

SUCCESSFUL APPROACHES

TO

REDUCING OCCUPATIONAL

MUSCULOSKELETAL DISORDERS

WITHIN THE

HEALTHCARE INDUSTRY

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Introduction

Healthcare organizations have begun implementing ergonomic management programs focusing on reducing risks associated with patient handling. It is valuable to review these stories to see the level of improvement that can be achieved and learn what are some of the key factors which contributed to successes in reducing occupational injury rates. The successful programs documented in this publication blend effective utilization of lifting aid devices into the process of providing patient care along with a management program to facilitate integration of these changes effectively into the workplace. A diverse collection of success stories has been included. The purpose of this publication is to provide the reader with a brief summary of the program implemented and a demonstration of the level of improvement actually achieved. Some of the stories provide a basic structure of the program process others highlight some of the key elements necessary for a successful program in a more narrative fashion. Prior to the success story presentations, some background material is offered regarding the magnitude of the problem, previous prevention strategies which have been unsuccessful, and what new directions are necessary for improvement. Much of the material in this background information is taken from an article by the author to be published in a future issue of the Journal of the American Association of Occupational Health Nurses.

Background

Musculoskeletal disorders experienced by workers in the healthcare industry have been, and remains, a major problem (Engkvist, 1992; Harber, 1988; Hignett, 1996; Jensen, 1990; Khuder, 1999; Ljungberg, 1989; Pheasant, 1992). Reviewing trends related to occupational injury experience, a steady decrease would be observed in total cases beginning in 1992. However, a closer review of these statistics focusing on healthcare workers who are involved in direct patient care, does not demonstrate an improving trend. Data available from the Bureau of Labor Statistics substantiates occupational back injuries as a major problem (Bureau of Labor Statistics, 2000). In 1998 there were 1,730,500 lost time occupational injuries reported in the United States. Forty-four percent of these were strains and sprains, with the majority involving the back. 10.5% of the total number of occupational back injuries suffered in this country, when considering all of industry, were caused by moving and assisting healthcare patients. In reviewing work related musculoskeletal disorders involving time away from work for 1998 by occupation, as cited in the Bureau of Labor Statistics data, the occupation leading the list is nursing aides, orderlies and attendants, and registered nurses are at number six. Sixty-six percent of all injuries suffered by nursing aides and orderlies were strains and sprains whereas 59% of all injuries suffered by registered nurses were strains and sprains (Bureau of Labor Statistics, 2000). When considering the event leading to an occupational injury within nursing and personal care facilities, overexertion specifically from lifting is a major contributing factor. In fact, the incidence rates calculated for overexertion as the cause for injuries in nursing and personal care facilities are four times higher than the national average for all industry. These rates rank as the fourth worst when considering all of the hundreds of industries, which report information to the Bureau of Labor Statistics. Back injuries among nurses and nursing aides and others

involved in direct patient care is a major problem which must be addressed. It is the intention of this publication to present a collection of research projects and case studies where injury rates have been reduced following implementation of an ergonomic management program.

Previous Approaches for Improvement

Traditionally, healthcare organizations have attempted to improve the back injury problem through body mechanics training programs where workers are taught proper lifting technique. Research has demonstrated that this approach has not been effective (Anderson, 1980; Brown, 1972; Buckle, 1981; Daltroy, 1997; Daws, 1981; Dehlin, 1976; Harber, 1994; Lagerstrom, 1997; Owen, 1991; Snook, 1978; Stubbs, 1983). Suggested reasons why this approach has been ineffective include:

1. Trying to encourage proper lifting technique requires behavior modification. Behavior modification is difficult to achieve and even if it is achieved, new behaviors are often short lived. Most times workers will revert back to old behavior styles.
2. Optimum theoretical principles are taught in a classroom setting. When workers move into the patient care environment, it is often very difficult to apply these theoretical principles.
3. There may not be optimum principles, which universally apply to all workers because of differences among people. With the wide variety of possible situations it is often difficult to prescribe a one best way technique.
4. Even if there were a best way to conduct a manual lift, because of the loads involved; there is no safe way for a worker to manually lift a dependent patient.

New Directions for Improvement

To achieve improvement related to reducing musculoskeletal disorders among healthcare workers involved in direct patient care, difficult and demanding jobs must be redesigned applying the principles and concepts of ergonomics. High-risk jobs must be changed and modified and a strategy for redesigning jobs as follows is suggested:

1. Can the need to do the high-risk activity be eliminated, such as by eliminating a bed to chair transfer using a bed which converts into a chair configuration?
2. Can the high-risk activity be redesigned using devices such as mechanical lifts?
3. Can the high-risk activity be improved through risk reduction using some type of lifting aid device, such as a gait belt with handles or friction reducing sheet?

In order to effectively integrate new and improved job design into the process of delivering care within healthcare facilities, a basic structure or process can contribute to the level of improvement achieved. A simple structure for the ergonomic management process is as follows:

1. Identify jobs and job tasks which stress body parts beyond limits.
2. Identify and develop solutions to change these task demands.
3. Use a well thought out process to implement these changes into the workplace.

4. In addition to reviewing job design, also review the design of the physical work environment to remove barriers, minimize travel and consider spatial relations.

Reviewing Successful Programs

Below is a collection of success stories highlighting the process implemented, key ingredients, and what results were achieved. The presentation format for each success story is not exactly the same since approaches to the process may have not been implemented with the same structure. A program summary for each success story is offered along with improvements achieved.

SUCCESS STORY # 1

State: Florida

Company: Veterans' Health Administration (VHA) VISN8

Industry: Nursing and Personal Care Facilities – SIC code 805

Employees: Total 15,000, staff in 23 high risk units 800

Success Brief:

Through the identification of patient care units presenting a high level of occupational risk to workers, a targeted back injury prevention program was developed and implemented. The program integrated the concept of ergonomics into a program to redesign high risk activities.

