Ergonomics Technical Advisory Group

Patient Care Ergonomics Resource Guide:

Safe Patient Handling and Movement

Developed by the Patient Safety Center of Inquiry (Tampa, FL), Veterans Health Administration and Department of Defense

October 2001

Table of Contents

Acknowledgements

The information contained in this report resulted from the collaborative efforts of the following individuals. The first list delineates authors, followed by a list of contributors and reviewers. Special thanks are conveyed to each person for the time and effort needed to produce this guidebook.

Section A: Primary Authors

Guy Fragala, PhD, PE, CSP
Director, Environmental Health & Safety
University of Massachusetts Medical School
Worcester, MA

Donna Haiduven, RN, PhD, CIC
Postdoctoral Nursing Research Fellow
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

John L. Lloyd, Ph.D.(c), M.Erg.S.,CPE
Associate Director, Technology Division
Patient Safety Center of Inquiry
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Mary W. Matz, MSPH
Industrial Hygienist & Project Manager
Safe Patient Handling & Movement Study
James A. Haley VAMC
Tampa, FL

Nancy Menzel, PhD, RN, COHN-S
Deputy Director, Occupational Health Nursing Program
College of Nursing
University of South Florida
Tampa, FL

Audrey Nelson, PhD, RN, FAAN
Associate Chief, Nursing Service for Research; Director, Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Bernice Owen, RN, PhD
Nurse Researcher and Professor
University of Wisconsin
School of Nursing
Madison, WI

Gail Powell-Cope, PhD, RN
Associate Chief, Nursing Service for Research and Associate Director, Knowledge Transfer Division
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Patricia Quigley, PhD, ARNP, CRRN
Associate Director, Clinical Division
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Hope Tiesman, MSPH
Epidemiologist
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Section B: Contributors & Reviewers

Margaret Amato, RN, BSN, CRRN
SCI Outpatient Services Manager
Zablocki VAMC
Milwaukee, WI

Andrea Baptiste, M.A, CIE
Ergonomist/ Biomechanist
Biomechanics Research Laboratory
James A. Haley VAMC
Tampa, FL

Thomas Bernard, PhD
Professor
College of Public Health
University of South Florida
Tampa, FL

Pascal Bidot, MD, MSPH
Director, Occupational Health
James A. Haley VAMC
Assistant Clinical Professor
University of South Florida
Colleges of Medicine and Public Health
Tampa, FL

Judith Bowers, RN, PhD
Patient Safety Officer
VISN 15
Kansas City, MO

Major Myrna Callison, US Army
PhD Candidate
Virginia Polytechnic Institute and
State University
Christianburg, VA

Pascale Carayon, PhD
Associate Professor
Industrial Engineering
University of Wisconsin
Madison, WI

CDR Donna L. Cain, RN, MSN
Family Nurse Practitioner
Health Promotion
Bureau of Medicine and Survey
US Navy, Washington, DC

William Charney, IH
President
Health Care Safety Consulting
Seattle, WA

Marianne Cloeren, MD, MPH
Occupational and Environmental
Medicine Program & Directorate of
Clinical Preventive Medicine
U.S. Army Center for Health Promotion
and Preventive Medicine
Edgewood, MD

James Collins, PhD, MSME
Epidemiologist
Division of Safety Research
National Institute for Occupational
Safety and Health
Morgantown, WV

Ann Converso, RN
Partnership Council
VAWNYHS Buffalo
Buffalo, NY

Hans-Peter de Ruiter, RN , MS
Nurse Manager
Mayo Clinic
Rochester, MN

Bradley Evanoff, MD, MPH
Head, Section Occupational and
Environmental Medicine
Washington University in St. Louis
School of Medicine
St. Louis, MO

Steven Field, MD, MSPH
Assistant Professor
Occupational Health
University of South Florida
Tampa, FL

Guy Fragala, PhD, PE, CSP
Director of Environmental Health and
Safety
University of Massachusetts Medical
School
Worcester, MA

Kathryn A. Grant, PhD, PE, CPE
Environmental Quality Management Inc.
Air Force Institute for Environment, Safety and Occupational Health Risk Analysis
AFIERA/RSHE
Brooks AFB, TX

Donna Haiduven, RN, PhD, CIC
Postdoctoral Nursing Research Fellow
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Michael Hodgson, MD, MPH
Director,
Occupational Health Program (136)
Veterans Health Administration
Washington, DC

John L. Lloyd, Ph.D.(c), M.Erg.S.,CPE
Director, Technology and Research Laboratories
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Mary Lopez, US Army
US Army Center for Health Promotion and Preventive Medicine
Edgewood Arsenal, MD

Timothy Mallon, LTC, US Army
US Army Center for Health Promotion and Preventive Medicine
Edgewood Arsenal, MD

