



Hospital eTool

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## Ergonomics

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## Ergonomics

**Ergonomics** is the science of fitting the job to the worker. When there is a mismatch between the physical requirements of the job and the physical capacity of the worker, work-related musculoskeletal disorders (MSDs) can result. Ergonomics is the practice of designing equipment and work tasks to conform to the capability of the worker, it provides a means for adjusting the work environment and work practices to prevent injuries before they occur. Health care facilities especially nursing homes have been identified as an environment where ergonomic stressors exist.

**Potential Hazard** Employee exposure to work related MSDs from ergonomic stressors that have not been effectively identified and addressed in a facilities safety and health program.

- Many patients/residents (especially nursing home residents) are totally dependent on staff members to provide activities of daily living, such as dressing, bathing, feeding, and toileting. Each of these activities involve multiple interactions with handling or transferring of patients/residents and could result in employee injuries. Employee injuries lead to increased injury costs, higher turnover rates, increased sick/injured days, and staffing shortages.

### Possible Solutions

- OSHA's [OSH Act of 1970](#) strives to "assure safe and healthful working conditions for working men and women..." and mandates that "each employer shall furnish to each of his/her employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his/her employees."
- [OSHA recommends minimizing manual lifting of patients/residents in all cases and eliminating lifting when possible.](#)
- OSHA recommends that employers identify and address ergonomic stressors in their facility's safety and health plan. General safety and health plan information can be found in the [Administration Module - Safety and Health Program](#).

Areas that should be addressed a facility's safety and health program include:

[Management Leadership/Employee Participation](#)  
[Workplace Analysis](#)  
[Accident and Record Analysis](#)  
[Hazard Prevention and Control](#)  
[Medical Management](#)  
[Training](#)

**Management Leadership/Employee Participation:**

- **Management Leadership** should demonstrate a commitment to reduce or eliminate patient/residents handling hazards through establishing a written program that addresses issues, such as:

Continued training of employees in injury prevention.

Methods of transfer and lifting to be used by all staff.

Compliance with transfer and lift procedures.

Procedures for reporting early signs and symptoms of back pain and other musculoskeletal injuries.

- **Employee Participation** should include:

Complaint/suggestion program which includes employee reports of unsafe working conditions.

Prompt reporting of signs and symptoms as well as injuries.

**Workplace Analysis** to identify existing and potential workplace hazards and find ways to correct these hazards. Assessment of work tasks involves an examination of duration, frequency, and magnitude of exposure to ergonomic stressors such as force, repetition, awkward postures, vibration and contact stress to determine if employees are at risk of pain or injury. Observation, workplace walkthroughs, talking with employees and periodic screening surveys are used to help identify hazards such as stressful tasks.

**Accident and Record Analysis:** Records of injuries and illnesses should be analyzed to identify patterns of injury that occur over time, enabling the hazards to be addressed and prevented. This includes reviewing OSHA 300 logs, OSHA 301 forms and Workers' Compensation reports.

**Hazard Prevention and Control** including implementing administrative and engineering controls.

- Administrative controls: Provide for adequate staffing, assessment of patient/residents needs, and restricted admittance policies.
- Engineering controls: Help to isolate or remove the hazards from the workplace, for example providing proper selection, training, and use of assist devices or equipment (see [Patient Handling Controls Section](#)).

**Medical Management:** A medical management program, supervised by a person trained in the prevention of musculoskeletal disorders, should be in place to manage the care of those injured. The program should:

- Accurate injury and illness recording.

- Early identification and treatment of injured employees.
- "Light duty" or "no lifting" work restrictions during recovery periods.
- Systematic monitoring of injured employees to identify when they are ready to return to regular duty.

