

Work Rehabilitation Guideline - Executive Summary

The purpose of this guideline is to:

1. Serve as an instructional aid for providers delivering work rehabilitation.
2. Shape policy implementation for the work rehabilitation program.
3. Provide utilization review staff with the information necessary to make recommendations about the medical necessity and clinical appropriateness of work rehabilitation.

A comprehensive search of available scientific literature on work rehabilitation was done by Labor and Industries staff in Fall 2019 and updated periodically through spring 2021. Literature was reviewed, assessed for relevance and quality and summaries were drafted by consensus of the joint subcommittee. A draft was posted for public comment and was revised and approved for distribution in October 2021.

Work rehabilitation is a broad term that encompasses physical, behavioral and vocational interventions geared toward facilitating participation in work and restoration of work-related function within a multidisciplinary model that includes medical and workplace stakeholders.

This report includes:

1. Concise summaries of published clinical and scientific literature regarding utility and effectiveness of work rehabilitation,
2. Consensus statements based on evidence and clinical experience of the subcommittee through a modified eDelphi process,
3. Recommendations for work rehabilitation providers and programs.

Recommendations for Work Rehabilitation Best Practices – Highlights

Coordination of care

- Successful rehabilitation and return to work (RTW) readiness require collaboration across the disciplines addressing medical, vocational, and behavioral aspects of care. This includes care conferences at regular intervals allowing providers to be clear about who is responsible for the next steps.
- The RTW goal must be clearly identified before the start of the program using an accurate job analysis/description developed in conjunction with a vocational provider.

Assessment

- Initial assessments establish a baseline measure of musculoskeletal, behavioral, and current work capabilities. This includes worker expectations for return to work, fear avoidance beliefs about work, and tolerance of pain. These aspects inform the need for additional interventions.
- The individualized written plan of care needs to be established within a few days of the initial assessment through shared decision-making with the worker.

Intervention components

- Multidisciplinary work hardening programs with high return to work rates include PTs and OTs administering job simulation tasks and physical conditioning; behavioral health providers (psychologists, master's level therapists, vocational provider) working on goal setting and stress management; and instruction on dietary and lifestyle changes.
- Include cognitive-behavioral approaches with graded activity or other ways to focus on functional gains rather than pain.
- Deliver pain neuroscience education before therapeutic exercise to reduce pain ratings, fear-avoidance, and catastrophizing in patients with chronic musculoskeletal pain.

Outcomes

- Assess both physical and behavioral outcomes with a focus on functional task performance, participation in daily and social activities, and reducing pain interference.
- Incorporate the use of self-reported functional assessments along with the evaluation of work behaviors and report changes in the care team meetings.

Recommendations for Work Rehabilitation Programs – Highlights

Program requirements

- Determination of work rehabilitation program intensity encompass required durational tolerances, physical job demands, psychosocial barriers, and generalized pain.
- Determination of work rehabilitation program duration encompass these factors: projecting progress toward the stated goals; accurately characterizing physical demands and thresholds for interim, modified, and full RTW; evaluating the opportunity for graded progress in modified duty to replace in-clinic rehabilitation; considering the impact of split rehab and modified duty on schedule and functional progress.

Provider requirements

- A therapist providing work rehabilitation needs additional education and training to deliver adequate work simulation and psychosocial barrier support.

Worker requirements

- Work rehabilitation should occur later than two months post-injury
- Workers with advanced claim age can make appropriate progress in strength, quality of life, and task performance through work rehabilitation, but may require additional psychosocial and vocational support to successfully return to work.

Work Rehabilitation Guideline

Table of Contents

Work Rehabilitation Guideline - Executive Summary.....	1
Recommendations for Work Rehabilitation Best Practices – Highlights.....	2
Coordination of care	2
Assessment	2
Intervention components	2
Outcomes	2
Recommendations for Work Rehabilitation Programs – Highlights.....	3
Program requirements.....	3
Provider requirements.....	3
Worker requirements	3
Work Rehabilitation Guideline.....	4
Table of Contents.....	4
Introduction	6
Purpose	6
Background	6
Participation in development	7
Baselines	7
Definitions.....	9
Guideline Development Methodology and Process	10
Recommendations for Work Rehabilitation Best Practices.....	11
Coordination of care components	11
Care team composition.....	11
Care authorization process	13
Care conferences	13
Assessment Components.....	16
Plan of Care Components	18
Intervention Components.....	19
Physical Conditioning and Exercise.....	21
	4

Work simulation.....	22
Psychosocial support.....	23
Patient education.....	25
Outcomes.....	26
Recommendations for Work Rehabilitation Programs.....	28
Criteria for Work Rehabilitation Programs	28
Program Requirements.....	28
Work Rehabilitation Provider Requirements.....	29
Worker Criteria for Program Eligibility.....	30
Worker Requirements for Admission	30
Worker Requirements for Discharge	31
Timing of Work Rehabilitation	32
Duration and Intensity	33
Reporting and Quality Assurance	34
Reporting.....	34
Quality Assurance	34
Acknowledgements.....	35
Tables and Graphics.....	35
Table 1: Comparison and Correlation to WA nomenclature	36
Table 2 – Criteria for admission to work rehabilitation programs	37
Table 3 – Criteria for continuation in work rehabilitation programs.....	38
Flowchart 1: Referral algorithm for acute care and work rehabilitation.....	39
APPENDIX A: Consensus Statements	40
APPENDIX B: Evidence Summary	41
References	56

Introduction

This guideline was developed by a subcommittee convened jointly from the Industrial Insurance Chiropractic Advisory Committee (IICAC) and Industrial Insurance Medical Advisory Committee (IIMAC) with representatives selected from the Washington Occupational Therapy Association (WOTA), American Physical Therapy Association's Washington Chapter (APTA-Washington) and Vocational Counselor Technical Stakeholder Group (VTSG). An internal workgroup of stakeholders from the Department of Labor and Industries (L&I) managed the project (consisting of one representative from each of the professions).

It provides concise summaries of published clinical and scientific literature regarding utility and effectiveness of commonly used work rehabilitation practices. It makes recommendations for work rehabilitation including practical clinical resources and policy implementation goals. This and other practice resources are in the public domain and are available for download at the State of Washington Department of Labor & Industries [website](#). Contact information for public input and submission of studies for future revisions is also available there.

Purpose

The purpose of this guideline is to create consensus in the development of a work rehabilitation guideline based on evidence-informed best practices and practitioner expertise across a variety of provider types involved in the recovery process. This guideline will be used to inform changes to L&I's existing work hardening program provided by physical and occupational therapy clinics to align with current best evidence. A modified eDelphi method was used to diminish group interaction bias, ensure equal representation across providers involved during the rehabilitation process, and reflect the unique perspectives and experiences across many stages of the recovery process.

These guidelines inform standards and recommendations within the provider community as well as L&I coverage and utilization review criteria.

This document gives guidance to L&I on improving standards to reflect significant changes in health care and workers' compensation. Part of this goal includes maintaining the flexibility to include different levels of service and clearly define the progression of rehabilitation services.

Background

It should be noted that while this document is an evidence-informed work, there are significant challenges that result from interpreting and applying data across systems with different compensation and healthcare structures.^[1] Many of the service delivery structures, fee schedules and policies may contribute to significant differences in access to services, timing of delivering care, or utilization of services. While administrative data can be an efficient tool for

evaluating outcomes^[2], the variety of complicating factors led to a strategy of careful consideration of evidence rather than a strict systematic review. Simple challenges as to the definitions of multi-disciplinary, the practicalities of clinic structures and access to care were factored into our recommendations. Additionally, systems that differed significantly and may have provided favorable outcomes were reviewed for potential impact on local policy development. This document is a synthesis of: the best evidence applicable; clinical experience from a variety of provider stakeholders; and accommodation to allow flexibility in patient choice.

Participation in development

This paper was developed by a subcommittee convened jointly from the Industrial Insurance Chiropractic Advisory Committee (IICAC) and Industrial Insurance Medical Advisory Committee (IIMAC) with representatives selected from the Washington Occupational Therapy Association (WOTA), American Physical Therapy Association's Washington Chapter (APTA-Washington) and Vocational Counselor Technical Stakeholder Group (VTSG). An internal workgroup of stakeholders from the Department of Labor and Industries (L&I) managed the project (consisting of one representative from each of the professions).

Baselines

Injured patients will be referred to as “workers” throughout this document because the goal of care is to support the worker in their physical and mental transition from injury to recovery (Johnson 2000).^[3] The document will refer to the provider responsible for directing and delivering the main components of intervention as the “Rehabilitation Provider.” The provider responsible for the claim overall and its management will be referred to as the “Attending Provider.”

While this document is focused on the provision of services by physical therapists (PT) and occupational therapists (OT), there are other professions who are qualified and skilled at the delivery of similar services including but not limited to Psychiatrists, Physical Medicine and Rehabilitation specialists, Sports Medicine specialists, Chiropractors, athletic trainers, and massage therapists. The services they provide include combinations of manual therapy, exercise interventions and physiologic therapeutic procedures. The literature and the subcommittee advocate for a multi-disciplinary, integrated approach which may include any number of provider types delivering services within their scope, skillset and appropriate payment policies.

About 43% of compensable work-related injuries are musculoskeletal.^[4] An internal review of L&I claims showed that ~52% of all paid time-loss claims have a physical medicine service. Physical medicine services (PT, OT, DC or MT) account for ~20% of all L&I paid charges based on internal review. The vast majority of claims resolve in 14 visits or less. However, about five percent of all cases go on to require additional therapy (beyond 25 visits) to close deficits in

physical capacity in order to Return to Work (RTW). About 64% of cases with 25+ visits to PT had a sprain, strain or tear. The top injury categories in the Washington state system are:

1. Back (24%)
2. Shoulder (22%)
3. Head and face (18%)
4. Knee (11%)
5. Upper extremity (9%)
6. Lower Extremity (8%)

Given the prevalence of low back and shoulder injuries, the evidence review and recommendations are focused on these conditions, although other workers' compensation musculoskeletal injuries like carpal tunnel syndrome will benefit from similar risk assessments and early interventions.^[5] Differences in body region and injury type are often less predictive of the patient's outcome than other factors, as will be discussed in this section. Many therapies are effective across a broad range of musculoskeletal conditions.^[6] L&I has evidence-based resources on the conservative management of a variety of musculoskeletal conditions [available online](#)¹.

While most injuries heal quickly, some linger and can become chronic. When this chronic pain becomes disabling or dysfunctional, it can complicate recovery and lead to extended rehabilitation or diagnostic overuse. The combination of these factors quickly leads to a failure to RTW which should be addressed within the first month.^[7] This may require additional interventions to deal with and prevent chronic pain.^[8, 9] While this happens to very few workers, the impact on the individual is large and requires extensive resources, leading to many groups working to improve the quality of care in delivery of chronic pain care for musculoskeletal conditions.^[10] Chronic pain and its sequelae can interact with other behavioral and social aspects of recovery. Work rehabilitation providers are well-placed to recognize and contextualize the recovery process to avoid disabling pain syndromes. If that is ineffective, work rehabilitation providers can intervene early, recommending referral for appropriate care before the worker has a long-term disability, while reducing return-to-work interruptions and potential for reinjury.^[11, 12] Treating chronic pain in workers compensation is particularly challenging when RTW is the goal, but multidisciplinary care offers the best solutions.^[13]

¹ <https://lni.wa.gov/patient-care/treating-patients/treatment-guidelines-and-resources/index#practice-resources-for-attending-providers>

Definitions

Work Disability is a concept describing the overall societal context of why workers may have continued disability.^[14] This model includes the personal aspects (like physical injury and coping strategies of the worker) and places them within a framework of the larger healthcare, legislative and workplace systems; all of which have impact on the benefits, incentives and decision-making for RTW options. Ultimately, these factors influence the worker to make a decision on when, or if, they RTW. Addressing these factors is part of a worker's recovery and when particular barriers to recovery are identified, efforts can be made to address and work toward satisfactory solutions. This requires proper messaging from all providers about the nature of work disability and methods to foster patient engagement, for which vocational providers are uniquely trained and specialized. The vocational provider also plays a pivotal role in work disability prevention via coordination across claim managers, behavioral health specialists, social support systems and the health care delivery team.^[15]

In 1985, Matheson et al. described work hardening as a “work-oriented treatment program that has an outcome measured in terms of improvement in the client's productivity.” Since then, there has been much confusion and discussion regarding how to define and operationalize “work conditioning” and “work hardening”.^[16, 17] The terms are unclear or used interchangeably in many research contexts, while different jurisdictions have varied definitions and implementations. Historically, L&I defined work hardening as an interdisciplinary, individualized, job specific program of activity with the goal of RTW. Work Hardening programs use real or simulated work tasks and progressively graded conditioning exercises that are based on the individual's measured tolerances. Work hardening provides a transition between acute care and successful return to work and is designed to improve the biomechanical, neuromuscular, cardiovascular and psychosocial functioning of the worker.

In 2011, the APTA recommended a change in name from “work hardening” to “work rehabilitation”.^[18] The change in terms was to emphasize individualized needs for separate physical and behavioral aspects of care.

Within the subcommittee formed for this project, it was challenging to clearly delineate the differences between the two programs because they share many similar components and principles. Consensus was reached that the primary difference is related to the durational aspect, with work hardening requiring longer sessions to match work demands. In our current system, hardening providers are held to higher quality standards in training, reporting and facilities whereas work conditioning has general direction with no formal training or requirements to provide services.

Irrespective of the name, being in one formal program vs. another often limits flexibility to meet the needs of individual patients, especially as those needs change and progress through their recovery. The goal is to recover and RTW by delivering the right services to the right patients at the right time. Multidisciplinary involvement has the most support for achieving

these goals with better worker outcomes.^[13, 19-21] The subcommittee and L&I working group came up with these new definitions:

“Work rehabilitation – conditioning” is intended for sedentary-medium physical job demands which require durational exertion from one to four hours per day. This program admits workers that will benefit from care five times per week or fewer days in clinic when combined with multiple days per week of additional modified duty activity with a home program. It is suitable for workers where psychosocial barriers and low-level fear avoidance, catastrophization, or pain behavior can be managed within the program. Higher-level psychosocial factors may require additional consultation with behavioral health support or activity coaching.

“Work rehabilitation – hardening” is intended for medium-heavy physical job demands which require durational exertion in excess of four hours per day. This program admits workers that will benefit from daily care to build tolerance, combined with their home and modified duty schedule to augment the rehabilitation. It is suitable for workers with jobs requiring greater task simulation and longer task performance; or workers with significant psychosocial barriers, catastrophization, moderate to high-level fear avoidance, or generalized pain behavior that is best managed with an integrated approach.