Sarah Manske
Ergonomics Research Assistant
Occupational Health and Safety Agency for Healthcare
OHSAH
British Columbia, CA

Mary W. Matz, MSPH
Industrial Hygienist
James A. Haley VAMC
Tampa, FL

Kelsey McCoskey, MS, OTR
Ergonomist
U.S. Army Center for Health Promotion and Preventive Medicine
Edgewood, MD

Nancy Menzel, PhD, RN, COHN-S
Deputy Director, Occupational Health Nursing Program
College of Nursing
University of South Florida
Tampa, FL

Susan Moss-Cureton, RN
AMCD Patient Care Services
Mountain Home VAMC
Mountain Home, TN

Audrey Nelson, PhD, RN, FAAN
Associate Chief, Nursing Service for Research; Director, Patient Safety Center of Inquiry; and Director, HSR&D Research Enhancement Award Program
James A. Haley VAMC
Tampa, FL

Marc Oliver, RN, MPH
Occupational Health Project
University of Maryland
Baltimore, MD

Bernice Owen, RN, PhD
Nurse Researcher and Professor
University of Wisconsin
School of Nursing
Madison, WI

Gail Powell-Cope, PhD, RN
Associate Chief, Nursing Service for Research; Associate Director
Patient Safety Center of Inquiry &
Associate Director HSR&D Research Enhancement Award Program
James A. Haley VAMC
Tampa, FL

Karen Putney, RN, MSN
Associate Chief Nursing Service
Orlando VA Healthcare Center Nursing Home Care Unit
Orlando, FL

Glenn Ramsey
Rehabilitation Planning Specialist
VHA
Memphis, TN

Patricia Quigley, PhD, ARNP, CRRN
Associate Director, Clinical Division
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Capt James Ronyak, OTR
Ergonomics Function
Air Force Institute for Environment,
Safety and Occupational Health Risk
Analysis
Brooks AFB, TX

Judy Schmitt
Technical Editor for DoD Ergonomics
Working Group, Weyandt Associates
Centreville, VA

Mindy Smith, Meng, AEP
Occupational Ergonomist
NAVFAC Contractor
Anteon Corp

Tom Sutton, MD
Director,
Occupational Health
VAMC
Bay Pines, FL

Hope Tiesman, MSPH
Epidemiologist,
Patient Safety Center of Inquiry
James A. Haley VAMC
Tampa, FL

Carla Treadwell, CIH
Head, Occupational Health
Bureau of Medicine and Survey
US Navy
Washington, DC

Colleen B. Weese, MD, MPH, FACOEM
Program Manager
US Army Center for Health Promotion
and Preventive Medicine
Edgewood Arsenal, MD

Barbara Weyandt
Facilitator for DoD Ergonomics
Working Group, Weyandt Associates
Huntingdon, PA

Chapter 1

GUIDE BOOK OVERVIEW

❖ PURPOSE

The goal of this guidebook is to reduce the incidence and severity of job-related injuries related to patient handling and movement tasks. While there is much to learn about the science of safe patient moving and handling, the tools provided in their current form can serve as cognitive aids for both caregivers and patients. Derived from best practices within and outside health care, the program elements described in this guidebook have been tested within the Veterans Health Administration (VHA) and are being fully implemented on 25 nursing home care units and spinal cord injury units within VISN 8.

Similar programs are in various development stages elsewhere, including the private sector. As with any new product in field-testing, modifications may prove useful or necessary. Nevertheless, preliminary data from VHA and outside organizations suggest a decrease in the frequency and severity of injuries to caregivers through the use of this approach. In the long run, a decrease in the costs associated with such injuries, reductions in musculoskeletal pain, improved quality of life, and reductions in disability are anticipated.

❖ TARGET AUDIENCE

This resource guide is targeted for

- A facility-based interdisciplinary team responsible for improving the safety of both caregivers and patients during the performance of patient handling and movement tasks.
- Caregivers involved in direct patient care and patient movement, including registered nurses, licensed practical nurses, nursing aides, and patient transport technicians.
- Risk managers, safety officers, quality managers, and administrators who influence workplace safety and support resources for lifting devices.

