work ability. It should be noted that several non-modifiable factors are likely to influence the extent to which other factors are modifiable. For example the ability to change a workers' perception of their work ability may be related to their age or level of education.

A further 18 barriers and enablers were identified but were considered to have limited or mixed evidence of an effect on RTW. A full list of barriers and enablers is provided in the Appendices.

Table 3. Barriers and enablers with strong or moderate evidence of an effect on RTW in the personal / worker domain

Barrier / Enabler	Description	Strength of evidence	Direction of RTW effect	Modifiability
Older age	Twenty-four studies reported that older workers have worse RTW than younger workers or that younger workers have better RTW than older workers.	Strong	Negative	Not modifiable
Greater injury/symptom severity	Fifteen studies reported that workers with more severe injury and/or more severe symptoms post-injury have worse RTW.	Strong	Negative	Potentially modifiable
Higher self-efficacy	Ten studies reported that workers with greater belief in their ability to achieve goals (such return to work or recovery) have better RTW.	Strong	Positive	Modifiable
Better recovery expectations	Nine studies reported that workers with stronger expectations that they will recover from their injury/illness have better RTW, or that those with lower expectations have worse RTW.	Strong	Positive	Modifiable
Lower perceived work ability	Nine studies reported that those who perceive their ability to function in the workplace as lower than normal have worse RTW.	Strong	Negative	Modifiable
Prior sickness absence	Seven studies reported that workers with prior episodes of extended sickness absence or a history of workers compensation claims have worse RTW.	Strong	Negative	Not modifiable
Greater intensity / extent of pain	Seven studies reported that those with more intense pain, or where pain encompasses multiple body regions, have worse RTW.	Strong	Negative	Potentially modifiable
Specific injury type (mental health conditions, whiplash)	Five studies reported that workers with mental health conditions are observed to have delayed RTW. A further two studies reported this effect in those with whiplash type injuries.	Strong	Negative	Not modifiable
Better self-rated health	Six studies reported that workers who consider that they are healthy have better RTW than those who consider themselves less healthy.	Strong	Positive	Potentially modifiable

Pain catastrophizing / fear avoidance	Five studies reported that workers who describe a pain experience in more exaggerated terms, to ruminate on or feel helpless about pain (catastrophizing) or who avoid pain-related situations (fear avoidance) have worse RTW.	Strong	Negative	Modifiable
Presence of co-morbid conditions	Nine studies reported that those with co-morbid health conditions have worse RTW than those without or with fewer co-morbidities. Co-morbidities can include both physical and psychological conditions. Two studies reported no effect of psychological comorbidity.	Moderate	Negative	Potentially modifiable
Higher education	Seven studies reported that workers with higher levels of education have better RTW than those with less education. One study reported no effect of education on RTW.	Moderate	Positive	Not modifiable
Lower income / socio-economic status	Six studies reported that workers whose usual income is lower than others, or who live in areas of low socio-economic status, have worse RTW than those with higher incomes or from areas with higher SES. One study reported no effect of pre-injury income.	Moderate	Negative	Not modifiable
Specific / radiating pain	Three studies reported that workers with pain conditions that are isolated to a specific site or radiating down a limb have worse RTW. One study reported no effect.	Moderate	Negative	Not modifiable
Lower social support	Four studies reported that workers with little support at home, in the community or in the workplace have worse RTW than those with more support.	Moderate	Negative	Potentially modifiable
Concern about making a claim	Three studies reported that those who are concerned about making a claim have worse RTW. Concerns are often reported as being about the employer or community response to making a claim.	Moderate	Negative	Modifiable

WORKPLACE / EMPLOYER DOMAIN

The literature review identified a total of seven barriers and enablers in the workplace domain in which there was moderate to strong evidence of an effect on RTW. These are described in Table 4.

The majority of these factors (five) were considered modifiable, with a single factor each considered not modifiable (company size) or potentially modifiable.

A further 20 barriers and enablers were identified but were considered to have limited or mixed evidence of an effect on RTW. A full list of barriers and enablers is provided in the Appendices.

Table 4. Barriers and enablers with strong or moderate evidence of an effect on RTW in the workplace / employer domain

Barrier / Enabler	Description	Strength of evidence	Direction of RTW effect	Modifiability
low workplace / co-worker support	Eleven studies reported that RTW is worse when the worker perceives that there is less psychosocial / emotional or practical support from co-workers, supervisors or others in the workplace.	Strong	Negative	Modifiable
high physical job demands	Ten studies reported that workers whose jobs are physically demanding have worse RTW than those with less physically demanding jobs.	Strong	Negative	Potentially modifiable
work accommodation	Eight studies reported that workplaces that provide injured/ill workers with opportunities to modify working hours or duties following injury/illness have better RTW outcomes.	Strong	Positive	Modifiable
RTW planning & coordination	Seven studies reported that RTW is better when the return to work process is planned and when the actions of the worker, the workplace (and external) parties are coordinated.	Strong	Positive	Modifiable
larger company size	Eight studies reported that workers in larger companies have better RTW outcomes than those in smaller companies. One study reported no effect of company size.	Moderate	Positive	Not modifiable
low job control / decision latitude	Four studies reported that those who report having less control over their day-to-day job tasks and less ability to make decisions have worse RTW.	Moderate	Negative	Potentially modifiable
early workplace contact	Three studies reported that workers in workplaces that make contact with the injured/ill worker early after the onset of the injury/illness have better RTW.	Moderate	Positive	Modifiable

HEALTHCARE DOMAIN

Literature review identified two barriers and enablers in the healthcare domain in which there was moderate to strong evidence of an effect on RTW. These are described in Table 5.

Both were considered modifiable. A further 8 barriers and enablers were identified but were considered to have limited or mixed evidence of an effect on RTW. Notably the use of cognitive behavioural therapy (CBT) was reported in six studies of which four reported evidence of no effect, one reported a positive effect on RTW and one a negative effect on RTW. Thus the evidence for CBT was considered mixed. A full list of barriers and enablers is provided in the Appendices.

Table 5. Barriers and enablers with strong or moderate evidence of an effect on RTW in the healthcare domain.

