

# Workplace Injuries

## Course Description

"Workplace Injuries" is a recorded video continuing education course for physical therapists and physical therapist assistants. This course explores the development of workplace injuries in various environments other than the traditional office setting. Management strategies including work environment modifications and worker education for successful return to work are examined.

## Course Rationale

The purpose of this course is to enhance the clinician's ability to understand the impact of occupational injuries and recognize contributing factors to enhance patient education on environmental modifications and strategies to minimize risk of injury.

## Course Goals and Objectives

Upon completion of this course, participants will be able to:

1. Define the impact of workplace injury on society.
2. Compare gender differences in incidence of work-place injuries.
3. Compare worker and non-worker related risk factors for the development of work-related injury.
4. Summarize the impact of insomnia on work-place injuries and errors.
5. Describe methods of reducing occupational injury.
6. Identify common workplace musculoskeletal disorders for specific professions.
7. Describe strategies which contribute to successful return to work.
8. Identify age and socioeconomic factors associated with injury risk among construction workers.
9. Identify the prevalence and risk of injury to healthcare providers.
10. Determine modifications to various work environments including grocery stores, meat packing plants, and farms.

**Course Provider** – Innovative Educational Services

**Course Instructor** - Jodi Gootkin, PT, MEd

**Target Audience** – Physical therapists and physical therapist assistants

**Level of Difficulty** – Basic, intermediate

**Course Prerequisites** – None

**Method of Instruction/Availability** – Recorded video available online on demand.

**Criteria for Issuance of CE Credits** – Verified attendance and at least 70% correct on the course post-test.

**Continuing Education Credits** – Three (3) hours of continuing education credit.

**Fees** - \$34.95

**Refund Policy** - Unrestricted 100% refund upon request. The request for a refund by the learner shall be honored in full without penalty or other consideration of any kind. The request for a refund may be made by the learner at any time without limitations before, during, or after course participation.

## Course Outline & Schedule

Impact of Workplace Injuries on Society	0:00-0:15
Incidence of Injuries	0:16-0:25
Risk Factors for Injury Development	0:26-0:30
Worker Related	0:31-0:35
Non-Worker Related	0:36-0:40
Impact of Insomnia	0:41-0:50
Interactive Discussion of Clinical Applications	0:51-0:60
Methods of Reducing Occupational Injury	1:01-1:15
Workplace Musculoskeletal Disorders	1:16-1:25
Return to Work Strategies	1:26-1:35
Healthcare Provider Injuries	1:36-1:50
Interactive Discussion of Clinical Applications	1:51-2:00
Construction Worker Injury Risk	2:01-2:10
Environmental Modifications	2:11 -2:20
Grocery Stores	2:21-2:30
Meat Packing Plants	2:31-2:40
Farms	2:41-2:50
Interactive Discussion of Clinical Applications	2:51-3:00

# Workplace Injuries

Live Interactive Webinar Presented by:  
Jodi Gootkin, PT, MEd, CEAS  
[jodiemail@comcast.net](mailto:jodiemail@comcast.net)

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## Overview of Course

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## Disclaimer

- > Application of concepts presented in this webinar is at the discretion of the individual participant in accordance with federal, state, and professional regulations.

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## Course Outline/Schedule 3 hour live interactive webinar

Topic	Time
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## Emphasis of Course

The goal is to enhance the clinician's understanding of the various contributing factors of workplace injuries to enhance rehabilitation plans, return to work, and prevention of subsequent injuries.

## Impact of Workplace Injury

- > The Occupational Safety and Health Act was passed in 1970 requiring employers to provide workplaces "free from recognized hazards that are causing or likely to cause death or serious physical harm" to their workers.\*
- > In their 2014 analysis report, OSHA reports "toll of workplace injuries, illnesses and fatalities in the US remains unacceptably high.\*"

\*OSHA. Adding Inequality to Injury: The Coast of Failing to Protect Workers on the Job. (2014). Retrieved from <http://www.dol.gov/oshareport/20150304-inequality.pdf>

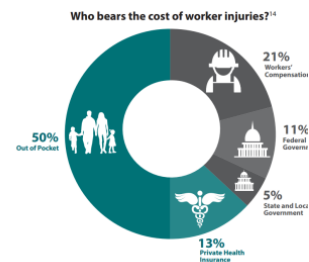
## Economic Cost

Injury/Illness	Year	Cost	Reporting Agency
Fatal and Non-Fatal Work Injuries	2012	\$198 Billion	National Safety Council
Alzheimer's and Dementia	2010	\$159-215 Billion	Rand Corporation
Diabetes	2012	\$245 Billion	American Diabetes Assoc.