❖ OVERVIEW OF CONTENT

Over the last six years, the Tampa VAMC research team, under the leadership of Dr. Audrey Nelson, has worked with experts within VHA and nationally recognized researchers to

design a comprehensive program to eradicate job-related musculoskeletal injuries in nursing. The elements of a comprehensive program include:

1. Ergonomic Workplace Assessments of Patient Care Areas
2. Patient Assessment Criteria
3. Algorithms for Safe Patient Handling and Movement
4. Equipment Selection, Storage, and Maintenance
5. Peer-Safety Leaders (Back Injury Resource Nurses)
6. Lifting Teams
7. After Action Reviews
8. No Lift Policy

These elements were developed over time, modified based on professional consensus and laboratory evidence, and pilot tested in several facilities. Each of these program elements represents a product in evolution. While facilities may opt to implement some combination of these program elements, it is critical that the No-Lift Policy be deferred until adequate infrastructure is in place. Furthermore, lifting teams offer a viable approach in settings where the number of lifts/day is low to moderate in volume, such as medical/surgical units. This strategy is less effective in long-term care where the volume of lifts is too high to make this a practical solution. The patient assessment criteria and algorithms should be implemented simultaneously. In order for staff to implement these tools properly, appropriate patient handling equipment must be available, including gait belts with handles, powered stand assist lifts, full body sling lifts, and friction reducing devices. Peer-Safety Leaders, known as Back Injury Resource Nurses (BIRNs) show much promise as an effective program element for changing provider behavior. However, the cost of training and maintaining this program makes it most beneficial in high-risk nursing units and departments where the injury rates are high.

Chapter 2 includes a brief description of the problem of musculoskeletal injuries in nursing. Over 35 years of research reveal that many of the strategies to reduce the incidence and severity of job-related injuries in nursing have been largely unsuccessful. Several myths and facts related to safe patient handling and movement are delineated and successful case studies are presented.

Chapter 3 details a protocol for conducting ergonomic assessments of patient care environments. These key steps include collecting baseline data, identifying high-risk units, obtaining pre-site visit data, identifying high-risk tasks, conducting site visits, analyzing risk, forming recommendations, implementing the recommendations, involving staff in selection of equipment, and monitoring results to continuously improve safety.

Chapter 4 outlines patient assessment and care planning strategies to be used in conjunction with algorithms for high-risk nursing tasks. A Technical Advisory Group (TAG), working in collaboration with the National Center for Patient Safety, Public Health and Environmental Hazards, Patient Safety Center of Inquiry (Tampa, FL), and Healthcare Analysis and Information Group (HAIG) was formed. The TAG, under the leadership of Dr. Nelson, developed an algorithm for each of the key transfer and repositioning tasks. The algorithms were tested with different patient populations in a variety of clinical settings. The algorithms were designed to assist health care employees in selecting the safest equipment and techniques based on specific patient characteristics.

Chapter 5 provides resources for selecting the right equipment. Costly mistakes have been made in selecting equipment that is inappropriate for the patient population or that staff do not use. A process for conducting clinical trials and strategies for obtaining clinician buy-in are included.

Chapters 6-9 address a series of best practices for safe patient handling and movement. These strategies include a No-Lift Policy, Back Injury Resource Nurses, Lifting Teams, and After Action Reviews. Each strategy is described and tools are provided to assist you in replicating these program elements at your facility.

Chapter 10 outlines a competency program for nurses related to safe patient handling and movement. It provides tools for training and evaluating staff in the mastery of principles of safe patient handling and movement. Additional slide presentation of the content in this guidebook will be available on the web site: patientsafetycenter.com

Chapter 11 delineates tools for monitoring progress and evaluating outcomes.

❖ HOW TO USE THIS GUIDE BOOK

This guidebook was designed to include user-friendly tools to assist teams in implementing strategies that can improve safety related to patient handling and movement tasks. Ideally, an interdisciplinary team will be formed to develop the program, obtain administrative support and funding, provide oversight for implementation, monitor progress, and evaluate outcomes. Key members of the team include, but are not limited to:

Team Leader:	The person who will coordinate implementation of the program facility wide.
Group Leaders:	If the facility is divided into segments or specialty areas, these group leaders will coordinate program implementation for specific areas, such as critical care or long-term care.
Key Operators:	Direct patient care staff, physical therapists or occupational therapists that will become trainers in use of equipment. Key operators will receive comprehensive training in equipment function and will train and be resource personnel for other staff members to come to if they are having any problems.
Specialty Staff	Other key personnel within the organization who will need to buy into the program if it is going to be successful.
Administration:	The member of senior administration who supports the program.

It is important to remember that to achieve success, staff must feel like they are part of program development.

NOTE: Any mention of brand names in this document is not intended to be an endorsement of this product by the authors and is for information or clarification purposes only.

Chapter 2

BACKGROUND

❖ INTRODUCTION

Many organizations are spending much time and effort on back injury prevention programs with little resulting improvement. With some guidance, injury prevention efforts could be directed to best utilize existing resources. The focus of this chapter is to (1) describe the magnitude of the problem of musculoskeletal injuries in nursing, (2) describe common myths and facts related to strategies to improve safety in performing patient handling tasks, and (3) summarize successful case studies. This chapter presents a brief summary of lessons learned from other facilities while attempting to reduce the risk to caregivers during patient handling and movement tasks.