Overall, the primary issues to be addressed in the work rehabilitation environment that are less prominent in standard outpatient therapy are: the provision of a collaborative delivery style across providers, employers and insurers; avoidance of over medicalization of conditions or behaviors; and addressing psychosocial issues early to enhance engagement and adherence.^[22]

Guideline Development Methodology and Process

This guideline was developed via a modified eDelphi process. Five rounds of statements were given including both new and revised statements to avoid question fatigue. Questions were developed by an internal team at L&I that included representative types of providers. Members of the panel were chosen from nominations by state associations or representative groups (IICAC, IIMAC, APTA-WA, WOTA, VTSG). Two nominees were chosen from each, based on their involvement with workers’ compensation and curriculum vitae. The internal L&I team strove to seek a balance of practitioners from large systems, private clinics and rural and urban settings.

The impetus for this guideline stems from the need to update policies and standards across the Work Conditioning and Work Hardening programs, which lacked an accepted L&I guideline. Topics were chosen based on areas of need identified by subcommittee and L&I staff and a topical captain from the subcommittee was assigned. The main topics identified were: Accurate Job Analysis/Description, Defined Work goal, Earning Power, Vocational Provider involvement, Worker Education, and Work Simulation. Searches were performed by internal staff including an epidemiologist and subcommittee members and ended in August 2020. Hand searching and secondary references were utilized for the successful identification of articles related to the main topics.

Panelists were provided with research material pertaining to each statement during survey rounds. Anonymous answers were collected via web response and comments were used to reframe and reword questions to all participants' satisfaction over multiple rounds.

Criteria for consensus required that all participants rate the statement neutral or above (no disagree or strongly disagree) and >75% of subcommittee members must have responded to each statement. These consensus statements preface the relevant sections throughout the document.

Post-survey debrief meetings were held to inform participants of the comments, concerns and direction of changes for the next round, as well as solicitation of general questions or concerns. There was no open debate of specific statements.

Recommendations for Work Rehabilitation Best Practices

This section makes recommendations for work rehabilitation providers to support evidence-informed best practices in assessment and treatment of work-related conditions. Each section of recommendations follows a standard format which identifies a topic and reviews the concepts and evidence regarding it. The review is followed by a boxed section that lists any applicable consensus statements from the subcommittee's eDelphi process and remarks that outline their perspective and the literature's influence on them.

Coordination of care components

Successful rehabilitation and RTW readiness require collaboration across the disciplines addressing each aspect of care: medical (attending provider), physical medicine (e.g. PT, OT, DC, PM&R), vocational (vocational provider, insurer, employer) and behavioral (master's level therapist, psychologist, counselor).

Care team composition

The work rehabilitation care team may be composed of a large variety of provider types and may be distributed across many office locations. At minimum, it will include the worker, AP, OT, PT, and VRC. It may include behavioral health providers, surgeons or others as needed. Many PTs and OTs may be on site together, but it is important to include the remote members in a weekly conference. If unable to attend in person/over the phone, weekly contact is at least made, and existing documentation (e.g. Activity Prescription Form, Vocational Recovery Plan, etc) is used to help support progression planning. Validation can be achieved at the care conference that the employer is engaged and has regular contact with the worker and vocational provider.

The more distributed the care team, the greater the importance of understanding the roles and abilities of each member of the team. Due to the nature of workers' compensation, care team members will likely vary across different patients with individualized needs. The variety of

locations, settings, onsite/offsite providers, and distributed assignment of vocational providers will require flexibility during coordination of services. Consider which services and interventions the patient needs and what the strengths of each team member are through a collaborative effort and common goals.^[18] Generally, here are the specific strengths and sets of expertise across different roles:

Occupational therapists (OTs) providing work rehabilitation have training that spans the domains of work-related injury or illness to encompass a worker's function in physical, cognitive, and psychological abilities. Foundational education in kinesiology, sociology and psychology provide a solid basis for assessing and addressing cognitive, emotional and behavioral ability and dysfunction related to work demands, capacities, and pacing. They serve an essential role in work rehabilitation in designing and administering graded functional interventions with an emphasis on purposeful activity, fine motor coordination, load handling and work simulation.

Physical therapists (PTs) providing work rehabilitation are focused on assessment and treatment of physical abilities through a variety of interventions. Their goal is to restore job-focused physical function through exercise, education and a patient-centered approach. They also collaborate with the work rehabilitation team to recognize and address psychosocial barriers and create new physical strategies to adapt to alternative rehabilitation goals or accommodate permanent injury or dysfunction. Physical therapy education is rooted in movement-based science and training that positions them as experts on function, body mechanics, strength, and mobility. They serve an essential role in assessing strength and mobility impairments and forming treatment plans to progress a patient's capacity, conditioning and function toward safe performance of daily and job-oriented functions.

Vocational Rehabilitation Counselors (VRC) collaborating with work rehabilitation providers ensure proper communication between the employer and the worker. This includes employing evidence-informed best practices to set appropriate expectations for the vocational recovery referral process and a worker centric approach. VRCs have training that provides a broad perspective on the domains of preventing work disability including the motivational, goal setting, and psychosocial components that may be barriers to RTW. While a wide variety of VRC training exists, the type of treatment the worker receives is considered in assigning the most appropriate counselor for the worker's needs. They serve an essential role in work rehabilitation in coordinating across workers, providers and employers to ensure therapeutic goals align with required job duties, worker's needs, and goals.

Attending providers with patients enrolled in work rehabilitation lead the decision making in medical recovery and physical disability. There are many types of attending providers across different professions and specialties. All attending providers have expertise in this decision-making process, causal relationships of injury, and the ability to address

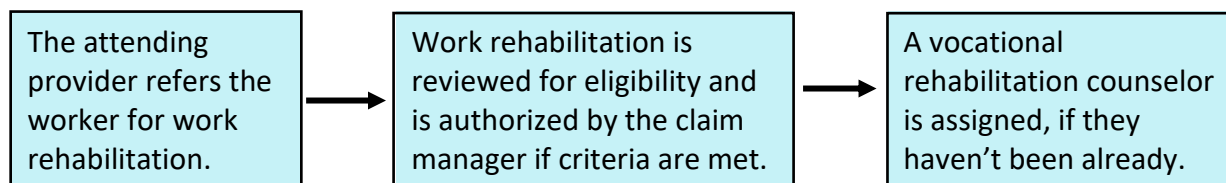
physiologic barriers to recovery. This includes utilizing occupational health best practices, setting realistic goals, appropriate messaging about the process of recovery, judging estimated capabilities, and re-engaging safely into increased activity. They provide a collaborative tie across medical, administrative, and vocational aspects of the claim. The most skilled attending providers also address [psychosocial barriers to recovery](#) which are recognized as influential in many claims.

Care authorization process

Coordination is essential before seeking authorization for services. The RTW goal must be clearly identified before the start of the program. The RTW goal includes an accurate job analysis/description developed in conjunction with a vocational provider. Since work rehabilitation typically occurs more than two months after injury, a vocational provider is often already assigned and will have developed a vocational recovery plan. The plan of care and treatment in work rehabilitation is focused on meeting this RTW goal.

During the initial week of work rehabilitation, there needs to be confirmation the worker has reviewed the job analysis/description or their vocational recovery plan. Any concerns are provided to the vocational provider during the first care conference. A job analysis has many complexities in the work activities, worker attributes and work context that may need careful consideration.^[23] If needed, a plan is developed with the vocational provider to resolve any discrepancies to facilitate RTW.

Authorization Process Flow



Care conferences

Coordination across the care team is important to address barriers, adapt to changes in goals, and maintain recovery momentum. This includes supporting the identified vocational recovery plan to empower the worker to be self-sufficient. One way to achieve this is a care conference at regular intervals so that all providers are clear about the next steps and who is responsible. The care team includes all providers who are participating in this phase of rehabilitation: (PT, OT, VRC, AP). The work rehabilitation care conference will also identify which team members will support the worker if they do not have an identified employer.

Standard topics during care conferences include:

- **Identified RTW plan** – Engage the employer to support and transition the worker back to modified/regular work. Review job goals and work demands. Consider alternative job

goals or a new employer. Maximize options for RTW in some capacity while continuing their rehab program on a modified schedule.

- **Job or duty modification** – Discuss potential modifications to the job including duties, schedule and equipment based on information from worker and vocational recovery plan with input from attending provider on medical contraindications.
- **Progression toward RTW goal** – Create a realistic time frame and rationale for goal completion. Coordinate anticipated abilities with available modified or regular duty opportunities and timeframes. Discuss potential plateaus, milestones for available duty and strategies for success.
- **Worker’s viewpoint** - What the worker believes needs to occur for a successful RTW. The goals they hold for recovery and/or RTW.
- **Barriers to recovery** – Consider the additional interventions needed and designate a responsible facilitator. Establish the level/severity of work disability, vocational recovery interventions, or other psychosocial and logistical barriers.

Consensus statement

A worker’s rehabilitation plan needs to include a job analysis/description which is accurate, reliable and completed in an objective manner based on specific worker tasks, with input from multiple subject matter experts (incumbent/experienced workers, less experienced workers and supervisors).

Subcommittee remarks

A job analysis/description is a guide for rehabilitation, vocational goals, and worker engagement in recovery. Therefore, it must be accurate and reflective of the job to avoid detrimental results from therapeutic and adjudicative decisions.^[24] There must be careful examination to eliminate common errors when matching a worker’s job duties to their rehabilitation goals.^[25] The best way to ensure an accurate analysis/description is to utilize a vocational provider supported by a variety of participants who know the work and include a vocational provider in the job analysis to obtain an accurate and unbiased assessment that encompasses the variety of responses.^[26]

Consensus statement

Involve vocational providers before a work rehabilitation program when the worker has low return to work expectations, a lack of modified duty work available, and/or an employer that is not engaged positively with the worker.

Subcommittee remarks

Proper timing of intervention is important for a successful RTW. The individual's expectation is the strongest predictor of successfully returning to work and is the most important aspect to address within a work rehabilitation setting.^[27] Early identification of those individuals who need assistance can prevent them from long-term work disability. Therefore it is important to identify workers at risk and intervene to support their recovery both medically and vocationally at the appropriate stages.^[28, 29] It is the responsibility of all members of a care team to recognize the need for additional vocational support. When vocational intervention is provided early, it helps to prevent unrealistic work expectations, a confusing process, and unnecessary delays or duration.^[14]

Consensus statement

For workers in physical rehabilitation programs, it is important to include discussions with managers and workers about expectations regarding work pace, suitable duty modifications, and exertion levels as an important component in safe return to work and injury prevention.

Subcommittee remarks

An engaged employer can make a significant positive impact on recovery for a worker.^[30] Rehabilitation recommendations such as graded activities and proper posture during or after treatment won't be effective if they cannot be followed in the workplace.^[31] Maintenance of work relationships through modified duty is a key factor in employer engagement.^[32] The worker can benefit from being supported in how to engage with their employer and have fruitful discussions about their plan. Additionally, the provider team plays an important role in addressing an employer's modified RTW plan and balancing the worker's and employer's expectations.^[33]

Consensus statement

Workplace interventions (changes to schedules, equipment, duty modification, employer engagement) result in decreased work disability and improve patient outcomes.

Subcommittee remarks

An engaged employer can impact recovery for a worker by modifying a job or offering light duty. Retaining skilled employees with small modifications is advantageous. The overall evidence supports endorsing a variety of measures to engage the worker and employer in

the mutual goal of RTW.^[34] This may include contact from the attending provider, work rehabilitation provider, or vocational provider, as suits the needs of the specialties and manner of the intervention.

Assessment Components

An assessment allows the provider to understand the current level of physical abilities and WR readiness including quantitative measures of factors like mobility, stability, strength, endurance, gross and fine motor coordination. These levels are compared with the needs of the worker in relation to their individualized RTW goals to develop a plan.

Quantitative measures of the worker's capabilities and conditioning are important through such tools as ergometers, dynamometers, treadmills, measured walking tolerances, commercial strength and exercise devices, free weights, and circuit training to assess the worker's baseline functional abilities.^[35] The use of functional tests and self-reported outcome measures are important to document progress.

Interdisciplinary evaluation by a care team that may include but is not limited to the OT/PT, attending provider, or vocational provider. Classification systems and clinical prediction rules across the professions can help identify needs and target interventions.^[18] Rehabilitation goals focus on improved function and RTW. L&I has developed evidence-based resources available for [conservative care of occupational musculoskeletal conditions](#)² (including, but not limited to lower back, shoulder conditions, elbow, wrist/CTS, knee, foot/ankle).

Evaluation must account for physical and psychosocial skills applicable to their recovery and their work behaviors. Consider factors like interests, motivation, age, education, culture, ethnic background, timeliness, attendance, ability to follow directions, initiative, interpersonal relationships and response to supervision.^[35]

Customary evaluation standards include assessment of:

- Musculoskeletal capabilities
- Current work capabilities
- Worker beliefs on importance of RTW, concerns about RTW, and competing factors in RTW
- Cardiovascular conditioning
- Likelihood of Vocational Recovery through RTW or retraining (including job analysis or onsite evaluation as appropriate)

² <https://lni.wa.gov/patient-care/treating-patients/treatment-guidelines-and-resources/#practice-resources-for-attending-providers>

- Cognitive/behavioral status (including attitude, motivation, and expectations of recovery and RTW)
- Safety and efficiency of job tasks (including accommodation or modification to improve this)
- Physical Function (Oswestry, etc.), Fear Avoidance Beliefs, Self-efficacy, Kinesiophobia

Consensus statement

Initial assessments establish a baseline measure of fear-avoidance beliefs about work along with pain tolerance and behavior to evaluate the need for early interventions (<1 mo). These behaviors and beliefs predict longer than expected claim duration and challenges associated with engagement and activation which affect the recovery of the worker.

Subcommittee remarks

Identification of the contributing factors of work disability is important to perform early at the start of care in cases with longer than expected duration or challenges associated with engagement. While most workers have good success in physical rehabilitation, some may require additional support or intensity of intervention to maximize their potential for a successful RTW.^[36] Identification and monitoring of high pain and disability, low recovery expectation and fear-avoidance beliefs are important in determining treatment effectiveness or need for additional services.^[37, 38] After identifying these needs, the rehabilitation provider should take action to modify treatment and emphasize strategies for coping with existing pain while improving function, and not on subjective pain reduction.^[16] If appropriate, workers may need additional support which may include a vocational provider or behavioral health intervention to address fear-avoidance beliefs or other [psychosocial determinants influencing recovery](#).^[39] Addressing these non-physical factors in addition to the physical components is associated with successful RTW.^[40]

Consensus statement

Baseline screening for work rehabilitation includes an assessment of expectations for return to work and treatment outcomes.

Subcommittee remarks

It is important to understand the worker’s expectations of what successful recovery and RTW looks like, both in regards to a reasonable time-frame as well as appropriate physical capabilities.^[3, 27] Differences in what a worker and a rehabilitation provider view as a successful outcome can cause problems that may influence long-term recovery.^[28] It is a best practice to have this discussion at the beginning of work rehabilitation and often will include input from the attending provider and vocational provider.^[41] Psychosocial findings such as

an estimation of RTW capability and perception of disability may play a larger role in RTW success than physical performance.^[42]

Plan of Care Components

The plan is an essential component for successful work rehabilitation. An individualized, written plan will identify measurable short- and long-term goals appropriate to the worker's functioning, limitations, restrictions and the expected outcome of care, which is agreed upon by provider and worker.^[43] It is important to understand whether the worker, employer or system holds each goal, what success means to them, and fostering good communication across them. Knowing which one holds the goal can steer the approach as each requires a unique approach and support. Thus, additional shared decision making on rationale for certain goals and the rights and processes to reach that may be necessary.^[44] This helps instill control and choice on the part of the worker and increases their investment in the plan. The plan will discuss the methodology and the projected time necessary to accomplish these goals.