*"Statistics are people with the tears washed off."*

OSHA. Adding Inequality to Injury: The Coast of Failing to Protect Workers on the Job. (2014). Retrieved from <http://www.dol.gov/oshareport/20150304-inequality.pdf>

## Bearing the Cost



OSHA. Adding Inequality to Injury: The Coast of Failing to Protect Workers on the Job. (2014). Retrieved from <http://www.dol.gov/oshareport/20150304-inequality.pdf>

## Temporary Workers

- > Despite the training of permanent workers, injuries occur.
- > Consider impact and risks to temporary workers who employers are less likely to invest in training for.
  - ▶ Newly assigned to unfamiliar workplaces.
  - ▶ Often hired through staffing agency.
  - ▶ Reluctant to speak out about training/safety concerns.

## Solution

- > *"...of course, to prevent workplace injuries and illnesses from occurring in the first place."*
- > New January 2015 reporting guidelines established to hold employers accountable for preventing injuries.\*

\*US Department of Labor. OSHA Announces new requirements for reporting severe injuries and updates list of industries exempt from record-keeping requirements. September 11, 2014. Retrieved from [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=NEWS\\_RELEASES&p\\_id=26673](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=26673)

## Mandatory Record Keeping

- Log of every incident involving loss of consciousness, restricted work activity, job transfer, days away from work:
  - Wounds
  - Amputations
  - Back Injuries
  - Serious conditions requiring care beyond first aid
  - Fatal injuries
  - Significant conditions diagnosed by healthcare professional.

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## Severe Injury and Illness Reporting Requirements

- High standards established by OSHA.
- Single incident reporting of sentinel events with OSHA notification within:
  - 8 hours of fatalities
  - 24 hours of non-fatal events including in-patient hospitalizations, amputations or losses of an eye.



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## Worker's Compensation

- Cases are not typically reliable method for identifying safety risks or hazards when establishing prevention guidelines:
  - Under reporting
  - Reporting bias
  - Limited diagnostic information
  - Incomplete or inaccurate information.



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## Injury Analysis

- "Near Misses" which are accidents that do not result in injury can identify weaknesses and areas for safety improvement in the workplace.
- Institute prevention and control measures to minimize risk.
  - Clinicians may play a role in workplace inspection.

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## Non-fatal Injuries

- Increased age of workforce and delayed retirement anticipated to contribute to increased incident of injuries in the future.
- Days away from work to recuperate is highest among workers 65 and over. \*
  - Median 14 days

\*Bureau of Labor Statistics, U.S. Department of Labor, Occupational Employment Statistics, [November 21, 2014] Nonfatal Occupational Injuries and Illnesses Requiring Days Away From Work, 2013  
<http://www.bls.gov/news.release/pdf/osh2.pdf>



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## Lost Work Days

- Days Away from work, Restricted, or Transfer Required (DART) tracked by OSHA.
- Approximately half of the injuries or illnesses require at least 1 day away from work, a job transfer, or a work restriction for recovery to occur.

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## Incidence Trends

- Primarily related to over exertion or body reaction as opposed to falls/slips/trips or violence.
- Greater frequency of cases in nursing assistants than laborers.
- Rate of musculoskeletal disorders in construction and agriculture is half the rate seen in transportation and warehousing workers.



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## Injuries by Gender

- The leading types of injuries among both men and women are the same but men incur them at a greater rate.
- Sprains, strains, or tears
- Soreness and pain
- More women sustain bruises/contusions.