❖ BACKGROUND

The healthcare industry is gradually accepting the reality that manually lifting and transferring dependent patients are high-risk activities, both for the healthcare worker and the patient being transferred. Nursing staff have one of the highest incidence of work-related back problems of all occupations (Cust, Pearson, & Mair, 1972; Magora, 1970;). The incidence rates continue to climb; from 1980 to 1990 incidence of back injuries have increased over 40% (Fragala, 1992). Direct and indirect costs associated with back injuries are estimated to be between $24 billion and $64 billion annually, with $20 billion of that attributed to the health care industry (Fragala, 1992; Fragala, 1992; Garrett, 1992; Williamson, et al., 1988). Over three quarters of a million working days are lost annually as a result of back injuries in nursing (Stubbs, Buckle, Hudson, & Rivers, 1983b), with an estimated 40,000 nurses reporting illnesses from back pain each year (Garrett, 1992). Preventive interventions are critically needed to control the hazards and economic burdens associated with patient handling tasks (Genaidy, Davis, Delgado, Garcia, & Al-Herzalla, 1994).

Data from the Bureau of Labor Statistics show a high number of strains and sprains reported by nursing staff. The back is the body part that is most frequently injured and the patient is the major source of injury for these same occupational groups. Information recently released by the Bureau of Labor Statistics for 1999 reported 271,000 occupational injuries suffered by hospital workers and 188,600 occupational injuries suffered by workers in nursing and personal care facilities (U.S. Department of Labor, 2001). Nursing injuries

represented 30% of all injured VHA workers in 2000, more than six times as frequent as any other single occupational group. Job-related injuries that occurred during the performance of patient care activities cost the VHA over $23 million in the year 2000. Approximately 31% of injuries to nurses consisted of upper extremity injuries 25.5%, back injuries; and 19.1%, lower extremity injuries. The vast majority of these injuries were related to patient transfer and repositioning tasks. Back injuries, although not the most frequent injury, do result in the most lost workdays. The importance of developing reliable approaches to injury prevention is obvious.

❖ ERGONOMICS STANDARDS

The National Institute for Occupational Safety and Health provided the scientific basis for safe practices for lifting and handling in the United States (Waters, Putz-Anderson, Garg, & Fine, 1993). A NIOSH Lifting Equation sets the maximum recommended weight limit at 51 pounds under ideal conditions. It applies to virtually all men and at least 75% percent of women. Studies that applied the NIOSH lifting guidelines to nursing practice found the estimates of compressive force to the spine were all above the action limit permitted as safe (Nelson, 1996; Owen & Garg, 1991). However, it is expressly stated that the revised NIOSH lifting equation is not particularly applicable where tasks involve elements of holding, pushing and pulling (Waters, Putz-Anderson and Garg, 1994), which encompasses patient care tasks. The NIOSH equation makes a determination of lift acceptability based only on estimation of compressive spinal forces and does not take into account shear forces, which are substantial in nursing activities.

❖ COMMON MYTHS AND FACTS ABOUT SAFE PATIENT HANDLING AND MOVEMENT

Myth: Education and training are effective in reducing injuries.

Facts: Although it is widely accepted that classes in body mechanics and training in lifting techniques prevent job-related injuries, 35 years of research dispute this belief. These efforts have consistently failed to reduce the job-related injuries in patient care delivery (Anderson, 1980; Brown, 1972, Buckle, 1981, Dehlin Hedenrud, & Horal, 1976; Hayne, 1994; Owen & Garg, 1991; Shaw, 1981; Shaw, 1981; Snook, Campanelli, & Hart, 1978; Stubbs, et al., 1983b, Venning, 1988; Wood, 1987). There are several reasons why training alone is not effective, including the following: (1) Body mechanics training is based on research that is not likely generalizable to nursing practice, (2) It is difficult for nurses to translate classroom content to direct patient care, (3) Experts do not agree on what proper body mechanics include, and (4) Manual patient handling tasks are intrinsically unsafe because they are beyond the capabilities of the general work force. Therefore traditional injury prevention programs based primarily on training and attempts to modify behavior of workers have not demonstrated widespread success.

Interestingly, body mechanics for safe lifting were based on research conducted with predominantly male subjects who lifted boxes vertically from the floor. While we have been teaching nurses “proper” body mechanics for years, it has only recently been questioned whether this research can be generalized to nursing. Why? Nursing remains a predominantly female profession. Furthermore, the science of body mechanics applies to vertical lifting. Many nursing tasks are accomplished in a lateral rather than vertical plane

(e.g. moving a patient from a bed to a stretcher). Ironically, using the “proper” body mechanics for lateral transfer of a patient may actually predispose a nurse to a higher level of risk.

