



Work-Related Musculoskeletal Disorders (WMSDs) in Washington State Health Care

A Summary of Research Study Findings

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Why do we study sprains and strains and overexertions?

The health care sector in Washington State includes a range of industries. Workers in these environments face a multitude of occupational safety hazards, from cuts and burns to exposure to hazardous materials and acts of violent aggression.

However, the most common and most costly type of injury health care workers incur is injury to the muscles, tendons, ligaments and joints, generally referred to collectively as work-related musculoskeletal disorders (WMSDs). These injuries can result from years of accumulated stress on these structures. Common risk factors for WMSDs include repetitive motions, awkward body postures, forceful hand exertions, and heavy manual material handling.

In 2010 the Safety and Health Assessment and Research for Prevention (SHARP) Program, began a five-year study exploring the physical and organizational factors that may contribute to WMSDs in nursing homes and community care centers for the elderly. Through interviews with company managers, employee representatives, and injured workers, researchers gained insight into the organizational climate, the nature of existing safety programs and the context within which



WMSDs occur. During site visits to health care facilities, SHARP researchers assessed physical risk factors for hundreds of jobs using a combination of well-researched evaluation instruments. This report draws on the data collected and summarizes the results of the analyses performed.

What are the injury trends in Health Care?

According to Washington State workers' compensation (WC) claims data from 2002-2010, health care ranks second when compared to other industry sectors in its compensable claims rate of WMSD injuries (for claims that involved more than 3 days away from work).

Seven health care industry groups rank in the top 25 when ranking industry groups within all industry sectors by WC compensable claims incidence rate.

Community Care Facilities for the Elderly has the highest number of lost work days among all Health Care groups.

Within health care, the top five industry groups by claims rate are:

1. Residential Mental Retardation, Mental Health and Substance Abuse Facilities
2. Psychiatric and Substance Abuse Hospitals
3. Other Ambulatory Health Care Services
4. Nursing Care Facilities
5. Community Care Facilities for the Elderly

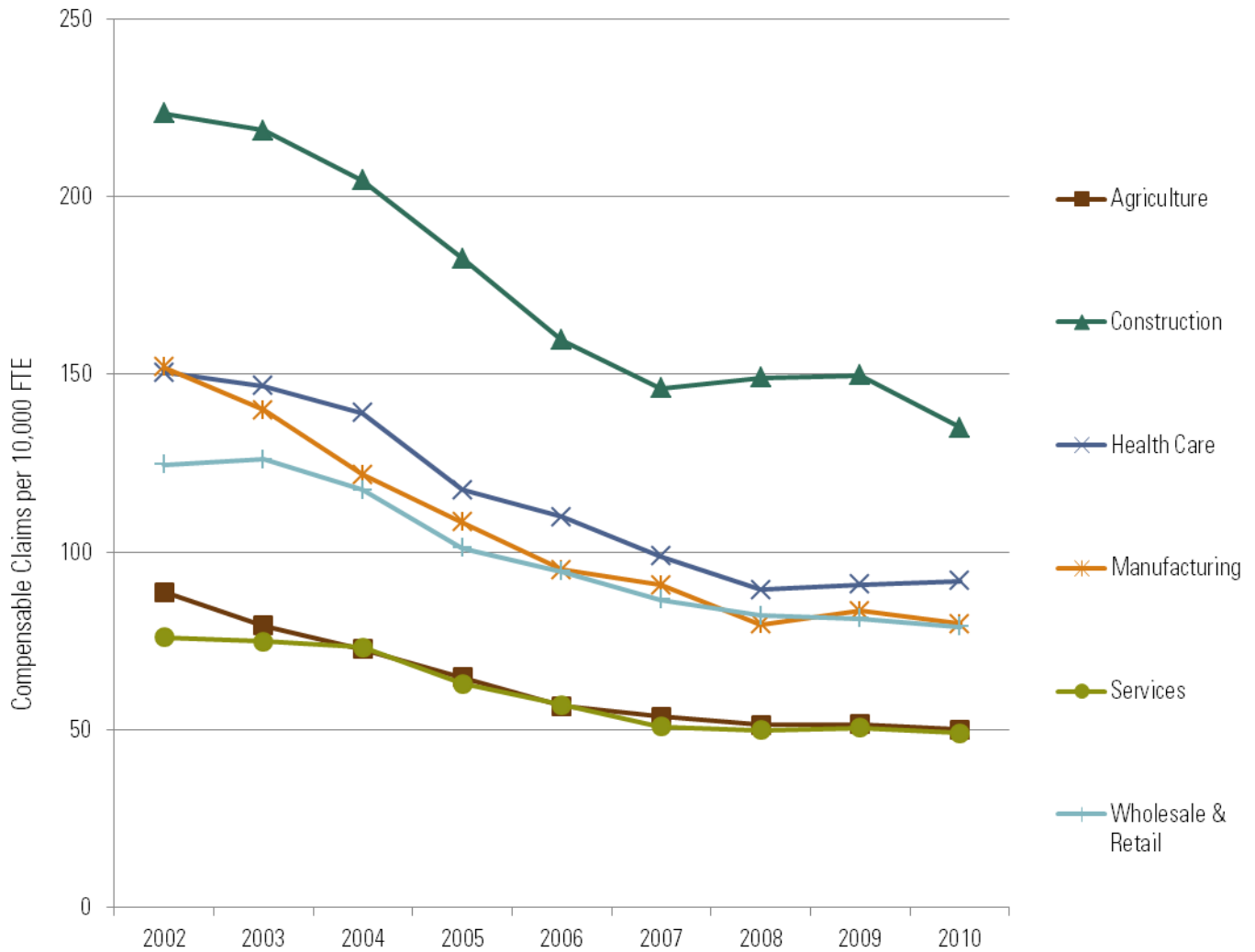
Community Care Facilities for the Elderly has the highest number of lost work days among all Health Care groups (652,111 lost days). When ranked by non-medical costs, General Medical & Surgical Hospitals is the highest industry group (\$97,059,216).

Injuries of the back are the most commonly reported WMSD injury, compared to other body areas.



How does Health Care compare to other industry sectors in Washington State?

Washington State, Compensable WMSD Claims Rates, 2002-2010^{1 2}



¹ Compensable Claim = a claim that involved more than 3 days away from work

² FTE = full time equivalent, an employee working 2000 hours/year

Which industry groups in Health Care have high WMSD claims rates?