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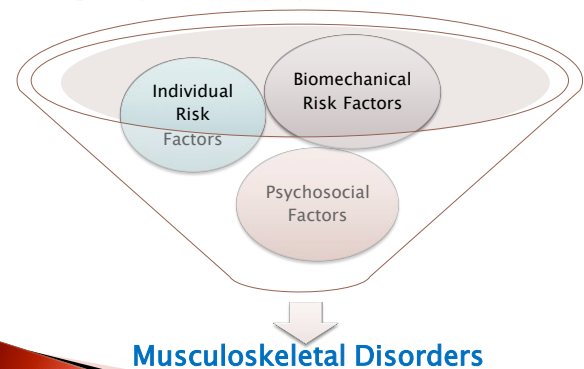
## Injury Incidence Trends

- Overall rates increasing for
  - Heavy and tractor trailer truck drivers
  - Food preparation workers.
  - Building and grounds cleaning and maintenance workers
- Musculoskeletal Disorders (MSDs) highest among
  - Nursing assistants
  - Laborers
  - Freight, stock, and material movers

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## MDS Risk Factors



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## Biomechanical Risk Factors

- Biomechanical factors fall into three broadly categories related to “nature of injury”
  - Awkward Posture
  - Excessive Repetition
  - Forceful Exertions

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## Psychosocial Factors

- Psychological factors which can positively or negatively impact injury incidence:
  - Psychological demands
  - Social support
  - Job satisfaction

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## Individual Risk Factors

- Several factors intrinsic to the individual will contribute to injury.
- Work Technique/Habits
  - Body mechanics
- General Health
  - Chronic disease, Obesity
  - Tobacco and alcohol
  - Rest and Recovery
  - Nutrition and fitness regimen

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## Comorbidities

- Certain chronic diseases appear to increase the occupational injury risk of acute hazard injuries.



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## Causal Relationships

- Examination of longitudinal studies has identified causal relationships with work related musculoskeletal disorders and:
  - High biomechanical demands
  - High psychosocial demands
  - Smoking
  - High body mass index
  - Presence of comorbidities

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## Risk Factors by Body Part

Risk Factor	Neck	Low Back	Shoulder	Knee
Awkward Postures	x	x		
Heavy Physical Work		x	x	x
Low Job Satisfaction and Control	x	x	x	Psychological Distress
Females	x			
Older Age			x	
High BMI				x

da Costa, B. R., & Vieira, E. R. (2010). Risk factors for work-related musculoskeletal disorders: a systematic review of recent longitudinal studies. *American journal of industrial medicine*, 53(3), 266-273.



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## Insomnia

- Defined as difficulty falling or staying asleep which can be transient or chronic.
- Transient may be secondary to illness, stress, travel, or environmental factors.
- Chronic may be secondary due an underlying physical or psychological condition.

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## Insomnia cont.

- Sleep disturbance appears to correlate to increased risk for work injuries.
- Delayed return to work and increased rates of longer term disability also occurs with this population.



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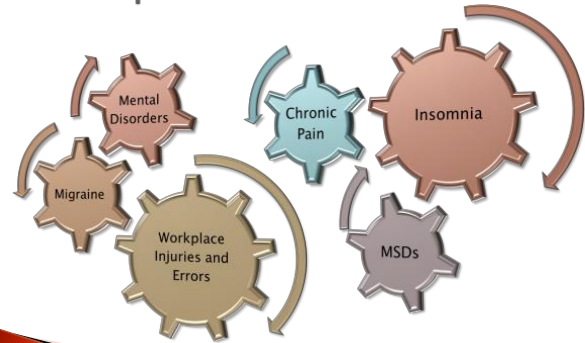
## Insomnia Direct Consequences

- Proportion of workplace accidents and errors associated with insomnia is higher than for many other chronic conditions.\*
- Increase minor injury rates may be attributed to decreased vigilance.
  - ▶ Cognitive impairments
  - ▶ Mood dysregulation
  - ▶ Psychomotor deficit

\*Shahly, V., Berglund, P. A., Coulouvrat, C., Fitzgerald, T., Hajak, G., Roth, T., ... & Kessler, R. C. (2012). The associations of insomnia with costly workplace accidents and errors: results from the America Insomnia Survey. *Archives of general psychiatry*, 69(10), 1054-1063.

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## Consequences or Causes?



