



Ergonomics Best Practices for Extended-Care Facilities

Extended-care facilities are the fastest-growing segment of the health-care industry. These facilities also are one of the fastest-growing industries in the United States.

Extended-care facility workers are caring individuals and often place more emphasis on patient safety issues than their own. Such circumstances have led to these employees sustaining frequent, and often severe, workplace injuries, according to the federal Bureau of Labor Statistics (BLS).

Nationally, extended-care facility workers have experienced injuries and illnesses at an alarming rate. BLS reported in 1998 that for Standard Industrial Code 8050, the extended-care facility injury and illness rate was 14.2, in comparison with a private industry incidence rate of 6.7.

There are many reasons for the high injury and illness rates in extended-care facilities. According to the BLS:

- Nursing home workers suffer most injuries when handling residents (51.2 percent);
- Strains and sprains account for 58 percent of the injuries;
- Back injuries account for 42 percent of all injuries in extended-care facilities (compared to 27 percent in the private sector);
- Nurses' aides and orderlies have the highest injury rates of any occupation, except for truck drivers and laborers.

The ergonomics process

One effective way to reduce the risk of cumulative trauma disorders (CTDs), such as carpal tunnel syndrome and back injuries is to establish an ergonomics process. Do not regard ergonomics processes as separate from those intended to address other workplace hazards. Use the same approaches to address workplace ergonomic issues, hazard identification, case documentation, assessment of control options and health-care management techniques that you use to address other workplace safety issues. It is important to realize that you cannot combat cumulative disorders effectively with a quick-fix program. Rather, a long-term process, which relies on continuous improvement, is the preferred approach to reducing CTDs. Successful programs not only result in reduction of injuries, but they also realize quality and productivity gains.

For an ergonomics process to be successful, it is imperative that management is committed to the process, participates in the process and provides the necessary resources to ensure its success.

An effective management commitment should include the following elements:

1. Issue policy statements that;
 - Treat ergonomic efforts as furthering the organization's goal of maintaining and preserving a safe and healthy work environment for all employees;
 - Expect full cooperation of the total work force in working together toward realizing ergonomic improvements;
 - Assign lead roles to designated persons who are known to make things happen;
 - Give ergonomic efforts priority with other cost reduction, productivity and quality assurance activities;
 - Have the support of the local union, if applicable;
2. Hold meetings between employees and supervisors that allow full discussion of the policy and the plans for implementation;
3. Set concrete goals that address specific operations. Goals give priority to the jobs posing the greatest risk;
4. Commit resources to;
 - Train the work force to be more aware of ergonomic risk factors for work-related CTDs;
 - Provide detailed instruction to those expected to assume lead roles or serve on special groups to handle various tasks;
 - Bring in outside experts for consultations on start-up activities and difficult issues until you develop in-house expertise;
 - Implement ergonomic improvements as they are required;
 - Provide release time or other compensatory arrangements during the workday for employees expected to handle assigned tasks dealing with ergonomic concerns;
 - Furnish information to all those involved in or affected by the ergonomic activities to be undertaken;
 - Conduct evaluative measures that track the results of the ergonomic process to indicate that progress has been made and if plans need to be revised. Reporting results of the process and publicizing notable accomplishments also emphasize the importance of the process and maintain the interest of those involved.

Employee involvement

Promoting worker involvement in efforts to improve workplace conditions is a critical element to an ergonomics process. It also has several benefits, including:

- Enhanced worker motivation/job satisfaction;
- Added problem-solving capabilities;
- Greater acceptance of change;
- Greater knowledge of the work and organization.

Task force development

Ergonomic issues typically require a response that cuts across a number of organizational units. An ergonomics task force provides an excellent forum to secure input and cooperation from these units. In addition to management and the work force, secure participation from:

- Safety personnel;
- Health-care providers;
- Human resources personnel;
- Maintenance;
- Purchasing;
- Ergonomics specialists.

Clearly define the roles and responsibilities of each team member, including determining who will document problems and monitor project progress.

Training

Training is an essential element for any effective safety and health program. Train all staff members in the following:

- Recognize workplace risk factors for CTDs and understand general methods for controlling them;
- Identify the signs and symptoms of CTDs that may result from exposure to such risk factors, and be familiar with the organization's health-care procedures;
- Understand the process the employer uses to address and control risk factors, the employee's role in the process and ways employees can actively participate.