The Problem

Workers involved in providing patient care in high risk units were suffering over 85% of reported injuries. This resulted in disability to workers and high workers' compensation costs

The Solution

An Ergonomic Management Program was implemented in six (6) Veterans' Administration Medical Centers within VISN8. Program development was started in January 2001 and the study data collection ran from January 2002 until December 2002. Program design included implementation of a nine (9) step process as follows:

◆ **Step 1 Collect Baseline Injury Data**

Injury data should focus on injuries related to patient handling and movement. Each clinical unit should gather and record their individual information. Data should minimally capture a description of the incident including; the patient care activity performed at the time of the injury, time of the incident, unit/location where incident occurred, body parts effected, days of work lost and modified duty days.

◆ **Step 2 – Identify High Risk Units**

Using baseline data on the incidence and severity of injuries identify the high risk units at the facility. Eventually, every unit may be included in the ergonomic management program, but prioritization is important to effectively allocate available resources. High risk units will normally have the highest incidence of patient handling injuries, the most work days lost, and the highest concentration of staff on modified duty.

- ◆ **Step 3 – Obtain Pre-Site Visit Data on High Risk Units**
 Normally some type of multidisciplinary team will be involved in program implementation. Prior to visits at the unit, unit specific information can be collected by staff and submitted to the site visit team prior to their visit. Generally the site visit team will evaluate injury data, equipment issues, space issues, storage availability, and maintenance and repair issues. Other factors such as patient population and staffing information are needed to determine unit characteristics that will influence intervention needs.
- ◆ **Step 4 – Identify High Risk Tasks**
 It is important to identify and assess staff perceptions of high risk tasks. The highest risk tasks are likely to vary between patient care units depending on patient characteristics, availability of equipment, physical layout and work organization.
- ◆ **Step 5 – Conduct Team Site Visit for Ergonomic Assessment**
 Following identification of high risk units from historical data, the Ergonomics Assessment Team conducts an onsite evaluation. This site evaluation serves to recognize the many direct and indirect factors that may contribute to risk potential and with staff input, to identify potential solutions that will serve to minimize risk of injury to the caregivers and patients.
- ◆ **Step 6 – Risk Analysis**
 Risk Analysis involves careful review of the base line injury data, pre-site visit data, identification of high risk tasks, and observational data from the site visit. Through Risk Analysis high risk situations or job tasks are identified. In this step a determination is made as to what changes are required for improvement.
- ◆ **Step 7 – Formulate Recommendations**
 Recommendations should be achievable and simple. When developing recommendations it is necessary to factor in constraints such as fiscal resources, administrative support, and environment. Generally solutions fall into two categories, engineering controls and administrative controls.
- ◆ **Step 8 – Implementation of Recommendations**
 Implementation of Recommendations will involve changes to the workplace. To enhance chances for success, a well thought out process needs to be developed. If engineering solutions such as new furnishings and patient lifting aid equipment are to be introduced, programs for educational awareness and detailed training are necessary. An implementation team must be recruited and this team will formulate a plan where each member of the team understands their role in the plan. The implementation team will be the group responsible to integrate recommendations formulated into the operational activities at the facility. Included in the implementation team are peer leaders who are directly involved in patient care. In this case, they were called Back Injury Resource Nurses or BIRN

nurses. They were responsible to provide ongoing support to the program implementation.

◆ **Step 9 – Monitor Results and Continuously Improve Safety on the Unit**

A system for monitoring and evaluation should be developed to determine what successes and failures have occurred so appropriate adjustments can be considered as necessary. The monitoring and evaluation system is also critical to maintaining an adequate level of interest and attention for the program. The monitoring function also requires a system for data collection similar to risk assessment. It must be determined what information will be useful in the evaluation process.

The Impact

MEASURE	PRE-INTERVENTION	POST INTERVENTION	% DECREASE
Reported Injuries	144	99	31%
Injury Incidence Rate	24	16.9	30%
Modified Duty Days	2061	256	88%
Lost Work Days	256	209	18%
Injury Costs	\$480,797	\$202,971	58%

Source

Results from VISN-Wide Deployment of a Back Injury Prevention Program for Nurses, conducted by Patient Safety Center, Tampa, Florida. (Nelson, Fragala, Matz, 2003).

SUCCESS STORY #2

State: Missouri and Illinois

Company: BJC Health System
St. Louis, Missouri

Industry: Nursing and personal care facilities – SIC code 805

Employees: 460 direct patient care staff at 6 sites

Success Brief:

The program was implemented in six nursing homes and is based on three elements:

- A zero-lift policy that uses state-of-the-art equipment to assist with patient transfers,
- Training in the use of patient transferring equipment
- A medical management program.

The Problem

Direct patient care staff responsible for assisting dependent residents were at a high risk for occupational injuries. Identified high risk activities included: transfers in and out of bed; in and out of bath tubs, showers and whirlpools; on and off toilets; repositioning in bed; and lifting a resident who has collapsed from the floor.

The Solution

This study examined the effectiveness of the ergonomic management injury prevention program by contrasting the injury, disability, and injury related cost experience of a cohort of nursing aides, orderlies, and assistants for a thirty-six month pre-intervention (1995-1997) and a thirty-six month post-intervention (1998-2000) intervention period in six nursing homes. The intervention program implemented was a best practices injury prevention program which included state of the art lifting equipment to assist nursing staff with resident transfers, a training program for nursing staff on how to use the lifting equipment, and a medical management program. The prevention program contained primary and tertiary prevention elements. The primary prevention was based on the use of modern resident lifting equipment and manual lifting methods, employing lifting aid devices, that have been shown in laboratory studies to reduce the physical stresses exerted by CNA's when transferring residents. The tertiary prevention was a medical management program that insured that quality healthcare was provided to injured workers and also allowed for light or restricted duty for workers being rehabilitated. This allowed injured workers to return to work in a prompt and safe manner.