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## Mechanisms of Insomnia

- Lack of sleep may alter the individuals health through several mechanisms:
  - ▶ Immune dysfunction
  - ▶ Increased cortisol levels
  - ▶ Dysregulation of the autonomic nervous system
  - ▶ Alterations in metabolism

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## Insomnia and Musculoskeletal Disorders

- Increase musculoskeletal symptoms and delayed tissue healing may occur as a result of insomnia:
  - ▶ Inducing inflammation
  - ▶ Impairing energy metabolism
  - ▶ Increased sensitivity to pain

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## Methods of Reducing Occupational Injury

- Organization should establish integrated processes to evaluate the work environment biomechanics/safety/hazards in relationship to other variables such as co-morbidities and psychological factors intrinsic to works when developing their plan.



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## Total Worker Health Strategy



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## Total Worker Health Strategy cont.

- Individual level interventions focus on educating the workers and building social norms that support worker health
- Environmental/organizational level focus on modifying work environment and organization to support worker health.

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## Occupational Safety and Health Elements

- Management commitment to and employee participation in OSH activities includes policies, funding, and opportunities for employees to report problems/concerns.
- Surveying workers regarding the work environment
- Avoid the tendency to be reactive only implementing/evaluating after a sentinel event has occurred.



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## OSH Elements cont.

- Workplace analysis incorporates assessment of methods, audits, investigations into injuries.
  - Tracking near misses provides valuable information on potential weaknesses in environment and safety policies.
  - Walk throughs for hazards and safety



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## OSH elements cont.

- Hazard prevention and control with accountability deadlines and follow-up inspections of corrective actions.
- Education and training to all employees especially when changing jobs in the company.
  - Body mechanics training
  - Injury prevention training

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## Worksite Health Promotion Elements

- Dissemination of health education information that facilitates behavioral changes.
  - Tobacco, Alcohol, and Substance use
  - Sedentary lifestyle
  - Poor nutrition
  - Stressors and reactions to them

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## WHP Elements cont.

- Linkage of program elements to the organizational goals to encourage balance between work and family.
  - Employee Assistance Programs

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## WHP Elements cont.

- Worksite screening programs linked to follow-up medical care.
- Cholesterol screening
- Mammography
- Annual biometric screening

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## WHP Elements cont.

- Assessment of physical and social environments to promote health and reduce risk of disease.
  - Ergonomic assessment
  - Consider catering and vending machines
- Recognize and modify known risk factors for the development of musculoskeletal disorders (MSD).

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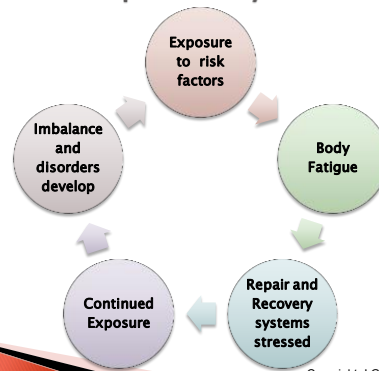
## Musculoskeletal Disorders

- MSDs were previously referred to as cumulative trauma disorders, repetitive stress injuries, overuse syndromes.



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## MSDs Development Cycle



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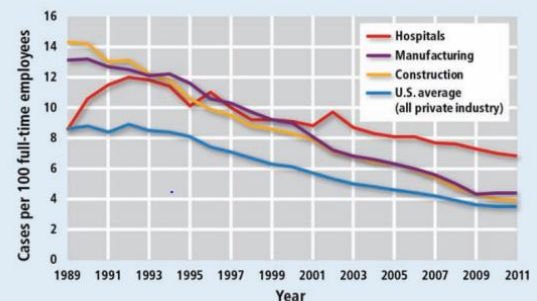
## Top 15 Occupations with MSDs

- Nursing assistants
- Laborers
- Janitors and cleaners
- Heavy and tractor-trailer truck drivers
- Registered nurses
- Stock clerks and order fillers
- Light truck or delivery services drivers
- Maintenance and repair workers
- Production workers
- Retail salespersons
- Maids and housekeeping cleaners
- Police and sheriffs patrol officers
- Firefighters
- First-line supervisors of retail sales workers
- Assemblers and fabricators

Source: Bureau of Labor Statistics, 2011

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## Injury and Illness Rates by Industry, 1989–2011<sup>2</sup>



Data source: Bureau of Labor Statistics

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## Musculoskeletal Disorders

- Classified as MSD when the nature of the work event or exposure leading to the condition is:
  - Body reaction and overexertion
  - Repetitive motion with micro tasks
  - Multiple exertions
  - Vibration body reaction

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## MSD cont.