All ergonomic task force members should receive advanced training in job analysis and control measures, problem identification, and should develop skills in team building and problem solving.

BWC's SafetyGrant\$ best practices

The preferred approach to the prevention and control of CTDs is to design the job taking into account the capabilities and limitations of the work force. Design jobs that minimize CTD risk factors such as high forces, awkward postures and repetitive motions.

BWC's SafetyGRANT\$ program has provided assistance to extended-care facilities to help them reduce their risk of CTDs in the workplace. As part of the program, BWC has collected job designs that health-care facilities have used to reduce the risk of CTDs.

Participating companies report the effectiveness of the interventions by measuring CTD incidence rates, lost days due to CTDs, restricted days due to CTDs and employee turnover. They also measure the relative risk of injury by completing risk factor assessments for affected tasks. These assessments provide a measure of the relative risk of injury for a specific task.

BWC calculated a return-on investment (ROI). Assumptions include:

- 1) \$29,000 per incident (www.backsafe.com);
- 2) Every dollar saved in injury reduction is available purchasing power to the employer;
- 3) BWC normalized data to calculate the injuries and costs that would occur in an equivalent one-year follow-up period. In this way, direct comparisons could be made between the baseline and follow-up periods;
- 4) BWC did not consider time value of money in the calculations.

The following are situations frequently encountered by extended care facilities that can lead to CTDs and demonstrated solutions (best practices) to alleviate those problems.

Extended-care facilities ergonomic best practices

Situation — lifting patients (or residents) in health-care settings

One of the greatest risks to health-care workers stems from manually lifting and moving patients or residents. The manual moving of residents results in high stresses in the spine. Lifting high weights in awkward postures cause these stresses. Nurses and nurses' aids have among the highest rates of back injuries of any occupational group. There really is no risk-free way to manually lift or move another person.

Best practice — patient-lifting devices

Many powered patient-lifting devices are available that will reduce the forces and awkward postures associated with manually lifting patients. Staff can use devices on wheels to mechanically lift and move patients. The advantage of these devices is that they are portable and employees can use them in many locations in a facility. It is important that you locate an ample number of these devices in a facility, so that they are readily available to the direct care staff.

Devices are available, which can provide a total lift, or that can aid residents in standing from a seated position.

BWC has analyzed data on injuries from health-care facilities that have received SafetyGRANT\$ to install floor-based patient-lifting devices. To date, 27 health-care facilities have reported their baseline (before ergonomic intervention) and follow-up (after ergonomic intervention) data, with an average follow-up period of 298 days. The results include:

1. The CTD incidence rate decreased from 21.3 CTDs per 200,000 hours to 11.9 CTDs per 200,000 hours worked — a 44-percent improvement;
2. The ROI for the floor lifts is 2.5 months;
3. The days lost due to CTDs went from 127.2 per 200,000 hours worked to 79.0 per 200,000 hours worked — a 38-percent improvement;
4. The restricted days due to CTDs declined from 96.6 per 200,000 hours worked to 87.0 per 200,000 hours worked — a 10-percent improvement;
5. The employee turnover rate changed from 98.5 per 200,000 hours worked to 74.1 per 200,000 hours worked — a 25-percent improvement;
6. The average risk factor score for patient lifting tasks was 70 before installing the floor-based patient-lifting devices, and 30.5 after the installation of lifting devices — a 56-percent improvement.

Another type of patient-lifting device consists of a sling which attaches to a track in the ceiling. These devices have the advantage of being easy to use and readily available when needed.

BWC has analyzed data on injuries from health-care facilities that have received SafetyGRANT\$ to install ceiling-mounted patient-lifting devices. These health-care facilities have reported their baseline (before ergonomic intervention) and follow-up (after ergonomic intervention) data, with an average follow-up period of 143 days.

Although the CTD incidence rate, and the lost days incidence rate, increased, we also found:

1. The restricted days due to CTDs declined from 81.3 per 200,000 hours worked to 77.2 per 200,000 hours worked — a 5-percent improvement;
2. The employee turnover rate decreased from 159.7 per 200,000 hours worked to 155.2 per 200,000 hours worked, — a 3-percent improvement;
3. The average risk factor score for patient-lifting tasks was 36 before installing the ceiling-based patient-lifting devices, and 21 after the installation of lifting devices — a 42-percent improvement.

Both types of patient-transfer devices can provide increased security for the patient or resident, reduce the staff required to perform these tasks and greatly reduce the risk of musculoskeletal injuries to the staff.