Barrier / Enabler	Description	Strength of evidence	Direction of RTW effect	Modifiability
Work-focussed healthcare	Four studies reported that healthcare that incorporates a work-focussed element such as work-focussed cognitive behavioural therapy, or graded exercise therapy, supports better RTW.	Moderate	Positive	Modifiable
More medical intervention	Three studies reported that workers who receive more medical intervention, including use of medication and specialist consultation, have worse RTW.	Moderate	Negative	Modifiable

COMPENSATION / INSURANCE DOMAIN

Literature review identified five barriers and enablers in the healthcare domain in which there was moderate to strong evidence of an effect on RTW. These are described in Table 6.

Three of these were considered modifiable, with a single factor each considered not modifiable (receipt of compensation) or potentially modifiable (amount of wage compensation).

A further 4 barriers and enablers were identified but were considered to have limited evidence of an effect on RTW. A full list of barriers and enablers is provided in the Appendices.

Table 6. Barriers and enablers with strong or moderate evidence of an effect on RTW in the compensation / insurance domain

Barrier / Enabler	Description	Strength of evidence	Direction of RTW effect	Modifiability
Administrative delays	Six studies reported that delays in the time taken to adjudicate a workers' compensation claim, or to make decisions around approval for treatments and services, result in worse RTW.	Strong	Negative	Modifiable
Receipt of compensation	Five studies reported that workers who receive income support through a statutory compensation scheme have worse RTW than those who are injured/ill but do not receive such compensation.	Strong	Negative	Not modifiable
Higher wage compensation	Four studies reported that in those who receive income support, higher levels of wage compensation are associated with worse RTW.	Moderate	Negative	Potentially modifiable
Negative interaction with insurer	Four studies reported that workers who report negative or adversarial interactions with their insurer have worse RTW.	Moderate	Negative	Modifiable
Lawyer involvement	Three studies reported that cases in which a worker reports having a lawyer have worse RTW.	Moderate	Negative	Modifiable

MULTIPLE DOMAINS / CONTEXT

Literature review identified three barriers and enablers in which there was moderate to strong evidence of an effect on RTW, but where the barrier/enabler could be characterised as crossing multiple domains. These are described in Table 7.

Only one of these were considered modifiable, with the other contextual factors of the jurisdiction of claim and the industry within which the injured workers is located being considered non modifiable.

A single further contextual factor was identified (unemployment rate) but was considered to have limited evidence of an effect on RTW. A full list of barriers and enablers is provided in the Appendices.

Table 7. Barriers and enablers with strong or moderate evidence of an effect on RTW that operate across multiple domains.

Barrier / Enabler	Description	Strength of evidence	Direction of RTW effect	Modifiability
Multi-component interventions	Seven studies report that multi-domain interventions that involve multiple coordinated actions by the worker, the workplace, healthcare practitioners (and potentially insurers) result in better RTW than usual care.	Strong	Positive	Modifiable
Industry	Four studies identified industry as a predictor of RTW but the direction of effect varied.	Moderate	Mixed	Not modifiable
Jurisdiction of claim	Three Australian studies reported that the state or territory in which a workers' compensation claim is made is statistically associated with duration of time loss.	Moderate	Mixed	Not modifiable

OPPORTUNITIES FOR CHANGE

The review identified a long list of barriers and enablers across multiple domains. Some of the individual barriers and enablers reported represent aligned concepts that may be addressed through a single change method (e.g., clinical intervention, education, policy or practice change).

The following section describes a candidate list of six opportunities for change that represent ‘categories’ or groups of individual barriers and enablers, and in which there is a feasible method of change. Six opportunities are presented, including:

1. Employer processes and procedures
2. Insurer case management
3. Worker psychological response to injury
4. Workplace support
5. Co-ordinated, multi-party rehabilitation
6. Tailoring support based on worker circumstances

For each opportunity we describe the rationale, provide an example of a change method, propose the parties that may effect change, and provide some implementation considerations.

We acknowledge that some of these opportunities are already being addressed by some participants in Australian workers’ compensation schemes, and that there are likely to be other opportunities arising from this evidence review that we have not presented here. Our intention in presenting these opportunities is not to be prescriptive, but rather to prompt consideration of how the stakeholders in Australian workers’ compensation systems could begin to address the identified barriers and enablers, through evidence-informed approaches.

The information presented in this section is not sufficient for intervention design. To be effective, interventions, to address these (or other) opportunities should be carefully designed, taking into consideration contextual, environmental and local factors. There are well-described methods for developing contextually relevant, evidence and practice informed interventions, such as intervention mapping¹⁰. We recommend use of these methods to maximise potential for positive change.

Opportunity	Employer processes and procedures
Rationale	Multiple barriers and enablers identified in the workplace domain related to employer processes and procedures and are modifiable. These include RTW planning and coordination; early workplace contact with the injured/ill worker; and workplace accommodations such as modified working hours or duties. Other barriers including the workers physical job demands and the degree of job control/decision latitude, may be amendable to modification through changes in workplace policy and practice.
Change method (example)	Changes in workplace RTW policy and procedures. Changes in workplace behaviour may be achieved through multiple means including education, incentives, or enforcing current employer obligations regarding RTW procedures. For example, all Australian workers' compensation jurisdictions require RTW planning yet multiple Australian studies have identified that approximately 50% of workers report having a written RTW plan.
Who can effect change?	Employers (directly), insurers and regulators (indirectly)
Implementation considerations	Some employers have more capacity to engage in RTW processes and practices than others (e.g., related to their size and resources available). Also employer obligations vary between workers' compensation jurisdictions.

Opportunity	Insurer case management
Rationale	The literature review identified that insurer case management practices were associated with RTW outcomes. For example, delays in administrative decision making (such as time taken to accept or deny a claim) had strong evidence of RTW effects. Workers who reported negative or adversarial interactions with their insurer had delayed RTW.
Change method (example)	Developing more efficient decision making and adjudication processes. Enhancing the capability of front-line case management staff to interact in positive ways with injured/ill workers.
Who can effect change?	Insurers (directly); Regulators (indirectly)
Implementation considerations	Policy varies between jurisdictions and thus tailored approaches will be required in each scheme. There may however be opportunity to develop some joint approaches that are consistent across jurisdictions.