Top 25 Study Industry Groups by Claims Rate, 2002-2010*

Industry Sector	Industry Group Description	Incidence Rate Per 100 FTE**
Services	Waste Collection	2.92
Health Care	Residential Mental Retardation, Mental Health and Substance Abuse Facilities	2.76
Health Care	Psychiatric and Substance Abuse Hospitals	2.64
Wholesale & Retail Trade	Beer, Wine, and Liquor Stores	2.41
Health Care	Other Ambulatory Health Care Services	2.40
Wholesale & Retail Trade	Vending Machine Operators	2.31
Construction	Foundation, Structure, and Building Exterior Contractors	2.15
Manufacturing	Other Furniture Related Product Manufacturing	2.12
Services	Spectator Sports	1.98
Health Care	Nursing Care Facilities	1.98
Manufacturing	Dairy Product Manufacturing	1.96
Wholesale & Retail Trade	Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers	1.86
Health Care	Community Care Facilities for the Elderly	1.81
Construction	Building Finishing Contractors	1.81
Construction	Residential Building Construction	1.73
Agriculture	Aquaculture	1.71
Wholesale & Retail Trade	Grocery and Related Product Merchant Wholesalers	1.68
Manufacturing	Clay Product and Refractory Manufacturing	1.65
Health Care	General Medical and Surgical Hospitals	1.65
Agriculture	Poultry and Egg Production	1.64
Wholesale & Retail Trade	Grocery Stores	1.64
Wholesale & Retail Trade	Department Stores	1.60
Manufacturing	Sawmills and Wood Preservation	1.59
Manufacturing	Electric Lighting Equipment Manufacturing	1.59
Health Care	Other Residential Care Facilities	1.58

*Washington State, all compensable WMSD claims. This table lists only those industry groups included in the present study, such that the Transportation & Utilities industry group has been omitted. Very small industry groups (those with 50 companies or fewer) have also been excluded.

**FTE = full time equivalent, an employee working 2000 hours/year

What is the burden of WMSD's in Health Care?

Cost and Lost Days in Healthcare (Industry Groups by Rate Rank), 2002-2010*

Industry Group	Non-Medical Costs	Lost Work Days**	Incidence Rate Per 100 FTE***	Rate Rank
All Industries	\$3,881,386,921	28,354,928	0.89	--
All Healthcare	\$394,454,635	3,313,156	1.14	--
Residential Mental Retardation, Mental Health and Substance Abuse Facilities	\$14,912,652	148,408	2.76	1
Psychiatric and Substance Abuse Hospitals	\$12,072,448	105,866	2.64	2
Other Ambulatory Health Care Services	\$9,231,651	53,214	2.40	3
Nursing Care Facilities	\$41,677,749	510,303	1.98	4
Community Care Facilities for the Elderly	\$45,970,204	652,111	1.81	5
General Medical and Surgical Hospitals	\$97,059,216	52,257	1.65	6
Other Residential Care Facilities	\$9,878,368	113,261	1.58	7
Vocational Rehabilitation Services	\$11,354,423	132,266	0.97	8
Individual and Family Services	\$21,486,707	317,101	0.93	9
Community Food and Housing, and Emergency and Other Relief Services	\$4,668,017	71,891	0.91	10
Home Health Care Services	\$25,088,210	345,414	0.64	11
Offices of Physicians	\$38,427,445	229,841	0.62	12
Child Day Care Services	\$11,275,604	134,548	0.59	13
Offices of Other Health Practitioners	\$9,489,490	97,941	0.44	14
Outpatient Care Centers	\$10,036,171	89,839	0.43	15
Medical and Diagnostic Laboratories	\$6,200,196	52,997	0.41	16
Offices of Dentists	\$25,176,232	201,763	0.41	17

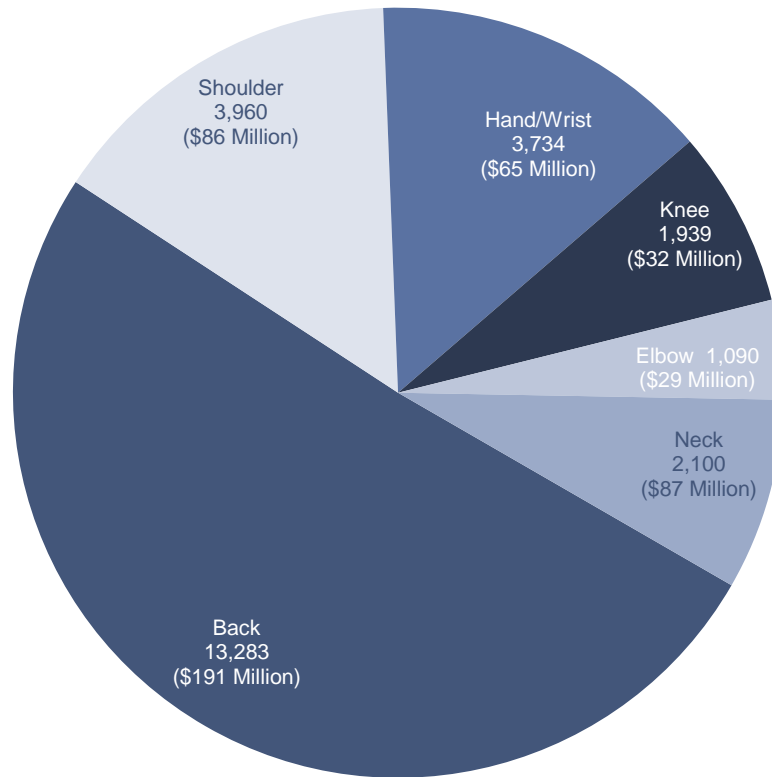
*Washington State, All Compensable WMSD Claims

**Lost work days included total time loss for state fund claims only; does not include self-insured employers.

**FTE = full time equivalent, an employee working 2000 hours/year

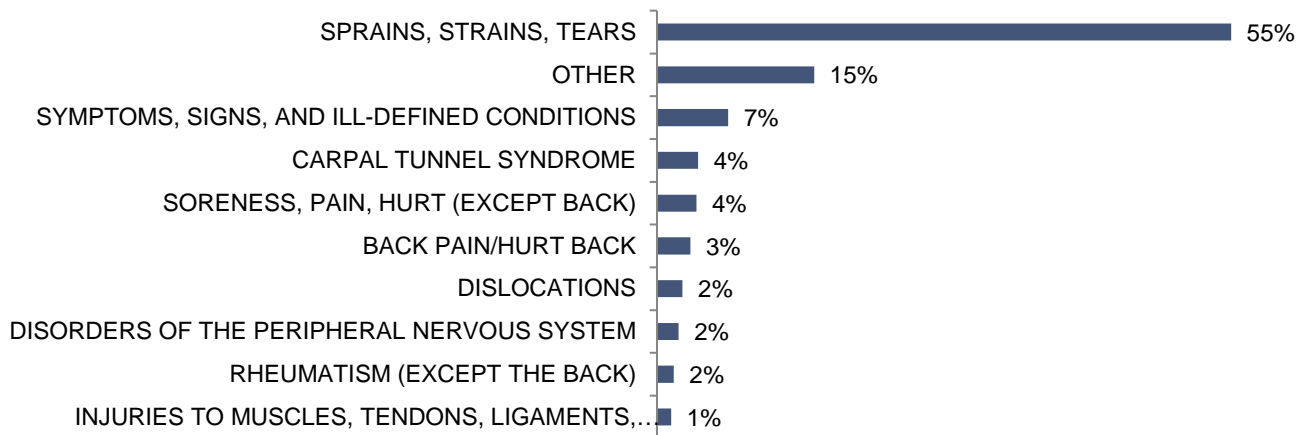
What kind of WMSD injuries are occurring in Health Care?