Training was an important part of this program. It was delivered to all nursing, maintenance, and physical therapy department personnel. Training was delivered upon initial department orientation, whenever there was a change in job assignment, equipment or process, or if there was a change in procedure. Training was refreshed during annual safety training orientation. Nursing personnel were trained on the recognition of type of transfer required for each resident, the purpose of the safe-lifting procedure and the correct use of each type of lifting equipment. Maintenance personnel were trained how to inspect lifting equipment, what to inspect on each piece of equipment, the frequency of inspection and tag out procedures for damaged equipment. Physical Therapy personnel were trained on the capabilities and limits of lifting equipment; the correct use and purpose of each type of lifting equipment, the purpose and policies of these zero-lift policies, and suggested classification of residents. A zero-lift policy implemented, attempted to eliminate all manual lifting where possible. All charge nurses on each shift were trained on all aspects of the zero-lift policy. The resident transferring program targeted the most back stressing resident handling tasks performed by CNA's. These included; resident transfers for toileting, bed to chair transfers, transfers to showers, bathtubs, whirlpools, and for weighing residents.

Depending on the level of assistance required by the resident, there were two types of mechanical lifts and several devices such as walking belts and gait belts used to assist with manual transfers. The zero-lift policy established requirements for the methods of transferring residents and was used to insure that all residents had been evaluated for transfer needs and that medical personnel responsible for performing resident transfers were trained on the correct procedure to transfer each resident. The complimentary element of the prevention program was the medical management program aimed at minimizing the cost and impact of worker disability. The objective of the program was to provide quality medical care to injured workers and provide modified duty programs that allowed workers to return to work as quickly and safely as possible.

The Impact

(Lifting related injuries are three year totals. Injury rates and costs are an annual average)

MEASURE	PRE-INTERVENTION	POST INTERVENTION	% DECREASE
Lifting Related Injuries	141	68	51.8%
Injury Incidence Rate	15.77	7.93	49.7%
Injury Costs	\$158,971	\$61,695	61.2%

Source

Intervention Program for Transferring Residents in Nursing Homes, (Collins, Wolf, Hsiao, 2002).

SUCCESS STORY # 3

- State:** Seven nursing homes located in four (4) different states, hospital in Canada
- Company:** Study conducted by National Institute for Occupational Safety and Health
NIOSH
Cincinnati, Ohio
- Industry:** Nursing and personal care facilities – SIC code 805
Hospitals – SIC code 806
- Employees:** 1,446

Success Brief

Zero-lift programs were implemented by replacing manual lifting and transferring of patients with modern, battery operated portable lifts and other patient transfer assist devices. The program reduced injury rates significantly and produced many intangible benefits including improvements in patients comfort and safety during transfers and patient care.

The Problem

Both management and the employees believed that manual lifting and transferring of patients were the most hazardous tasks in their facilities. This belief was confirmed by injury statistics including number of injuries, lost work days and workers' compensation cost. The targeted tasks included lifting and transferring patients from bed to wheelchair, wheelchair to bed, bed or wheelchair to toilet, toilet to bed for wheelchair, lifting patients off the floor, bed or wheelchair to bathtub, shower chair or gurney and back, weighing patients, and bathing. In addition, some nursing homes also targeted repositioning in bed and wheelchair.

The Solution

The primary objective of this study was to reduce injuries to healthcare workers resulting from manual lifting and transferring patients. Zero-lift programs using employee management advisory teams termed as a participatory approach were implemented in seven (7) nursing homes and one (1) hospital. A zero-lift program was implemented by replacing manual lifting and transferring of patients with modern battery operated portable lifts and other patient transfer assisting devices. Ergonomics committees with nearly equal representation from management and employees selected the equipment and implemented the zero-lift programs. Injury statistics were collected during post-intervention for 51 months and were compared with pre intervention data for 37 months.

Two key elements for a successful ergonomics program were identified as management commitment and worker participation.

Management Commitment Includes Providing Financial and Organizational Resources

Financial Resources Include:

- ◆ Providing a safe workplace
- ◆ Appropriate patient transfer devices and other equipment
- ◆ Adequate staffing to manage the ergonomics program

Organizational Resources Include:

- ◆ Providing an ergonomics coordinator
- ◆ Adequate staff
- ◆ Assigning responsibilities
- ◆ Training, monitoring, feedback to employees
- ◆ Injury investigation and medical management

Key Elements of Worker Participation Include:

- ◆ Identifying the most stressful job tasks
- ◆ Evaluation of suggested solutions to problems including patient transferring procedures and devices
- ◆ Selecting the most effective procedures and devices, participation in implementation of the program
- ◆ Input on injury investigation making employees equal partners where they will take ownership of the program as much as possible

Management's Role in Worker Participation Includes:

- ◆ Encourage worker participation so that they will feel confident and perform well
- ◆ Emphasize positive reinforcement
- ◆ Appreciate and respect employees for achieving small goals
- ◆ Seek workers input prior to any decision making
- ◆ Good communication where information and feedback are provided in a timely manner
- ◆ Address workers' problems and concerns

Engineering Controls Implemented

The primary patient transferring devices used in the eight (8) healthcare facilities were different types of battery operated portable lifts, both full-sling lifts and stand-assist lifts were used. In addition, the hospital and four (4) of the nursing homes used walking

belts with handles, shower chairs, shower gurneys, ramp type weighing scales, and devices to reposition patients in bed. The hospital also installed a few ceiling mounted hoists. All nursing homes except one had modern bathing facilities. The equipment supplied to the eight (8) healthcare facilities came from different manufacturers.