**Training:** A training program, designed and implemented by qualified persons, should be in place to provide **continual** education and training about ergonomic hazards and controls to managers, supervisors and all healthcare providers, including "new employee" orientation. Training should be updated and presented to employees as changes occur at the workplace, and be at a level of understanding appropriate for those individuals being trained, and should also include:

- The opportunity to ask questions of the trainer.
- An overview of the potential risks, causes, and symptoms of back injury and other injuries. Be able to identify existing ergonomic stressors and methods of control, such as the use of engineering, administrative, and work practice controls particularly safe resident handling techniques.
- Recognizing the signs and symptoms of MSDs and the procedures for reporting potential problems.
- Encouragement of staff physical fitness.
- **Lifting guidelines** for health care workers (nurse assistants, licensed practical nurses, registered nurses) which should include:

Never transfer patients/residents when off balance.

Lift loads close to the body.

Never lift alone, particularly fallen patients/residents, use team lifts or use mechanical assistance.

Limit the number of allowed lifts per worker per day.

Avoid heavy lifting especially with spine rotated.

Training in when and how to use mechanical assistance.

**Additional Information:**

- [Ergonomics](#), Publications.
- [Ergonomics](#), Safety and Health Topics Page.
- [Your Aching Back: A Look at Back Strain in the Workplace](#). Job Safety and Health Quarterly Fall, 1990, PDF File 364 KB.

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## Patient Handling Program

According to the Bureau of Labor Statistics employees in nursing and personal care facilities suffer over 200,000 work-related injuries and illnesses a year. Many of these are serious injuries. More than half require time away from work. Worker's compensation costs for the industry now amount to nearly \$1 billion per year. Workers in nursing homes are 2x as likely as other workers to be injured on the job.

### Potential Hazard

Employee exposure to injury from ergonomic stressors during handling, transferring and repositioning patients/residents.

### Patient handling tasks pose increased ergonomic risk if they are:

- repetitive (e.g., repeatedly cranking manual adjustments for beds),
- done in awkward postures (e.g., reaching across beds to lift patients/residents)
- done using a great deal of force (e.g., pushing chairs or gurneys across elevation changes or up ramps),
- lifting heavy objects (e.g., manually lifting immobile patients/residents alone) or
- combining these factors.

Other hazards include:

- Overexertion; trying to stop a patient/residents from falling or picking patient/residents up from floor or bed.
- Multiple lifts per shift (more than 20).
- Lifting alone, no available staff to help.
- Lifting un-cooperative, confused patients/residents.
- Lifting patients/residents that cannot support their own weight.
- Patient/residents weight (bariatric patients/residents)
- Expecting employees to perform work beyond their physical capabilities.
- Distance to be moved, and the distance the patient/residents is from the employee, (it is more stressful to reach away from the body to lift or pull a patient/residents).

- Awkward postures required by the activity.
- Ineffective training of employees in body mechanics and proper lifting techniques.

**Possible Solutions**

- Facilities should establish a safety and health program that addresses patient/residents handling hazards and establishes patient/residents handling criteria:

[Guidelines for Nursing Homes](#) Section III Identifying Problems and Implementing Solutions for Resident Lifting and Repositioning includes an assessment of resident handling tasks that can help to determine the safest methods for performing necessary tasks for individual patients/residents without injuring workers for example:

FIGURE 1. Transfer to and from: Bed to Chair, Chair to Toilet, Chair to Chair, or Car to Chair.

FIGURE 2. Lateral Transfer to and from: Bed to Stretcher, Trolley

FIGURE 3. Transfer to and from: Chair to Stretcher

FIGURE 4. Reposition in Bed: Side-to-Side, Up in Bed

FIGURE 5. Reposition in Chair: Wheelchair and Dependency Chair

FIGURE 6. Transfer a Patient/residents Up From The Floor

A list of sample equipment solutions for resident lifting and repositioning tasks are also included.

- OSHA recommends minimizing manual lifting of patients/residents in all cases and eliminating lifting when possible. Example patient/residents handling controls are listed below.

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**Patient Handling Controls**

**Potential Hazard**

**Employee exposure to injury from ergonomic stressors during handling, transferring and repositioning of patients/residents.** Hospital health care workers (especially nursing assistants, who do a majority of the lifting in many facilities) may develop musculoskeletal injuries such as muscle and ligament strain

and tears, joint and tendon inflammation, pinched nerves, herniated discs and others from patient/residents handling.