Factors to consider when purchasing patient-lifting devices include:

- User-friendly design;
- Availability;
- Accessibility;
- Speed of operation;
- Resident comfort;
- Maintainability;
- Training required.

Best practice — gait belts (or transfer belts)

In situations where mechanical means of lifting are not available, use a gait belt as a patient-transfer aid. You can place the gait belt on the resident and/or the health-care worker. The belt then provides a handle that the resident and/or the health-care worker can hold onto; thus, improving coupling during the lift. Note: using gait belts while lifting still produces relatively large forces on the spine.

The average risk factor score for patient lifting tasks was 32 before the use of gait belts and 19 afterward — a 40-percent improvement.

Best practice – sliding board

When residents are moved from one surface to another at the same level, a sliding board reduces the forces on the body by decreasing the friction that is normally present during a lateral transfer or when changing the position of a resident in bed. Furthermore, the patient's skin bears the friction forces when transferred without a sliding board, so this device helps reduce the incidence of tissue damage, like skin tears.

Best practice — resident chair design

When residents are in chairs, employees must reposition or move them periodically. Repositioning residents can expose health-care workers to awkward postures and forces in the spine, which can increase the risk of injury. You can adjust some geri-chairs to a variety of positions; thus, repositioning the resident.

Another benefit of these types of chairs is that they provide therapeutic benefits to the residents because they can use the chair to move from one place to another within the facility.

A facility using geri-chairs achieved the following results:

1. The restricted days due to CTDs dropped from 7.2 per 200,000 hours worked to 0 per 200,000 hours worked — a 100-percent improvement;
2. The ROI for geri-chairs is 1.4 months;
3. The days lost due to CTDs went from 14.4 per 200,000 hours worked to 0 per 200,000 hours worked — a 100-percent improvement;
4. The restricted days due to CTDs declined from 35.5 per 200,000 hours worked to 0 per 200,000 hours worked — a 100-percent improvement;
5. The employee turnover rate decreased from 168 per 200,000 hours worked to 68.9 per 200,000 hours worked — a 59-percent improvement.
6. The average risk factor score for patient lifting tasks was 56 before using the geri-chairs and seven after introduction of the chairs — an 87-percent improvement.

Note: this facility also implemented other ergonomic interventions besides the geri-chairs. Those interventions may have also impacted the incidence rates.

Best practice – bladder scanner

Staff sometimes move residents to the toilet to relieve themselves. In some cases, once they are on the toilet, they no longer have to urinate. In that case, direct care staff members have needlessly exposed themselves and the resident to a risk of injury. Similarly, sometimes employees do not place residents on the toilet when they should, and then they urinate in the bed or chair. In that case, the staff must clean the resident and the bed clothes. Cleaning bed-clothes results in much manual materials handling that can create the risk of back injury.

To minimize unnecessary transfers to the bathroom and to minimize bedwetting accidents, use a bladder scanner to determine if the resident does or does not need to be transferred to the toilet.

The average risk factor score for patient-lifting tasks was 39 before using the bladder scanners and 5 after using the scanners – an 87-percent improvement.

Note: this facility also implemented other ergonomic interventions. Those interventions may have also impacted the incidence rates.

Situation — awkward postures when providing patient care

Sometimes, residents in public employer nursing homes sleep in beds that are placed low to the ground to minimize the risk of injury should they fall out of bed. Although this situation is beneficial to the resident, it can increase the risk of back injury to the staff when they provide care to the resident. This is because it causes extreme trunk flexion (bending) — a risk factor for low back pain. If the bed is equipped with a manual crank adjustment, the direct care staff member must crank the bed to the desired height — a process which requires force and repetitive motion in the hands, wrists, elbows and shoulder. Furthermore, this process takes time, which employees could use to provide direct care to the resident.

Best practice – hi-lo beds

Beds, which an electric motor can raise and lower can greatly reduce the trunk flexion in these situations. The direct care staff can then provide care to the resident with the trunk in an upright posture. Furthermore, risk of upper extremity CTDs is reduced because the manual cranking to adjust the bed is not required. Research performed by the National Institute for Occupational Safety and Health indicated that to achieve adjustable beds' fullest potential, the beds should adjust from their lowest position to their highest position in no less than 20 seconds. Longer height adjustment times reduce the likelihood that the staff will use the adjustable features of the bed.