The Impact

As a result of implementation of this program the following results were achieved:

TABLE 1	SUMMARY OF PERCENT DECREASES IN NUMBER OF INJURIES PER YEAR	
NURSING HOME/HOSPITAL	PATIENT TRANSFER	ENTIRE FACILITY
A	56%	55%
B & C	39%	32%
D	55%	16%
E	79%	37%
F	63%	19%
G	78%	33%
H	64%	30%
AVERAGE	62%	32%

TABLE 2	SUMMARY OF PERCENT DECREASES IN LOST WORKDAYS PER YEAR	
NURSING HOME/HOSPITAL	PATIENT TRANSFER	ENTIRE FACILITY
A	99.6%	76%
B & C	86%	89%
D	95%	64%
E	50%	40%
F	94%	30%
G	99%	56%
H	80%	81%
AVERAGE	86%	62%

TABLE 3	SUMMARY OF PERCENT DECREASES IN RESTRICTED WORKDAYS PER YEAR	
NURSING HOME/HOSPITAL	PATIENT TRANSFER	ENTIRE FACILITY
A	NA	NA
B & C	NA	10%
D	(17%)*	(220%)*
E	96%	81%
F	79%	48%
G	77%	39%
H	84%	75%
AVERAGE	64%	6%

* denotes increase

TABLE 4	SUMMARY OF PERCENT DECREASES IN WORKERS' COMPENSATION COSTS PER YEAR	
NURSING HOME/HOSPITAL	PATIENT TRANSFER	ENTIRE FACILITY
A	99.8%	55%
B & C	NA	32%
D	66%	16%
E	53%	37%
F	98%	19%
G	99%	33%
H	90%	30%
AVERAGE	84%	32%

Source

Long Term Effectiveness of Zero-Lift Programs in Seven (7) Nursing Homes and One (1) Hospital, (Garg, 1999).

SUCCESS STORY # 4

State: Connecticut

Company: Masonic Home and Hospital
Wallingford, Connecticut

Industry: Nursing and personal care facility – SIC code 805

Employees: 1,200

Success Brief

Facility identified high risk units, purchased lifting aid devices and introduced an ergonomic management program. This resulted in reduced injury claims and cost and also generated a financial credit for their next workers' compensation premium.

The Problem

Insurance records indicated that in 1992 there were 1,025 workdays lost as a result of occupational injuries involving patient handling tasks. This was a major contributor to the \$628,511 incurred workers' compensation cost.

The Solution

Risk Identification and Assessment

The effort at Masonic Home was championed by the Assistant Director of Human Resources who realized the magnitude of the back injury problem at the institution. In order to develop necessary awareness with administration, risk management staff from the Workers' Compensation Trust provided strong support with data collection and highlighted opportunities for financial savings if improvements could be made. Insurance records indicated that in 1992 there were 1,025 workdays lost as a result of occupational injuries involving patient handling tasks. This was the major contributor to \$628,511. incurred Workers' Compensation cost. To begin the process for improvement, an initiation team was formed. The team included three certified nursing aids, one from each shift, three licensed nurses, one from each shift, a representative from Rehabilitation Services, representation from Quality Assurance and Risk Management, the Safety Officer, the head of Education and In-Service Training, and the team leader was the Assistant Director of Human Resources. An ergonomics expert and a loss prevention representative from the Connecticut Hospital Association Workers' compensation Trust served as ad-hoc members of the initiation team. As the team investigated the occupational injury problem, they realized that the educational programs they have been using to train personnel in lifting techniques were ineffective in improving their experience, particularly among nursing aids and there back injury problems were growing

worse. A number of brainstorming sessions were held with staff members to determine what was considered to be the high risk jobs. In the data collection process, the focus was to determine by area where patient care staff were at the highest risk for occupational injuries. From information learned in the pilot study done at another location, many felt that resident handling tasks would be identified as high risk occupational activities. The Workers' Compensation Trust provided a basis to enlist better administrative support by which engineering improvements such as state of the art lifting equipment could be provided to the facility at a reduced cost if it were determined appropriate in the formulation of recommendation. In addition, a financial incentive beyond reduction in Workers' Compensation experience was offered to the facility. If performance could improve over a six month period there would be a financial reward. A system was set up where by if staff back injuries related to resident handling tasks could be reduced by at least 30% over a six month period, once the selected ergonomics management program had been implemented, a five percent credit would be granted on Masonic Homes' annual Workers' Compensation premium paid. For Masonic Homes and Hospital this would be a significant amount. Their annual insurance premium was approximately \$660,000 and the resulting refund would be \$33,000. This provided further incentives among administration to back the program. Through facility tours and brainstorming sessions high risk areas were identified. These activities did achieve necessary by –in from administration and other important staff plus the team moved on in their process.

Risk Analysis

At this point, the Director of Quality Management became involved in the process as data was analyzed. The team found no correlation between things like staffing patterns or long shifts to the rate of injuries. The team also realized that although new aides were correctly trained in lifting techniques, when they got out on the floors and worked with experienced aides new lifting techniques were introduced that may not have been the best. It was found that the new recently trained aides were not using techniques as taught in the classroom training programs. Because many of the team members were front line workers, not supervisors, they were better able to identify what exactly was causing back injuries in the risk analysis process. One floor on the skilled nursing unit was identified as having higher than normal injury rates for the facility. This high risk unit was referred to as the SNF floor and identified as a top priority for the improvements to be determined.