### **Possible Solutions**

Good work practice includes continually identifying the most hazardous tasks and implementing engineering and work practice controls to help reduce or prevent injuries in those tasks. Remember [OSHA recommends minimizing manual lifting of patients in all cases and eliminating lifting when possible.](#)

- Provide employees with proper assist devices and equipment to reduce excessive lifting hazards.

Proper equipment selection depends on the specific needs of the facility, patients/residents, staff, and management.

#### **For example, implement the use of:**

- **Devices such as [shower chairs](#)** that fit over the toilet, using this device can eliminate multiple transfers, saving health care workers multiple lifts. A patient/residents can be moved to the shower chair, toileted, showered, and transferred back to the wheelchair.
- **Shower stalls** that allow for shower chairs to be pushed in and out on level floor surfaces. This is a standard shower without the front lip to allow for easy access.
- Other [bathing systems](#) include: [Bath Cabinets](#) and [Adjustable Tubs](#).
- **Toilet seat risers:** Use toilet seat risers on toilets to equalize the height of wheelchair and toilet seat, making it a lateral transfer rather than a lift up and back into wheelchair.
- **Mechanical lift equipment** to help lift patients/residents who cannot support their own weight. Choose a lift that does not require manual pumping to avoid possible repetitive motion disorders to workers' arms or shoulders. Lift equipment can be categorized into 2 main categories:

[Lean-Stand Assist Lift](#)

[Sling-Type Full Lift](#)

- **[Overhead track mounted patient lifters:](#)** A tract system built into the ceiling that sling lifts attach to. This system provides patient/residents mobility from room to room without manual lifting.
- **[Lateral transfer devices:](#)** Devices used to laterally transfer a patient/residents for example from bed to gurney. They usually involve multiple staff members to help do the lifting. This is often done with the help of a draw sheet, or similar device. Some new lateral transfer systems do not require any lifting by staff, and are totally mechanical.

This type of device helps prevent staff back injuries.

- **Sliding boards**: A slick board used under patients/residents to help reduce the need for lifting during transfer of patient/residents from bed to chair, or chair to car. Patients/residents are slid rather than lifted.
- **Slip sheets/Roller sheets**: Help to reduce friction while laterally transferring patients/residents or repositioning patients/residents in bed and reduce the force workers need to exert to move the patient/residents.
- **Repositioning Devices**: Mechanically pulls patient/residents up in bed eliminating manual maneuvering by staff.
- **Height adjustable electric beds** that have height controls to allow for easy transfers from bed height to wheelchair height. These beds can be kept low to the ground for patient/residents safety and then raised up for interaction with staff. Avoid hand cranked beds, which can lead to wrist/shoulder musculoskeletal disorders such as strain or repetitive motion injuries.
- **Trapeze lifts**: A bar device suspended above the bed which allows patients/residents with upper muscle strength to help reposition themselves. This device is particularly useful with adjustable beds and armless wheelchairs.
- **Walking belts or gait belts (with handles)** that provide stabilization for ambulatory patients/residents by allowing workers to hold onto the belt and support patients/residents when walking. Not designed for lifting patients/residents.
- **Wheelchairs with removable arms** to allow for easier lateral transfers. Especially useful with height adjustable beds.  
  
**Sitting-standing Wheelchairs**: Wheelchairs that provide sitting to standing options for patients/residents and health care workers.
- **Descent Control System (DCS)**: Emergency evacuation or retrieval from older or disabled structures may require using stairs or negotiating rough terrain when moving patients. These devices allow ambulance technicians or emergency evacuation personnel to safely move a loaded hospital cot or gurney down stairs or any steep decline. The Device easily attaches to any ambulance cot currently in the pre-hospital care market. When not in use, the DCS simply folds up and out of the way.