- Pinched nerve
- Herniated disk
- Meniscus tear
- Sprains, strains, tears
- Pain, swelling, numbness
- Carpal or Tarsal Tunnel Syndrome
- Hernia
- Raynaud's syndrome

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## Contributors to Development

- Industry requirements for higher production rates have altered job tasks leading to increased physical demands on workers.
- Increased use of technology and equipment which may be poorly designed for the varied workforce creates additional physical stresses on worker's bodies.

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## Changing Philosophy

*“Designing the job to fit the worker, rather than physically forcing the worker’s body to fit the job.”*

OSHA, 3125, 2000, Ergonomics: Department of Labor, 11.The Study of Work, U.S

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## Biomechanical Risk Factors

- Awkward Posture
  - Repetitive or sustained awkward postures place excessive force on joints and overload surrounding musculature.

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## Biomechanical Factors cont.

- Excessive Repetition
  - High task repetition is considered a repetitive cycle time of 30 seconds or less
  - Exacerbated by increased job specialization and increased pace of work.

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## Biomechanical Factors cont.

- Forceful Exertions
  - ▶ Increased muscle effort to produce high force induces fatigue.
  - ▶ Availability of equipment to distribute loads may be limited.
  - ▶ Consider grasping force contribution to tissue ischemia and decreased nerve conduction.

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## Biomechanical Factors cont.

- Vibration
  - ▶ Localized excessive vibration from tools can diminish blood flow, damage nerves, and contribute to muscle fatigue.
  - ▶ Whole body vibration impacts multiple joints including spine and places stress on muscle groups.

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## Return to Work Strategies

- Strategies which encourage successful return to work following injury include:
  - ▶ Multidisciplinary participation including the employer
  - ▶ Employee participating in the decision making
  - ▶ Work environment adaptations
  - ▶ Gradual exposure to job related tasks



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## Return to Work cont.

- Individuals with comorbidities need education on the impact of other diagnoses.
- As the history of chronic conditions increases, sustaining acute injuries may become a cycle.

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## Determining Work Capacity

- Both subjective and objective measures provide information for clinicians to assess the ability of the individual to return to work.
  - ▶ Patient self reports of functional abilities
  - ▶ Objective tests and measures
  - ▶ Task simulation
  - ▶ Work place assessment

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## Supporting Return to Work

- Recommendations may include equipment, modification to work space and task performance, body mechanics, and work/rest planning.

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## Healthcare Provider Injuries

- *A hospital is one of the most hazardous places to work according to the Bureau of Labor Statistics.\**

\*[https://www.osha.gov/dsg/hospitals/documents/1.2\\_Factbook\\_508.pdf](https://www.osha.gov/dsg/hospitals/documents/1.2_Factbook_508.pdf)

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## Healthcare cont.

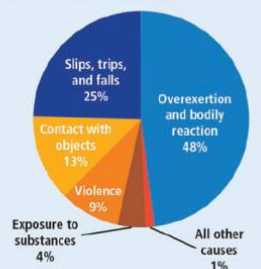
- Musculoskeletal injuries are the leading category of occupational injury in healthcare workers.
- High rate may be related to ethical duty of “Do no harm” but outcome may be decreased patient safety and satisfaction.



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## Causes of Injuries

Figure 6. Hospital Worker Injuries Resulting in Days Away from Work, by Event or Exposure, 2011<sup>7</sup>

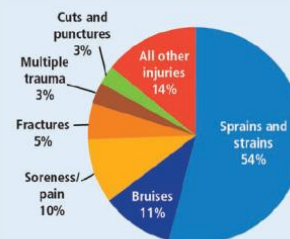


Data source: Bureau of Labor Statistics, 2011 data

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Nearly half of “days away from work” injuries are attributed to overexertion or related events.