The plan is based on functional assessment at baseline, evaluating their body mechanics, ability to work under pressure over a period of time and comparison of critical demands as stated on the job analysis or job description. This often includes their capacity for problem-solving, coping skills and ability to translate body mechanics and ergonomic skills to tasks outside the controlled environment. This ensures the ability to meet the demands of their job.^[18] A comparative analysis is done via re-evaluation before discharge to determine job readiness.

The plan is most effective when completed within the first few days of the program and with shared decision-making from the worker. The work team (lead PT/OT providers, vocational providers, attending provider if necessary and worker) meet within a week to finalize and implement the plan. Incorporation of requirements stated in the attending provider referral or certain goals/tasks from the vocational recovery plan and job analysis can substitute for active participation by these providers in plan development, when appropriate. Consider these components^[35]:

- Physical and psychological tolerances
- Interpersonal communication and work relationships
- Work behavior and attitudes
- Pain effects on task performance
- Shared decisions on RTW goals and objectives
- Behaviors and attitudes
- Recommendations for modifications/accommodations

Intervention Components

There are a variety of interventions that are suitable for use in work rehabilitation which combine aspects of strengthening, conditioning, and flexibility. Physical intervention delivery may benefit from utilizing techniques rooted in behavioral coaching and goal-directed care. Multidisciplinary care tends to outperform single discipline care, with advantages in multimodal delivery of care within each discipline.^[21, 45-48] Most physical conditioning performs better for chronic low back pain rather than acute, but involving the employer in exercise and recovery may also create beneficial effects across all conditions.^[30]

Therapeutic activities should address worker's needs and tolerance for work requirements while endeavoring to encourage early engagement rather than waiting for pain to resolve. Readiness can be assessed along with the following components^[18]:

- Mobility and flexibility
- Strength and stabilization
- Cardiovascular and physical endurance
- Ergonomics and wellness education
- Injury prevention and safety

Multidisciplinary delivery of care is supported by a large body of literature where combined therapy tends to do better than usual care, particularly in chronic and less so in subacute care.^[49, 50] Acute care for MSK conditions rarely seems to benefit from intensive, multidisciplinary care in the first one to two months.^[30] For most patients, a multidisciplinary choice with lighter intensity (one to three hours per day, two to three days/wk) is often just as effective and is less resource-intensive.^[51]

Because of the unique nature of worker's compensation and the likelihood of complex recovery processes, extra care must be taken to address psychosocial issues and involve the worker in the process. Additional care beyond the initial one to two months, when risks of long-term disability increase rapidly, may require more specialized care than standard outpatient therapy. Analysis of L&I data shows that about 70% of cases resolve in the first 12 visits with acute outpatient PT following standard guidelines. Beyond those first two months, the complexity and risk of disability increase rapidly in the absence of appropriate interventions. It is important to ensure proper messaging and delivery of services in the more complex patients seen in work rehabilitation. One benefit of having a specialized work rehabilitation program is to ensure quality delivery of services in all levels of care, according to their respective standards. Maximizing clinical effectiveness can contribute to worker satisfaction and reduce claim duration.^[52]

Prior reviews have made conclusions that an active therapeutic exercise program or guideline-compliant usual care do not have differences from work hardening.^[49, 50] Although usual care in

these studies was the Dutch outpatient therapy practice guidelines, the nature of recovery and referral in worker’s compensation may not reflect the same patient population.^[53] When studies with acute and subacute care are removed from their conclusion and terminology is roughly standardized by care intensity, it is apparent that there are benefits to different levels of intervention. [Table 1](#) demonstrates the variation in nomenclature and delivery of services across studies that presents significant challenges to interpreting and translating into policy. Approximations are made to convert the timing, intensity, and services provided into analogous services available within the WA workers’ compensation system.

Consensus statement
<u>Integrated interventions for chronic low back pain using graded activity, a cognitive-behavioral approach, workplace interventions and coordinated care result in a more effective reduction in duration of absence from work.</u>
Subcommittee remarks
There are a number of strategies and techniques to deliver rehabilitation services that account for both physical and psychosocial components of care. ^[31] Whenever possible, these interventions should be coordinated across providers and in collaboration with the workplace to result in more effective recovery and reduction in time away from the workplace during recovery.

Consensus statement
<u>Short and long-term benefits can be gained by setting realistic worker expectations, increasing social support and communication with the employer and utilizing cognitive-behavioral training and exercise compliance.</u>
Subcommittee remarks
Enhancing adherence to prescribed exercises and activities can occur through a variety of strategies to gain better outcomes of care. Many of these techniques come from social science techniques including exercise journaling, identification of barriers, and recognizing moods. Techniques such as time management strategies and contingency management can also enhance compliance and adherence. ^[54] Behavioral techniques combined with cognitive-behavioral interventions can reduce the risks of long term disability. ^[55] Involving management in setting expectations for RTW and job modification as well as addressing psychosocial issues at the workplace can also enhance the effectiveness of the therapy. ^[33, 56]

Consensus statement

Multidisciplinary work hardening programs with high return to work rates include PTs and OTs administering job simulation tasks and physical conditioning; behavioral health providers (psychologists, master’s level therapists, vocational provider) working on goal setting and stress management; and instruction on dietary and lifestyle changes.

Subcommittee remarks

Workers present with a variety of needs in addition to physical conditioning that should be addressed during a comprehensive rehabilitation program. The wide variety of needs and factors to enhance recovery warrant an approach that includes the diversity of practitioners to support those needs.^[41, 57] Not every worker will require all services, but work rehabilitation programs should have access to or collaborative referral relationships with providers able to enhance their recovery.^[3] Across individual services, there may be a spectrum of intensity and depth of knowledge needed to appropriately address the worker’s need. Behavioral health interventions may range from goal setting to complex cognitive-behavioral approaches provided by different specialties.

Physical Conditioning and Exercise

Physical conditioning is an important component of the rehabilitation process to increase cardiovascular fitness, enable workers to sustain tasks and return to a full workload. This is achieved through the use of therapeutic exercise, multi-hour training regimens, and a higher intensity than outpatient care. The individual neuromuscular adaptations require tailored intervention, particularly in long-standing movement patterns.^[58] Exercise interventions are well-supported by the literature, but no single exercise modality shows superiority over others in most MSK conditions. Therefore, exercises should align with patient preferences and job task performance.^[20, 59] These components must be paired with other interventions for maximal effect and have stronger effects with chronic conditions rather than acute conditions.^[30]

Consensus statement
<u>Intense physical conditioning for subacute back pain appears more beneficial than multidisciplinary exercise treatment focused on pain reduction to decrease the proportion of workers off work in both the short and long term.</u>
Subcommittee remarks
When combined with an approach to focus on function rather than pain reduction, conditioning showed beneficial effects for work participation in long-term follow-up. ^[60, 61] Physical conditioning alone is not particularly effective for acute or subacute conditions with a small benefit shown in chronic low back pain with higher intensity (>4 hours, 5 days/week). ^[30] However, when the employer and occupational medicine providers are involved there is increased effectiveness for subacute pain.

Consensus statement
<u>Exercise plans need to be individualized and incorporate factors of both physical and psychosocial aspects to improve outcomes.</u>
Subcommittee remarks
Remarks: Exercise plans should be individualized in patients with pain because of the wide variability in contribution from physical and psychological components of pain. The neuromuscular adaptations to pain are often unique to the individual and targeted exercises may provide greater benefit than standard protocols, particularly for patients with greater than three months of pain or specific physical demands. ^[58]

Work simulation

Simulation of appropriate job tasks can reflect the work demands and environment to which the worker will return. The level of fidelity necessary in the simulation to produce the best results may vary with what the individual finds valuable and meaningful.^[62] Work simulation provides an essential technique for an engaging, meaningful progression in frequency, load and duration toward the work goal. It also evaluates and trains the worker on the use of tools and techniques required for a safe and productive job performance. Establishing the abilities needed to perform a job may be challenging post-injury and early functional testing may play a role in creating a baseline for certain job classes. Performing meaningful work has a protective effect and work rehabilitation is focused mainly on the physical task component, but with acknowledgement of cognitive demands and behavior characteristics.^[63]

Consensus statement

Work rehabilitation programs that build purposeful, meaningful activities into their care delivery drive higher effort and engagement from workers.

Subcommittee remarks

The inclusion of purposeful activity is important for recovery and can be enhanced by adding meaning to the task by tying an abstract weight to a real-world object, or substituting a real-world application of an abstract exercise. Whether through physical or mental imagery, enhancement of the activity can lead to increased repetition and lowered perception of difficulty.^[62, 64, 65] Cognitive components of tasks are present even in physical movements and thus building an effective exercise program that engages both parts of the worker, can create more support and enhancement of the work rehabilitation program.^[63]

Psychosocial support

It has been long recognized that providers must address cognitive-behavioral issues in chronic pain, which formed the basis of current interventions.^[66] These are approaches to the delivery of usual physical interventions but with reframing around patient-led goals and intentional progress. The application by physical and occupational therapists appears as a shift in the delivery of usual care as an adjunct, rather than a stand-alone intervention, to improve psychological outcomes in musculoskeletal conditions.^[67] Common cognitive-behavioral strategies may include motivational interviewing, cognitive-behavioral therapy, acceptance and commitment therapy, problem-solving therapy, or other brief behavioral interventions. Often, this takes the form of discussing the normal emotional response to injury/impairment and activity limitations or participation restrictions, which are often linked to the worker's sense of self and affect physical recovery.^[68] When on lighter intensity rehabilitation, workers may benefit from activity coaching to assist in daily planning and activation which can augment their abilities throughout the work rehabilitation process.^[69]

Providing workers with strategies to cope with a problem gives them long-term control over flare-ups and recurrences. They can then deal better with small setbacks and future injuries and changes in pain intensity during active rehabilitation. There is some evidence to show that lack of coverage for individual psychosocial support may influence outcomes in the workers' compensation setting.^[3, 70] To help recognize and address these issues in workers' compensation, a resource on [psychosocial determinants influencing recovery](#) was developed by L&I and is accessible online. Programs showing successful outcomes in workplace rehabilitation have attributed the success to psychosocial support and being engaged and present at work.^[13, 71]

These principles of recognizing and addressing the behavioral components of recovery are incorporated during the work rehabilitation program and may require alteration of the program.^[72] The recovery is achieved through interactions and education with the care team, coordinating the steps needed to address psychosocial barriers through care conferences. If those issues can't be addressed within the initial therapy interventions, reaching out to the attending provider to request consideration for a behavioral health provider would be indicated and expected.

Consensus statement
<u>Cognitive-behavioral approaches including graded activity or other ways to focus on functional gains rather than pain, are critical and included in successful programs.</u>
Subcommittee remarks
Cognitive-behavioral approaches need to be integrated into work rehabilitation. This would include approaches provided by the rehabilitation provider but may also include other specialists. However, these approaches often do not represent discreet interventions or produce significant outcomes alone and must be delivered with standard rehabilitation interventions. ^[3, 30, 73] Care must be taken when adding additional specialists to avoid delays in treatment and a resulting delay in RTW. ^[74]

Consensus statement
<u>To prevent recurrence of low back pain, promising outcomes result from combining functional movements, relaxation, behavioral change and integrated coping skills when compared to exercise programs done in isolation.</u>
Subcommittee remarks
Prevention of flare-ups during the rehabilitation process as well as immediately afterward is important to enhance outcomes by using a combined cognitive, behavioral and physical approach. ^[73, 75]

Consensus statement

Incorporate competence building strategies (such as patient education, goal setting, and role modeling) into care delivery to enhance self-efficacy which improves engagement with rehabilitation and psychosocial outcomes.

Subcommittee remarks

Supporting the worker through building self-efficacy and engaging with their recovery helps them gain ownership of the outcomes. Ensuring their rehabilitation teaches them competent strategies which can improve their engagement and adherence during rehabilitation, leads to better outcomes.^[9] The positive effects of this work are related primarily to psychosocial outcomes rather than physical.^[76]

Consensus statement

Work rehabilitation can be structured to build self-efficacy of the worker in both physical and cognitive components of a job, which prepares them for a successful return to work.

Subcommittee remarks

Work rehabilitation programs routinely employ providers trained in therapy to engage workers both physically and cognitively. For workers who have [psychosocial determinants impeding recovery](#), there may be a benefit to programs providing enhancement and explicit emphasis of meaningful occupation to allow for mastery and personal control.^[63] It is important to note that addressing barriers and behavioral or cognitive components of a job does not require the addition of a mental health diagnosis to the claim, as every person has thoughts and actions that impact their recovery and job performance. Treatment for mental health disorders follows a [separate pathway](#)³.

Patient education

Education of the worker serves a vital role in recovery and long-term benefit. Within work rehabilitation, the most appropriate education stresses body mechanics, work pacing, neuroscience pain education, safety and injury prevention. It also promotes worker responsibility and self-management and may be important in dealing with fear-avoidance beliefs that often impact participation and recovery.^[39] Many forms of education and interaction can be beneficial and should be targeted based on the worker's need and

³ <https://lni.wa.gov/patient-care/docs/20160615MHSpecialistsAuthorizationandReportingRequirements.pdf>

educational goals, including home exercise, ergonomics and self-care. Generalized education like the “Back School” has not been shown to be particularly effective.^[20]

Consensus statement
<u>Before completing their work rehabilitation program, workers receive instruction on performing a regular (three to five times/wk), short duration (5 to 15 mins) exercise program that can be performed while at work to reduce the severity of low back pain and activity interference caused by low back pain.</u>
Subcommittee remarks
The inclusion of exercise performed regularly during the worker’s workweek has been shown repeatedly to benefit outcomes in the reduction of both back pain and activity interference. ^[73] Even in physically demanding work settings, there is a beneficial protective effect in adding short-duration strength training to reduce musculoskeletal disorders. ^[77] Workers should be trained in the performance of these tasks and in collaboration with their employer, the work rehabilitation team can provide support for the worker and their coworkers in recovering and preventing further injury.