Opportunity	Worker psychological response to injury
Rationale	The literature review identified five factors related to the workers psychological response to the injury as having strong or moderate evidence, and all were considered modifiable. These include recovery expectations; self-efficacy; perceived work ability; pain catastrophizing; and concerns about making a claim.
Change method (example)	The literature review identified that work focussed CBT was effective at reducing time off work. This type of psychological therapy is designed to address several of these barriers. Also there is Australian evidence that early psychological treatment after MSK conditions reduces time off work.
Who can effect change?	Healthcare providers (delivering therapy). Employers, insurers and regulators (funding, coordinating or otherwise supporting therapy).
Implementation considerations	Need to identify workers who are experiencing these psychological barriers to recovery in order to target interventions efficiently. Probably not feasible to offer psychological interventions to every worker early post claim.

Opportunity	Workplace support
Rationale	The literature review identified three barriers and enablers that suggest the psychosocial support of the worker is important for achieving positive RTW outcomes. These included eleven studies showing low co-worker or supervisor support was associated with slower or delayed RTW; and three further studies on concerns that workers held about their employer's response to making a claim. In the personal domain lack of social support was also identified as a barrier.
Change method	There is some evidence that supervisor training can facilitate a faster RTW, and Australian studies that identify the important attributes that supervisors need to be effective in supporting workers to RTW. Although not specifically around RTW, there is also international evidence that positive workplace occupational health culture (safety leadership) can improve organisational health and safety performance. Programs aimed at education and training or workplace culture may be effective in supporting improvements in RTW.
Who can effect change?	Employers, co-workers, supervisors.
Implementation considerations	Some employers have more capacity to engage with increased supervisor training than others (e.g. size and resources available).

Opportunity	Co-ordinated, multi-party rehabilitation
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Rationale	Seven studies identified that RTW and rehabilitation strategies that involve multiple stakeholders, and that include multiple elements across healthcare, the workplace and the personal domain, support better RTW outcomes. Also identified was that RTW coordination by the workplace is effective at improving RTW. There was limited evidence to support case management/coordination from a healthcare setting.
Change method	Workplace-based RTW interventions that incorporate elements of healthcare, workplace modifications and address the workers personal and other barriers to RTW. There are now multiple published examples of these sorts of programs.
Who can effect change?	Necessarily a coordinated effort between worker, workplace, healthcare and preferably insurer.
Implementation considerations	Studies suggest that the most effective multi-domain interventions are those that are tailored to address worker specific barriers. Such interventions can be time and cost intensive and thus probably not feasible to offer multi-domain interventions to every worker early post claim.

Opportunity	Tailoring approaches based on worker circumstances
Rationale	The literature review identified many factors that are important predictors of RTW outcomes but that are not modifiable. It is important to collect data on these non-modifiable factors as they (1) can help to determine the likely RTW trajectory of a given worker; and (2) are likely to influence the most effective way of addressing modifiable factors (e.g., workers with multiple co-morbidities may be less able to undertake physical exercise interventions). Early knowledge of the modifiable AND non-modifiable barriers and enablers can thus support targeting of rehabilitation approaches to individual worker circumstances.
Change method	Collection of worker-specific data across a range of barriers and enablers early in the course of the claim. For example, multiple Australian studies within the insurer environment have supplemented claim data collection with collection of information on psychosocial factors that affect RTW. This data can then be used to identify worker-specific supports and services.
Who can effect change?	Employers, Insurers.
Implementation considerations	The initial claims data collected in most workers' compensation systems does not include information on many important barriers and enablers. Data collection systems and data management systems can be costly and time consuming to change. Collection and analysis of sensitive personal data presents privacy and confidentiality challenges.

GAPS IN EVIDENCE

This project has identified a substantial amount of research evidence on the barriers and enablers of RTW. Much of this evidence base describes factors related to the worker themselves (the personal domain) or to their workplace. There is a smaller volume of evidence on factors affecting RTW in the healthcare, compensation domains, and even less on the impact of contextual / environmental factors or factors that operate across multiple domains.

This finding suggests both the relative importance of the workplace and the worker in RTW, but also that further work is required to understand the important factors in the healthcare and compensation domains. For example, there were no studies included that examined specifically the quality of healthcare provision and RTW, despite evidence from international studies that healthcare quality can have a significant impact on other associated outcomes such as quality of life and activities of daily living in samples of people with work-related conditions¹¹.

The majority of the included studies were in cohorts of workers with musculoskeletal or mental health conditions. While these two groups of conditions comprise a substantial portion of cases in Australian workers' compensation systems, there is less evidence in some other important groups, such as workers with occupational diseases, or those with traumatic injury.

Many of the Australian prognostic studies have been conducted in jurisdictions that have made their data available for research, or have invested in research entities. In particular the state of Victoria was over-represented in the Australian studies due largely to the established of a claims research database¹² and a cohort study¹³ from which multiple publications have now emerged.

Another gap is the relative lack of Australian intervention studies. While there are many published Australian studies describing the predictors of RTW, in multiple different cohorts, there are few examples of successful Australian intervention studies. Exceptions include studies by Iles¹⁴ and Nicholas and colleagues (reference) both conducted cohorts of workers with musculoskeletal conditions. There is opportunity to trial interventions in groups of workers with other conditions, and in more diverse circumstances. This sort of trial evidence is necessary to determine what works in the Australian context.

Finally, due to time limitations we limited our search strategy to studies in which RTW was reported as an outcome. There is a substantial amount of published literature in which a RTW process or one of the reported barriers/enablers is the outcome. For example, there are studies exploring RTW coordination, and others

examining relationships between worker features and claims processing times. These were excluded from this review but may provide further valuable insights into how to change the identified barriers and enablers.

SUMMARY AND CONCLUSIONS

This rapid review of international and Australian research identified a large volume of evidence regarding the barriers and enablers to RTW. A total of seventy-six studies were included in the review and synthesised. This included 49 reviews that present evidence from hundreds of primary studies conducted internationally, as well as 27 Australian primary studies that provide contextually relevant information.

Most studies examined groups of workers with musculoskeletal disorders (e.g., back pain) and mental health conditions (e.g., depression, anxiety), with a smaller amount of evidence in other conditions such as traumatic injury, cancer and chronic disease. We identified a total of 83 barriers and enablers, of which 33 were considered to have moderate to strong evidence of a positive, negative or neutral effect on RTW. The majority of evidence relates to barriers and enablers relating to the worker and the workplace, with less evidence in the healthcare and insurer domains.