WMSD Claims & Non-Medical Costs in Health Care by Body Area, 2002-2010³



Number of Claims (and Non-Medical Costs)

WMSD Claims in Health Care – Top 10 “Nature of Injury” Categories, 2002-2010⁴



³ Washington State, All Compensable WMSD Claims. A claim may include more than one body area. WMSD claims with uncategorized body area have been excluded.

⁴ Washington State, All Compensable WMSD Claims. Excluded categories include remaining 4% of claims.

What are the physical risks in Health Care?

Focus Industry Groups:

- ▶ Nursing Care
- ▶ Community Care

Methods

To assess the physical risk factors in health care, SHARP researchers visited 10 nursing care facilities and 6 community care facilities. At each site, we assessed risk factors specific to 4 body parts: the back, the shoulder, the hand and wrist, and the knee. A total of 458 jobs were assessed for WMSD risk factors. Based on the exposure to these risk factors, we determined the magnitude of risk of injury as either low, moderate, high, or very high.

The physical risk factors that were evaluated are those that have been associated with WMSDs. These risk factors are:

- Awkward postures
- Heavy, frequent lifting
- Pushing, pulling, carrying
- High hand forces
- Highly repetitive motions
- Repeated impacts of the hand or knee
- Vibration (whole body; hand)

Results

The charts in the following pages display some of the notable findings from our analyses.

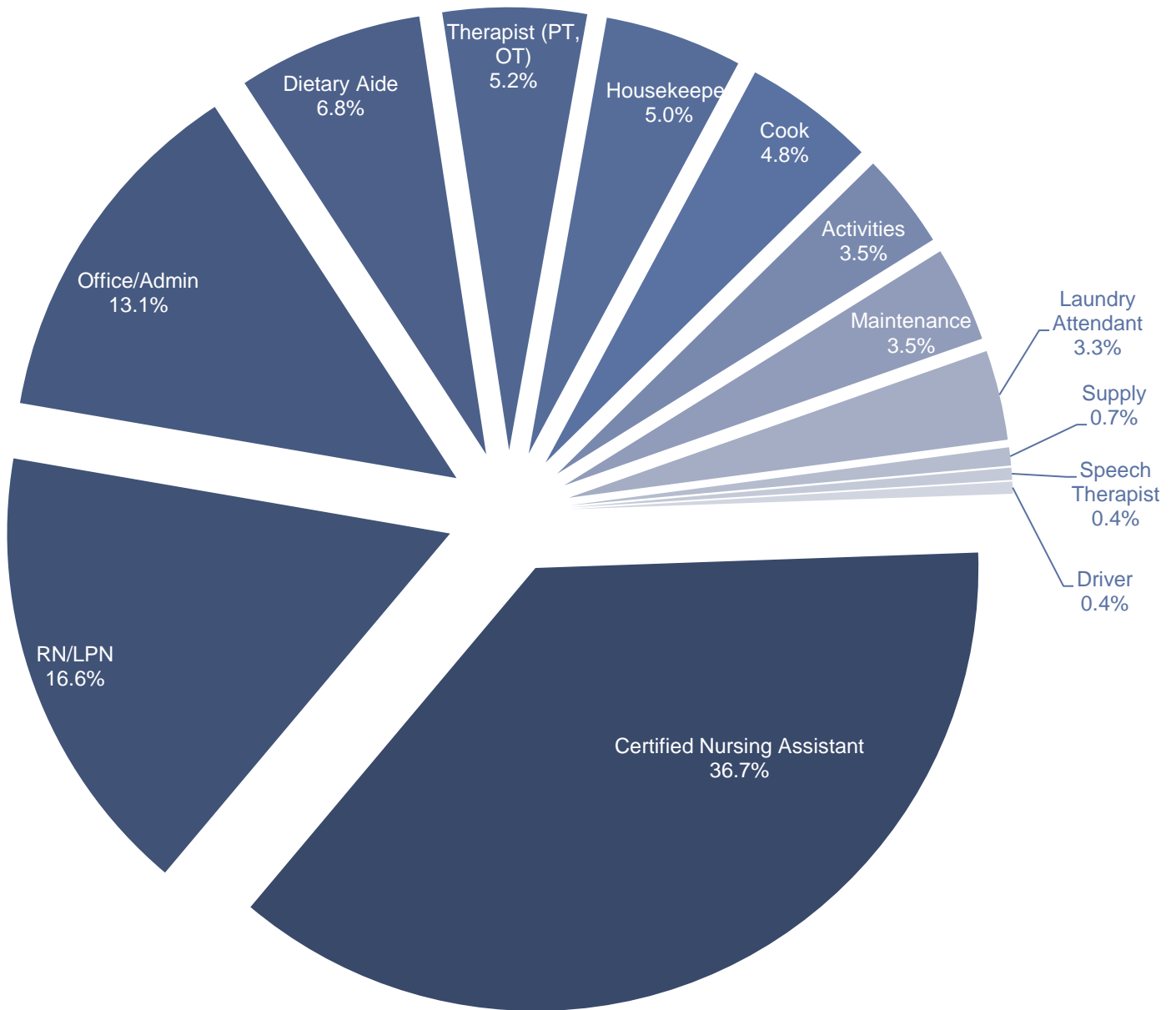
- Job Categories Assessed
- Level of Risk for Back Injury from Lifting
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- Level of Risk for Hand or Wrist Injury from Awkward Wrist Postures

The charts that follow illustrate the level of risk (very high, high, moderate, low) posed by each risk factor. The level of risk is determined by these factors:

- The duration of exposure to the risk factor (How long?)
- The frequency of exposure to the risk factor (How often?)
- The intensity of the exposure to the risk factor (How much?)