Consensus statement
<u>Deliver pain neuroscience education before therapeutic exercise to reduce pain ratings, fear-avoidance, and catastrophizing in patients with chronic musculoskeletal pain. Reducing these behaviors leads to healthy attitudes, improved engagement and physical movement.</u>
Subcommittee remarks
Those participating in a work rehabilitation program may be experiencing chronic pain. Appropriate interventions must be recommended to address pain behaviors and beliefs. Addressing these issues provides benefit for improved function, lowering of disability and psychosocial factors, and minimizes healthcare utilization. ^[8] Pain education may have greater benefit if it is provided before rehabilitation begins and works best on those with higher central sensitization scores. ^[78] Pain neuroscience education can be delivered equally and effectively in a couple of short group sessions or in one-on-one care. ^[78]

Outcomes

Functional outcome measures are important for judging the progress and engagement of the worker. Gains from actual physical ability versus motivational/behavioral gains are often

challenging to separate, if not indistinguishable. Functional testing during a work rehabilitation program needs to assess both physical and behavioral outcomes. Incorporating self-reported functional assessments along with the evaluation of work behaviors is essential, as is reporting changes in the care team meetings. Pain intensity rating may not match well to disability, and care should be taken to not conflate these pain with disability.^[79]

Self-reported functional assessments are meant to assess the physical aspect, but what tools does one employ to assess the behavioral aspect of work rehabilitation? Physical and mental health have strong cross-effects and in some instances the same scales used to assess physical improvement can be utilized by behavioral health providers to assess motivational/behavioral gains.^[80] Whether progress in function occurs from actual physical ability or a motivational/behavioral gain, it is still an improvement in function. The World Health Organization has taken this approach in recent years with the WHODAS questionnaire, which assesses global function without attempting to separate physical or mental components. PROMIS 10 is another measure designed around global function, but does integrate assessment of mental and physical components. Referencing the same outcome measure by both physical and behavioral providers may provide consistency and a common baseline across treating providers, while acknowledging the correlation of physical and behavioral health. It is becoming more common in some integrated practice settings to share standard outcome measures such as the Oswestry or DASH in this fashion across physical and behavioral health providers.

L&I in partnership with the Industrial Insurance Chiropractic Advisory Committee (IICAC) has created the [Documenting Functional Improvements Resource](#)⁴ to aid providers in selecting appropriate outcome measurement tools that are freely available and appropriate for all body regions and most common conditions.

Consensus statement
<u>Progress and outcome measures throughout the program focus on functional task performance, participation in daily and social activities, and reducing pain interference.</u>
Subcommittee remarks
Function-centered treatment and goals are important to facilitate recovery and RTW. By focusing on task performance, progressive goals, and reducing pain interference, many of the risk factors for work disability can be addressed and recovery can be reinforced. ^[16, 37, 81] Conversely, focusing on pain levels and areas the worker is lacking in function or capacity can result in a negative mindset toward recovery and preoccupation with disability. Additionally,

⁴ <https://lni.wa.gov/patient-care/advisory-committees/docs/2018DocFuncImprovfunctionalscales.pdf>

the individual's work status should not be tied directly to physical performance and rather be recorded as a separate measure.^[82]

Recommendations for Work Rehabilitation Programs

This section provides evidence-based guidance on appropriate Criteria, Predictive Factors/Timing, and Reporting/QA for work rehabilitation programs. Each section of recommendations follows a standard format which identifies a topic and reviews the concepts and evidence regarding it. The review is followed by a boxed section that lists any applicable consensus statements from the subcommittee's eDelphi process and remarks that outline their perspective and the literature's influence on them.

Criteria for Work Rehabilitation Programs

Suggested criteria is outlined below for clinic and individual providers administering work rehabilitation programs. It has been proposed for decades that proper management of musculoskeletal conditions is reliant on prevention and optimum management of psychosocial factors.^[83] Work rehabilitation programs incorporate the physical and behavioral components necessary to prevent disability as well as close the gap between physical function and requirements for a successful RTW.

Program Requirements

A work rehabilitation program must offer the processes, education, and instruments to establish baseline values and progress towards the RTW goal. As described in the above section [Assessment](#), this includes the areas of assessment, plan of care, intervention, care conference, and functional outcomes.

Site Requirements Include:

1. Equipment and methods that quantify and measure strength, condition and flexibility levels – (e.g. in [Interventions](#), ergometers, dynamometers, treadmills, measured walking tolerances, commercial strength and exercise devices, free weights, circuit training).
2. Collaborative referral relationships with community providers with the ability to offer behavioral health services such as masters-level therapists, psychologists, and activity coaches.
3. Equipment to simulate the critical work demands, tasks, and environments that the worker will return to.
 - a. [Work simulation](#) tasks that provide for progression in frequency, load, and duration.

- b. A variety of workstations that offer opportunities to practice work-related positions and motions across multiple industries tailored to your community needs.
- 4. A safe work environment and atmosphere that is appropriate to the vocational goal and worker.
 - a. Designated work rehabilitation area that can accommodate the needs of the workers.
 - b. Space adequate to accommodate the number of workers accepted into the program.
- 5. Designation of which program intensity level the site can offer.
- 6. A proper ratio of providers to work rehabilitation participants to ensure safe, appropriate performance of work simulation, based on the supervision needs of the worker in relation to their progress and the task being performed
- 7. Multidisciplinary and/or multimodal delivery of care with licensed providers who may perform combinations of exercise, behavioral health services, lifestyle, and health advice.

Consensus statement
<u>Work hardening needs more than one level of intensity (frequency/duration) to address appropriately the gaps between worker capacity and job requirements.[36, 51]</u>
Subcommittee remarks
Musculoskeletal injuries have multiple unique physical and psychosocial components that play a role in rehabilitation. ^[58] This variety of patient presentations requires individualized care and flexibility in the timing of frequency, intensity, and duration of care rendered. For many workers, straightforward care has the same benefit as more intensive care and early screening can help to determine who will be successful with which level of intensity. ^[36] Light intensity may perform better than extensive treatment in less-complex patient populations and is more efficient for the worker, therapist, and the system. ^[51]

Work Rehabilitation Provider Requirements

There are a variety of provider types that have the training, education, and scope of practice to provide appropriate evaluation, treatment, and education during a work rehabilitation program.

Providers performing specialized work rehabilitation services require additional training and experience. This is because there are differences between standard outpatient therapy and

work rehabilitation. Part of this is in explaining processes unique to workers' compensation while maintaining a positive therapeutic alliance.^[84] Any treating provider must have additional training in the following areas:

- Functional goal setting
- Facilitating appropriate patient expectations
- Psychosocial barrier support
- Lifestyle and health advice

In addition, a basic understanding of the workers' compensation system to include benefits, tools, and resources such as:

- Job analysis/job descriptions
- Modifying jobs/participatory ergonomics
- Vocational recovery including RTW options and priorities
- Employer incentive programs

Consensus statement
<u>Additional therapist training is required to deliver proper work conditioning, work hardening, work simulation, and psychosocial barrier support.</u>
Subcommittee remarks
There is unanimous support by the subcommittee that providers, performing the specialized services of work rehabilitation, require additional training. The differences between standard outpatient therapy and work rehabilitation may present barriers to focusing on functional goals, setting appropriate patient expectations, and having familiarity with workers' compensation-specific information such as job analysis/job descriptions and job modifications.

Worker Criteria for Program Eligibility

This section outlines the suggested criteria for admission and discharge from a work rehabilitation program. Consideration of appropriate level of intensity for conditioning or hardening must be taken into account and is reflected in Table 2 for Admission and Table 3 for Continuation. A general flowchart for outpatient therapy and work rehabilitation timing can be found in Flowchart 1.

Worker Requirements for Admission

Early care is important, as claims that have delayed care tend to have poor recovery. This phenomenon of worsening results appears at around three months and flattens out over the first two years^[85], but does not preclude older or higher risk claims from seeing benefits from

care if offered appropriate support.^[41, 86] Based on the prognosis of the patient at intake, varying levels of care may be required to appropriately support a worker, and advanced claim age and severity of disability are factors that trigger the deployment of additional intensity.^[36, 87]

Conversely, there is little benefit to a multidisciplinary, intensive rehabilitation program for injuries that are in the first two months of recovery, when usual outpatient care is often beneficial and will impact recovery.^[30, 49, 50, 88] In the third month post-injury, it is appropriate to begin multidisciplinary, intensive programs such as work rehabilitation at either light or moderate intensity based on patient goals and RTW requirements.

Based on the evidence and clinical consensus of the subcommittee, these criteria were developed and are summarized in Table 1.

1. Agreement by the attending provider the individual is ready to participate in a work rehabilitation program. This takes into consideration tissue recovery as well as other medical conditions that impact recovery. Consider and discuss with the attending provider what additional safeguards/assurances/services would enhance their success.
2. The worker has had at least two months of recovery since their injury which may include participation in standard outpatient therapy.
3. The worker can only benefit from the program if the provider can consider the likelihood of success and additional support or services the worker needs.
 - a. Workers with multiple risk factors for poor success must be provided with appropriate support to maximize their potential for success. It is important to mobilize resources to address their risk factors before or at the initiation of the work rehabilitation program, potentially including:
 - Vocational engagement
 - Behavioral health needs
 - Claim manager, employer, and family support
4. Identified RTW goal with job analysis/description to describe work demands
5. Program intensity is selected based on individual needs, job demands, and availability of modified duty.

Worker Requirements for Discharge

Before discharge, assess the worker for psychosocial barriers influencing their recovery ([PDIR](#)). These issues must be addressed during the rehab program to ensure success, although, in some scenarios where there are unmet administrative requirements or vocational criteria, it may be more appropriate to consider a hold on the rehab program instead of discharge.

Criteria for discharge from a work rehabilitation program^[35]

The worker must meet one or more of these criteria to be discharged:

1. Has accomplished the goals stated in the care plan.
 - a. RTW
 - b. Met job goals

2. Would no longer benefit from work rehabilitation services.
 - a. Plateau in functional progress
 - b. Change in medical condition
3. The worker has not participated according to the program plan.

Timing of Work Rehabilitation

Despite questions regarding the probability of long-term claims recovering and returning to work^[83], there is supportive evidence that many workers do return to work even after two years.^[3] The two outcomes for the determination of a successful work rehabilitation are program completion and successful RTW, yet these are sometimes conflated in discussing success in older claims. Program graduation rates are similar across claims that are around three months old compared to claims older than 19 months. However, RTW rates in injuries older than nine months were less than 30% whereas RTW rate was approximately doubled in workers with claims less than nine months.^[40] It is important to consider that the work rehabilitation program has very little control over the opportunities and choices that a worker makes on actual RTW, but heavily influences the worker’s physical and behavioral readiness for those opportunities.

Therefore, when a worker has an opportunity and job-oriented factors are present, there is no upper limit on claim age of when it would be appropriate to provide work rehabilitation. It is appropriate to select the correct intensity, as a lighter intensity program is often just as effective and less resource-intensive for the system and the worker.^[51]

Consensus statement
<u>Workers with advanced claim age can make appropriate progress in strength, quality of life, and task performance through work rehabilitation, but may require additional psychosocial and vocational support to successfully return to work.[89, 90]</u>
Subcommittee remarks
RTW is often measured as an outcome for work rehabilitation, but many psychosocial factors affect RTW and may outweigh the physical gains made in a traditional rehab program. ^[42, 90] Claim age, therefore, is not a barrier to physical progression but may help identify the need for additional psychosocial support during the rehab program. Identification of these at-risk patients must be followed by appropriate support and intervention.

Duration and Intensity

Work rehabilitation programs are usually completed in four to eight weeks or less. Daily visit length is between two to eight hours per day depending on the required intensity and worker goals.^[51, 57, 88, 91] Evidence for a dose response outcome is lacking which may relate to the strong association with other factors.^[92] Additionally, the importance of flexibility and adaptability with employer and worker's compensation policies to individual needs in the prevention of work disability was demonstrated in cross-country comparisons.^[43, 93]

Returning to modified work has significant benefits in reduction of lost workdays and facilitation in RTW, and therefore is encouraged within a work rehabilitation program.^[94] Workers may be able to return to work on a modified, light and/or part-time basis. Some workers may need further rehabilitation to progress to full-time or unmodified work. If the employer has a light/modified duty job, then the work rehabilitation plan should incorporate and be compatible with those accommodations and schedules.

One of the most important factors preventing timely RTW are the physical demands of the workplace.^[95] Across multiple phases of recovery, but with potentially more impact in the chronic phase, higher physical demands are associated with delayed RTW. As high physical demand workers progress in their recovery, the transition from clinical rehab to practical application is important and may be best facilitated by modified duty.^[93]

Determination of work rehabilitation intensity should encompass these factors:

- required durational tolerances
- physical job demands
- psychosocial barriers
- generalized pain

Determination of work rehabilitation program duration should encompass these factors:

- projection of progress toward the stated goals
- accurate physical demands and thresholds for interim, modified, and full RTW
- evaluation of opportunities for graded progress in modified duty to replace in-clinic rehabilitation
- consideration for the impact of split rehab and modified duty on schedule and functional progress

Consensus statement

Workers who are engaged in recovery, performing light duty for six to eight hours/day, and are participating in a two-hour work rehabilitation program outside of work hours have a significant burden to their schedule which greatly affects compliance and recovery.[93]

Subcommittee remarks

It is important to accommodate workers' schedules and outside lives to ensure adherence and compliance to a rehabilitation program. Long hours with combined work duties and work rehabilitation program requirements could place a burden on a worker's time and impact the choices they make on RTW and participation in rehabilitation (Expert consensus). Wherever possible, policies need to allow for flexible work rehabilitation programs and modifications to allow both work and rehabilitation to progress in tandem.^[93]

Reporting and Quality Assurance

This section outlines the suggested criteria for reporting and quality assurance applicable to work rehabilitation program requirements.

Reporting

A reporting system is structured to ensure that the evidence-based recommendations and patient goals are being achieved within the program. Components of this include:

1. Initial evaluation with baseline results and includes the plan of care and RTW goals.
2. [Care team meeting](#) note resulting from the initial and follow-up meetings and includes documentation of decisions, provider responsibilities, and future goals.
3. A discharge summary with an [assessment](#) of the worker's abilities, achievement of their goals to include return work goal status, as well as comparison to their initial assessment.
4. Daily documentation identifying interventions and changes in duration and intensity of the program.

Quality Assurance

It is important to have a written quality assurance system that periodically reviews the program to ensure effectiveness, quality, and adherence to criteria that are based on professional consensus, evidence recommendations, and standards within the industry. Processes that record outcomes based on the provider's program goals and the achievement of worker goals are essential.

Quality assurance should review and critique the provider documentation to look at how work rehabilitation programs demonstrate value to the worker and system, document progress,

denials of requested care, the amount met of the worker’s job description that they must return to, and adherence to evidence-based guidelines of care delivery, such as this document.

Acknowledgements

Our deepest appreciation to the IICAC and IIMAC committee members, Delphi panelists, experts, and L&I staff who gave their time, expertise, and dedication to this guideline.

Joint Subcommittee Members and eDelphi Panel	Department Staff
Josh Cobbley, OTR/L	Morgan Young, DC
Justin Cooper, DO	Sarah Martin, OTR/L
Michael Dowling, DC	Zachary Gray, MPH
David Folweiler, DC	Kristine Ostler, CDMS
Andrew Friedman, MD	Ryanne Karnes, DPT
Emilie Jones, DPT	Susan Reynolds-Sherman
Teri Jo Lientz, DPT, ATC	
April Poier, CRC, CDMS	Technical Expert
Lori Stephens, OTR/L	Melanie Golob, MS

Tables and Graphics

Table 1 – A comparison and correlation across well-known studies used to break down terminology barriers and convert the types of programs present in the literature into analogous programs in the Washington State L&I system.