Figure 5. Hospital Worker Injuries Resulting in Days Away from Work, by Nature of Injury, 2011<sup>4</sup>

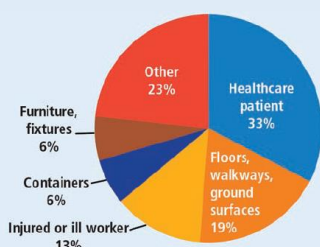


Data source: Bureau of Labor Statistics, 2011 data

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## Sources of Injuries

Figure 7. Hospital Worker Injuries Resulting in Days Away From Work, by Source of Injury, 2011<sup>4</sup>



Data source: Bureau of Labor Statistics, 2011 data

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## Injury Prevention Strategies

- Multifaceted plan needed with specific prevention strategies in the various facets of the organization.

“Workplace safety is inextricably linked to patient safety. Unless caregivers are given the protection, respect, and support they need, they are more likely to make errors, fail to follow safe practices, and not work well in teams.”

— National Patient Safety Foundation, Lucian Leape Institute. *Through the Eyes of the Workforce: Creating Joy, Meaning, and Safer Health Care*<sup>24</sup>



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## Nursing Injuries

- Common injuries in descending order:
  - ▶ Needle stick
  - ▶ Back strain
  - ▶ Other musculoskeletal injuries
  - ▶ Falls
- Profession is also associated with high stress leading to compromised emotional health.

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## Back Injuries in Nursing

- Prevalence highest among any profession internationally even greater than manual laborers.
- Education and body mechanics training alone unsuccessful in decreasing injuries.

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## Patient Handling

- A Minimal Manual Lift Environment incorporating mechanical patient lift equipment does not consistently decrease the incidence of musculoskeletal injuries in the hospital environment.
- Longitudinal surveillance of effectiveness is required based on setting to determine effectiveness.

Schoenfisch, A. L., Lipscomb, H. J., Pompeii, L. A., Myers, D. J., & Dement, J. M. (2013). Musculoskeletal injuries among hospital patient care staff before and after implementation of patient lift and transfer equipment. *Scand J Work Environ Health*, 39(1), 27-36.



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## Non-lifting Contributors

- Stressful patient handling tasks that contribute to risk of injury include:
  - ▶ Repositioning in bed or chair
  - ▶ Changing bed sheets with patient in bed
  - ▶ Patient dressing
  - ▶ Bed to stretcher transfers
  - ▶ Donning anti-embolism stockings on patient

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## Therapy Professional Injuries

- Incident reporting may be diminished and early interventions limited due to the therapy culture of
  - ▶ Not taking time off
  - ▶ Working through pain
  - ▶ Self treating
- These same factors may limit work productivity and efficiency.



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## Impaired Presenteeism Among Therapists

- The productivity measure of presenteeism is defined as being physically present at work but not fully productive.

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## Physical and Occupational Therapist MSDs

- 2012 Study of APTA and NOTA members assessed impact on performance.\*
- Analyzed work output and work impairment to assess productivity.
- Therapy classified as knowledge based, productivity based, physically demanding job requiring complex decision making.

\*Campo, M., & Darragh, A. R. (2012). Work-related musculoskeletal disorders are associated with impaired presenteeism in allied health care professionals. *Journal of Occupational and Environmental Medicine*, 54(1), 64-70.

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## Study Results

- Moderate MSD defined as work related ache or pain rated at least 4/10 VAS, lasting greater than 1 week or present once per month or more.

PT	OT
Low Back	Low back
Wrist/Hand	Neck
Neck	Wrist/Hand
Shoulder	Shoulder

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## Compensations to Maintain Productivity

- Therapist often continue treating full caseloads, but vary work habits.
- Quality not quantity of work may be more impacted.

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## Mind-Body Interventions

- Promoting health and well being through mind-body exercise may enhance physical, emotional and spiritual health reducing work related stress and potential injury.

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## Yoga

- Stress contributes to musculoskeletal disorders particularly back pain, shoulder/neck tension, eye strain, headaches, and carpal tunnel syndrome.

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## Yoga cont.

- Positive impact on work performance potentially product of decrease pain/tension, improve posture, increased energy/attention span, and enhanced feelings of overall wellness/well-being, improved sleep quality.