The volume of lifting, turning, pulling and positioning of patients leads to fatigue, muscle strain and, ultimately, injury. Unlike lifting a box, which has handles, a patient lift is much more difficult. A patient’s weight is not evenly distributed and the mass is asymmetric, bulky, and cannot be held close to the body. Furthermore, patient handling tasks are unpredictable; patients can be combative, experience muscle spasms, or suddenly lose their balance. The amount of assistance a patient can offer at any point in time will vary making the task somewhat different each time it is performed.

Furthermore, the hospital or home environment adds to the complexity of patient handling and movement tasks. Access to patients can be very difficult because of clutter around a bedside or small spaces, such as a bathroom. It can be very difficult for nursing staff to position themselves properly when trying to assist a dependent patient with toileting activities. Patient rooms are often crowded and awkward postures are often required when trying to gain access to a patient in a bed. The environment in which nurses care for patients can be very unpredictable and is constantly changing.

Education and training have not been effective because experts do not agree about the content of these initiatives. To date, *lifting techniques* have had limited value in hospital settings, primarily due to time, comfort, or safety issues. Experts do not agree on which lifting techniques are optimal for nursing tasks (Owen & Garg, 1990; Venning, 1988). Owen (1985) identified the discrepancies by experts in identifying effective lifting techniques, addressing studies by Jones (1973), Brown (1973), Hipp (1976), Dukes-Dobos (1977), and Chaffin (1975). Proper lifting techniques have often failed to consider one or more of the following:

(1) While mechanical loading associated with lifting primarily involves the lower back, other body parts -- particularly the knees and the shoulders -- are particularly vulnerable and may be injured as a result of the repeated lifting of heavy loads; this is known as "transferring the overload to multiple other body parts" (Gagnon Chehade, Kemp, & Lortie, 1987).

(2) Balance was virtually ignored when nurses were taught to lift loads from below the level of the knees in the position of flexed knees, with the back straight;

(3) Not all stressful patient handling tasks are lifts; however techniques have focused exclusively on this task (Owen & Garg, 1990). Investigations show that 20 -30% of the working time is spent in a position with a forwardly bent or twisted trunk during activities, such as bathing or dressing and undressing the patient;

(4) Techniques have failed to consider that lifting, turning and repositioning of patients often must be accomplished on a lateral plane, using the weaker muscles of the arms and shoulders as primary lifting muscles, rather than the stronger muscles of the legs;

(5) The patient is asymmetric, bulky, and cannot be held close to the body; patient handling tasks are often unpredictable and can be complicated by patients who are uncooperative, combative, or severely contracted.

Therefore, education and training on body mechanics alone, for a variety of reasons, have not been effective in reducing injuries. Additional biomechanical evaluations are needed to address optimal lifting and patient handling techniques for caregivers and nursing staff.

***Myth**:* Back belts are effective in reducing risks to caregivers.

Facts: Back belts were widely used in the 1990's as a strategy to prevent job-related injuries in nursing. However, there is no evidence these belts are effective (Alexander, Woolley, & Bisesi, 1995; NIOSH Back Belt Working Group, 1994; Wassell, Gardner, Landsittel, Johnston, & Johnston, 2000; vanPoppel, Koes & van der Ploeg, 1998).

Back belts have been used by a variety of industries. They are made of a lightweight breathable material normally having double sided pulls that allow varying degrees of tightness and pressure. Those promoting the use of back belts claim they:

1. Reduce internal forces of the spine during forceful exertions of the back.
2. Increase intra-abdominal pressure, which may counter the forces on the spine.
3. Stiffen the spine, which may decrease forces on the spine.
4. Restrict bending motions.
5. Remind the wearer to lift properly.
6. Reduced injuries in certain work places.

In the comprehensive studies done by NIOSH, it is stated these claims remain unproven. Lifting may produce a variety of forces within the body that contribute to the overall force acting on the spine from compressive, lateral, and anterior-posterior components, termed spinal loading. Many of the studies NIOSH reviewed sought to examine the impact of back belt use of loading. None of the studies provide sufficient data to indicate that industrial back belts significantly reduce loading during lifting. While the theory of increased intra-abdominal pressure remains controversial, some believe that if pressure is increased, it will counter balance forces on the spine. The studies NIOSH reviewed were inconclusive, and the relationship between intra-abdominal pressure and spinal compression is not well understood. Therefore, even if a back belt increased intra-abdominal pressure, there is no evidence that it would reduce forces on the spine or decrease risk of back injury. Loading on the spine increases when a person has to bend as far forward as possible. Some feel if the ability to bend could be restricted by a back belt the risk of injury might be decreased. Although, back belts restrict range of motion during side to side bending and twisting, it was found that they do not have the same effect when a worker bends forward, as is the case in many patient lifting tasks. Regarding the claim that back belts remind workers to lift properly, there is little scientific evidence to support this. There have been anecdotal case reports of injury reduction at work places where back belts have been used. However, many companies that have instituted back belt programs have also implemented training and ergonomic awareness programs. The report of injury reduction may be related to these or other factors. On the basis of available evidence, the potential effectiveness of back belts in reducing the occurrence of low back injuries remains unproven. There has been some concern that wearing a back belt may increase the potential for injury. A nurse may believe that he or she can lift more wearing a back belt. If nurses falsely believe they are protected, they may subject themselves to even greater risk by lifting more weight than they are capable of handling.