Job Categories Assessed

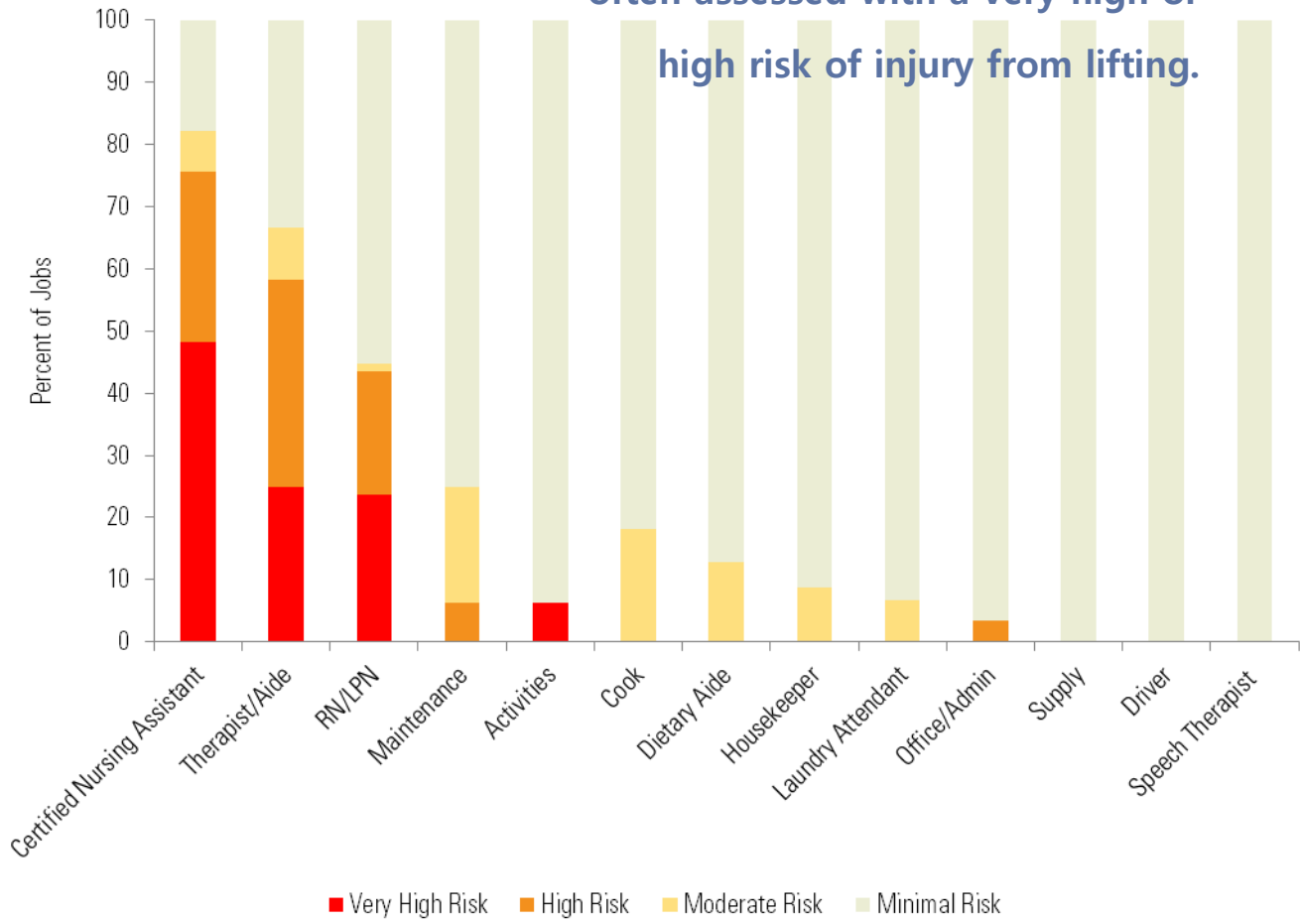
We assessed a representative sample of each site's job categories. Each item below shows the percentage of all workers observed in the study.



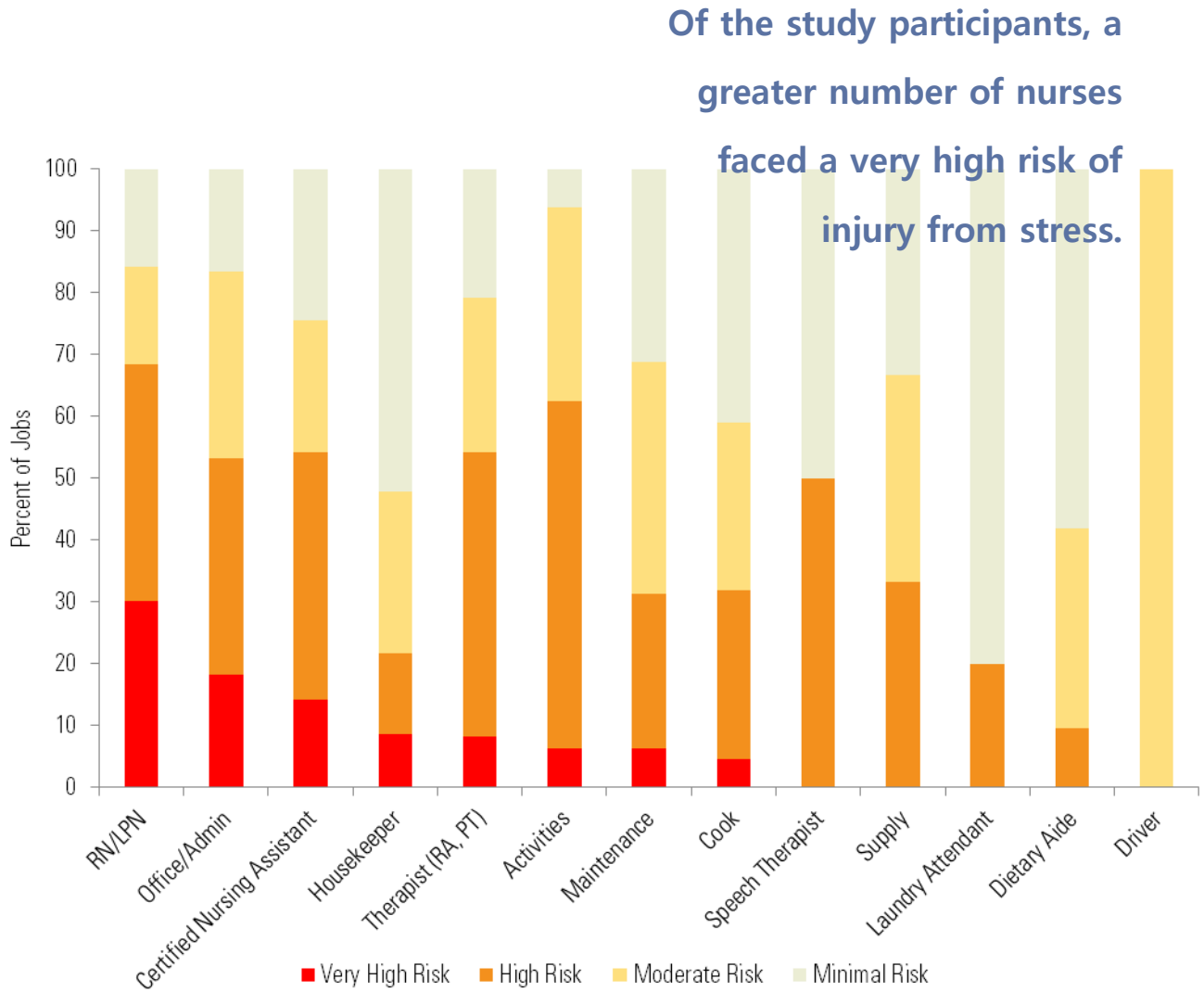
Percent of Workers

Level of Risk for Back Injury from Lifting

Those jobs most commonly associated with patient handling were most often assessed with a very high or high risk of injury from lifting.