Eight facilities using hi-low beds achieved the following results:

1. CTD incidence rate decreased from 21.1 CTDs per 200,000 hours to 15.0 CTDs per 200,000 hours worked — a 29-percent improvement;
2. The ROI or payback period for hi-lo beds is 8.5 months;
3. The days lost due to CTDs dropped from 72.7 per 200,000 hours worked to 20.1 per 200,000 hours worked — a 72-percent improvement;

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4. The restricted days due to CTDs declined from 53.1 per 200,000 hours worked to 36.7 per 200,000 hours worked — a 31-percent improvement;
 5. The employee turnover rate changed from 71.9 per 200,000 hours worked to 65.2 per 200,000 hours worked — a 9-percent improvement;
 6. The average risk factor score for patient lifting tasks was 31.6 before using the hi-lo beds and 21.4 after using the beds — a 10-percent improvement.

Situation — bathing residents

Bathing residents often generates large forces on the spine of the health-care worker when transferring residents to/from the tub. Additional forces are generated on the spine when health-care workers stoop to bath residents in conventional bathtubs. These forces can lead to back pain.

Best practice — bathing systems

Commercially available bathing systems minimize the spinal forces associated with transferring residents. Some systems are coupled with portable lifting devices to minimize the manual handling of residents.

Additionally, you can adjust the bathtub vertically so you can adjust it to a height that minimizes forward bending of the trunk and the associated forces.

A facility using a bathing system achieved the following results:

1. The CTD incidence rate decreased from 39.3 CTDs per 200,000 hours to 0 CTDs per 200,000 hours worked — a 100-percent improvement;
2. The ROI for bathing systems is .7 months;
3. The days lost due to CTDs remained at zero;
4. The restricted days due to CTDs changed from 368 per 200,000 hours worked to 0 per 200,000 hours worked — a 100-percent improvement;
5. The employee turnover rate dropped from 185 per 200,000 hours worked to 0 per 200,000 hours worked — a 100-percent improvement;
6. The average risk factor score for patient lifting tasks was 31.6 before using the hi-lo beds and 21.4 after using the beds — a 10-percent improvement.

Situation — weighing residents

The weighing of residents involves manually moving the resident from a wheelchair to the scale and then back into the wheelchair. This activity often involves two staff members and exposes them to awkward postures and high forces in the shoulders and back, increasing the risk of injury.

Best practice — wheelchair scale

By using a scale that accommodates wheelchairs, the resident can remain in the wheelchair during the weighing process. Subtract the weight of the wheelchair from the weight shown on the scale to get the resident's weight. Such a scale eliminates two manual resident transfers, and frees staff up to perform other patient care functions.

The average risk factor score for patient weighing tasks was 16.5 before using the wheelchair scale, and 0 after using the scale — a 100-percent improvement, since the switch to the wheelchair scale eliminated manual handling of the residents.

Situation – laundry bins

When pulling laundry out of laundry bins, health-care employees must often bend deep into the bins to retrieve clothing. This situation increases the risk of back pain by requiring extreme trunk bending coupled with heavy loads.

Best practice – spring-loaded laundry bins

Purchase bins with spring-loaded bottoms or retrofit existing bins to reduce the amount of trunk bending when pulling laundry from bins. As laundry is pulled from the bin, the level raises. The worker can then lift laundry from the bin with minimal trunk bending; thus, reducing the risk of back injury.

The average risk factor score for laundry handling tasks in four facilities that used modified laundry bins was 34.75 before using the bins and 24 after using the bins – a 40 percent improvement.

SafetyGRANT\$ case studies

Can health care facilities reduce injuries in their workplaces? The answer is unequivocally, yes! Through SafetyGRANT\$, BWC has collected data on the effectiveness of installing ergonomic interventions in extended-care facilities' workplaces. The following case studies demonstrate that by incorporating ergonomic best practices into the design of tasks, and by using good safety management processes, you can reduce the risk of injuries, including CTDs. Ergonomic best practices worked for them, and they can work for you, too.