Sixteen barriers and enablers in the worker domain were considered to have moderate to strong evidence. These include non-modifiable factors such as worker age, pre-injury income and level of education, and a range of modifiable factors such as recovery expectations, self-efficacy and perceptions of own work ability. A total of seven barriers and enablers were considered to have moderate to strong evidence in the workplace domain. Work accommodation, RTW planning and accommodation, and early workplace contact were modifiable enablers with strong evidence in the workplace domain. Low workplace support, high physical job demands, and low job control were barriers to RTW in this domain. Work-focussed healthcare was the only identified enabler in the healthcare domain, whilst more medical intervention was found to be a barrier to RTW.

A total of five barriers and enablers were identified in the insurer domain with moderate to strong evidence. These included administrative delays, receipt of compensation, higher wage compensation, negative interactions with insurer, and lawyer involvement, all of which had negative relationship with RTW. Finally, some factors were found to operate across several domains. For example, multi-component interventions that involved the worker, workplace, and healthcare provider were enablers of RTW, while jurisdiction and industry of claim were also identified as contextual factors that are associated with RTW outcomes.

Our findings are similar to one previous meta-analysis of prognostic factors for RTW⁹. This prior study examined barriers and enablers to RTW that were common across multiple health conditions in studies of

injured and ill workers. The authors found that factors associated with positive RTW outcomes included higher education and socioeconomic status, higher self-efficacy and better recovery expectations, lower severity of the injury/illness, RTW coordination, and multidisciplinary interventions that include the workplace and stakeholders. Factors that were identified as being associated with negative RTW outcomes included older age, being female, higher pain or disability, presence of depression, higher physical work demands, prior sick leave and unemployment, and activity limitations. The authors recommended, as do we, that a focus for future research should be on developing and implementing interventions to address the identified barriers and enablers and improve RTW outcomes.

We identified and synthesised findings from reviews of intervention studies. Consistent with prior studies^{8,9}, we identified that multi-component or multi-disciplinary interventions that address factors across multiple domains are effective at improving RTW outcomes. These findings suggest that providing resources and support across multiple domains is an effective way of addressing the multiple barriers and enablers that influence RTW. There is also evidence from primary intervention studies that such approaches may also be cost-effective. For example Cullen and colleagues found evidence that multi-disciplinary interventions for workers with musculoskeletal disorders were effective at reducing time off work, and also at reducing the costs associated with work disability. These authors also found strong evidence that work-focussed cognitive behavioural therapy (an intervention that includes personal, workplace and healthcare domains) was effective at reducing the costs associated with work disability. Individual intervention studies provide illustrate these findings. For example a multi-disciplinary RTW intervention for workers with musculoskeletal disorders conducted in Sweden¹⁵ reduced the median costs of time loss by USD\$2596, or approximately 21%.

To illustrate some ways in which the information can be used, we describe six opportunities for change. These represent areas in which there is good evidence of modifiable RTW factors, and clear avenues to change. They include (1) Employer processes and procedures, (2) Insurer case management, (3) Worker psychological response to injury, (4) Workplace support, (5), Co-ordinated multi-party rehabilitation, and (6) Tailoring support based on worker circumstances. These opportunities are intended to prompt consideration of how stakeholders in Australian workers' compensation systems could begin to address the identified barriers and enablers, and improve RTW for Australian workers.

This review also revealed some gaps in evidence. These include that there are relatively few studies on prognostic factors for RTW in less common health conditions; few examples of Australian RTW intervention

studies; a limited number of studies in the healthcare and insurance domains; and among the Australian literature an over-representation of some states.

Strengths of this review include its breadth and the use of standardised methods for synthesising evidence and describing findings. The review was conducted in a short time frame and this limited our ability to examine study quality in detail, and meant that with the exception of Australian studies, we were unable to review the primary literature on RTW.

In conclusion, there is a large volume of evidence on barriers and enablers to RTW. This evidence base is focussed on factors related to workers and employers, with some evidence of factors related to insurers and healthcare providers. Many of these factors are modifiable and present opportunities for change. There are multiple opportunities for those involved in Australian workers' compensation systems to improve RTW outcomes through programs, policies, services and strategies that seek to change these modifiable factors. Workers' compensation policy agencies, regulators, insurers, employers and healthcare providers can use the information presented in this review to develop and implement strategies to improve RTW among injured and ill Australian workers.

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APPENDICES

Appendix A. Summary of literature reviews of prognostic studies of factors affecting return to work.

Author (Year)	Study Design	Condition	Domain, factor and direction of effect
Andersen et al (2012) ¹⁶	Systematic review of qualitative studies N=8 primary studies (medium to high quality)	Common mental disorders	<u>Personal</u> : Low self-efficacy (-). <u>Workplace</u> : Work accommodation (+); Graduated RTW (+); Support from supervisors and co-workers (+). <u>Compensation</u> : Administrative delays (-); Negative interactions with social insurance office (-). <u>Healthcare</u> : Work-focussed rehabilitation/healthcare (+).
Bartys et al (2017) ¹⁷	Best evidence synthesis of academic and grey literature N=57 primary studies and reviews	Low back pain	<u>Personal</u> : Appropriate support from significant others (+) <u>Compensation</u> : Rigidity of compensation system processes (-); Administrative delays (-); Requirements for medical certainty (-); Higher wage compensation rates (-). <u>Healthcare</u> : Lack of work-focussed healthcare (-); Poor communication/cooperation between healthcare and other stakeholders (-).
Black et al (2017) ¹⁸	Systematic review of cohort studies N=7 primary studies (medium to high quality)	Psychological or Upper-body musculoskeletal	<u>Personal</u> : Higher self-efficacy (+)
Campbell et al (2013) ¹⁹	Systematic review of prognostic studies N=13 primary studies	Non-specific back pain	<u>Workplace</u> : Co-worker support (+ but mixed evidence); General work support (+ but mixed evidence)
Cancelliere et al (2014) ²⁰	Systematic review of prognostic studies N=4 primary studies	Mild traumatic brain injury	<u>Personal</u> : Higher level of education (+); Extracranial injury (-); Symptoms on hospitalisation (-); Post-injury pain (-) <u>Workplace</u> : Low job control (-); Low decision-making latitude (-).