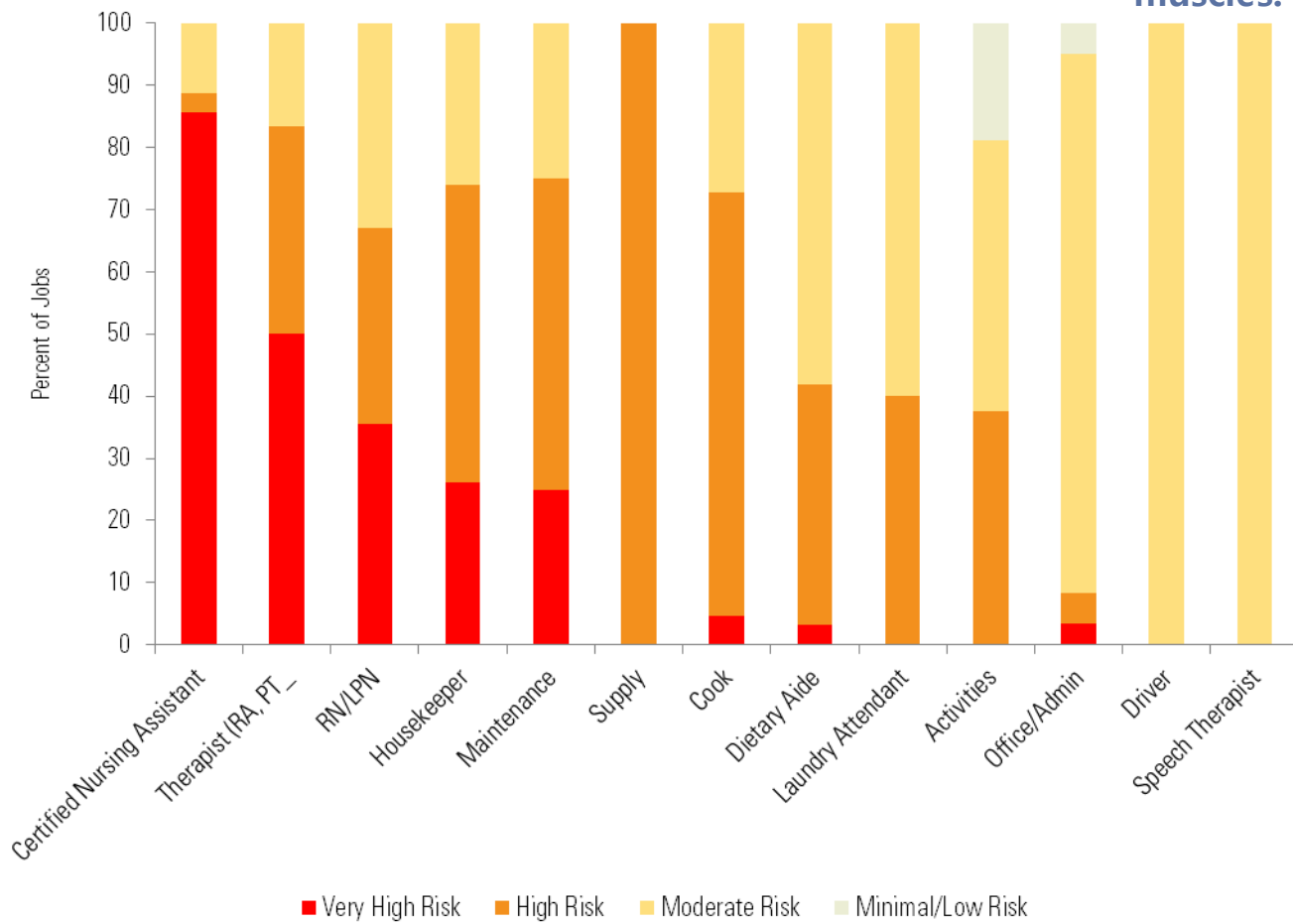


Level of Risk from Work-Related Stress



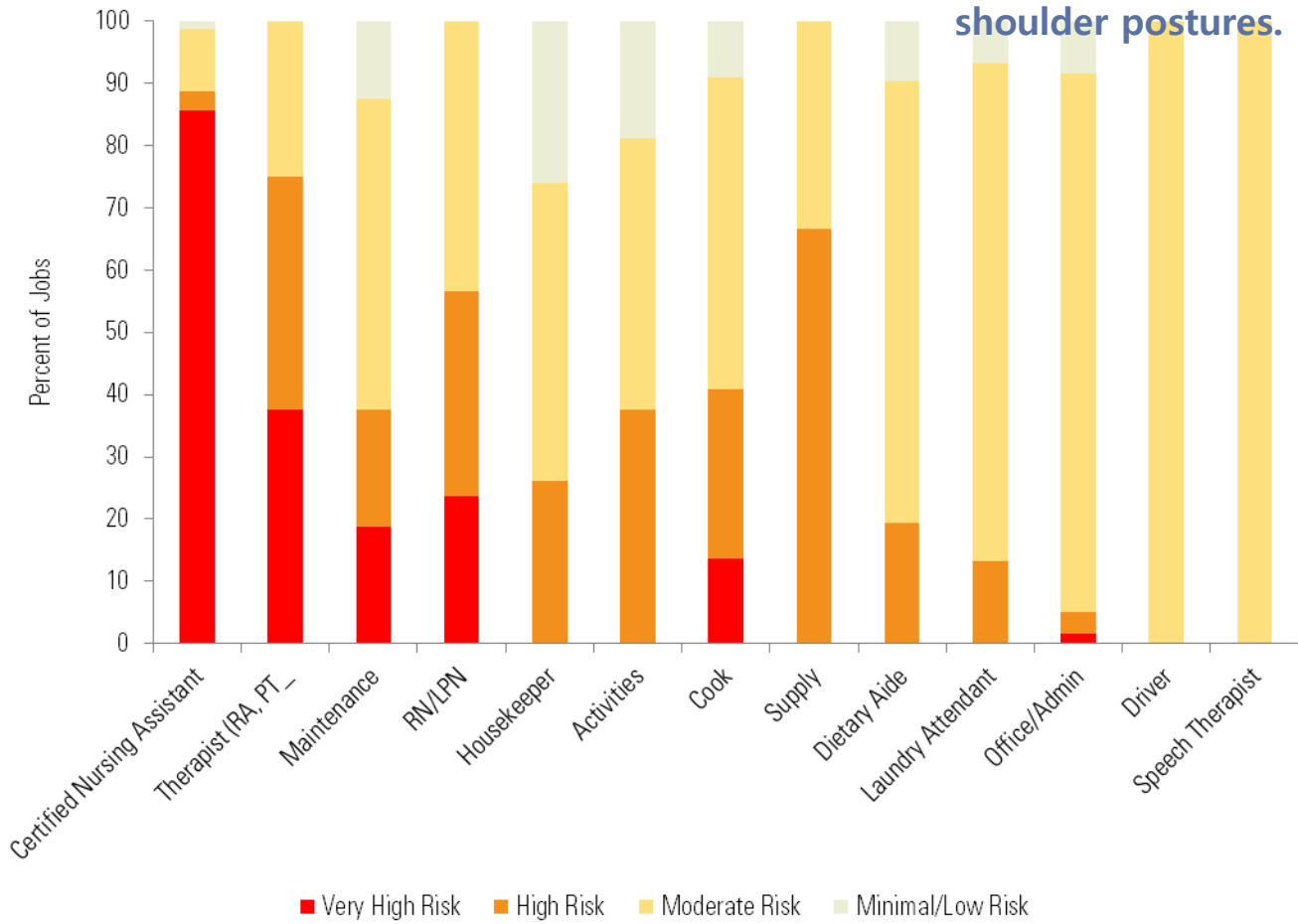
Level of Risk for the Back from Static Back Postures

Static postures are defined as: physical exertions where the same position is held for a period of time. These types of exertions put increased loads on the muscles.