Descent Control System



Descent Control System attached to cot



Demonstration of Descent Control System on stairs

- >
- > **Patient care plans:** A written care plan that describes specific patient/residents needs, degree of assistance required, special treatments etc. Possible scenarios include:
  - > color coding of patient/residents lift requirements for posting at bedside. By simply looking at displayed color coding system an employee can know what kind of assistance the patient/residents will need with moving or transfers.
  - > segregation of patients/residents based on need so equipment and trained staff are appropriately assigned.
  - > staggered staffing to provide additional manpower for peak periods.
- > **Roll on weight scale:** Patients/residents who cannot stand can be weighed in their wheelchairs.
- > **Pivot transfer disk devices:** Used for standing pivot transfers and seated pivot transfers for patients/residents that have weight bearing capacity and are cooperative.
- > A more complete list of resident handling devices can be found in [Guidelines for Nursing Homes](#).
- > **Back belts:** The effectiveness of back belts in reducing the risk of back injury among healthy workers remains unproven.
- > If workers falsely believe that they are protected when wearing belts they may attempt to lift more weight than they would have without a belt, risking potential injury (See [Backbelts: Do They Prevent Injury?](#))

(DHHS) (NIOSH) Publication No. 94-127).

**Additional Information:**

- **The Nursing Home eTool - [Whirlpool/Shower Module](#)**
- [Back Disorders and Injuries](#). OSHA Technical Manual Section VII Chapter 1.TED 1-0.15A.
- [Back Facts](#): An OSHA funded SEIU training workbook to prevent back injuries in nursing homes.

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### **Trips/Slips/Falls**

#### **Potential Hazard**

#### **Trip/slips and falls from spills or environmental hazards.**

- Environmental hazards such as:
- Slippery or wet floors.
- Uneven floor surfaces.
- Lifting in confined spaces.
- Cluttered or obstructed work areas/passageways.
- Poorly maintained walkway or broken equipment.
- Inadequate staffing levels to deal with the workload, leading to single person lifts and greater chances of falls.
- Inadequate lighting, especially during evening shifts.

#### **Possible Solutions**

#### **Good work practice includes implementing engineering and work practices controls to help prevent slips/falls such as:**

- Eliminate uneven floor surfaces.
- Create non slip surfaces in toilet/shower areas.

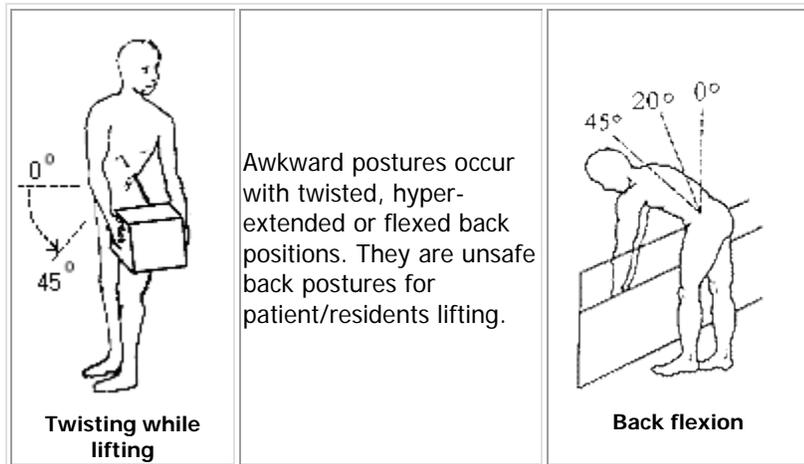
- Immediate clean-up of fluids spilled on floor.
- Safely working in cramped working spaces-avoiding awkward positions, using equipment that makes lifts less awkward.
- Eliminate cluttered or obstructed work areas.
- Provide adequate staffing levels to deal with the workload.



For additional information, see **HealthCare Wide Hazards - [Slips/Trips/Falls](#)**.

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### Awkward Postures



### Potential Hazard

Increased potential for employee injury exists when awkward postures are used when handling or lifting patients/residents. Awkward postures include:

- Twisting while lifting.
- Bending over to lift, see [Back Flexion figure](#).
- Lateral or side bending.
- Back hyperextension or flexion.
- Forces on the spine increase when lifting, lowering or handling

objects with the back bent or twisted. This occurs because the muscles must handle your body weight in addition to the weight of the patient/residents being lifted.