Table 2 – Criteria for admission to a work rehabilitation program to be used by providers and utilization review in determining proper program placement between the two levels of work rehabilitation: conditioning and hardening.

Table 3 - Criteria for continuation in a work rehabilitation program to be used by providers and utilization review in determining proper progress made and requirements to continue across the two levels of work rehabilitation: conditioning and hardening.

Flowchart 1 – An algorithm to help providers to refer from outpatient conservative care into a suitable work rehabilitation program and understand general requirements. It follows progress through outpatient therapy and conservative options and into work rehabilitation encompassing multiple referral and follow-up pathways, along with usual timeframes for progress check-ins.

Table 1: Comparison and Correlation to WA nomenclature

Acronyms used: Functional Recovery Program (FRP), Structured Intensive Multidisciplinary Program (SIMP), Work Conditioning (WC), Work Hardening (WH).

Author	Intervention	Comparison	Article naming convention	WA system approximate equivalency	Conclusion framed in WA system terms
Bendix 2000 ^[91]	Days/wk: 5 # of wks: 3 Time/visit: 8hr Total hours: 117	Days/wk: 3 # of wks: 8 Time/visit: 1.5hr Total hours: 36	Group FRP vs Group Intensive Outpatient Training	SIMP vs WC	Supports WC
Roche 2007 ^[57]	Days/wk: 5 # of wks: 5 Time/visit: 6hr Total hours: 150	Days/wk: 3 in office, 2 at home # of wks: 5 Time/visit: 1hr Total hours: 15-25 (incl. home)	Group FRP vs active individual therapy	WH vs Outpatient PT	Slight support for WH based on Quality of Life, RTW and endurance
Van der Roer 2008 ^[88]	Days/wk: unclear # of wks: unclear Time/visit: unclear Total hours: 10 indiv, 20 group sessions	Days/wk: variable # of wks: variable Time/visit: variable Total hours: 13 visit mean (~13 hrs)	Intensive training (individual and group) vs Guideline PT	WC vs Outpatient PT	Little difference in acute patients <3mo
Skouen 2002 ^[51]	Days/wk: 5 # of wks: 4 Time/visit: 6hr Total hours: 120	Days/wk: 1 # of wks: variable Time/visit: 3.5hr initial, 1hr f/u Total hours: 5-10 (3 visits mean)	Extensive Multidisc, Light Multidisc, vs usual care	WH vs WC vs usual care	Supports WC

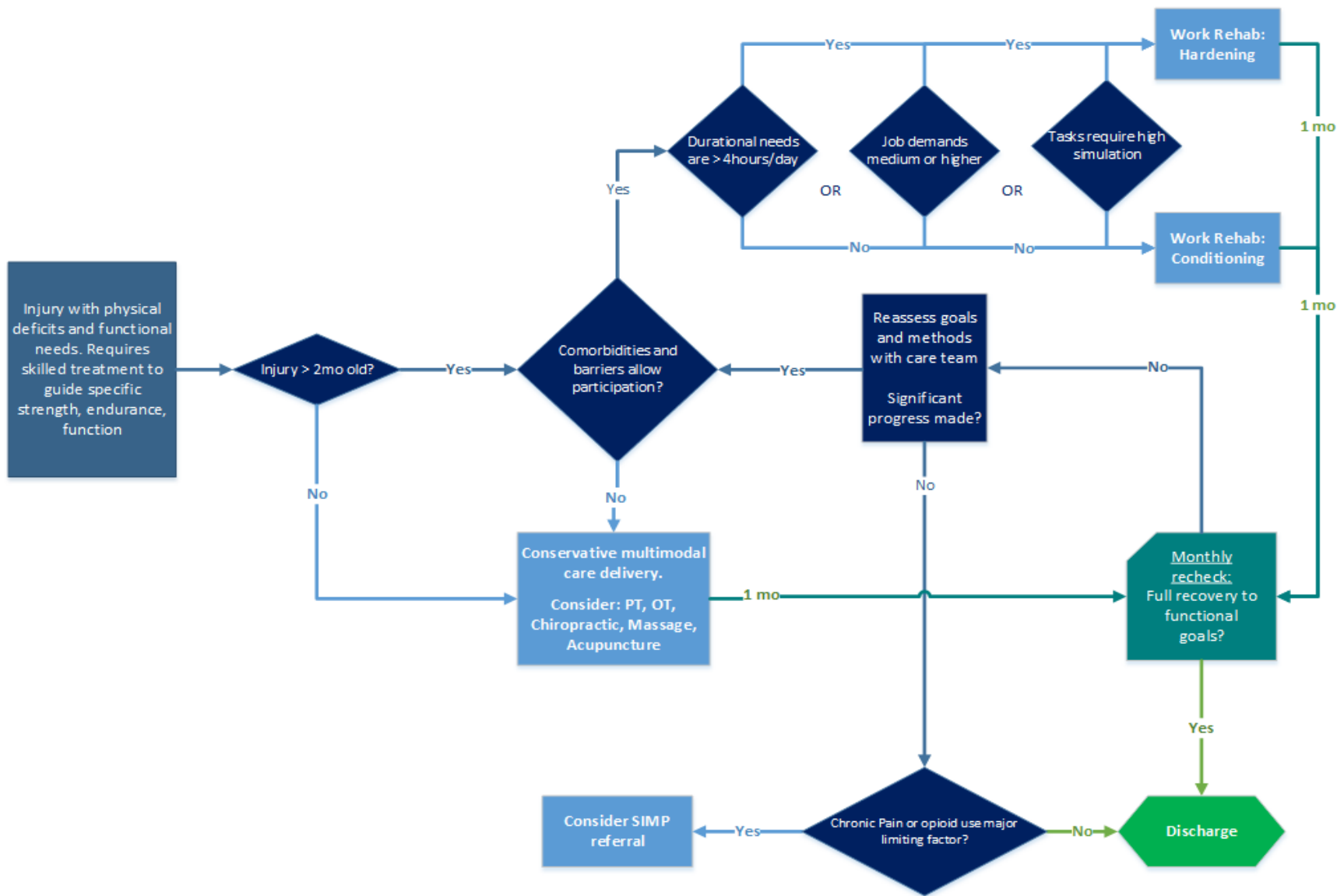
Table 2 – Criteria for admission to work rehabilitation programs

A request may be appropriate for:	If the patient has:	AND the diagnosis is supported by these clinical findings:	AND this has been done:		
Program Admission	Condition or Diagnosis	Objective	Non-operative care		
Work Rehabilitation					
<ul style="list-style-type: none"> Conditioning 	<p>Musculoskeletal condition(s)</p> <p>Other conditions impacting ability to return to work</p> <p>Requires skilled guidance for specific strength, endurance, function (e.g. needs frequent monitoring to progress activities)</p>	<p>Can participate 2-4 hrs per day</p> <p style="text-align: center;">AND</p> <p>Can participate 3-5 days per week</p> <p style="text-align: center;">AND</p> <p>Conditions allow full participation, including:</p> <ul style="list-style-type: none"> ○ Medical comorbidities ○ Adequate tissue recovery ○ Psychosocial ○ Psychological 	<p>Documentation of examination including at least:</p> <ul style="list-style-type: none"> • Gap in strength/motion/function between current task performance and job goals 	<p>Two months of conservative care</p> <p style="text-align: center;">AND</p> <p>Defined goal with documentation and an assigned Vocational Recovery Counselor</p> <p style="text-align: center;">AND</p> <p>Consideration of:</p> <p>Other concurrent services such as Activity Coaching/BHI</p>	<p><i>Conservative care is defined as:</i></p> <p>At least two months of conservative therapy, which may include multiple components of:</p> <ul style="list-style-type: none"> • Manual therapy • Manipulation • Neuromobilization • Flexion/distraction • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management
<ul style="list-style-type: none"> Hardening 		<p style="text-align: center;">IF</p> <p>Durational needs exceed 4+ hours/day 5 days/wk</p> <p style="text-align: center;">OR</p> <p>Job demands medium or higher</p>	<p style="text-align: center;">IF</p> <p>Task performance requires greater level of simulation</p> <p style="text-align: center;">OR</p> <p>Generalized pain or psychosocial barriers are significant concern</p>	<p style="text-align: center;">IF</p> <p>No RTW/modified duty</p> <p style="text-align: center;">OR</p> <p>Off work and/or employer does not have full time modified duty</p>	

Table 3 – Criteria for continuation in work rehabilitation programs

A request may be appropriate for:	If the patient has:	AND the diagnosis is supported by these clinical findings:	AND this has been done:		
Program Continuation	Condition or Diagnosis	Objective	Non-operative care		
Work Rehabilitation					
<ul style="list-style-type: none"> Conditioning 	<p>Musculoskeletal condition(s)</p> <p>Other conditions impacting ability to return to work</p>	<p>Admission criteria remain true.</p> <p>AND</p> <p>Timeframe proposed is realistic to allow for progress to meet stated goals.</p> <p>AND</p> <p>Progress made in program to date is on pace to achieve stated goals.</p>	<p>Documentation of examination including at least:</p> <ul style="list-style-type: none"> Gap in strength/motion/function between current task performance and job goals 	<p>Worker has demonstrated participation and engagement in prior trial of care</p> <p>AND</p> <p>Defined goal with documentation and an assigned Vocational Recovery Counselor</p> <p>AND</p> <p>Consideration of other concurrent services such as Activity Coaching/BHI</p>	<p>Workers should continue in their program when adequate progress is made.</p> <p>Lack of progress in one program does not warrant consideration of admission to the other program.</p> <p>Only workers with additional criteria for Work Hardening should switch programs from WC to WH.</p>
<ul style="list-style-type: none"> Hardening 		<p>AND</p> <p>Durational needs exceed 4+ hours/day 5 days/wk</p> <p>OR</p> <p>Job demand med or higher</p> <p>OR</p> <p>Off work and/or no full time modified duty</p>	<p>IF</p> <p>Task performance requires greater level of simulation</p> <p>OR</p> <p>Targeted interventions in place for psychosocial or generalized pain</p>	<p>IF</p> <p>No RTW/modified duty available</p>	

Flowchart 1: Referral algorithm for acute care and work rehabilitation



APPENDIX A: Consensus Statements

Care Team:

- Involve vocational providers before a work rehabilitation program when the worker has low return to work expectations, a lack of modified duty work available, and/or an employer that is not engaged positively with the worker.
- For workers in physical rehabilitation programs, it is important to include discussions with managers and workers about expectations regarding work pace, suitable duty modifications, and exertion levels as an important component in safe return to work and injury prevention.
- Workplace interventions (changes to schedules, equipment, duty modification, employer engagement) result in decreased work disability and improve patient outcomes.

Assessment:

- Initial assessments establish a baseline measure of fear-avoidance beliefs about work along with pain tolerance and behavior to evaluate the need for early interventions (<1 mo). These behaviors and beliefs predict longer than expected claim duration and challenges associated with engagement and activation which affect the recovery of the worker.
- Baseline screening for work rehabilitation includes an assessment of expectations for return to work and treatment outcomes.

Intervention:

- Integrated interventions for chronic low back pain using graded activity, a cognitive-behavioral approach, workplace interventions and coordinated care result in a more effective reduction in duration of absence from work.
- Short and long-term benefits can be gained by setting realistic worker expectations, increasing social support and communication with the employer and utilizing cognitive-behavioral training and exercise compliance.
- Multidisciplinary work hardening programs with high return to work rates include PTs and OTs administering job simulation tasks and physical conditioning; behavioral health providers (psychologists, master's level therapists, vocational provider) working on goal setting and stress management; and instruction on dietary and lifestyle changes.
- Intense physical conditioning for subacute back pain appears more beneficial than multidisciplinary exercise treatment focused on pain reduction to decrease the proportion of workers off work in both the short and long term.
- Exercise plans need to be individualized and incorporate factors of both physical and psychosocial aspects to improve outcomes.
- Work rehabilitation programs that build purposeful, meaningful activities into their care delivery drive higher effort and engagement from workers.

- Cognitive-behavioral approaches including graded activity or other ways to focus on functional gains rather than pain, are critical and included in successful programs.
- To prevent recurrence of low back pain, promising outcomes result from combining functional movements, relaxation, behavioral change and integrated coping skills when compared to exercise programs done in isolation.
- Incorporate competence building strategies (such as patient education, goal setting, and role modeling) into care delivery to enhance self-efficacy which improves engagement with rehabilitation and psychosocial outcomes.
- Work rehabilitation can be structured to build self-efficacy of the worker in both physical and cognitive components of a job, which prepares them for a successful return to work.
- Before completing their work rehabilitation program, workers receive instruction on performing a regular (3-5x/wk), short duration (5-15mins) exercise program that can be performed while at work to reduce the severity of low back pain and activity interference caused by low back pain.
- Deliver pain neuroscience education before therapeutic exercise to reduce pain ratings, fear-avoidance, and catastrophizing in patients with chronic musculoskeletal pain. Reducing these behaviors leads to healthy attitudes, improved engagement and physical movement.

Outcomes:

- Progress and outcome measures throughout the program focus on functional task performance, participation in daily and social activities, and reducing pain interference.

Work Rehab Programs:

- Work hardening needs more than one level of intensity (frequency/duration) to address appropriately the gaps between worker capacity and job requirements.
- Additional therapist training is required to deliver proper work conditioning, work hardening, work simulation, and psychosocial support.
- Workers with advanced claim age can make appropriate progress in strength, quality of life, and task performance through work rehabilitation, but may require additional psychosocial and vocational support to successfully return to work.
- Workers who are engaged in recovery, performing light duty for 6-8hrs/day, and are participating in a two-hour Work Rehabilitation program outside of work hours have a significant burden to their schedule which greatly affects compliance and recovery.^[93]

APPENDIX B: Evidence Summary

Consensus statement

A worker’s rehabilitation plan needs to include a job analysis/description which is accurate, reliable and completed in an objective manner based on specific worker tasks, with input from multiple subject matter experts (incumbent/experienced workers, less experienced workers and supervisors).

Dierdoff 2003 performed a review of forty-six studies and 299 estimates of reliability.^[25] They found that data for specific tasks had higher inter- and intra-rater reliability. Whereas, incumbents displayed the lowest levels of reliability in estimating their job duties. Scales regarding frequency and importance of tasks were the most reliable. This gave the subcommittee an estimate of the errors common in average job analyses and encouraged more careful examination when matching a worker’s job duties to their rehabilitation goals.

Cucina 2012 highlighted the tendency toward a self-serving bias effect when having incumbents rate their job task importance and performance.^[26] In analyzing 57 clerical and technical occupations with 26,682 participants involved. Subject matter experts tend to indicate that their own traits are important for success and thus lead to biased representations of job analysis. This study underscored to the subcommittee the need for a variety of participants including a vocational counselor to be involved in the job analysis process to obtain an accurate and unbiased assessment.