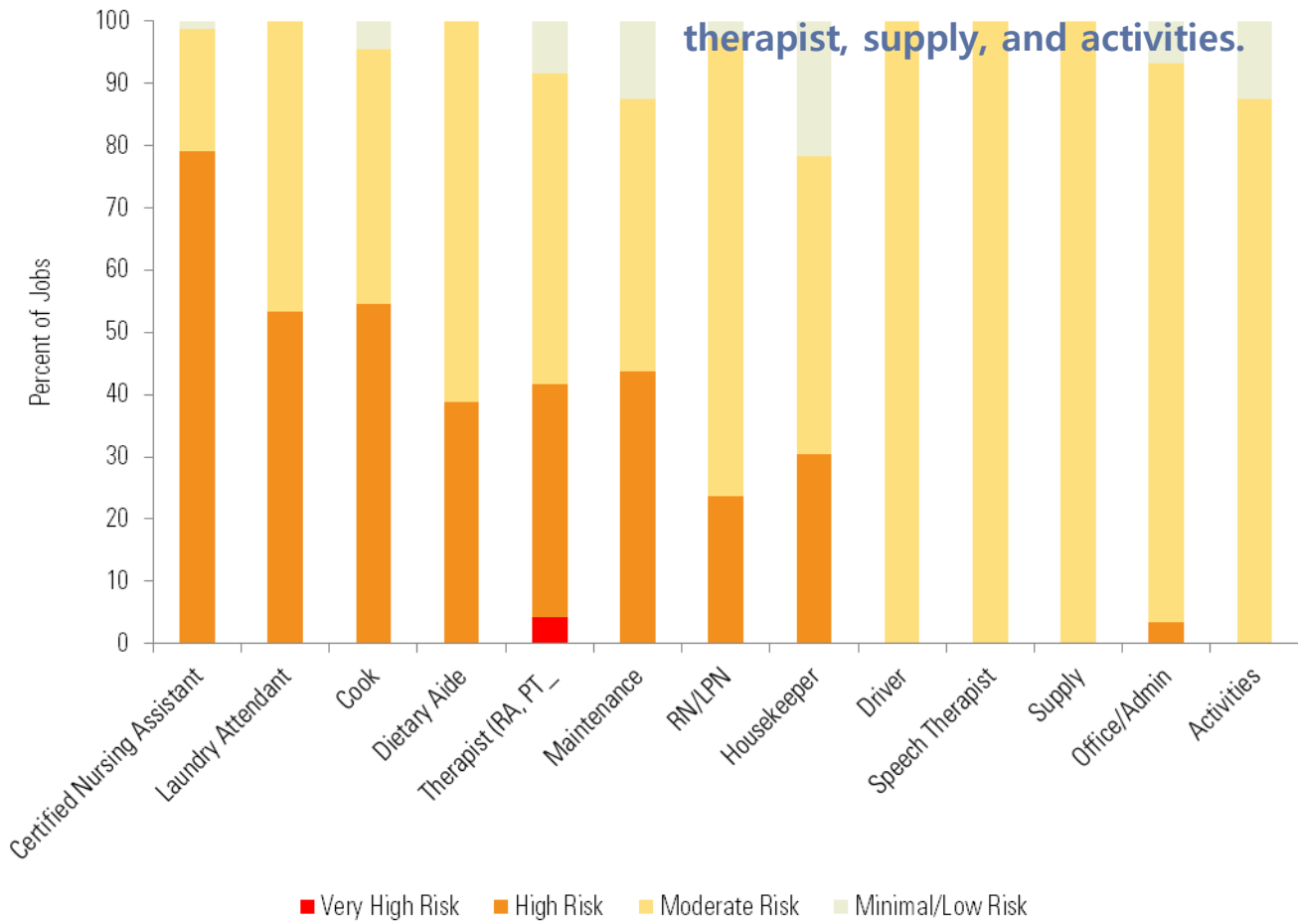
Level of Risk for Shoulder or Arm Injury from Awkward Shoulder Postures

Therapists and CNAs face the highest risk from awkward shoulder postures.



Level of Risk of Hand or Wrist Injury from Awkward Wrist Postures

We found high levels of risk for hand or wrist injury in all job categories except: driver, speech therapist, supply, and activities.



Discussion

Many of the physical demands in health care, such as lifting and pushing, are not equivalent to the traditional manual material handling demands associated with the industrial setting. As such, many common material handling assessment tools are not well-suited for evaluating patient handling tasks.

Handling people is inherently different from handling objects. Lifting a person is not the same as a traditional lift in which the object is completely supported by the worker and the object maintains a rigid shape. Oftentimes in health care, patients are capable of partially supporting their own weight. In these cases, it is difficult to know the patient weight actually borne by the worker.

Pushing actions in health care are often different than pushing objects. Rolling or turning a patient in bed can be accomplished by “pushing” the patient onto her side; however, this is not the typical definition of a “push.” The common action of repositioning patients in bed by sliding them cannot be captured by existing measures. In addition, patient handling is complicated by the varying acuity of patients, some of whom experience Alzheimer’s disease, end-of-life needs, rehabilitative needs, and other special needs (such as bariatric issues). With this variety comes variation in worker exposure to hazards, such that risk is variable with patient population.



Physical Job Evaluation Checklist for Health Care

In an effort to help increase general awareness of physical factors that contribute to work-related musculoskeletal disorders and injuries (WMSDs), such as sprains and strains, SHARP researchers developed a Physical Job Evaluation Checklist tailored especially for workers in the health care sector. This checklist can quickly assess levels of risk for the back, shoulder, hand/wrist, and knee in a given job.

The Physical Job Evaluation Checklist was developed from observations of the more common jobs performed in nursing homes and community care centers and the evaluation of WMSD risk based on those observations. The checklist is comprised of items for WMSD risk factors that were assessed to pose more than a minimal risk.

While the checklist was developed using observations from nursing homes and community care centers, other industries in health care have similar job activities, such as patient handling and medication dispensing and may benefit from the use of the Physical Job Evaluation Checklist.