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## Injury Reduction Strategies

- Strategies need to address all aspects and be specific.
- Clinicians play a role in activity and environment modification.
- Same common practices across various occupations may not be effective.

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## Mechanics of Lifting

- Stresses during lifting are created from the weight lifted and the method of handling the load resulting in torque on the joints.

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## Back Belt Theories of Functioning

- Reduce internal forces on the spine
- Increase intra-abdominal pressure
- Decrease internal forces on spine through semi rigid support
- Restrict bending motion
- Kinesthetic cue for proper lift technique

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## Back Belt Effectiveness

- Research varies as to benefit and highlights potential risk of increased injury.

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## Construction Worker Injury Risk

- Median age of construction workers is increasing.
- The aging workforce may have higher chronic disease and functional impairments prior to injury.

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## Contributing Factors

- Working conditions are demanding with stressful environmental conditions, long work hours, irregular work periods, unpredictable workplaces, non-continuous employment.
- Physical job demands contributing to injury are heavy lifting, material handling, vibrating tools, awkward postures, prolonged static positions.

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## Common Injuries

- When interviewing patients about work task and environment gather information about common ways injuries occur and education/training strategies to minimize exposure.

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## Slips and Falls

- Focus on equipment positioning and body mechanics.

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## Falling debris, materials and objects

- Are awkward postures or fatigue contributing to dropping objects?
- Is rapid twisting or awkward postures to catch or avoid falling objects occurring?

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## Getting Caught Between Objects or Materials

- Can awareness of environment and obstacles be increased?
- Is overexertion contributing to risk as fatigue occurs and reaction time decreases?

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## Mental Stress

- Considering all professions one of the highest rates of suicide and prevalence of musculoskeletal pain among workers.
- Mental distress is a mediator between safety attitudes and injuries as cognitive impairment results in concentration and memory problems.

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## Grocery Stores

- Common physically demanding tasks require force, repetition, awkward posture and static postures:
  - Stocking shelves
  - Checking groceries
  - Pushing carts
  - Bakery work
  - Meat preparation

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## Common Injuries

- Muscle strains and back injuries
- Tendonitis
- Carpal tunnel syndrome
- Rotator cuff injuries
- Epicondylitis
- Trigger Finger

Exposure Risk Assessment:  
REBA  
RULA  
SNOOK tables  
WISHA caution/hazard zones

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## Storewide Modifications

- Push more than pull
- Lifting items should be waist height.
- Incorporate breaks into repetitive motions
- Utilize gloves when handling cold items
- Tools should be the correct size for the worker

Calculators:  
Push/Pull/Carry  
Lift/Lower

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## Storewide Modifications cont.

- Minimize finger force or operation of tools.
- Avoid pinching and utilize power grips whenever possible.
  - Wrapping all fingers and thumb around object to utilize extrinsic muscles of hand.

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## Proper Lifting Mechanics

- Avoid rotating spine.
- Lift with the legs.
- Alter positioning with standing, kneeling and squatting.
- Limit reaching overhead.

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## Best Work Zone

- As far forward as your wrist when you hold your arm bent at the side
- As wide as your shoulders
- Upper level at heart height
- Lower level at waist height



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## Preferred Work Zone

- As far forward as your wrist when you hold your arm out straight
- A foot on either side of your shoulders
- Upper level at shoulder height
- Lower level at tip of fingers with hands held at the side.

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## Cashier

- Avoid quick wrist motions when scanning items
- Objects should be easily scanned the first time.
- Scan heavy/awkward items without lifting.
- Work items should be at elbow height.
- Reading display should not involve twisting or excessive neck motion.
- Utilize anti-fatigue mat and/or footrest

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## Consider the Small Details

- Maintain wheels on racks and carts.
- Ensure knives, deli slicers, and box cutters are sharp.
- Rotate stocking shelves at different levels
- Work from the long side of pans and trays.
- Can the space be rearranged?

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## Meat Packing Plants

- Confined space standards designed to protect employees from workplace hazards associated with asphyxiation, engulfment, contact with moving parts, and exposures to hazardous chemicals.
- Work station design for multiple statures, work method design avoiding static, extreme force, repetitive motions, and tool and handle design must be evaluated.