BWC has analyzed data on injuries from health-care facilities that have received SafetyGRANT\$ to install ergonomic interventions like those mentioned in the best practices previously described. These health-care facilities have reported their baseline (before ergonomic intervention) and follow-up (after ergonomic intervention) data, with an average follow-up period of 299 days. Results include:

1. The CTD incidence rate has declined from 18.5 CTDs per 200,000 hours to 11.6 CTDs per 200,000 hours worked — a 37-percent improvement;
2. The days lost due to CTDs dropped from 95.8 per 200,000 hours worked to 58.8 per 200,000 hours worked — a 39-percent improvement;
3. The restricted days due to CTDs decreased from 79.5 per 200,000 hours worked to 58.8 per 200,000 hours worked — a 26-percent improvement;
4. The employee turnover rate changed from 96.8 per 200,000 hours worked to 80.9 per 200,000 hours worked — a 16-percent improvement.

These best practices are just a few of the ergonomic interventions that you can incorporate into health-care facilities. For more information about safety in the workplace, or for assistance with your operation, please contact BWC's Division of Safety and Hygiene at 1-800-OHIOBWC and listen to the options, or visit our Web site at ohiobwc.com.

Champaign County Nursing Home Urbana Ohio

Situation

Champaign County Nursing Home is an employment and training center for adults with mental retardation and developmental disabilities. The facility was concerned with the stresses and strains on its nurses while they turned, positioned and gave daily care to the residents. Risk factors included repetitive motion since the employees perform numerous lifts and transfers throughout the day, awkward postures since the old lifts are not stable or compact, and the residents do not always feel comfortable with them, and lifting/twisting is done when transferring the residents.

Solution

Champaign County Nursing Home purchased 32 electric beds. Employees can raise these beds to reduce the need for awkward lifting. The beds make patient transfers easier because nurses can lift a patient from a comfortable level, while keeping the resident safe and comfortable. The facility also purchased an Arjo patient lift with slings and attachments. The lift is battery powered and is stable and compact so that it can fit into tight places.

Results

- Total project cost was approximately \$59,000.
- Champaign Nursing Home believes that many of the risk factors related to transferring patients from their beds are reduced because staff can position the beds to reduce bending.
- CTD rates fell from 16 CTDs per 200,000 hours worked (before the interventions) to 0 CTDs at 7 months after the intervention.
- The lost days rate due to CTDs dropped from 289 per 200,000 hours worked (before the interventions) to 0 lost days at seven months after the intervention.
- Champaign Nursing Home believes that the reduction in time spent without cranking beds has led to greater productivity.

Virginia Decker Calvary Manor Nursing Home, Ottawa

Situation

Calvary Manor is a nursing home that has experienced back injuries due to heavy lifting related to patient transfers. It was concerned with the stresses and strains on its nurses while turning, positioning and providing daily care to residents. Risk factors included repetitive motion, awkward postures, and lifting/twisting when transferring the residents. Nurses perform numerous lifts and transfers throughout the day.

Solution

The facility implemented a zero lift system by purchasing 20 Ultra Care electric beds, an Apollo Bath System and the two lift-n-weigh assists. The lift-n-weigh assists virtually eliminate the need for the workers to adopt awkward postures as well as exert force when performing patient handling tasks.

Results

- Total purchase price was \$13,053.
- It was noted that the workers really like the new equipment.
- Workers have a decreased exposure to CTD risk factors — patient handling risk factor scores decreased from 35 to 28.
- In 18 months, CTD incidence rates fell from 22 to 14 incidents per 200,000 hours worked.
- In 18 months, the restricted-days rate decreased from 121 to 44 days per 200,000 hours worked.
- Turnover rate went from 55 percent to 32 percent.

Wood County Nursing Home, Bowling Green

Situation

Wood County Nursing Home had nurses and nurses' aides at high risk of injuries like lumbar strain and pulled muscles in the back, shoulder and legs. Activities that contributed to these risks include:

- Moving a resident in or out of bed;
- Moving a resident from a bed to a wheelchair;
- Moving a resident from a wheelchair to a toilet;
- Moving a resident from a bed to and from a shower chair;
- Repositioning residents while in bed.

Each of these activities creates awkward trunk postures and generates high forces in the spine.

Solution

Wood County Nursing Home purchased six lifts to assist in the transfer of residents. These lifts have not only decreased CTDs, but they have also improved the work environment and reduced injuries to the residents

Results

- Equipment cost \$25,347.30. Approximately 80 employees have benefited from these lifts.
- The direct care staff has not experienced any work-related back injuries since the introduction of the lifts. The CTD rate fell from 29.6 CTDs per 200,000 hours worked (before the intervention) to 15.5 CTDs per 200,000 hours worked (at one year after the intervention).
- Direct care staff turnover rate decreased from 58 percent before the intervention to 35 percent after the intervention.