This checklist is **not** intended to predict injury. Instead, the purpose of the Physical Job Evaluation Checklist is:

- 1) To help identify aspects of the job that pose a risk for back, shoulder, hand/wrist and knee injury
- 2) To help prioritize injury prevention efforts by identifying the jobs or the aspects of the job that pose the greatest risk of injury

Physical Job Evaluation Checklist, Health Care - SHARP Program, Washington State Department of Labor and Industries

TUTORIAL	JOB BASICS	BACK	SHOULDER	NECK
HAND EXERTIONS	REPETITION / HAND	PINCH GRIP	LIFTING	CARRYING
WHEELING/PULLING	HANDCARRIAGE/VEHICLES	WHOLE BODY VIBRATIONS		

PINCH GRIP

DURATION

Total hours DURING THIS WORK pinching an unsupported object weighing 2 lbs. or more PER HAND or using a force of 4 lbs. or more PER HAND (like pinching half a ream of paper) for: hours

IF DURATION IS MORE THAN 3 HOURS:

Does this work also involve: No other risk factors, OR

Select all that apply below:

Highly repetitive motions

Wrist flexion > 30°

Ulnar deviation > 30°

Wrist extension > 45°

Download the checklist (click here)

HOME PAGE
HEALTH CARE

Welcome to the Physical Job Evaluation Checklist!

This checklist is intended to help the user determine the level of risk of developing work-related musculoskeletal disorders and injuries (WMSDs) through the observation and measurement of the work performed. Users of the checklist will be able to identify high risk jobs and be able to prioritize injury prevention efforts. This checklist can also be used to evaluate injury prevention solutions by comparing pre- and post-solution results. This tool cannot, however, predict injury or provide specific suggestions or solutions for reducing risk.

INSTRUCTIONS

- 1 Select the industry sector you are working with by clicking SELECT INDUSTRY.
- 2 To collect observational data, begin by clicking PRINT PAPER FORM.
- 3 Print a copy of the form for each job/task you plan to assess.
- 4 Observe the work performed by the worker as you fill out each page of the form.
- 5 After completing the form, return to this screen, select your industry, and click LAUNCH CHECKLIST.
- 6 Transfer your information from the paper form to the fields in the electronic checklist.
- 7 For some sections of the checklist, certain fields are required to calculate risk. However, you are not required to complete all sections.
- 8 Based on the results of the job report, consider ways you can change work practices and improve processes at your organization in order to minimize worker risk.

SELECT INDUSTRY PRINT PAPER FORM LAUNCH CHECKLIST

Developed in Excel 2010 for Windows. Other versions may cause errors. Ver. 1.0, September 2016

Recommended screen resolution is 1920x1080. Washington State Department of Labor & Industries

<http://www.lni.wa.gov/Safety/Research/Wmsd/WMSD2010>

Start With the Basics: General Principles for Preventing Musculoskeletal Injuries and Disorders

The physical risk factors in a workplace that can contribute to the development of musculoskeletal injuries and disorders can be both numerous and complicated. However, there are several basic principles and “safe practices” that should be considered when attempting to eliminate or reduce these physical risk factors. If you have jobs that have more than one of these risk factors occurring at the same time (combination exposures), these should be your first priority for improvement. Finally, involve workers in brainstorming solutions if physical risk factors are found.

Awkward Postures:

Avoid holding the body in the same position for long periods of time (static postures).

- Try to move from that posture, even if for a short period of time (micro-pauses).
- Use a machine to do the task.
- Keep the body moving (dynamic movements)--vary the levels or distance in which the work is performed.

Avoid working with the limbs far from the torso.

- Adjust (lower) the height of the work to below shoulder level.
- Frequently performed activities should be performed directly in front of the body.

Avoid hand tools or the orientation of objects that cause the wrist to bend up (extension) or down (flexion) or to the side (ulnar deviation).

- Use tools with bent handles.
- Use jigs or work surfaces that can orient the object to keep the wrist straight.

Avoid working with the back bend forward (back flexion) for long periods of time.

- Raise the work to at least waist level.
- Provide a stool so that workers can sit while doing the lower activities.
- Alternate with work that is performed standing up straight.

High Hand Forces:

When grasping an object with any kind of force, avoid using a pinch grip (grasping with the tips of the fingers). A power grip (holding the object with the fingers wrapped around it) can generate more force.

- Use a vise or a jig to hold the object.
- Use a tool to hold the object that requires a power grip.

Repetitive Motions:

Avoid having to perform quick motions repeatedly.

- See if it is possible to use a machine instead.
- Alternate the performance of repetitive tasks with less repetitive ones.

Heavy, Awkward and Frequent Lifting:

Avoid lifting objects that:

- 1) can't be lifted close to the body,
 - 2) require twisting during the lift,
 - 3) are too big or of a shape that doesn't allow a good hold by the hands,
 - 4) require the start and end of the lift to be greater than between knee or shoulder level.
- Use a machine to do the lifting.
 - Arrange space so that heavier objects are kept between knee and shoulder height.
 - Store less used, lighter, smaller objects below knee level or above shoulder level if there are no other alternatives.

Myth Busters: Safe Patient Handling & Mobility (SPHM)

Myth: Proper body mechanics (including use of gait belts) prevents patient handling injuries.

"People just need to practice good body mechanics. People get in such a rush they forget." --CNA

- Because body mechanics guidelines for safe lifting are often based on research conducted with male subjects lifting boxes vertically from the floor, they may not be adequate for preventing injuries from lifting a human patient.
- Decades of research shows that "proper" body mechanics are not an effective way to reduce injuries.
- There is no such thing as safe manual patient lifting.

Myth: Safe patient handling & mobility technology is not affordable.

"This is an old facility, and trying to update it costs a lot of money." --Maintenance Tech

- The benefits of safe patient handling and mobility equipment include a rapid return-on-investment.
- Savings associated with reduced health care worker and patient injuries far outweigh the costs.
- A common mistake in the acquisition of assistive equipment is selecting equipment without adequate input from health care workers. The result may be equipment inappropriate for the patient population or that staff do not use.

Myth: Most of the time, manually lifting or transferring patients does not result in injury.

"I've done this transfer numerous times before with the same resident and this hadn't happened. For me there was no inclination that my shoulder would have done anything like that in this type of situation." --CNA

- Manual lifting may result in micro-injuries. Although the health care worker may not feel the effects immediately, cumulative micro-injuries can result in a debilitating injury.
- One estimate sets the maximum recommended weight limit at 35 pounds for patient handling tasks⁵.

⁵ Waters, T. R. (2007). When is it safe to manually lift a patient? *Am J Nurs*, 107, 53-58; quiz 59.

Myth: Health care workers who are physically fit are less likely to be injured.