Formulation of Recommendations

The team working with nurse managers and patient care staff consulted further with their insurance carrier. At this time the Workers' Compensation Trust had further developed their pilot ergonomics management program by which they would contribute to the purchase of engineering controls of lifting aid equipment, Masonic Homes took advantage of this program and obtained new mechanical lifts. In addition, gait belts which are a fabric belt which staff place around the patient's waist to help them walk were also issued. The use of the belts would essentially put handles on residents. These belts had occasionally been used in the past on people by physical therapist, but had not

been used by staff nurses and certified nursing aides. Recommendations were formulated; now the task remained as to how to effectively implement the program.

Implementation

Lifting aids had been suggested within the facility in the past; however, there were problems with getting people to use the equipment. The Initiation Team now became an Implementation Team or a Continuous Quality Improvement Team and they appointed contact people on each unit who were responsible for making sure staff felt comfortable using the new equipment. Continuous Quality Improvement Team members also toured the facility and spoke at staff meetings, particularly those team members who were Certified Nursing Assistants themselves. They urged their fellow workers to use this new equipment. The equipment was accepted and monitoring of the program was planned.

Measuring and Assessing

One of the key monitors selected for measuring effectiveness of the program was Workers' Compensation assessments for back injuries. Prior to initiation of the program, an assessment for a representative four month period was \$174,412. After the program had been initiated, the assessment for a similar period was down to \$4,500 as a result of a dramatic decrease in back injuries associated with patient handling tasks. Since the program was initiated there was only one patient handling related back injury reported among the entire 876 person workforce. This was a CNA who didn't use a proper lift device on a designated patient. Lost days associated with patient handling injuries were reduced from the 1992 figure of 1,025 to 81 in 1993. Overall incurred Workers' Compensation costs for 1993 were reduced to \$142,995 down from the \$628,511 in 1992.

Masonic Home decided to further mechanize their operation through the purchase of additional lifting aid equipment. Lifting aid equipment has now become an integral part of the process for care and Masonic Home is experiencing significant financial rewards for the improvements they have made. Masonic Home did qualify for the credit on their Workers' Compensation Premium and the amount was \$33,000 toward their 1994 cost.

The Impact

MEASURE	PRE-INTERVENTION	POST INTERVENTION	% DECREASE
Annual Lost Work Days	1,025	81	92.1%
Injury Assessments Four Month Period	\$174,412	\$4,500	97.4%
Incurred Annual Workers' Compensation Costs	\$628,511	\$142,995	77.2%

Source

An Ergonomic Back Injury Prevention Program at Masonic Home and Hospital, (Fragala, 1995)

SUCCESS STORY # 5

State: Connecticut

Company: Lawrence and Memorial Hospital
New London, Connecticut

Industry: Hospital – SIC code 806

Employees: 1400

Success Brief

To protect its employees from the risk of occupational back injuries, Lawrence and Memorial Hospital eliminated high risk manual patient transfers by purchasing lifting aid equipment. This equipment was integrated into patient care through an effective ergonomics implementation plan.

The Problem

An analysis conducted by in-house staff determined that traditionally the main approach to controlling back injuries from patient lifting was trying to teach nurses how to apply body mechanics. It was determined that training alone had been ineffective in reducing back injuries at Lawrence and Memorial Hospital. Patient handling tasks were determined to be a problem because of the requirements of these tasks. These tasks were determined to be beyond what is considered a reasonably acceptable risk. Handling patients was recognized as much more difficult and unpredictable than handling and lifting a compact box or container.

The Solution

Step 1 – Risk Identification and Assessment

In this first step the objective is to identify what is perceived to be the high risk areas or activities within the facility. Also, this initial activity begins to bring awareness to the problem and starts preliminary thinking for directions to be taken for solutions. A high level of involvement created throughout the organization can help establish buy-in for the program and makes everyone feel as though they have had a part in the program development. A three month data collection period was established from September 1992 through December 1992. The objective was to collect data from nurses who actually perform the task to be evaluated and thus allow nurses to feel that they had an early opportunity to have input in the program development. Prior to the data collection activity, a meeting was held with Nurse Managers to enlist their support in gathering information from their staff. Nurse Managers were asked to hold brainstorming sessions with

staff members to gather information and a back injury questionnaire was sent out to all nursing staff. From the data gathered, four main reasons were identified as perceived to be important when considering causes which contribute to back injuries due to lifting patients. They were:

1. Low staffing levels
2. No time to wait for help, that is, rushing to the next patient, late lunch, or getting near the end of a work shift.
3. Current lifting aid equipment available to assist in patient lifts is difficult to use and not readily available when needed.
4. The nature of the work itself is difficult even when adequate staff are available such as three or four nurses to assist in a lifting task; someone is still at risk for injury.

It was recognized that the hospital had begun redesigning some tasks such as using stretchers with adjustable height, sliding boards for lateral transfers, and employing gait belts when transferring a patient. However, opportunities for greater improvement were identified related to patient handling tasks where the objective would be to eliminate the lift where possible using effective engineering controls.

◆ **Step 2 - Risk Analysis**

Through risk analysis actual loss data and injury experience records are analyzed to determine specific actual high risk areas for comparison with what was determined to be perceived high risk. In this process an analysis was done on back injuries due to patient lifting for the nursing department for the calendar year 1992. Results of the analysis identified four floors to have the highest injury occurrence rates. The Orthopedic Unit was found to have the highest number of lost work days and restricted workdays and Medical Surgical was found to have the highest number of back injuries due to patient lifting. On the Orthopedic Unit fifty percent of the back injuries were due to boosting patients up in bed and fifty percent due to chair to bed transfers. On the Medical Surgical Unit chair to bed transfers were again identified as a high risk activity with fifty percent of injuries attributable to this activity. The cost of an individual back injury was analyzed and it was determined that a common back injury usually resulted in three weeks of missed work. A point was raised that this single estimate is conservative and it is possible for a single back injury case to cost the hospital anywhere from \$50,000 to \$100,000, possibly even more. In this step, it was recognized that case management had been effective in decreasing the number of lost workdays in the past. However, there was much opportunity to focus improvement activities on prevention efforts, the goal to prevent injuries from happening in the first place.