Cancilliere et al (2016) ⁹	Meta-review N=57 systematic reviews of quantitative studies	Any injury or illness	<p><u>Personal:</u> Higher education (+); Higher socio-economic status (+); Higher self-efficacy (+); lower injury severity (+); Older age (-); Female sex (-); Higher pain or disability (-); Presence of Depression (-); Prior sick leave or unemployment (-); Positive recovery expectations (+)</p> <p><u>Workplace:</u> Work accommodation (+); RTW coordination (+); Higher physical work demands (-);</p> <p><u>Healthcare:</u> Active participation in RTW process (+)</p>
De Vries et al (2012) ²¹	Systematic review of qualitative and quantitative studies N=7 primary studies (2 qualitative & 5 cross-sectional)	Chronic musculoskeletal pain	Primary outcome was staying at work (SAW) rather than RTW after a period of absence. No high level (strong) evidence for determinants of staying at work were identified.
De Vries et al (2017) ²²	Scoping review of longitudinal cohort studies N=21 primary studies	Common mental disorders	<p><u>Personal:</u> low symptom severity (+); No prior sickness absence (+); Higher recovery expectations (+); Younger age (+); co-morbidity (-); higher self-efficacy (+); Better general health (+); Better perceived work ability (+)</p> <p><u>Workplace:</u> Supervisor support (+); Co-worker support (+); Bullying (-)</p>
De Wit et al (2018) ²³	Systematic review of qualitative and quantitative studies N=113 studies	Health problems	<u>Personal:</u> Positive recovery expectations (+); Higher self-efficacy (+); Better perceived health (+); Optimism (+); Motivation (+); Feelings of control (+); Fear avoidance (-); Catastrophising (-); Perceived work-relatedness of the health problem (-).
Dekkers-Sanchez et al (2007) ²⁴	Systematic review of longitudinal cohort studies N=5 studies	Health problem resulting in > 6 weeks sick leave	<u>Personal:</u> Older age (-); Prior sickness absence (-)
Detaille et al (2009) ²⁵	Systematic review of cohort studies N=43 studies (moderate to high quality)	Chronic somatic disease (rheumatoid arthritis, asthma, COPD, diabetes, ischemic heart disease)	<u>Personal:</u> Lower perceived health (-); female sex (-); Higher pain (-); Lower perceived function / work capacity (-); Older age (-); Higher education (+); Higher symptom severity (-); Presence of depression (-); Lower self-efficacy (-); Higher recovery expectations (+); Presence of diabetes (-)

			<u>Workplace:</u> Higher physical work demands (-)
Duijts et al (2007) ²⁶	Meta-analysis of observational studies N=20 prospective studies	Sickness absence due to psychosocial health complaints (excluded studies of specific clinical conditions)	<u>Personal:</u> Higher education (+); Being married (+); Mental health problems (-); Psychosomatic complaints (-); Prior sickness absence (-); <u>Workplace:</u> Low job control (-); Low decision authority/latitude (-); Higher job satisfaction (+); High physical job demands (-); Larger company size (+); Greater workplace social support (+); <u>Healthcare:</u> Using medication (-)
Ervasti et al (2017) ²⁷	Systematic review and meta-analysis of observational studies N=11 studies	Depression	<u>Personal:</u> Older age (-); More severe depression (-); psychiatric comorbidity (-); Somatic comorbidity (-); High conscientiousness (+)
Hansson & Jensen (2004) ²⁸	Review of longitudinal cohort studies N=48 studies (mainly moderate to low quality)	Back and neck disorders	<u>Personal:</u> Older age (-); Prior sickness absence (-); Presence of specific back disorder (-); Lower self-rated health (-); Higher pain (-); Lower perceived function (-); <u>Workplace:</u> High physical job demands (-); Low job satisfaction (-); Low decision latitude (-); shorter job tenure (-); Larger company size (+) <u>Compensation:</u> Receipt of compensation (-)
Iles et al (2008) ²⁹	Systematic review of prognostic studies N=24 studies	Non specific low back pain	<u>Personal:</u> Higher recovery expectation (+); Fear avoidance (-); Presence of depression (no effect); Presence of stress/anxiety (no effect) <u>Workplace:</u> Job satisfaction (no effect);
Karkkainen et al (2017) ³⁰	Systematic review of experimental and observational studies N=10 studies	Burnout	<u>Personal:</u> Male gender (+); Unimpaired sleep (+); longer duration of symptoms (-); Over-commitment to work (+); Covert coping (-) <u>Workplace:</u> Enhanced communication (+); Low job control (-); Work accommodation (+);
Lagerveld et al (2010) ³¹	Systematic review of observational studies	Depression	<u>Personal:</u> Older age (-); Prior sick leave (-); Higher education (+); Low self-esteem (-); Hopelessness (-); Low social functioning (-); Higher neuroticism (-); low self-

	N=30 studies		<p>efficacy (-); More severe symptoms (-); Presence of comorbidity (-); Less clinical improvement (-); Longer duration of depression (-)</p> <p><u>Workplace</u>: More frequent supervisor contact (-); Contact between supervisor and other professionals (+); Low prior work function (-)</p>
Manson et al (2015) ³²	Systematic review of cohort studies N=21 studies	Spinal fusion surgery	<u>Compensation</u> : Receipt of compensation (-)
Nigatu et al (2017) ³³	Meta-analysis of quantitative cohort studies N=18 studies	Common mental disorders	<p><u>Personal</u>: Older age (-); High self-efficacy (+); High work ability (+);</p> <p><u>Healthcare</u>: Contact with medical specialists (-);</p>
Peters et al (2007) ³⁴	Systematic review of quantitative observational studies N=5 studies	Respiratory Illness (Asthma, COPD, Rhinitis)	<p><u>Personal</u>: Lower education (-); More severe symptoms (-);</p> <p><u>Workplace</u>: Smaller company size (-)</p>
Peters et al (2016) ³⁵	Systematic review of quantitative observational and experimental studies N= 11 studies	Workers having surgery for carpal tunnel syndrome	<p><u>Personal</u>: Lower household income (-); Higher recovery expectation (+); Lower pain catastrophizing (+); More pain symptoms (-); Worse mental health (-); Lower work function (-); Older age (-)</p> <p><u>Workplace</u>: Lower physical job demands (+); No change in work role (+); High job demands (-); Prior sickness absence (-); Lower workplace support (-); Poor co-worker relationships (-); Lack of work accommodation (-)</p> <p><u>Compensation</u>: Receipt of compensation (-); Lawyer involvement (-)</p>
Rashid et al (2017) ³⁶	Narrative review of longitudinal cohort studies N=10 studies	Neck and back pain	<p><u>Personal</u>: Higher recovery expectation (+); Better health (+); Higher pain intensity / duration (-); Higher work ability (+); Greater disability (-); Fear avoidance (-)</p> <p><u>Workplace</u>: Higher physical job demands (-); Lower job satisfaction (-)</p>
Shi et al (2014) ³⁷	Systematic review of quantitative observational and experimental studies.	Traumatic hand injury	<u>Personal</u> : More severe injury (-); Lower pre-injury income (-)