Larsen 2012 analyzed the existing data around job task analysis to provide guidelines and best practices for conducting analyses.^[24] Overall, the authors concluded that capturing information from a variety of sources is the best practice for obtaining an accurate representation of the job. The subcommittee found value in the variety of participant responses and underscored the importance of an accurate job analysis to guide rehabilitation, vocational recovery and worker engagement. Job analysis may also affect adjudicative decisions made within the claim and inaccuracies can result in detrimental outcomes.

Consensus statement

Involve vocational providers prior to a work rehabilitation program when the worker has low return to work expectations, lack of modified duty or an employer that is not engaged positively with the worker.

Beemster 2020 studied work participation across two groups that used standard vocational rehabilitation versus an additional workplace visit and more involved case management.^[27] Both groups had increased work participation, but no differences at discharge and small but important differences in followup. The authors found that return to work expectations were a significant source of confounding in both the discharge and 6 month followup. Workers with positive RTW expectations had three times higher odds of successful response. This data is challenging to apply to L&I because of the role and duties of our vocational rehabilitation counselors crosses the services delivered in each group of this study. The subcommittee concluded that the evidence of RTW expectation was the strongest predictor

and these confounding factors would be the most important to address within a work rehabilitation setting. The vocational program is already addressing counselor duties, assessments and best practices.

Consensus statement

For workers in physical rehabilitation programs, it is important to include discussions with managers and workers about expectations regarding work pace, suitable duty modifications and exertion levels as an important component in safe return to work and injury prevention.

Poiraudeau 2007 evaluated functional restoration programs in a systematic review.^[32] The articles included in the review mostly delivered full-day intensive services which were found to have positive influences on RTW rate. Key to this was maintaining job status with the pre-injury employer through the use of modified duty. The authors concluded that RTW rate is likely strongly influenced by the social security and policies of the resident country. While Work Rehabilitation is a less intensive delivery of services, the subcommittee concluded that maintenance of employer relationships through modified duty was equally applicable in the Work Rehab setting.

Ajslev 2017 questioned 481 construction workers on their room for agency as it related to musculoskeletal disorders, physical exertion and bodily or mental fatigue.^[33] The authors found a clear contradiction between the workers' perception of control over their work pacing and management's expectations. The authors concluded that interaction with management and discussing these expectations could have a positive effect on fatigue, pain levels and exertion. The subcommittee applied these results to the role that providers play in engaging with the employer to accommodate modified work, pacing and facilitate return to work.

Lambeek 2010 studied adding workplace interventions compared usual care across 120 participants.^[31] These additional interventions included participatory ergonomics, involving a supervisor and graded activity. The integrated care program substantially reduced disability due to chronic low back pain. The subcommittee concluded that the addition of an involved supervisor and engaged employer was relevant to successful RTW in Work Rehabilitation.

Schaafsma 2013 is a Cochrane review of 41 articles reporting on 25 RCTs with 4404 participants.^[30] The authors conclusions pertinent to this statement were that involving the workplace may have a positive effect on reduction of sick leave, but requires further research.

Consensus statement

Workplace interventions (changes to schedules, equipment, duty modification, employer engagement) result in decreased work disability and improve patient outcomes.

Vilsteren 2015 Cochrane review of workplace interventions to prevent work disability.^[34] The review concluded that workplace interventions significantly improved time until first RTW and improve pain and functional status in workers with musculoskeletal disorders. While many studies had variability in the interventions used and results varied across studies, the subcommittee agreed that the overall evidence supported endorsing a variety of measures to engage the worker and employer in the mutual goal of RTW.

Consensus statement

Initial assessments establish a baseline measure of fear avoidance beliefs about work along with pain tolerance and behavior to evaluate the need for early interventions (<1 mo). These behaviors and beliefs predict work disability and engagement which affect recovery of the worker.

Petersen 1995 Non-physical factors that limited success in work hardening were pain behavior, attorney representation, McAndrews score above 70, education less than high-school.^[40] There was a 24% dropout/non-compliance rate. Nearly three times as many workers without pain behaviors successfully returned to work as ones with pain behaviors. The author concludes that non-physical factors in addition to the physical components being treated are associated with successful RTW after a work hardening program.

Swinkels-Meewisse 2003 evaluated 615 acute low back pain patients in primary care settings receiving physical therapy.^[38] The authors concluded that pain-related fear, pain intensity and participation are mediated by disability. The clinical implication of this finding was that early successful reduction of pain-related fear and disability might foster increased participation in daily and social life activities. The subcommittee agreed with the conclusion that screening for pain-related fear avoidance beliefs would be the first step to identifying those in need of early interventions.

Turner 2006 performed telephone interviews of 1,068 workers and reviewed 6 month claim data to identify the risk factors for chronic work disability as: high pain and disability, low recovery expectations and fears that work may increase pain or cause harm.^[37] The subcommittee concluded that early identification of these factors was critical to target appropriate intervention.

Wertli 2014 performed a systematic review of the use of FABQ and TSK on patients with low back pain for <6 months.^[39] The authors concluded that patients with high fear avoidance beliefs are more likely to improve when treatment is modified to address these beliefs. The subcommittee viewed early identification of these beliefs as a priority in order to adapt the findings of Wertli et al to modify treatment.

Joy 2001 performed a retrospective review of 115 cases with low back injury and analyzed them for variables that predicted return to work.^[16] The authors' conclusion was that patients who returned to work perceived a significantly greater improvement in pain tolerance. Therefore, the emphasis for rehabilitation should be on strategies for coping with existing pain while improving function and not on subjective pain reduction.

Consensus statement

Baseline screening for Work Rehabilitation includes an assessment of expectations for return to work and treatment outcomes.

Pfingsten 1997 studied ninety disabled patients with chronic low back pain in a 2month multidisciplinary program with a 5 week intensive (7hr/day) treatment program while evaluating multiple factors that influenced patient outcomes.^[42] The subcommittee included this article for its discussion and conclusion of the importance of expectation in RTW and treatment outcomes, not for the interventions studied. The authors concluded that physical performance parameters were not strongly linked with successful return to work and supported that psychosocial findings such as estimation of RTW capability and perception of disability may play a large role in RTW success.

Staal 2005 conducted a descriptive literature review to identify current knowledge around physical exercise interventions in a disability context.^[28] The authors found that treatment confidence and patients' expectations were significant influences on recovery. The subcommittee underscored the need for assessment of these factors.

Luk 2010 examined the effectiveness of a multidisciplinary rehab program on chronic low back pain patients.^[41] The authors noted a 32% increase in pain control ratings by the return to work group, which was not present in those who did not return to work. This difference may play a clinically significant role. The authors proposed that candidates to multidisciplinary programs be screened for maximum benefit. The subcommittee concluded that entry to Work Rehabilitation is a logical point in the delivery of care to create screening mechanisms that can help classify workers who may need extra assistance, or those who would benefit from a more intensive program than Work Rehabilitation, such as a chronic pain program. Screening at this stage may be more beneficial for the worker and the insurance system.

Beemster 2020 studied work participation across two groups that used standard vocational rehabilitation versus an additional workplace visit and more involved case management.^[27] Both groups had increased work participation, but no differences at discharge and small but important differences in

followup. The authors found that return to work expectations were a significant source of confounding in both the discharge and 6 month followup. Workers with positive RTW expectations had three times higher odds of successful response. The subcommittee concluded that the evidence of RTW expectation was the strongest predictor and these confounding factors would be the most important to address within a Work Rehabilitation setting.

Johnson 2000 performed a sequential case series design of 112 patients in a work hardening program in a multidisciplinary program across six weeks at 4-6 hours daily including a PT, OT, psychologist and dietician.^[3] The authors found that perceived disability was a strong predictor of return to work.

Consensus statement

Integrated interventions for chronic low back pain using graded activity, a cognitive behavioral approach, workplace interventions and coordinated care result in a more effective reduction in duration of absence from work.

Lambeek 2010 studied adding workplace interventions compared usual care across 120 participants.^[31] These additional interventions included participatory ergonomics, involving a supervisor and graded activity. The integrated care program substantially reduced disability due to chronic low back pain. The subcommittee concluded that the mixture of combined therapies appears to offer benefit over traditional methods.

Consensus statement

Short and long term benefits can be gained by setting realistic worker expectations, increasing social support and communication with the employer and utilizing cognitive behavioral training and exercise compliance.

Woodard 2001 reviewed the literature on enhancing adherence to prescribed exercise regarding structured behavioral interventions.^[54] The authors provided evidence-based recommendations to enhance exercise adherence coming from social science work on behavior change. Some of these strategies include exercise journaling, identification of barriers and environmental cues, recognizing mood and developing time management strategies. Additional education was recommended toward goal creation, incentives and contingency management plan creation. Finally, clinic involvement should be tailored toward developing a timeline for clinic-based assessment and maintaining regular contact with program staff and providers.

Linton 2005 conducted a randomized controlled trial on 185 patients for nonspecific back and neck pain and were at risk for developing long-term disability.^[55] The authors concluded that adding cognitive-behavioral interventions and preventive physical therapy can enhance the prevention of long-term disability, although no differences were found between groups given solely CBT and CBT with PT.

Myhre 2013 performed a cross-sectional study of 373 patients on sick leave from neck and back pain.^[56] Participants were measured across a battery of tests for fear avoidance, effort/reward and psychosocial factors. The authors found that perceived psychosocial factors at work were strongly associated with fear-avoidance beliefs about being sick-listed. The demands at work outweighed pain and increased disability and emotional distress. The subcommittee concluded that addressing these perceptions with the worker and employer may facilitate greater recovery and RTW.

Ajslev 2017 questioned 481 construction workers on their room for agency as it related to musculoskeletal disorders, physical exertion and bodily or mental fatigue.^[33] The authors found a clear contradiction between the workers' perception of control over their work pacing and management's expectations. The authors concluded that interaction with management and discussing these expectations could have a positive effect on fatigue, pain levels and exertion. The subcommittee applied these results to the role that providers play in engaging with the employer to accommodate modified work, pacing and facilitate return to work.

Consensus statement

Multidisciplinary work hardening programs with high return to work rates include PTs and OTs administering job simulation tasks and physical conditioning; behavioral health providers (psychologists, master's level therapists, vocational counselor) working on goal setting and stress management; and instruction on dietary and lifestyle changes.

Johnson 2000 performed a sequential case series design of 112 patients in a work hardening program in a multidisciplinary program across six weeks at 4-6 hours daily including a PT, OT, psychologist and dietician.^[3] The authors concluded that the program resulted in a ~83% RTW rate which was mostly stable out to two years. The subcommittee concluded that this program was similar to the best-performed work hardening within our system and applicable, but set an aspirational goal toward integration in future programs.

Roche 2007 concluded that low-cost active individual therapy was effective compared to functional restoration in all outcome measures except endurance, but the multidisciplinary program achieved significantly greater improvements.^[57] The authors concluded that patients with more severe physical deconditioning and more disability perception would be more appropriate for the intensive program which included a physiatrist, dietician and psychologist. The subcommittee concluded that current work hardening practices contain most, but not all of these components and workers at higher risk of disability may benefit from the availability of these enhanced clinical services.

Luk 2010 examined the effectiveness of a multidisciplinary rehab program on chronic low back pain patients.^[41] The authors examined the effectiveness of a multidisciplinary rehab program on chronic low

back pain patients. The authors noted a 32% increase in pain control ratings by the return to work group, which was not present in those who did not return to work. This difference may play a clinically significant role. The authors proposed that candidates to multidisciplinary programs be screened for maximum benefit.

Consensus statement

Intense physical conditioning for subacute back pain appears more beneficial than multidisciplinary exercise treatment focused on pain reduction in order to decrease the proportion of workers off work in both short and long term.

Kool 2005, 2007 performed a RCT of 174 participants who had function-centered or pain-centered treatment.^[60, 61] The function-centered approach increased the number of work days in a one year follow up of patients with non-acute LBP. The subcommittee judged the function-centered treatment as representative of L&I work hardening practices.

Bethge 2011 conducted a meta-analysis of the literature on Work-related Medical Rehabilitation (WMR).^[96] The author concluded WMR programs are beneficial compared to usual care and that direct involvement of the workplace and cooperation with employers and occupational medicine providers may improve outcomes.

Schaafsma 2013 is a Cochrane review of 41 articles reporting on 25 RCTs with 4404 participants.^[30] The author's conclusions pertinent to this statement were that the evidence was mixed for intense physical conditioning, but appeared more positive for subgroups involving the workplace. Results remain unclear. The subcommittee included this evidentiary support despite the mixed results because the literature supports a functional goal orientation and physical conditioning while discouraging use of pain reduction outcomes and therapies.

Consensus statement

Exercise plans need to be individualized and incorporate factors of both physical and psychosocial aspects to improve outcomes.

Falla 2017 conducted a review of exercise for spinal pain and exercise interventions.^[58] The authors make a case for emphasizing the heterogeneous nature of spinal pain and adapting interventions to accommodate the patient's unique blend of biological, psychological and social factors. It is probable that the large heterogeneity across back pain factors contributes to a heterogeneity in outcomes if interventions are not targeted to patient needs. While based in solid evidence, their conclusions are a

hypothesis and remain to be fully tested. The subcommittee concluded that despite the preliminary nature, this is an admirable standard to consider during care delivery.

Consensus statement

Work Rehabilitation programs which build purposeful, meaningful activities into their care delivery drive higher effort and engagement from workers.

Kircher 1984 studied a small group of women who were given a purposeless activity of jumping versus a more meaningful activity of using a jump rope.^[64] The authors compared perceived exertion, heart rate and duration of activity and found that participants performed more work with higher heart rates and lower perceived effort when performing the meaningful activity. This lends support to the meaningful engagement during conditioning exercise and that motivation is a critical component of work effort in conditioning.

Riccio 1990 studied a small group of elderly women doing purposeless reaching activities and then added imagery to the tasks.^[62] The imagery was correlated with both a positive perception of the exercise and increased repetition. The authors concluded that mental imagery was an effective tool to increase motivation and provide purpose to an imagined task and could be effective in rehabilitation.

Wisenthal 2013 wrote a review and position paper looking at work hardening interventions with a cognitive emphasis.^[63] The authors make the case for using work hardening to treat workers with depression using enablement and graded progression, just as in physical work hardening but with emphasis on the psychological and social components of work. The authors propose that current work hardening resources could be extended and enhanced to provide support for those with psychosocial or mental health problems. The subcommittee concluded that the work simulation is an essential part of work hardening programs as long as the activity closely resembles the worker's actual work activities in order to make them purposeful and meaningful to the patient.

Consensus statement

Cognitive behavioral approaches including graded activity or other ways to focus on functional gains rather than pain, are critical and included in successful programs.

Johnson 2000 performed a sequential case series design of 112 patients in a work hardening program in a multidisciplinary program across six weeks at 4-6 hours daily including a PT, OT, psychologist and dietician.^[3] The authors concluded that the program resulted in a ~83% RTW rate which was mostly stable out to two years. This program included behavioral approaches and graded activity.

Bell 2009 conducted a systematic review on prevention of low back pain in the workplace.^[73] While only two of the reviewed studies were high quality, they demonstrated significant reductions in LBP intensity

with exercise. Most of the reviewed trials utilized cognitive behavioral approaches to exercise delivery as integral treatment strategies. The subcommittee concluded that this was representative of standards of care within the provider community.