◆ **Step 3 – Formulation of Recommendations**

Once problems were identified and priorities set as to which units or floors needed attention, work began on redesigning high risk activities. Through a categorization of the patient population on the Orthopedic Unit and the Medical

Surgical Unit it was determined that if two types of patient lifting aid devices were obtained, many of the unacceptable job tasks could be changed. The devices identified were a standing and repositioning lifting aid with a commode attachment and a full body sling lift with a bed scale attachment. Although funds had not been budgeted for expenditures such as patient lifting aid equipment, support from senior management had been established and when the request for funds to purchase these engineering controls was made, the request was approved and funds were provided through a contingency fund to purchase needed patient lifting aid devices.

◆ **Step 4 – Implementation**

The best ideas in the world can fail if they are not accompanied by a good implementation plan. Once recommendations have been formulated and it has been determined what to do, the process by which changes are made and the new ways of doing things implemented are keys to overall success. At Lawrence and Memorial Hospital a well thought-out implementation plan was a prime contributor to the overall success of this program. Education and training are critical parts of any implementation plan. Two sets of educational awareness programs were developed. The first, for management staff of direct patient care workers. Management needed to be convinced of the requirement for equipment and understand what an important role mechanical lifting aid equipment plays in the overall back injury prevention program for the hospital. The second set of educational awareness sessions was given to direct patient care staff. Nurses needed to be in-serviced in the philosophies of an ergonomic program and why the mechanical lifting aid equipment was being introduced into their worksites. Beyond the educational awareness sessions, training programs were done utilizing a train-the-trainer approach. Key operators were identified as those who would be trained to instruct other direct patient care staff in the use of patient lifting aid equipment. These people were identified through buttons so that nursing staff knew who the key operators were in case there were questions. Key operators were extensively trained and they were sent to nursing floors to train staff. All staff who were trained signed an acknowledgement form, to add an element of accountability regarding learning the skills to operate the new equipment. Other issues important in implementation were covered in an implementation plan for the facility. This written implementation plan provides an example for other facilities and is presented below.

◆ **Step 5 – Measure and Assess**

An important part of any undertaking is to satisfy the customers. In this case, one of the customer groups would be staff who uses the new patient transfer equipment. A satisfaction survey was distributed to staff and overall, staff were very pleased with performance of the new equipment. To further establish buy-in, part of the survey requested their input on recommendations to improve the lifting aid equipment, and staff were very enthusiastic about offering ideas. From the

perspective of an administrator, satisfied staff is important. In addition, how has injury experience changed as a result of the new program? After a six-month period data was gathered to present to senior management. The monitoring system put in place to measure the impact of the back injury prevention program included data on injury experience, days lost resulting from occupational injuries, restricted days resulting from occupational injuries, costs associated with occupational injuries, in addition to the satisfaction data.

The Impact

TABLE 1

UNIT B1 RESULTS

MEASURE	PRE-INTERVENTION 1/1/92 – 12/31/92	POST INTERVENTION 1/1/93 – 9/30/93	% DECREASE
# injuries	20	5	75.0%
# lost work days	69	0	100%
# restricted days	122	2	98.4%
Indemnity costs	\$24,306	\$65	99.7%
Replacement costs	\$9,936	\$0	100%

TABLE 2

UNIT E3 RESULTS

MEASURE	PRE-INTERVENTION 1/1/92 – 12/31/92	POST INTERVENTION 1/1/93 – 9/30/93	% DECREASE
# injuries	42	7	83.3%
# lost work days	48	0	100%
# restricted days	11	4	63.6%
Indemnity costs	\$9,938	\$87	99.1%
Replacement costs	\$6,912	\$0	100%

TABLE 3**WORKERS' COMPENSATION COSTS**

	FY 92 PRE- INTERVENTION	FY 93 POST INTERVENTION Year 1	FY94 POST INTERVENTION Year 2
Annual Cost	\$556,078	\$376,359	\$209,200
Annual Percent Improvement	Base	32.3%	44.4%
Total Percent Improvement	-	-	62.4%

TABLE 4**ALL PATIENT CARE AREAS**

MEASURE	PRE- INTERVENTION 1993	POST INTERVENTION 1994	% DECREASE
Patient Transfer Incidents	128	67	47.7%
Lost Time Claims	36	28	22.2%
Lost Days	446	149	66.6%

Source

Successfully Reducing Back Injuries and Workers' Compensation Costs at Lawrence and Memorial Hospital, (Fragala, Santamaria, 1997).

SUCCESS STORY # 6

State: Texas

Company: Edinburg Hospital
Edinburg, Texas

Industry: Hospital – SIC code 806

Employees: 1200

Success Brief

Through integration of an effective ergonomic management program into a facility-wide quality improvement activity, occupational injury experience was improved. This resulted in a significant cost savings for the organization.

The Problem

A review of occupational injury data demonstrated that back injuries attributable to patient lifting tasks were a significant contributor to total injury experience. This was resulting in significant increases to workers' compensation premiums for the organization.

The Solution

Edinburg Hospital in Edinburg aggressively pursued the development and implementation of an ergonomic-based back injury prevention program. The director of quality improvement and the director of physical therapy coordinated their efforts and enlisted other appropriate personnel in the institution to attack this problem. Consistent with techniques of problem solving being used in many healthcare organizations, a quality improvement process was used to address the issue of occupational back injuries. The directors of physical therapy acted as a team leader and the director of quality improvement as a team facilitator and have launched the beginnings of what is expected to be a successful ergonomic-based injury prevention program. With the team leader and the team facilitator in place, additional team members were added to include representation from administration, nursing, infection control, radiology, the rehabilitation unit and a physician administrator.