Myth: Mechanical lifts are not affordable.

Facts: The long-term benefits of proper equipment far outweigh costs related to nursing work-related injuries. In nine case studies evaluating the impact of lifting equipment in healthcare facilities, the incidence of injuries decreased from 60- 95%, Workers' compensation costs decreased by 95%, insurance premiums dropped 50%, medical and indemnity costs decreased by 92%, lost work days decreased by 84%-100%, and absenteeism due to lifting and handling was reduced by 98% (Bruening, 1996; Fragala, 1993; Fragala, 1995; Fragala and Santamaris, 1997; Logan, 1996; Perrault, 1995; Stensaas, 1992; Villaneuve, 1998;and Werner, 1992).

As these studies show, the purchase of lifting devices benefits the facility, patient, and nursing staff. A higher quality of work life for healthcare workers results from occupational injury risk reduction, which translates into improved quality of care for the patient due to higher staff productivity and reduced turnover.

Myth: Use of mechanical lifts eliminates all the risk of manual lifting.

Facts: While lifting devices minimize risk, unfortunately the risk cannot be eliminated altogether. Even when using lifting equipment, the patient must first be rolled in order to insert the sling. Furthermore, human effort is needed to move, steady, and position the patient. However, since most injuries in nursing are cumulative, any steps to minimize risks in key nursing tasks will offer substantial benefits.

Myth: High-risk tasks in nursing are restricted to lifting patients.

Facts: Not all stressful tasks in nursing are patient lifts. Many patient-handling tasks are performed in a forwardly bent position with a twisted trunk, such as feeding, bathing, or dressing a patient. Additionally, high-risk tasks completed on a horizontal plane are common. These tasks include lateral transfers from bed to stretcher or tasks that involve repositioning a patient in bed. Owen & Garg (1990) identified 16 stressful patient handling tasks in nursing. The most stressful tasks identified in rank order included: (1) transferring patient from toilet to chair, (2) transferring patient from chair to toilet, (3) transferring patient from chair to bed, (4) transferring patient from bed to chair, (5) transferring patient from bathtub to chair, (6) transferring patient from chair lift to chair, (7) weighing a patient, (8) lifting a patient up in bed, (9) repositioning a patient in bed side to side, (10) repositioning a patient in a chair, (11) changing an absorbent pad, (12) making a bed with a patient in it, (13) undressing a patient, (14) tying supports, (15) feeding a bed ridden patient, and (16) making a bed while the patient is not in it. Furthermore, Nelson and colleagues (1996) identified the following nursing tasks as high-risk: bathing patient in bed, making an occupied bed, dressing a patient in bed, transferring a patient from bed to stretcher, transferring from bed to wheelchair, transferring from bed to dependency chair, repositioning a patient in a chair, repositioning a patient in bed, and applying anti-embolism stockings (TED hose).

Myth: Facilities should standardize the lifting equipment across all units.

Facts: Standardizing the lifting equipment has great appeal to purchasers for three reasons: the slings are interchangeable, maintenance is easier, and buying larger quantities usually results in price discounts. Standardization also has great appeal to nursing administration, in that training is easier and there is less of a problem with staff competency in using equipment when they are floated between units. The disadvantage to standardization is that

the equipment selected may not meet the needs of all staff and patients. Patient characteristics, physical environment, and staff acceptance should influence the purchase and may result in variations across patient care areas. Buying the wrong equipment for a unit in the spirit of standardization may mean staff will not use it. A more reasonable approach is to standardize among like units; e.g., critical care, long-term care, or medical/surgical, noting any unique aspects of units.

Myth: If you buy equipment and devices for safe patient handling and movement, staff will use them.

Facts: While use of mechanical lifting aid equipment has been shown to be far safer for nurses and patients (Harvey, 1987; Owen, Keene, Olson, & Garg, 1995), several limitations interfere with its use in practice. In two large studies (Prezant, Demers & Strand**,** 1987; Venning, 1985), nurses indicated that mechanical lifts were not appropriate for all patients, not feasible for use in confined areas, and too time consuming for regular use. Bell (1987) found that nurses did not use lifting aids because they were too much trouble and patients disliked them. Fragala (1993) identified several reasons why patient-handling equipment has failed in the past, including: the equipment is neither patient- nor user-friendly and is unstable, hard to operate, difficult to store, not easily accessible or available, and poorly maintained. There are several strategies for avoiding costly equipment purchase errors. First, include staff in making the selection. This can be accomplished through an equipment fair or small clinical trial of equipment in the patient area where it will be used. It is important to include all staff that will be expected to use the equipment.