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## General Guidelines

- Avoid prolonged static or awkward postures.
- Inspect for continued contact of body parts with work surfaces.
- Evaluate vibration from power tools.
- Use protective equipment for cold temperatures.
- Utilize appropriate size hand tools for worker.

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## Carpal Tunnel Syndrome

- Repetitive wrist motions of plucking, cleaning, cutting, and trimming.
- Less incidence among workers in sanitation, packing, and chilling than those performing more repetitive motions.
- Conditioning period should be incorporated for return to work and workers new to tasks.

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## Handle Designs

- Knives, pliers, scissors can minimize wrist motions, finger force, and contact stress to fingers/palm.
- The handle should be perpendicular to the line of action and extend at least the length of the palm.

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## Handles cont.

- Pistol grip handles best for neutral wrist during slicing or on spray nozzles.
- Wrap around handles allow relaxation of grip.
- Textured handles reduce vibration.
- Spring force designed tools minimize fatigue.



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## Table Height

- For standing tasks tilted tables reduce wrist motion.
- For close visual inspection table should be slightly higher than elbow.
- For low force manual tasks table should be slightly below elbow height.

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## Table Height cont.

- For low force manual tasks, table should be slightly below elbow height.
- When packing, consider height of box when determining appropriate table height.
- For heavy force, table height should be below elbow.

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## Conveyor Belts

- Typically designed for taller employees so shorter workers must use platform.

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## Carts

- Optimal shelf height should range from knuckles with arm straight at side up to shoulder.
- Vertical handles allow workers to adjust hand placement to be at elbow height.
- Solid hard wheels used on concrete or hard surfaces. Pneumatic wheels better for rough uneven surfaces.

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## Farmers

- Injuries resulting in long term pain diminish work capacity resulting in additional negative consequences:
  - Lower farm income
  - Poor quality of life
  - Onset of stress or depression

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## Farmers cont.

- The most prevalent MSDs among farmers in order are low back pain, upper extremity followed by lower extremity.
- Work exposures contributing to injuries include:
  - Lifting/carrying heavy loads
  - Frequent trunk flexed positioning
  - Unpredictable actions of livestock
  - Vibration exposure from operating heavy farm vehicles and power tools.



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## Work Safety Climate

- Suggested that workers are aware of the occupational hazards and risks intrinsic to farming which are expected and accepted.
- This may result in a culture of poor worker safety.
- Minor changes can have significant positive impact such as using smaller harvest tubs and lifting handles.



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## Migrant Workers

- Migrant workers may be at greater risk of injury as they are more likely to comply with employer expectations and have less regard for individual safety.

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## Conclusion

- Multiple ways the clinician can apply knowledge of workplace injuries for prevention programs in addition to return to work.

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## Workplace Injuries Resource Links

### Exposure Risk Assessment Tools

RULA

<http://ergo.human.cornell.edu/ahrula.html>

REBA

**[https://www.physio-pedia.com/Rapid\\_Entire\\_Body\\_Assessment\\_\(REBA\)](https://www.physio-pedia.com/Rapid_Entire_Body_Assessment_(REBA))**

SNOOK Liberty Mutual Manual Materials Handling Tables

[https://libertymmhtables.libertymutual.com/CM\\_LMTablesWeb/taskSelection.do?action=initTaskSelection](https://libertymmhtables.libertymutual.com/CM_LMTablesWeb/taskSelection.do?action=initTaskSelection)

WISHA Hazard Zones Jobs Checklist

<http://lni.wa.gov/safety/SprainsStrains/evaltools/HazardZoneChecklist.PDF>

WISHA Caution Zones Jobs Checklist

<http://www.lni.wa.gov/safety/SprainsStrains/evaltools/CautionZones2.pdf>

### Job Task Modification

Oregon OSHA Lifting Calculator App

<http://osha.oregon.gov/OSHAPubs/apps/liftcalc/lifting-calculator-app.html>

Push/Pull/Carry Calculator

**<http://worksafebcmedia.com/misc/calculator/ppcc/#welcome>**

Lift/Lower Calculator

**<http://worksafebcmedia.com/misc/calculator/lc/>**

NIOSH Ladder Safety App

<https://www.cdc.gov/niosh/topics/falls/mobileapp.html>