Opportunity for Improvement

With the quality improvement team in place, the initial task was to define an opportunity for improvement. As a result of work in their initial meetings, the team developed a statement for opportunity for improvement as follows:

“To decrease risk of patient and staff injury during patient transfers by providing a more efficient, ergonomically effective and safe patient handling mechanism.”

Current Situation

With the opportunity for improvement defined, the team began to assess their current situation through initial data analysis. A review of the data for calendar year 1993 revealed that there were 13 back injuries attributable to patient lifting tasks. These resulted in a direct cost of \$61,090.31. Cost implications were identified as a critical measure in the improvement process. Other costs related to this issue were Workers' Compensation premiums. It was found that because of past experience for calendar year 1994 Workers' Compensation premiums had increased by \$118,206. This resulted in a total premium for 1994 or \$740,756, a significant expenditure for this institution. These Workers' Compensation premiums and the direct costs associated with occupational back injuries related to patient handling tasks presented an opportunity for significant cost savings.

Analysis of Causes

In order to attempt to improve the situation, causation related to patient care handling injuries was studied. Figure 1 represents the cause and effect diagram resulting from the team's effort. From the cause and effect diagram, root causes were determined to be:

1. Lack of transfer equipment
2. Staff fatigue combined with poor technique
3. Patient medical status and lack of cooperation with transfer
4. Poor assessment process for present assistance needed by patient for transfer

Potential Solutions

After a study of root causes, the team was lead to solutions which involved redesign of high risk patient transfers. In order to accomplish this, the team realized that effective patient handling devices must be obtained. An action plan was determined as follows:

1. January, 1993 – Review the literature on equipment available
2. July, 1993 – In-service the safety committee and administration once a vendor of choice was selected on chosen equipment.
3. January, 1994 – Purchase equipment and develop an orientation throughout the facility on lifting aid devices.
- 4.

Results

Lifting aid equipment was purchased and the program implemented in February 1994. The team determined that in addition to programs for senior administration, educational awareness was required throughout the facility. It was also identified that there was a need for training key operators who would participate in the changes of methods in

handling and transferring patients. Measurement began immediately. One injury did occur in the third month, April, when an operator conducted a patient transfer not using the lifting equipment provided. After the injury to a key operator, the team realized that additional ground work would be required to better implement Step 3 in the action plan. There was a need to redefine the responsibility for key operators within the facility. In order to maintain interest and enthusiasm for the program, two additional training sessions were held for key operators. This was done in June, the fifth month of the program. In redefining the responsibility of key operators, the team developed a mission statement. The mission statement was developed for those who would be affected most directly by the changes to take place as a result of the solutions to be implemented. That is, for personnel directly involved in patient handling tasks. The mission statement developed was as follows:

“Our mission as key operators is to reduce risk of patient and staff injury during patient handling tasks by providing a more efficient and ergonomically effective and safe mechanism through education, encouragement and recognition/rewards program.”

At the same time in June, a modification was made to the overall system to better identify patients who require lifting aid devices. After this five-month period, the team established redefined goals as follows:

1. To review and modify the role of key operators within 30 days.
2. To re-establish needs to appropriately measure trends and evaluate outcomes of changes in patient handling to the overall safety program.
3. To design four major processes that would be applicable to all departments hospital-wide with regard to patient handling techniques.
4. A long-term performance goal to reduce injury to staff by at least 50% in the next six-month period and to reduce the occurrence of injuries related to patient handling and transfers by in excess of 90% in the same six-month period.

In order to better train staff in new patient handling techniques, train-the-trainer sessions were done. Following these sessions, training was given to staff institution-wide.

The Impact

Results as of October 1994 are displayed in Table 1. There has been a significant savings in the direct costs associated with occupational injuries. The facility has also considered the impact of indirect costs which include sick, time, orientation and training to replace injured employees, overtime for staff and other activities which effect operational revenues. Safety professionals have estimated that these indirect costs may be from four to ten times in excess of direct costs.

TABLE 1	COST OF BACK INJURIES DUE TO PATIENT HANDLING				
Year	# of Injuries	Direct Cost	Indirect Cost (X4)	Total Cost	# of Case Still Open and Receiving Workers'
1991	4	\$174,528	\$698,112	\$872,640	1
1992	7	\$81,241	\$324,964	\$406,205	2
1993	13	\$77,708	\$310,832	\$388,540	1
1994	3	\$743	\$2,972	\$3,175	0

SUMMARY OF IMPROVEMENTS FROM ERGONOMIC MANAGEMENT

PROGRAM

Edinburg Hospital

MEASURE	PRE-INTERVENTION	POST INTERVENTION	% DECREASE
Direct cost of back injuries due to patient handling	\$77,708	\$743	99.0%
Indirect cost	\$310,832	\$2,972	99.0%
Total cost	\$388,540	\$3,175	99.0%

Figured on annual basis

Source

Addressing the Workers' Compensation Crisis at Edinburg Hospital. (Fragala, Read, Kelley, 1995).

SUCCESS STORY # 7

State: Multiple

Company: Diamond Insurance Group, insuring three (3) skilled nursing facility chains which were Heritage Enterprises, Dynamic Healthcare, and Christian Homes

Industry: Nursing and personal care facilities – SIC code 805

Employees: Multiple locations 1,000 plus

Success Brief

Through the implementation of a limited lift policy, OSHA recordable injuries, lost work days, and total workers' compensation claims and costs were reduced for a number of long term care facilities.

The Problem

It was recognized that lost work days due to injury and illness for skilled nursing facilities were 2.5 times the average for all private industry in the United States. The high rate of these on-the-job injuries was traced to largely three (3) basic tasks: Manual lifting, transferring and repositioning of patients.