Another mistake commonly made is to purchase manual equipment rather than slightly more expensive powered versions. When making decisions about whether or not to use a lifting device, a nurse balances the amount of effort required with the amount of extra time it will take. Slight improvements to minimize effort can result in an increased number of staff members that use the equipment, making powered devices more cost effective.

Other common mistakes are to purchase insufficient quantities of devices, locate the lifts inconveniently, or fail to adequately maintain equipment. The way that nurses organize their work assignments must be carefully considered. Patient lifting tasks are not evenly distributed throughout a 24-hour period. Often, there are peak periods where staff must compete for lifting devices. If the expectation is that staff will use equipment to reduce risk, there should be a commitment to purchase sufficient quantities so this is feasible. Furthermore, few healthcare facilities have adequate and conveniently located storage space. Developing a plan for placement of equipment is critical to success. Additionally, a plan for routine service/maintenance is needed. This includes not only the motor and frame, but cleaning of the equipment, laundering of the slings, and a plan for sling and battery replacement.

Myth: If you institute a no-lift policy, nurses will stop lifting.

Facts: In 1993, a national policy was instated in England prohibiting nurses from lifting patients. This “no-lift” policy resulted in a significant decrease in job-related injuries. This policy states that 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. 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. Implementation focuses on creating a safe workplace for caregivers rather than a punitive action for mistakes.

While a few hospitals in the United States have attempted to implement no-lift policies many have failed. In order to institute a no-lift policy successfully, the infrastructure must first be shaped to support the policy, including the provision of sufficient quantities of appropriate technological solutions.

Myth: Various lifting and patient handling equipment and devices are equally effective.

Facts: Operation of some lifting devices can be as stressful as manual lifting. Equipment needs to be evaluated for ergonomics as well as user acceptance. In a study conducted to redesign at-risk nursing tasks, Nelson et al (2001) found that lifting devices were not intuitive and staff had difficulty using some equipment as it was designed. Furthermore, sling attachment mechanisms varied and some were significantly more stressful than others to use. A biomechanical evaluation of friction reducing devices showed statistically significant differences in spinal loading between products, where cost was not predictive of effectiveness (Lloyd & Baptiste, 2001). Lifting devices that require manual pumping to raise the lift can be stressful to shoulders and may be more stressful than a two person manual transfer. Specialty hospital mattresses, designed to reduce patient risk for pressure ulcers, have been shown to increase caregiver exertion by 17%, by allowing the patient to sink low into the mattress and reducing access to the patient (Nelson, et al, 2001).

Myth: Nurses who are physically fit are less likely to be injured.

Facts: Multiple studies have explored *characteristics of the nurse that affect risk*. The underlying assumption of this research is that staff could be screened for employment or placed in jobs based on level of risk. This approach, viewed by many as discriminatory, has not been successful. Personal risks identified include level of fitness (Legg, 1987), obesity (Gold, 1994; Lagerstrom, Wenemark, Hagberg, & Hjelm, 1995; Patenaude & Sommer, 1987), genetics (Gold, 1994), height (Dehlin, Hedenrud, & Horal, 1976) muscular strength (Kilbom, 1988), age (Kelsey & Golden, 1988; Lagerstrom et al., 1995; Lavsky-Shulan et al., 1985), and stress (Hawkins, 1987). Nurses with a previous history of back injury are deemed at higher risk for re-injury (Fuortes, Shi, Zhang, Zwerling, & Schootman, 1994; Stubbs, Buckle, Hudson, Rivers, & Worringham, 1983a). Some health-related behaviors and habits might to some extent confound associations between occupation and low back pain, including drug/alcohol consumption (Bigos et al., 1986; Manning, Leibowitz, Goldberg, Rogers, & Newhouse, 1984) and cigarette smoking (Frymoyer et al., 1980; Frymoyer et al., 1983; Heliovaara, Knekt, & Aromaa, 1987; Kelsey, 1975; and Kelsey et al., 1984). Contradicting the studies identifying obesity as a risk factor, in a case control study of 306 automobile workers, Kerr et al. (2001) found Body Mass Index (BMI) to be lower in those with reported work-related back pain. In a prospective cohort study of 961 female hospital nurses, Smedley et al. (1997) found no relationship between BMI and the development of low back symptoms.