Schaafsma 2013 is a Cochrane review of 41 articles reporting on 25 RCTs with 4404 participants.^[30] The authors' conclusions pertinent to this statement were that most physical conditioning programs studied incorporated components of graded activity in the progression of exercise therapy and be geared toward functional job demands.

Consensus statement

To prevent recurrence of Low Back Pain, promising outcomes result from combining functional movements, relaxation, behavioral change and integrated coping skills when compared to exercise programs done in isolation.

Bell 2009 conducted a systematic review on prevention of low back pain in the workplace.^[73] While only two of the reviewed studies were high quality, they demonstrated significant reductions in LBP intensity with exercise in the workplace. Most of the trials paired multiple modalities with cognitive behavioral components to increase compliance and adherence rates with good long-term success.

Beaudreuil 2010 performed a prospective one-year study of 39 patients with chronic low back pain in a functional restoration program utilizing a spectrum of provider services and integrated care.^[75] The authors concluded that a multidisciplinary care pathway could be beneficial even for workers off work for greater than 3 months with incapacitating low back pain. The subcommittee concluded that the vast majority of services offered were reflective of a work hardening program.

Consensus statement

Incorporate competence building strategies (such as patient education, goal setting, and role modeling) into care delivery to enhance self-efficacy which improves engagement with rehabilitation and psychosocial outcomes.

Levack 2015 is a Cochrane review of goal setting and strategies to enhance goal pursuit for adults with acquired disability.^[76] The authors conclude that although most of the evidence is very low quality, the evidence favors positive effects for psychosocial outcomes rather than physical outcomes.

Podlog 2019 investigated the mediating role of autonomous motivation in competence perception and patient outcomes in chronic low back pain.^[9] The study looked at 64 participants over 6 weeks and compared relationships across motivation, competence perception and pain/disability. The authors

concluded that competence perception can help mitigate lack of motivation for physical therapy and avoid the poor outcomes associated with low adherence and compliance.

Consensus statement

Work rehabilitation can be structured to build self-efficacy of the worker in both physical and cognitive components of a job, which prepares them for successful return to work.

Wisenthal 2013 wrote a review and position paper looking at work hardening interventions with a cognitive emphasis.^[63] The authors make the case for using work hardening to treat workers with depression using enablement and graded progression, just as in physical work hardening but with emphasis on the psychological and social components of work. The authors propose that current work hardening resources could be extended and enhanced to provide support for those with psychosocial or mental health problems. The subcommittee concluded that given the current work hardening criteria, occupational therapist experience and psychosocial support needs that applying this work toward Work Rehabilitation to address psychosocial needs was an important and well-supported step.

Consensus statement

Prior to completing their work rehabilitation program, workers receive instruction on performing a regular (3-5x/wk), short duration (5-15mins) exercise program that can be performed while at work to reduce severity of low back pain and activity interference caused by low back pain.

Bell 2009 conducted a systematic review on prevention of low back pain in the workplace.^[73] While only two of the reviewed studies were high quality, they demonstrated significant reductions in LBP intensity with exercise in the workplace even with small doses of 6-10 minutes when performed regularly during the work week.

Sundstrup 2020 conducted a systematic review of workplace interventions for musculoskeletal disorders (MSD) in physically demanding work settings.^[77] Pertinent to this statement, the authors recommend implementing strength training at the workplace to reduce MSD based on high-medium quality data, but recommend against participatory ergonomics and multifaceted workplace interventions.

Consensus statement

Deliver pain neuroscience education before therapeutic exercise to reduce pain ratings, fear avoidance, and catastrophization in patients with chronic musculoskeletal pain. Reducing these behaviors leads to healthy attitudes, improved engagement and physical movement.

Louw 2016 conducted a systematic review of the efficacy of pain neuroscience education for musculoskeletal pain.^[8] They found 13 RCTs to include and concluded that current evidence supports the use of pain neuroscience education for chronic musculoskeletal disorders. The outcomes included improved function, lowered disability, reduced psychosocial factors and minimization of healthcare utilization. The subcommittee concluded that because of the prevalence of chronic conditions in Work Rehabilitation, appropriate interventions should be recommended.

Pardo 2018 assessed the effects of pain neurophysiology education in a group of 56 patients with chronic LBP across two 30-50minute sessions in groups of 4 to 6 participants.^[78] When therapeutic exercise followed an education program, they found beneficial results in pain intensity and disability outcome measures. The results indicate that even short, infrequent group sessions are an effective intervention when combined with usual care.

Consensus statement

Progress and outcome measures throughout the program focus on functional task performance, participation in daily and social activities, and reducing pain interference.

Kool 2005 performed a RCT of 174 participants who had function-centered or pain-centered treatment.^[61] The function-centered approach increased the number of work days, self-efficacy, and lifting capacity of patients with non-acute LBP. The subcommittee judged the function-centered treatment as representative of L&I work hardening practices.

Turner 2006 performed telephone interviews of 1,068 workers and reviewed 6 month claim data to identify the risk factors for chronic work disability as: high pain and disability, low recovery expectations and fears that work may increase pain or cause harm.^[37] The subcommittee concluded that ongoing identification and monitoring of these factors was important in determining treatment effectiveness or need for additional services.

Joy 2001 performed a retrospective review of 115 cases with low back injury and analyzed them for variables that predicted return to work.^[16] The author's conclusion was that patients who returned to work perceived a significantly greater improvement in pain tolerance. Therefore, the emphasis for

rehabilitation should be on strategies for coping with existing pain while improving function and not on subjective pain reduction.

Trinderup 2018 analyzed 559 patients with chronic low back pain to examine the association between fear avoidance beliefs and sick leave, disability and pain at one year of followup.^[81] The authors found that high fear avoidance beliefs regarding work, but not physical activity, were associated with increased sick leave, no reduction in pain and no reduction in disability. The subcommittee applied these findings to encourage outcome measures like FABQ or STarT Back as well as treatment strategies that focus on functional task performance which could address fear avoidance beliefs regarding work.

Sivan 2009 performed a cross-sectional analysis of outcome measures and work status in 375 enrolled patients with chronic LBP over one year.^[82] The authors concluded that standard outcome measures are not interchangeable with work status. Work status should be recorded as a separate measure and not interpreted from other outcomes scales.

Consensus statement

Additional therapist training is required to deliver proper Work conditioning, Work hardening, Work simulation, Psychosocial barrier support.

Kilgour 2015 performed a systematic review of articles that considered the impact of workers' experiences after work injury on their recovery. Findings showed that provider-worker interactions can be both healing and harming. Interactions can influence care provided and recovery. Training specific to workers' compensation and maintaining therapeutic alliance has particular influence in workers' compensation.

Consensus statement

Workers who are engaged in recovery, performing light duty for six to eight hours/day, and are participating in a two-hour work rehabilitation program outside of work hours have a significant burden to their schedule which greatly affects compliance and recovery.[93]

Anema 2009 reviewed compensation policies across six nations for differences in how policy affected sustainable RTW.^[93] The authors concluded that the policies that encourage work interventions supported by less strict compensation policies for entitlement to long-term and partial disability benefits

resulted in more sustainable RTW outcomes. The subcommittee came to consensus that long hours with combined work and rehabilitation may place a burden on a worker's time that can impact the choices they make on return to work and adherences to rehabilitation. They recommended that wherever possible, policies support flexible work rehabilitation programs and modification to allow both work and work rehabilitation to progress in tandem.

Consensus statement

Workers with advanced claim age can make appropriate progress in strength, quality of life, and task performance through work rehabilitation, but may require additional psychosocial and vocational support to successfully return to work.[89, 90]

Haldorsen 2002 conducted a randomized controlled trial of 654 patients with musculoskeletal pain across three outpatient treatments at different levels of intensity.^[36] All patients were sick-listed for greater than 8 weeks and 10-15% of patients in each group were considered recidivists who had greater than two months of sick-listing per year for the past two years. For patients with a good prognosis, treatment group was irrelevant. For medium prognosis patients, a light multidisciplinary treatment with followups was sufficient and extensive treatment did not offer long term benefits, whereas ordinary treatment gave poor results. Patients classified as a poor prognosis needed extensive treatment and did poorly in usual care or light treatment. The subcommittee concluded that matching the correct treatment protocols and intensity to the worker's needs is supported by the literature and may require more intensive and additional measures for those with a poor prognosis. A poor prognosis should be an alert to increased need for services and not a barrier to receiving care of an ineffective intensity.

Voss 2019 conducted a retrospective database analysis on 495 participants in an interdisciplinary work rehabilitation program. Strength increased across the program and RTW grew from 31.6% to 83.9%.^[90] Participants had an average of ~5months off prior to the program with a large standard deviation of ~10months. The authors found that strength levels at discharge were not associated with days off work prior to entering the program, nor was type of injury related to strength progress. The authors concluded that delayed entry into the rehab program did not negatively affect strength on discharge. This was not correlated with their return to work percentage, suggesting that other psychosocial factors may play an important role above and beyond physical capacity in RTW for advanced age of injury.

Pfingsten 1997 concluded that physical performance parameters were not strongly linked with successful return to work and that findings in improvement of strength, endurance or mobility do not automatically correlate with return to work.^[42]

Consensus statement

Work hardening needs more than one level of intensity (frequency/duration) to address appropriately the gaps between worker capacity and job requirements.

Falla 2017 conducted a review of exercise for spinal pain and exercise interventions.^[58] The authors make a case for emphasizing the heterogeneous nature of spinal pain and adapting interventions to accommodate the patient's unique blend of biological, psychological and social factors. It is probable that the large heterogeneity across back pain factors contributes to a heterogeneity in outcomes if interventions are not targeted to patient needs. While based in solid evidence, their conclusions are a hypothesis and remain to be fully tested. The subcommittee concluded that the ability to tailor frequency and duration to address individual needs was in line with these preliminary findings.

Haldorsen 2002 conducted a randomized controlled trial of 654 patients with musculoskeletal pain across three outpatient treatments at different levels of intensity.^[36] All patients were sick-listed for greater than 8 weeks and 10-15% of patients in each group were considered recidivists who had greater than two months of sick-listing per year for the past two years. For patients with a good prognosis, treatment group was irrelevant. For medium prognosis patients, a light multidisciplinary treatment with followups was sufficient and extensive treatment did not offer long term benefits, whereas ordinary treatment gave poor results. Patients classified as a poor prognosis needed extensive treatment and did poorly in usual care or light treatment. The subcommittee concluded that matching the correct treatment protocols and intensity to the worker's needs is supported by the literature and may require more intensive and additional measures for those with a poor prognosis, as well as not increasing time burdens on the worker and system costs with an unnecessary level of intensive therapies for those with a good prognosis.

Skouen 2002 studied 195 patients with chronic low back pain as part of a larger study in a randomized, controlled, prospective clinical study.^[51] The groups were assigned to either treatment as usual by their general practitioner, light multidisciplinary treatment, or an extensive multidisciplinary program. They evaluated return to work, cost-benefit and followed up 26 months after treatment. An effect of gender was found where men tended to benefit from light multidisciplinary care more than women. These results may be related to work culture such as job satisfaction or control over work, in addition to levels of psychosocial support. It did not appear to be related to physical workload or duty level, which suggested that psychosocial and vocational support is a key component in this population. Extensive multidisciplinary was effective only for those with poor prognosis, generalized muscular pain and significant psychosocial problems.

References

1. Clay, F.J., J. Berecki-Gisolf, and A. Collie, *How well do we report on compensation systems in studies of return to work: a systematic review*. Journal of occupational rehabilitation, 2014. **24**(1): p. 111-124.
2. Fulton-Kehoe, D., et al., *Measuring work disability: what can administrative data tell us about patient outcomes?* Journal of occupational and environmental medicine, 2007. **49**(6): p. 651-658.
3. Johnson, L.S., et al., *Work hardening: Outdated fad or effective intervention?* Work, 2001. **16**(3): p. 235-243.
4. Marcum, J. and D. Adams, *Work-related musculoskeletal disorder surveillance using the Washington state workers' compensation system: Recent declines and patterns by industry, 1999-2013*. American journal of industrial medicine, 2017. **60**(5): p. 457-471.
5. Spector, J.T., et al., *Pre-surgery disability compensation predicts long-term disability among workers with carpal tunnel syndrome*. American journal of industrial medicine, 2012. **55**(9): p. 816-832.
6. Skelly, A.C., et al., *Noninvasive nonpharmacological treatment for chronic pain: A systematic review update*. 2020.
7. Wynne-Jones, G., et al., *Absence from work and return to work in people with back pain: a systematic review and meta-analysis*. Occupational and environmental medicine, 2014. **71**(6): p. 448-456.
8. Louw, A., et al., *The efficacy of pain neuroscience education on musculoskeletal pain: a systematic review of the literature*. Physiotherapy theory and practice, 2016. **32**(5): p. 332-355.
9. Podlog, L., et al., *Does motivation mediate the relationship between competence perceptions and patient outcomes among individuals with chronic low back pain? A multiple mediation analysis*. Disability and Rehabilitation, 2019: p. 1-7.
10. Hawk, C., et al., *Best Practices for Chiropractic Management of Patients with Chronic Musculoskeletal Pain: A Clinical Practice Guideline*. The Journal of Alternative and Complementary Medicine, 2020.
11. Keeney, B.J., et al., *Early Predictors of Occupational Back Re-Injury: Results from a Prospective Study of Workers in Washington State*. Spine, 2013. **38**(2): p. 178.
12. Sears, J.M., et al., *Workforce reintegration after work-related permanent impairment: a look at the first year after workers' compensation claim closure*. Journal of Occupational Rehabilitation, 2021. **31**(1): p. 219-231.
13. Wegrzynek, P., E. Wainwright, and J. Ravalier, *Return to work interventions for chronic pain: a systematic review*. Occupational Medicine, 2020.
14. Loisel, P. and J.R. Anema, *Handbook of work disability*. Prevention and management.: Springer, 2013.
15. Pransky, G., P. Loisel, and J. Anema, *Work disability prevention research: current and future prospects*. Journal of occupational rehabilitation, 2011. **21**(3): p. 287.
16. Joy, J.M., J. Lowy, and J.K. Mansoor, *Increased pain tolerance as an indicator of return to work in low-back injuries after work hardening*. American Journal of Occupational Therapy, 2001. **55**(2): p. 200-205.
17. Demers, L.M., *Work hardening: A practical guide*. 1992: Andover Medical Publishers.
18. Bossen, D., et al., *APTA Guideline: Occupational Health Physical Therapy: Advanced Work Rehabilitation Guidelines*. APTA Guidelines, 2011: p. 1.