The Solution

A typical limited lift policy (LLP) implementation consists of four distinct phases, including:

1. *Evaluation and Introduction (Phase 1)*

During this first phase, the facility's current mechanical lifting equipment and patient acuity are evaluated; nursing staff get to examine various brands of equipment available on the market; and lifting equipment is then ordered based on acuity, facility layout, and staff input. This is also the phase in which questions and concerns are addressed via programs and equipment introductions aimed at staff members, individual patients, patients' council, admissions coordinators, patients' families, and physicians.

2. *Education and Assessment (Phase 2)*

At this point, care giving staff are educated on the policy directives and safe use of the lifting equipment. Qualified personnel assess each patient for the safest method of transfer, and this is posted via a coding system (to maintain patient privacy) in the patient's room. As appropriate, caregivers should communicate perceived changes in a patient's condition to the charge nurse for possible

transfer-status change. Equipment checklists are implemented into the maintenance department with vendor contact information to ensure the lifts are operational and safe for use at all times. Sling-laundering instructions and checklists are given to the laundry department to ensure slings are in safe condition after every laundering.

3. ***Front-line Employee Involvement (Phase III)***

Specific front-line nursing staff are selected by the director of nursing to serve as the “product champions.” These individuals are schooled to assist with training of new employees and to provide feedback on the equipment itself. They also handle all staff and patient issues related to the equipment. The product champions are perhaps the most integral part of the policy besides the equipment itself with regard to employee “buy-in” and compliance.

4. ***Program Evaluation and Appreciation (Phase IV)***

In this final phase, the administrator, director of nursing, and product champions complete audits of the equipment, patient acuity and concerns, and staff issues. Once recommendations based on the audits are implemented, staff are treated to a thank-you party for their assistance in implementing the LLP. Providers should continue the audits on a quarterly basis to ensure ongoing success.

The Impact

**COMPARATIVE RETURNS ON INVESTMENT OF LIFTS FOR THREE SNF CHAINS
2001 – 2002**

	Percent decrease in OSHA recordable resident handling injuries	Percent decrease in lost workday injuries related to resident handling	Percent decrease in total Workers' Compensation claims	Percent decrease in total Workers' Compensation claims dollars incurred
Heritage Enterprises	96%	94%	30%	57%
Dynamic Health Care	89%	75%	47%	27%
Christian Homes	97%	86%	44%	57%

Source: Diamond Insurance Group
Pre and post-policy year comparison information from limited lift audits

Source

Limit Liability with Lift Programs (Moreno, 2003)

SUCCESS STORY # 8

- State:** Outside the United States, England
- Company:** Wigan and Leigh NHS Trust
- Industry:** Nursing and personal care facilities – SIC code 805
Hospitals – SIC code 806
- Employees:** 10,000 plus – involves workers from 30 trusts throughout the country

Success Brief

Through the introduction of an ergonomic approach aimed at improving all aspects of work systems including the implementation of a policy with appropriate management support, equipment and training, and sustaining intervention over a long period of time, lost time from occupational injuries was significantly reduced.

The Problem

A study conducted by the National Audit Office concluded that there might be an excess of one million reported occupational accidents in the national health system each year contributing to a high level of worker disability and placing a serious financial burden on the healthcare system.

The Solution

In January of 1993, England introduced the EC Legislation on Lifting and Manual Handling which stated all hazardous manual handling tasks are to be avoided wherever possible. If hazardous manual handling tasks are unavoidable, they must be assessed in advance. Once they are assessed, action should be taken to remove or reduce the risk of injury. A safe manual handling policy, incorporating training and assessment, must take place. Dangers and hazards must be identified and equipment provided for safer working practice for staff and caregivers. Before any moving and handling procedure can be performed, the nurse should undertake a full risk assessment, completing the appropriate documentation. As a result of these regulations, facilities in England have experienced a reduction in injuries among caregivers.

To measure the impact of the EC Legislation, a study was conducted by the National Audit Office where 30 acute trusts, a grouping of healthcare facilities, were surveyed. It was found that with the implementation of an ergonomic program in 1994 through 1995, lost work hours from patient moving and handling injuries dropped by 84%. Pre-intervention more than 11,635 hours of work were lost at the Wigan and Leigh NHS Trust in 1993-1994 because of occupational injuries. Over 6,720 of these hours were due to injuries caused by moving and handling of patients. Under the direction of

the health and safety advisor at the Trust, the group took advantage of a free equipment assessment offered by a lift manufacturer. A moving and handling coordinator was appointed to undertake a detailed audit of manual handling activity and related issues. An action plan was developed and equipment purchased. The results were dramatic yielding the 84% decrease in lost work hours, thus saving 5,638 hours of work. Once the program was implemented, good injury experience was maintained and the yearly costs in absenteeism resulting from lifting and handling injuries have been reduced by a factor of 97.5%. The moving and handling coordinator appointed was a nurse with over thirty years experience who played a key role in persuading staff to change their practice and use new equipment. Initially, there was a common misconception among staff that using equipment to move patients took longer. Staff soon began to realize that once they were skilled and confident with using equipment, it actually was a lot quicker. The ergonomic approach meant that hospitals had to improve all aspects of their work systems. This involved trusts implementing a policy with appropriate management support, equipment and training, and sustaining intervention over a long period of time.

The Impact

**TABLE 1 SUMMARY OF INJURY EXPERIENCE IMPROVEMENT
RELATED TO HANDLING PATIENTS**

MEASURE	PRE-INTERVENTION	POST INTERVENTION	% DECREASE
Work Hours Lost	6,720	1,082	84%
Cost of Absenteeism	-	-	97.5%

Source

Implementation of the EC Legislation on Lifting and Manual Handling in England (Logan, 1996), (Waters, 1997), (Gaze, 1997)

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