"It's a hard industry. It's just a very demanding job. It takes a special kind of person to do what we do." --CNA

- Research does not support this.⁶ Body mass index (BMI), often used as a measure of obesity, was found to have no relationship with work-related low back symptoms.⁷
- Good health and strength may actually put health care workers at increased risk because their peers are much more likely to seek their assistance when manually lifting health care recipients.

Myth: It's much faster to manually move patients than to take the time to get SPHM technology.

"I was helping him get into position so he could be put in the sling to get up in the Hoyer. But he gets frustrated, so he decided he would kind of use my arm for leverage." --CNA

- Adequate (and on-going) investments in both SPHM devices and dedicated storage areas help encourage staff to use equipment as well as meet the increasing demands for such technology.
- It is often more time consuming to round up a team of colleagues to manually lift a health care recipient than it is to get the SPHM technology.

Myth: Using patient handling equipment reduces patient mobility and independence.

- Research supports the use of SPHM equipment, even during rehabilitation activities, because of its ability to prevent injuries to both patients and staff.
- SPHM equipment can be used effectively during mobility treatment activities.

⁶ Nelson, AUDREY L. (2001). Patient care ergonomics resource guide: Safe patient handling and movement. Tampa, FL: Veterans Administration Patient Safety Center of Inquiry.

⁷ Smedley, J., Egger, P., Cooper, C., & Coggon, D. (1997). Prospective cohort study of predictors of incident low back pain in nurses. British Medical Journal, 314 (7089), 1225-1228.

Safe Patient Handling & Mobility (SPHM): The Basics

Implement a No-Lift policy

- Following SPHM policies should be no different than following policies that are implemented to protect against needle sticks, blood-borne pathogens, or the spread of infectious disease. All are in place to protect the health of the staff and patients.
- Minimize patient lifting and eliminate patient lifting wherever possible.
- A no-lift policy means that the decision to transfer, reposition or otherwise manually handle patients is based on the patients' physical and cognitive abilities and overall medical condition.

Select, store, and maintain the right equipment

- Provide patient handling equipment and devices such as floor lifts, sit-to-stands, or ceiling mounted lift systems.
- Include patient handling staff in equipment selection, storage, and maintenance decisions.
- Consider all patient populations, such as the bariatric, when considering equipment selection.

Conduct assessments of patient care activities

- Common physical risk factors specific to the health care industry might include:
 1. Reaching and lifting with the patient far from the body
 2. Lifting heavy patients
 3. Twisting while lifting patients
 4. Unexpected changes to patient positioning during the lift
 5. Reaching low or high to begin a lift
 6. Moving/carrying a patient a significant distance
- Identify environmental hazards as well, such as cluttered patient care areas, confined space in bathrooms, or broken equipment.

"I would say it had to do with all the bookshelves and tables that there are in the rooms. It's hard to take care of residents because there's so much stuff in the way, and if you move anything they get really offended." --CNA

Utilize clinical assessment and planning tools to evaluate patient mobility

"I don't think that they do enough assessment on residents to really give us any idea how they transfer." --CNA

- Patient assessment protocols and algorithms can provide a standardized way to make the best decisions about how to safely perform potentially hazardous tasks.
- Effective assessment tools should determine: the patient's ability to assist and/or bear weight, their upper body strength, their ability to follow instructions, their weight and height, their medical condition, and any medical orders regarding their treatment.
- The results of the assessment should be used to determine the appropriate equipment, techniques, and team members for safely handling each patient on a case by case basis.

Conduct ongoing program evaluations

"Injured workers are invited to safety meetings to present their experience, describing how they were injured and what could have been done differently to prevent it." --Safety Committee Chair

- Perform an internal review following each injury event to identify contributing factors that most likely resulted in the injury attend to recordable injuries and "near misses" alike.
- Conduct safe patient handling and mobility program performance/outcomes evaluations, on a yearly basis, at minimum.
- Establish patient handling hazard correction procedures.

Encourage a visible safe patient handling and mobility champion in upper management

"Our administrator came up with the Safety Task Force. I really like it. I've never seen anything like anywhere else." --Safety Committee Chair

- Visible support of SPHM by all levels of management should be demonstrated.
- A visible champion in upper management provides both material support and a morale boost to the program.
- Those directly involved in implementing the program can point to this leadership as demonstrating a commitment to cultural change and shared responsibility for worker and patient safety at all levels.

What are nursing homes & community care centers doing to prevent WMSDs?

SHARP researchers observed some interesting injury prevention innovations at study work sites.

Arms for lap tops on med carts. This frees up space on the med cart. Height is adjustable for each nurse, to eliminate neck flexion.



Wall-fixed computer stations with adjustable height for monitor and keyboard. The keyboard and monitor can be set at a height comfortable for each care provider.



Individual cassettes with medications filled by the pharmacy. Each cassette is personalized to the patient and is color-coded and segmented by dosing schedule. These eliminate the repetitiveness and hand forces needed to open medication packages..



Additional Resources

WMSDs

- Work-Related Musculoskeletal Disorders of the Back, Upper Extremity, and Knee in Washington State, 2002-2010
 - Report Summary: http://www.lni.wa.gov/Safety/Research/Files/WMSD_TR_EXP_Summary2.pdf
 - Full Report: http://www.lni.wa.gov/Safety/Research/Files/WMSD_TechReport2015.pdf
- Perceptions of risk from workers in high risk industries with work related musculoskeletal disorders
<http://iospress.metapress.com/content/e3553913x0503461/>

Safe Patient Handling & Mobility

- VIDEO: The Caretaker Crisis: Investigating Work-Related Injuries in Health Care
<https://www.youtube.com/watch?v=BI9fVLtlaE>
- Safe Patient Handling Programs: A Best Practices Guide for Washington Hospitals
<http://www.washingtonsafepatienthandling.org/>
- SHARP Safe Patient Handling Project
<http://www.lni.wa.gov/Safety/Research/SafePatient/Default.asp>
- Implementation of Safe Patient Handling in Washington State Hospitals
2011: <http://www.lni.wa.gov/safety/research/files/safepatienthandlingrpt2010.pdf>
2012: <http://www.lni.wa.gov/safety/research/files/finalreportsafepatienthandlingreport22oct12.pdf>
- A Systems Approach to Caregiving
http://caregiver.com/magazine/digital/caregiver_mayjun15/#?page=20
- Comparison of Muscle Activity of Four Types of Bed-to-Wheelchair Transfers
http://www.americanjournalofsphm.com/shop_ajsphm/index.php?route=product/product&path=72_73&product_id=102
- Patient Handling: Fact vs. Fiction
<http://www.americannursetoday.com/patient-handling-fact-vs-fiction/>
- Lift that Patient, Spare that Back
http://www.nwpublichealth.org/docs/nph/f2006/silverstein_f2006.pdf



L&I Programs

- SHARP Program
<http://www.lni.wa.gov/Safety/Research/default.asp>
- Sprains & Strains Prevention Resources
<http://www.lni.wa.gov/safety/SprainsStrains/>
- DOSH Consultations
<http://www.lni.wa.gov/Safety/Consultation/default.asp>