19. Cullen, K., et al., *Effectiveness of workplace interventions in return-to-work for musculoskeletal, pain-related and mental health conditions: an update of the evidence and messages for practitioners*. Journal of occupational rehabilitation, 2018. **28**(1): p. 1-15.
20. Malfliet, A., et al., *Best evidence rehabilitation for chronic pain part 3: Low back pain*. Journal of clinical medicine, 2019. **8**(7): p. 1063.
21. Nazarov, S., et al., *Chronic diseases and employment: Which interventions support the maintenance of work and return to work among workers with chronic illnesses? A systematic review*. International journal of environmental research and public health, 2019. **16**(10): p. 1864.
22. Nastasia, I., M.-F. Coutu, and R. Tcaciuc, *Topics and trends in research on non-clinical interventions aimed at preventing prolonged work disability in workers compensated for work-related musculoskeletal disorders (WRMSDs): a systematic, comprehensive literature review*. Disability and Rehabilitation, 2014. **36**(22): p. 1841-1856.
23. Sanchez, J.I. and E.L. Levine, *The rise and fall of job analysis and the future of work analysis*. Annual review of psychology, 2012. **63**: p. 397-425.
24. Larsen, B. and B. Aisbett, *Subjective job task analyses for physically demanding occupations: What is best practice?* Ergonomics, 2012. **55**(10): p. 1266-1277.
25. Dierdorff, E.C. and M.A. Wilson, *A meta-analysis of job analysis reliability*. J Appl Psychol, 2003. **88**(4): p. 635-46.
26. Cucina, J.M., et al., *Self-serving bias effects on job analysis ratings*. J Psychol, 2012. **146**(5): p. 511-31.
27. Beemster, T.T., et al., *Vocational Rehabilitation with or without Work Module for Patients with Chronic Musculoskeletal Pain and Sick Leave from Work: Longitudinal Impact on Work Participation*. Journal of occupational rehabilitation, 2020.
28. Staal, J.B., et al., *Physical exercise interventions to improve disability and return to work in low back pain: current insights and opportunities for improvement*. Journal of occupational Rehabilitation, 2005. **15**(4): p. 491-505.
29. Skarpaas, L.S., et al., *The association between having a coordinator and return to work: the rapid-return-to-work cohort study*. BMJ open, 2019. **9**(2): p. e024597.
30. Schaafsma, F.G., et al., *Physical conditioning as part of a return to work strategy to reduce sickness absence for workers with back pain*. Cochrane Database of Systematic Reviews, 2013(8).
31. Lambeek, L.C., et al., *Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life*. BMJ, 2010. **340**: p. c1035.
32. Poiraudou, S., F. Rannou, and M. Revel. *Functional restoration programs for low back pain: a systematic review*. in *Annales de réadaptation et de médecine physique*. 2007. Elsevier.
33. Ajslev, J.Z.N., R. Persson, and L.L. Andersen, *Contradictory individualized self-blaming: a cross-sectional study of associations between expectations to managers, coworkers, one-self and risk factors for musculoskeletal disorders among construction workers*. BMC musculoskeletal disorders, 2017. **18**(1): p. 13.
34. van Vilsteren, M., et al., *Workplace interventions to prevent work disability in workers on sick leave*. Cochrane Database Syst Rev, 2015(10): p. CD006955.
35. American Occupational Therapy Association, *Work hardening guidelines*. American Journal of Occupational Therapy, 1986. **40**(12): p. 841-43.
36. Haldorsen, E.M.H., et al., *Is there a right treatment for a particular patient group? Comparison of ordinary treatment, light multidisciplinary treatment, and extensive multidisciplinary treatment for long-term sick-listed employees with musculoskeletal pain*. Pain, 2002. **95**(1-2): p. 49-63.
37. Turner, J.A., et al., *Worker recovery expectations and fear-avoidance predict work disability in a population-based workers' compensation back pain sample*. Spine, 2006. **31**(6): p. 682-689.

38. Swinkels-Meewisse, I.E., et al., *Fear of movement/(re) injury, disability and participation in acute low back pain*. Pain, 2003. **105**(1-2): p. 371-379.
39. Wertli, M.M., et al., *Fear-avoidance beliefs—a moderator of treatment efficacy in patients with low back pain: a systematic review*. The Spine Journal, 2014. **14**(11): p. 2658-2678.
40. Petersen, M., *Nonphysical factors that affect work hardening success: a retrospective study*. Journal of Orthopaedic & Sports Physical Therapy, 1995. **22**(6): p. 238-246.
41. Luk, K.D., et al., *A multidisciplinary rehabilitation programme for patients with chronic low back pain: a prospective study*. J Orthop Surg (Hong Kong), 2010. **18**(2): p. 131-8.
42. Pfingsten, M., et al., *Effectiveness of a multimodal treatment program for chronic low-back pain*. Pain, 1997. **73**(1): p. 77-85.
43. Muenchberger, H., et al., *Clinical utility of predictors of return-to-work outcome following work-related musculoskeletal injury*. Journal of Occupational Rehabilitation, 2008. **18**(2): p. 190-206.
44. Kirsh, B. and P. McKee, *The needs and experiences of injured workers: a participatory research study*. Work, 2003. **21**(3): p. 221-231.
45. Jousset, N., et al., *Effects of functional restoration versus 3 hours per week physical therapy: a randomized controlled study*. Spine, 2004. **29**(5): p. 487-493.
46. Roche-Leboucher, G., et al., *Multidisciplinary intensive functional restoration versus outpatient active physiotherapy in chronic low back pain: a randomized controlled trial*. Spine, 2011. **36**(26): p. 2235-2242.
47. Bethge, M., et al., *Work status and health-related quality of life following multimodal work hardening: a cluster randomised trial*. J Back Musculoskeletal Rehabil, 2011. **24**(3): p. 161-72.
48. Schonstein, E., et al., *Physical conditioning programs for workers with back and neck pain: a cochrane systematic review*. Spine, 2003. **28**(19): p. E391-E395.
49. Scott Kreiner, D. *Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care: Diagnosis & Treatment of Low Back Pain*. in North American Spine Society. 2020.
50. Kamper, S.J., et al., *Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis*. Bmj, 2015. **350**.
51. Skouen, J.S., et al., *Relative cost-effectiveness of extensive and light multidisciplinary treatment programs versus treatment as usual for patients with chronic low back pain on long-term sick leave: randomized controlled study*. Spine, 2002. **27**(9): p. 901-909.
52. Butler, R.J. and W.G. Johnson, *Satisfaction with low back pain care*. The spine journal, 2008. **8**(3): p. 510-521.
53. Bekkering, G.E., et al., *Dutch physiotherapy guidelines for low back pain*. Physiotherapy, 2003. **89**(2): p. 82-96.
54. Woodard, C.M. and M.J. Berry, *Enhancing adherence to prescribed exercise: structured behavioral interventions in clinical exercise programs*. J Cardiopulm Rehabil, 2001. **21**(4): p. 201-9.
55. Linton, S.J., et al., *The effects of cognitive-behavioral and physical therapy preventive interventions on pain-related sick leave: a randomized controlled trial*. Clin J Pain, 2005. **21**(2): p. 109-19.
56. Myhre, K., et al., *Fear-avoidance beliefs associated with perceived psychological and social factors at work among patients with neck and back pain: a cross-sectional multicentre study*. BMC musculoskeletal disorders, 2013. **14**(1): p. 329.
57. Roche, G., et al., *Comparison of a functional restoration program with active individual physical therapy for patients with chronic low back pain: a randomized controlled trial*. Arch Phys Med Rehabil, 2007. **88**(10): p. 1229-35.

58. Falla, D. and P.W. Hodges, *Individualized Exercise Interventions for Spinal Pain*. *Exerc Sport Sci Rev*, 2017. **45**(2): p. 105-115.
59. Steuri, R., et al., *Effectiveness of conservative interventions including exercise, manual therapy and medical management in adults with shoulder impingement: a systematic review and meta-analysis of RCTs*. *British journal of sports medicine*, 2017. **51**(18): p. 1340-1347.
60. Kool, J., et al., *Function-centered rehabilitation increases work days in patients with nonacute nonspecific low back pain: 1-year results from a randomized controlled trial*. *Archives of physical medicine and rehabilitation*, 2007. **88**(9): p. 1089-1094.
61. Kool, J.P., et al., *Increasing days at work using function-centered rehabilitation in nonacute nonspecific low back pain: a randomized controlled trial*. *Archives of physical medicine and rehabilitation*, 2005. **86**(5): p. 857-864.
62. Riccio, C.M., D.L. Nelson, and M.A. Bush, *Adding purpose to the repetitive exercise of elderly women through imagery*. *American Journal of Occupational Therapy*, 1990. **44**(8): p. 714-719.
63. Wisenthal, A. and T. Krupa, *Cognitive work hardening: a return-to-work intervention for people with depression*. *Work*, 2013. **45**(4): p. 423-430.
64. Kircher, M.A., *Motivation as a factor of perceived exertion in purposeful versus nonpurposeful activity*. *American Journal of Occupational Therapy*, 1984. **38**(3): p. 165-170.
65. Martin, K.A., S.E. Moritz, and C.R. Hall, *Imagery use in sport: A literature review and applied model*. *The sport psychologist*, 1999. **13**(3): p. 245-268.
66. Fordyce, W.E., *Behavioral methods for chronic pain and illness*. 1976: CV Mosby.
67. Silva Guerrero, A.V., et al., *A systematic review and meta-analysis of the effectiveness of psychological interventions delivered by physiotherapists on pain, disability and psychological outcomes in musculoskeletal pain conditions*. *The Clinical journal of pain*, 2018. **34**(9): p. 838-857.
68. Volker, D., et al., *Return-to-work self-efficacy and actual return to work among long-term sick-listed employees*. *Journal of occupational rehabilitation*, 2015. **25**(2): p. 423-431.
69. Sullivan, M.J. and W.D. Stanish, *Psychologically based occupational rehabilitation: the pain-disability prevention program*. *The Clinical journal of pain*, 2003. **19**(2): p. 97-104.
70. Sullivan, M.J., et al., *Integrating psychosocial and behavioral interventions to achieve optimal rehabilitation outcomes*. *Journal of occupational rehabilitation*, 2005. **15**(4): p. 475-489.
71. Cheng, A.S.-K. and L.-K. Hung, *Randomized controlled trial of workplace-based rehabilitation for work-related rotator cuff disorder*. *Journal of occupational rehabilitation*, 2007. **17**(3): p. 487-503.
72. Sullivan, M.J., et al., *Initial depression severity and the trajectory of recovery following cognitive-behavioral intervention for work disability*. *Journal of occupational rehabilitation*, 2006. **16**(1): p. 60-71.
73. Bell, J.A. and A. Burnett, *Exercise for the primary, secondary and tertiary prevention of low back pain in the workplace: a systematic review*. *J Occup Rehabil*, 2009. **19**(1): p. 8-24.
74. Steenstra, I.A., et al., *The effectiveness of graded activity for low back pain in occupational healthcare*. *Occupational and Environmental Medicine*, 2006. **63**(11): p. 718-725.
75. Beaudreuil, J., et al., *Efficacy of a functional restoration program for chronic low back pain: prospective 1-year study*. *Joint Bone Spine*, 2010. **77**(5): p. 435-9.
76. Levack, W.M., et al., *Goal setting and strategies to enhance goal pursuit for adults with acquired disability participating in rehabilitation*. *Cochrane Database of Systematic Reviews*, 2015(7).
77. Sundstrup, E., et al., *A Systematic Review of Workplace Interventions to Rehabilitate Musculoskeletal Disorders Among Employees with Physical Demanding Work*. *Journal of Occupational Rehabilitation*, 2020: p. 1-25.

78. Pardo, G.B., et al., *Pain neurophysiology education and therapeutic exercise for patients with chronic low back pain: a single-blind randomized controlled trial*. Archives of physical medicine and rehabilitation, 2018. **99**(2): p. 338-347.
79. Turner, J.A., et al., *The association between pain and disability*. Pain, 2004. **112**(3): p. 307-314.
80. Ohrnberger, J., E. Fichera, and M. Sutton, *The relationship between physical and mental health: A mediation analysis*. Social Science & Medicine, 2017. **195**: p. 42-49.
81. Trinderup, J.S., et al., *Fear avoidance beliefs as a predictor for long-term sick leave, disability and pain in patients with chronic low back pain*. BMC musculoskeletal disorders, 2018. **19**(1): p. 431.
82. Sivan, M., B. Sell, and P. Sell, *A comparison of functional assessment instruments and work status in chronic back pain*. Eur J Phys Rehabil Med, 2009. **45**(1): p. 31-6.
83. Frymoyer, J.W. and W.L. Cats-Baril, *An overview of the incidences and costs of low back pain*. Orthopedic Clinics of North America, 1991. **22**(2): p. 263-271.
84. Kilgour, E., et al., *Healing or harming? Healthcare provider interactions with injured workers and insurers in workers' compensation systems*. Journal of occupational rehabilitation, 2015. **25**(1): p. 220-239.
85. Cheadle, A., et al., *Factors influencing the duration of work-related disability: a population-based study of Washington State workers' compensation*. American Journal of Public Health, 1994. **84**(2): p. 190-196.
86. Clay, F.J., et al., *The association of social functioning, social relationships and the receipt of compensation with time to return to work following unintentional injuries to Victorian workers*. Journal of occupational rehabilitation, 2012. **22**(3): p. 363-375.
87. Knapp, S., J. Briest, and M. Bethge, *Work-related rehabilitation aftercare for patients with musculoskeletal disorders: results of a randomized-controlled multicenter trial*. International Journal of Rehabilitation Research, 2015. **38**(3): p. 226-232.
88. van der Roer, N., et al., *Intensive group training protocol versus guideline physiotherapy for patients with chronic low back pain: a randomised controlled trial*. European Spine Journal, 2008. **17**(9): p. 1193-1200.
89. Haldorsen, E., et al., *Multimodal cognitive behavioral treatment of patients sicklisted for musculoskeletal pain: a randomized controlled study*. Scandinavian journal of rheumatology, 1998. **27**(1): p. 16-25.
90. Voss, M.R., et al., *Outcomes of an interdisciplinary work rehabilitation program*. Work, 2019. **64**(3): p. 507-514.
91. Bendix, T., et al., *Functional restoration versus outpatient physical training in chronic low back pain: a randomized comparative study*. Spine, 2000. **25**(19): p. 2494-2500.
92. Waterschoot, F.P., et al., *Dose or content? Effectiveness of pain rehabilitation programs for patients with chronic low back pain: a systematic review*. PAIN®, 2014. **155**(1): p. 179-189.
93. Anema, J.R., et al., *Can cross country differences in return-to-work after chronic occupational back pain be explained? An exploratory analysis on disability policies in a six country cohort study*. Journal of occupational rehabilitation, 2009. **19**(4): p. 419.
94. Krause, N., L.K. Dasinger, and F. Neuhauser, *Modified work and return to work: a review of the literature*. Journal of occupational rehabilitation, 1998. **8**(2): p. 113-139.
95. Steenstra, I.A., et al., *Systematic review of prognostic factors for return to work in workers with sub acute and chronic low back pain*. Journal of occupational rehabilitation, 2017. **27**(3): p. 369-381.
96. Bethge, M., *Success factors of work-related orthopaedic rehabilitation*. Die Rehabilitation, 2011. **50**(3): p. 145-151.