- More muscular force is required when awkward postures are used because muscles cannot perform efficiently.
- Fixed awkward postures (i.e., holding the arm out straight for several minutes) contribute to muscle and tendon fatigue, and joint soreness.
- To be considered a risk factor, awkward postures need to last more than 1 hour continuously or for several hours in the work shift.
- Reaching forward or twisting to support a patient/residents from behind to assist them in walking.

#### **Possible Solutions**

Good work practice recommends avoiding awkward postures while lifting or moving patients/residents.

- Educate and train employees about safer lifting techniques.
- Use assist devices or other equipment whenever possible.
- Team lifting based on assessment.

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#### **Other Ergonomic Hazards**

For more information see: [Guidelines for Nursing Homes](#).

#### **Potential Hazard**

Employee exposure to ergonomic stressors in healthcare workplaces occurs not only during patient/residents handling tasks but while performing other tasks as well in the kitchen, laundry, engineering, and housekeeping areas of facilities, for example during:

- transporting of equipment, moving food carts or other heavy carts, pouring liquids out of heavy pots or containers, reaching into deep sinks or containers, using hand tools, and during housekeeping tasks.

#### **Possible Solutions**

- **Use engineering or work practice techniques to eliminate the hazard or decrease the hazard for example:**

**Transferring Equipment:** Strains and sprains can occur if employee is transferring equipment like iv poles, wheelchairs, oxygen canisters, respiratory equipment, dialysis equipment, x-ray machines, or multiple items at the same time. To reduce the hazards of transferring equipment:

- Place equipment on a rolling device if possible to allow for easier transport, or have wheels attached to the equipment.
- Push rather than pull equipment when possible. Keep arms close to your body and push with your whole body not just your arms.
- Assure that passageways are unobstructed.
- Attach handles to equipment to help with the transfer process.
- Get help moving heavy or bulky equipment or equipment that you can't see over.
- Don't transport multiple items alone for example if moving a patient/residents in a wheelchair as well as an iv pole and/or other equipment get help, don't overexert yourself.



**Reaching into deep sinks or containers:** If washing dishes, laundry, or working in maintenance areas and using a deep sink, limit excessive reaching and back flexion by:

- Placing an object such as a plastic basin in the bottom of the sink to raise the surface up while washing items in the sink or
- Remove objects to be washed into a smaller container on the counter for scrubbing or soaking and then replace back in the sink for final rinse.



**Limit reaching or lifting hazards when lifting trash, laundry or other kinds of bags by:**

- Using handling bags for laundry, garbage, and housekeeping when possible that have side openings to allow for easy disposal without reaching into and pulling bags up and out. The bags should be able to slide off the cart without lifting.

Limiting the size and weight of these bags and provide handles to further decrease lifting hazards.



Handling Bag

- Using garbage cans that have a frame vs. a solid can to prevent plastic bags from sticking to the inside of the can or use products that stick to the inside of the garbage can that prevent the bag from sticking.

Limit the size of the container to limit the weight of the load employee must lift and dump.

Place receptacles in unobstructed and easy to reach places.

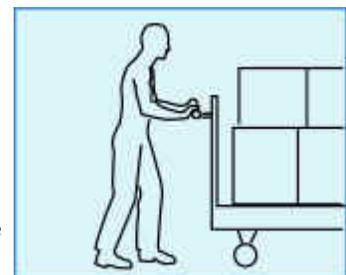
- Installing chutes and dumpsters at or below grade level.
- Using spring-loaded platforms to help lift items such as laundry keeping work at a comfortable uniform level.



Spring Loaded Platform

**Limit reaching and pushing hazards from moving heavy dietary, laundry, housekeeping or other carts by:**

- Keeping carts, hampers, gurneys, or other carts well maintained to minimize the amount of force exerted while using these items.
- Using carts with large, low rolling resistance wheels. These can usually roll easily over mixed flooring as well as gaps between



elevators and hallways.

- Keeping handles of devices to be pushed at waist to chest height.

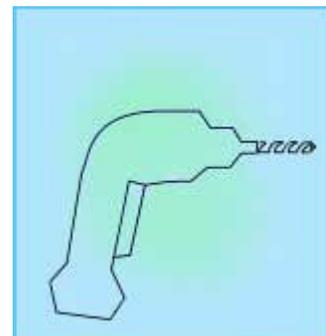
Using handles to move carts rather than the side of the cart to prevent the accidental smashing of hands and fingers.