	N=8 studies (low to moderate quality)		
Slebus et al (2007) ³⁸	Systematic review of quantitative longitudinal observational studies N=6 studies	Myocardial infarction; Chronic low back pain; Major depressive disorder.	<u>Personal</u> : Younger age (+); <u>Workplace</u> : Lower physical job demands (+);
Steenstra et al (2005) ³⁹	Systematic review of inception cohort studies N=14 studies (mainly moderate to high quality)	Acute low back pain	<u>Personal</u> : Older age (-); Greater disability/severity (-); Female gender (-); More social isolation/dysfunction (-); Specific / radiating pain (o); Level of education (o); Marital status (o); Level of income (o); Ethnicity (o); Number of dependents (o); Smoking (o); Physical activity (o); <u>Workplace</u> : Higher physical job demands (-); low co-worker support (-); job satisfaction (o); occupation (o); company size (o); union membership (o); sick leave policy (o) <u>Compensation</u> : Higher wage compensation (-)
Steenstra et al (2017) ⁴⁰	Systematic review of inception cohort studies N=22 studies (mainly moderate to high quality)	Sub-acute and chronic low back pain	<u>Personal</u> : Male sex (+); Older age (-); Higher pain intensity (-); Higher work function (+); Lower physical health (-); Low recovery expectations (-); Fear of movement (-); Higher socioeconomic status (+); Presence of depression (o); Specific / radiating pain (o); <u>Healthcare</u> : Delay in referral to treatment (-); More medical intervention (-) <u>Compensation</u> : Lawyer involvement (-)
Turner et al (2000) ⁴¹	Systematic review of population based or prospective cohort studies N=20 studies	Work-related injury excluding studies exclusively on brain injury, major trauma or burns	<u>Personal</u> : Older age (-), Greater pain (-); Lower function (-); specific/radiating pain (-); lower pre-injury income (-); lower recovery expectations (-) <u>Workplace</u> : Smaller company size (-); Higher physical job demands (-) <u>Healthcare</u> : Longer time from injury to treatment (-) <u>Compensation</u> : Higher wage compensation (-) <u>Contextual / Environmental</u> : Higher unemployment rates (-)

White et al (2015) ⁴²	Meta review N=26 systematic reviews of quantitative and qualitative studies	Common health conditions	<u>Personal</u> : Lower education (-); Older age (-); Female gender (-); Being unmarried (-); Ethnic origin (non-white) (-); Psychological problems (-); Lower function (-); Clinical complications (-); Overweight status (-); <u>Workplace</u> : Lower occupational level (-); Prior sickness absence (-) <u>Compensation</u> : Receipt of compensation (-);
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Note: Symbols are as follows: (-) = evidence that the listed factor is associated with a negative return to work outcome; (+) = evidence that the listed factor is associated with a positive return to work outcome; (o) = evidence that the listed factor is not associated with return to work.

Appendix B. Summary of Australian return to work literature

Author (Year)	Study Design	Condition	Domain, factor and direction of effect
<i>Published academic literature</i>			
Berecki-Gisolf et al (2012) ⁴³	Quantitative. Retrospective cohort study. N=59,526 workers' compensation claimants. Victoria.	Any work-related injury or illness.	<u>Personal</u> : Older age (-); injury or disease in neck or multiple locations (-); <u>Workplace</u> : Industry (manufacturing) (-);
Casey et al (2014) ⁴⁴	Quantitative. Retrospective cohort study. N=9,262 (of 65,762). NSW.	Any work-related injury or illness	<u>Personal</u> : Higher socioeconomic status (+); shorter duration of disability (+)
Clay et al (2012) ⁴⁵	Quantitative. Prospective cohort study. N=133 Victoria.	Any unintentional injury resulting in 1 or more day hospital stay	<u>Personal</u> : Older age (-); Greater injury severity (-); self-reported somatic pain (-); poor mental health (-); high social functioning (+); strong relationships (+) <u>Compensation</u> : Receipt of compensation (+)
Cocker et al (2018) ⁴⁶	Quantitative. Retrospective cohort study. N=71,607 Victoria	Any work-related injury or illness resulting in 1 day of time loss.	<u>Compensation</u> : Longer claim lodgement time (-); Longer insurer decision time (-); Longer employer lodgement time (-).
Collie et al (2016) ⁴⁷	Quantitative. Retrospective cohort study. N=95,976 Victoria.	Any work-related injury or illness resulting in 10 days of time loss.	<u>Compensation</u> : Jurisdiction of compensation claim (+ / -)
Gray & Collie (2018) ⁴⁸	Quantitative. Retrospective cohort study. N=19,833	Mental health condition claims resulting in	<u>Personal</u> : Older age (-); depression (-); post-traumatic stress (-)