- Keeping floors clean and well maintained.
- Pushing rather than pulling whenever possible.
- Removing from use all malfunctioning carts.
- Getting help with heavy or bulky loads.

#### Using Hand Tools in maintenance areas:

Limit strains and sprains of the wrists, arms, and shoulders, of maintenance workers by choosing hand tools carefully hand tools should:

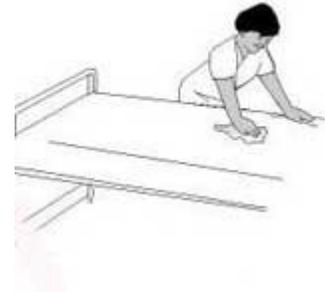
- Be properly designed, and fit to the user.
- Have padded non-slip handles.
- Allow the wrist to remain straight while doing finger intensive tasks. Select ergonomic tools such as ergonomic knives or bent-handled pliers.
- Have minimal tool weight.
- Have minimal vibration or use vibration dampening devices and vibration-dampening gloves.
- Use trigger bars rather than single finger triggers.
- Not be used when performing highly repetitive manual motions by hand, use power tools (e.g., use power screwdrivers instead of manual screwdrivers).



## Trigger bar

**Housekeeping Tasks:** To decrease ergonomic stressors when employees are performing cleaning tasks employees should:

- Alternate leading hand.
- Avoid tight and static grip and use padded non-slip handles.
- Clean objects at waist level if possible, rather than bending over them (e.g., push wheelchairs up a ramped platform to perform cleaning work, or raise beds to waist level before cleaning).
- Use knee pads when kneeling.
- Use tools with extended handles, or use step stools or ladders to avoid or limit overhead reaching.
- When sweeping or dusting use flat head dusters and push with the leading edge; sweep all areas into one pile and pick up with a vacuum.
- Use chemical cleaners and soaks to minimize force needed for scrubbing.
- Frequently change mopping styles when mopping (e.g., push/pull, figure 8, and rocking side to side) to alternate stress on muscles.
- Be sure buckets, vacuums, and other cleaning tools, have wheels or are on wheeled containers with functional brakes.
- Alternate tasks or rotate employees through stressful tasks.
- Avoid awkward postures while cleaning (e.g. twisting and bending).
- Use carts to transport supplies rather than carrying.
- Use buffers and vacuums that have lightweight construction and adjustable handle heights.



- Use spray bottles and equipment that have trigger bars rather than single finger triggers.

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## Recordkeeping

OSHA issued a revised [Recordkeeping Rule](#) to improve the system employers use to track and record workplace injuries and illnesses. Final rule became effective on Jan. 1, 2002.

### Potential Hazard

Without proper recordkeeping, illness and injury trends would go unreported and unstudied and valuable information about causes and possible prevention of injuries would be lost.

### Possible Solutions

Follow the [Recordkeeping](#) Standard.

Employers must record each fatality, injury or illness that:

Is work related, and

Is a new case, and

Meets one or more of the criteria contained in sections 29 CFR 1904.7 through 1904.12 of the regulation.

Exposure to ergonomic stressors in healthcare workplaces can result in a variety of disorders in affected workers referred to as musculoskeletal disorders (MSDs). MSDs may develop gradually over time or may result from instantaneous events such as a single heavy lift. These conditions will be classified on recordkeeping forms as either injuries or illnesses. It is critical for recording keeping data to be kept accurately and that employers do not under report these events.

OSHA offers EXCEL worksheet versions of the [OSHA 300, 300A and 301 forms](#) for health care facilities who have computer access.

[OSHA's FAQ for Recordkeeping.](#)

[How to Decide if a particular injury is reportable - Table and Decision Tree.](#)

[Recordkeeping Policies and Procedures Manual](#) CPL 2-0.131 (2002,

January 1).

[Recordkeeping](#), Safety and Health Topics Page.

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