	Australia.	minimum 10 days of time loss.	<u>Workplace:</u> Industry (wholesale trade) (-); Occupation (protective service and emergency worker) (-); industry (transport, postal and warehousing industry OR healthcare and social assistance industry) (+)
Gray et al (2018) ⁴⁹	Quantitative. Retrospective cohort study. N=31,953 Victoria.	Any transport-related injury or illness	<u>Personal:</u> Female sex (-); older age (-); injury type (whiplash or dislocations) (-); injury severity (-);
Jetha et al (2017) ⁵⁰	Quantitative. Prospective cohort study. N=551 (baseline), 403 (follow-up) Victoria.	Any work-related injury or illness	<u>Workplace:</u> Positive supervisor injury reaction (+)
Lane et al (2018) ⁵¹	Quantitative. Prospective cohort study. N=869 (baseline), N=632 (follow-up) workers' compensation claimants Victoria.	Upper-body musculoskeletal condition, mental health condition	<u>Workplace:</u> RTW plans (+); Good interaction with RTW coordinator (+)
MacPherson et al (2018) ⁵²	Quantitative. Retrospective cohort study. N=1,232,818 Australia / Canada	Any work-related musculoskeletal disorder	<u>Personal:</u> Older age (-)
Magee et al (2011) ⁵³	Quantitative. Longitudinal study. N=2,861 (subset of HILDA waves 5, 6, 7, 8) Australia		<u>Workplace:</u> High job strain (-); physical job demands (-); longer commuting time (-); occupation (admin / retail role) (-)
Mills (2011) ⁵⁴	Quantitative. Retrospective cohort study. N=9,018	Any work-related injury or illness	<u>Personal:</u> Female (-)

	Australia.		
Nicholas et al (2018) ⁵⁵	Quantitative. Prospective cohort study. N=163 healthcare workers NSW.	Work-related soft tissue injuries	<u>Healthcare</u> : Higher psychosocial complications (Orebro) (-)
Prang et al (2015) ⁵⁶	Quantitative. Retrospective cohort study. N=8,358 Victoria	Work-related mental health conditions	<u>Personal</u> : Older age (-); Female (-) <u>Workplace</u> : Small company size (-); Lower skill level occupation (+); <u>Healthcare</u> : Psychological therapy (-); Using medication (-) <u>Compensation</u> : Previous claim (-)
Smith et al (2014) ⁵⁷	Quantitative. Retrospective cohort study. N=13,893 Victoria.	Any work-related mental health condition or upper body or back musculoskeletal condition	<i>Mental health conditions</i> <u>Personal</u> : Older age (-); <u>Workplace</u> : Industry (education and training) (-); Job pressure (-); Industry (agriculture, forestry, fishing, and mining, or transport, postal and storage) (+); Large company size (+); Governmental employer (+) <u>Compensation</u> : Longer claim processing time (-); <i>MSK conditions</i> <u>Personal</u> : Older age (-); Female (-); Previous claims (-) <u>Workplace</u> : Industry (construction) (-); Small company size (-); healthcare and social assistance industry (+); public administration and safety industry (+); education and training industry (+) <u>Compensation</u> : Longer claim processing (-)
<i>Reports and unpublished Australian RTW studies</i>			
Wyatt et al (2016) ⁵⁸	Quantitative. Prospective cohort study.	Work-related mental health conditions	<u>Personal</u> : concern about claim lodgement (-); positive overall view of workplace (+); self-efficacy (+); RTW plan perceived helpful (+)

	N=575 Australia		<u>Workplace:</u> positive employer response (+); early contact (+); positive work place support (+); large company size (+); disputes (-); <u>Compensation:</u> positive interaction with insurer (+)
Wyatt et al (2016) ⁵⁹	Quantitative. Prospective cohort study. N=575 (Mental health conditions), 8,736 (physical conditions) Australia.	Any work-related injury or illness	<u>Personal:</u> concern about claim lodgement (-); positive overall view of workplace (+); greater resilience (+); RTW plan perceived helpful (+) <u>Workplace:</u> early claim lodgement (+); early contact (+); disputes (-); <u>Compensation:</u> positive interaction with insurer (+)
Lane & COMPARE Project Team (2018) ⁶⁰	Quantitative. Retrospective cohort study. N=942,051 Australia.	Any work-related injury or illness	<u>Compensation:</u> Higher wage compensation (-)
Gray & COMPARE Project Team (2018) ⁶¹	Quantitative. Retrospective cohort study. N=751,424 Australia.	Any work-related injury or illness	<u>Personal:</u> Younger age (+); Mental health conditions (-); Fractures (-) <u>Compensation:</u> Longer claim lodgement time (-) Longer insurer decision time (-); Longer claim processing time (-); Jurisdiction (+/-) <i>Determining the association between workers' compensation claim processing times and duration of compensated time loss.</i>
Collie & COMPARE Project Team (2018) ⁶²	Quantitative. Prospective cohort study. N=11,056 Australia.	Any work-related injury or illness.	<u>Compensation:</u> Positive claims experience (+) <i>Claims experience in injured Australia workers: overview and association with return to work</i>
Sheehan & COMPARE	Quantitative. Prospective cohort study. N=8,266 Australia.	Any work-related injury or illness.	<u>Workplace:</u> Higher employer support (+);

Project Team (2018) ⁶³			<i>Employer support for injured Australian workers: overview and association with return to work</i>
Sheehan & COMPARE Project Team (2018) ⁶⁴	Quantitative. Prospective cohort study. N=11,586 Australia.	Any work-related injury or illness.	<u>Personal</u> : Concerns about making a claim (-) <i>Workplace support for making a workers' compensation claim: overview and association with return to work</i>
Sheehan & COMPARE Project Team (2018) ⁶⁵	Quantitative. Prospective cohort study. N=5,212 Australia	Any work-related injury or illness.	<u>Workplace</u> : RTW plan (+); <i>Return to work plans for injured Australian workers: overview and association with return to work</i>
Sheehan & COMPARE Project Team (2018) ⁶⁶	Quantitative. Prospective and Retrospective Cohorts N=390,129 (Scheme insurers), 340,175 (Self-insurers) Australia	Any work-related injury or illness.	<u>Workplace</u> : Self-insured company (+) <i>Comparison of return to work practices and outcomes in self-insured and scheme-insured organisations</i>
Sheehan & COMPARE Project Team (2018) ⁶⁷	Quantitative. N=730,304 (NDS), 4,161 (RTW Survey) Australia	Any work-related injury or illness.	<u>Workplace</u> : Industry - education (-); Industry - healthcare (-) <i>Workers' compensation claims in government employees.</i>
Lane et al (2016) ⁶⁸	Quantitative. Retrospective cohort study. N=242,000 Australia.	Any work-related injury or illness.	<u>Personal</u> : Mental health condition (-); Older age (-) <u>Environmental / Contextual</u> : Jurisdiction of claim (+/-)
Smith (2018) (slides) ⁶⁹	Quantitative. Prospective cohort study.	Any work-related injury or illness	<u>Personal</u> : Serious mental illness (-); lower coping ability (-); trouble sleeping (-)

	N=504 Victoria.		<u>Compensation</u> : Lawyer involvement (-);
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Note: Symbols are as follows: (-) = evidence that the listed factor is associated with a negative return to work outcome; (+) = evidence that the listed factor is associated with a positive return to work outcome; (o) = evidence that the listed factor is not associated with return to work.

Appendix C. Summary of literature reviews of return to work interventions.

Author (Year)	Study Design	Condition	Domain, factor and direction of effect
Arends et al (2012) ⁷⁰	Systematic review of RCTs of psychological interventions N=10 studies	Adjustment disorders	<u>Healthcare</u> : Cognitive Behavioural Therapy (o); Problem Solving Therapy (+)
De Boer et al (2017) ⁷¹	Systematic review of RCTs N=15 studies	Cancer	<u>Multi-domain</u> : Multi-component interventions (+)
Carroll et al (2010) ⁷²	Systematic review of controlled intervention trials of workplace based interventions N=9 studies	Back pain	<u>Workplace</u> : Multi-party RTW planning (+); Exercise Therapy (+)
Cochrane et al (2017) ⁷³	Systematic review of RCTs of biopsychosocial interventions N=8 studies	Musculoskeletal pain	<u>Healthcare</u> : Case management (o); <u>Multi-domain</u> : Multi-component interventions (+)
Cullen et al (2017) ⁸	Systematic review of controlled intervention trials of workplace based interventions N=35 studies	Musculoskeletal disorders and Mental Health conditions	<u>Workplace</u> : Graded activity (+); Work accommodation (+) <u>Multi-domain</u> : Multi-component interventions (+);_Work-focussed Cognitive Behavioural Therapy (+); Cognitive Behavioural Therapy (o)
Donker-Cools et al (2015) ⁷⁴	Systematic review of RCTs and cohort studies N=12 studies	Brain injury	<u>Workplace</u> : Multi-component interventions (+)

Furlan et al (2012) ⁷⁵	Systematic review of randomised and non-randomised trials of workplace based intervention trials N=12 studies	Depression	Evidence was graded a being very low quality and thus no interventions were identified as effective.
Hou et al (2017) ⁷⁶	Systematic review of RCTs of vocational interventions.	Traumatic upper limb injury	No RCTs meeting the study inclusion criteria were identified and thus no conclusions were drawn.
Hoving et al (2014) ⁷⁷	Systematic review of RCTs on non-pharmacologic interventions N=3 studies	Inflammatory arthritis	Evidence was graded a being very low quality and thus no interventions were identified as effective.
Kumar et al (2017) ⁷⁸	Systematic review of RCTs of cognitive rehabilitation N=4 studies	Traumatic brain injury	<u>Healthcare</u> : Cognitive rehabilitation (o)
Marin et al (2017) ⁷⁹	Systematic review of RCTs of biopsychosocial rehabilitation N=3 studies	Sub-acute low back pain	<u>Multi-domain</u> : Multi-component intervention (+)
Mikkelsen et al (2017) ⁸⁰	Systematic review and meta-analysis of controlled studies N=42 studies	Common mental disorders	<u>Workplace</u> : Graded return to work (+); Workplace contact (+) <u>Multi-domain</u> : Multi-component intervention (+)
Nieuwenhuijsen et al (2014) ⁸¹	Systematic review of RCTs for work-directed and clinical interventions N=23 studies	Depression	<u>Healthcare</u> : Telephone Cognitive Behavioural Therapy (+); Enhanced primary care with CBT (+) <u>Multi-domain</u> : Multi-component intervention (+)
Nigatu et al (2016) ⁸²	Systematic review of RCTs using cognitive behavioural therapy approaches	Common mental disorders	<u>Healthcare</u> : Cognitive Behavioural Therapy (o)

	N=16 studies		
Palmer et al (2012) ⁸³	Systematic reviews of RCTs and cohort studies N=42 studies	Musculoskeletal disorders	<u>Workplace</u> : Work accommodation (+) <u>Healthcare</u> : Behavioural intervention (+); Exercise therapy (+)
Pomaki et al (2011) ⁸⁴	Systematic review of controlled workplace-based intervention trials. N=8 studies	Common mental health conditions	<u>Workplace</u> : Case management (+); Low intensity psychological therapy (o); High intensity psychological therapy (+)
Schaafsma et al (2013) ⁸⁵	Systematic review of RCTs of physical conditioning interventions N=25 studies	Acute, sub-acute and chronic back pain	Evidence was graded a being low quality or inconsistent in direction of effect and thus physical conditioning interventions were not identified as effective.
van der Geissen et al (2012) ⁸⁶	Systematic review of RCTs of graded activity interventions N=3 studies	Non-specific low back pain	Evidence was inconsistent in direction of effect and thus graded activity interventions were not identified as effective for RTW.
Vargas-Prada et al (2016) ⁸⁷	Systematic review of controlled studies of early workplace interventions N=3 studies	Musculoskeletal disorders and mental health conditions	<u>Workplace</u> : Guideline based care (+); Reduce working hours (+)
van Vilsteren et al (2015) ⁸⁸	Systematic review of RCTs of workplace interventions N=14 studies	Musculoskeletal disorders, mental health conditions and cancer	<u>Workplace</u> : Work adaptation + employer/supervisor involvement (+)
Vogel N et al (2017) ⁸⁹	Systematic review of RCTs of insurer RTW coordination / case management programs N=14 studies	Musculoskeletal disorders and mental health conditions	<u>Compensation</u> : Case management (o)

Note: Symbols are as follows: (-) = evidence that the listed factor is associated with a negative return to work outcome; (+) = evidence that the listed factor is associated with a positive return to work outcome; (o) = evidence that the listed factor is not associated with return to work.