Intuitively, it would seem that nurses who were more physically fit would be injured less, although the literature does not support this. Why? These staff members are exposed to risk at a greater level; co-workers are four times more likely to ask stronger, fitter peers for help. Older, frailer nurses are less likely to be injured since coworkers rarely ask them to assist

with lifting, they are less likely to be assigned heavy patients, and often coworkers cover for them.

Observations at the Tampa VA Hospital revealed that social relationships on a unit predicted (1) staff who were at risk for a job-related injury as well as (2) number of workdays lost when an injury occurred. Specifically, nurses that were well integrated on a unit were able to secure assistance from peers easier and more quickly than staff members who were marginally accepted. In addition to staff who were not well-liked or respected by peers, other staff who had difficulty securing assistance included new staff and staff who floated to the unit. Once an injury occurred, staff who had positive relationships with their nurse manager were more likely to return to work sooner than staff with poorer relationships with management.

❖ Case Studies of Successful Implementation Strategies

We have examined successful case studies internationally to determine which program elements have the best chance for success and can be easily implemented. We have carefully selected interventions from England, the military and non-healthcare industries. We have designed this program to facilitate provider acceptance as well as knowledge transfer throughout the VHA and healthcare industry.

Facilities that have developed and implemented ergonomic-based injury prevention programs using effective engineering controls have achieved considerable success in reducing work-related injuries and costs. Studies show that ergonomic approaches have reduced staff injuries from 20-80%, significantly reduced workers compensation costs, and reduced lost time due to injuries (Bruening, 1996; Empowering Workers, 1993; Fragala, 1993; Fragala, 1995; Fragala, 1996; Fragala & Santamaria, 1997; Logan, 1996; Perrault, 1995; Sacrificial Lamb Stance, 1999; Stensaas, 1992; Villaneuve, 1998; Werner, 1992). Furthermore, several researchers have concluded that there is little evidence to suggest that intensive training schedules have decreased back injuries among direct care providers over a thirty-five year period (Anderson 1980; Brown, 1972; Dehlin et al., 1976; Lagerstrom & Hagberg, 1977; Stubbs, et al., 1983a). Table 1 summarizes ergonomic intervention case studies.

TABLE 2-1: SUMMARY TABLE OF ERGONOMIC INTERVENTION CASE STUDIES

Facility	Intervention	Post Intervention Results
Northern Virginia Training Center (Werner, 1992)	Mechanical lifts on 4 high-risk units	73% reduction in injuries
Wyoming nursing facility (Stensaas, 1992)	Lifting aid devices	60% reduction in injuries
Nursing home (Fragala, 1993)	New lifting devices	Only 2 strains/sprains in 6 months vs. 12 pre-intervention; Provider acceptance high.
Kennebec Health System ("Empowering Workers," 1993.	Ergonomic management program; engineering controls, including lifting devices	Lost workdays dropped to 48 from 1,097. Experience modification factor dropped from 1.8 (worse than average) to 0.69 (better than average). Insurance premiums dropped from $1.6

Facility	Intervention	Post Intervention Results
		million to $770,293.
Texas hospital (Fragala, 1995)	Lifting equipment	Workers' compensation costs for back injuries declined from $111,159 to $743.
Long term care facility in CT (Fragala, 1996)	Ergonomics-based back injury prevention program, including lifting devices	74% reduction in back injuries over a 3-year period. Workers' compensation costs $4500 vs. $174,412 pre-intervention. Lost workdays reduced from 1025 to 81.
United Kingdom (Logan, 1996)	Equipment for manual handling, ergonomics program for all aspects of hospital work systems	Reduction in injuries among caregivers; 84% decrease in lost work hours. Absenteeism due to lifting and handling reduced 98%.
Surrey Memorial Hospital (British Columbia) (Bruening, 1996; Perrault, 1995)	Ergonomics based program; no lift policy	Reduced injuries by 95%.
Health Sciences Center (Manitoba, Canada) (In CTD News)	Ergonomics program, lifting aid devices, staff training on device use	Back injury incidence rates decreased by 23% Lost time hours dropped by 43%.
Lawrence and Memorial Hospital (Fragala and Santamaria, 1997)	Lifting aids on two high-risk units	Occupational injuries improved approximately 80%. Lost work days decreased from 69 to 0, Restricted workdays decreased from 133 to 6.
Quebec nursing facility (Villaneuve, 1998)	Ceiling mounted lifts	Number of lost-time injuries dropped from 26 to 6.5 per year; Annual average lost days dropped from 983 to 67.
Maine facility ("Sacrificial Lamb Stance," 1999)	Policy for no manual lifting	Drop in medical and indemnity costs from $75,000 to $5,600.

As these studies show, ergonomic programs make sense and provide opportunities to create win/win situations in the VA system. When health care facilities apply innovative approaches to injury prevention, they benefit themselves, patients, and their caregivers. A higher quality of work life for healthcare workers results from occupational injury risk reduction, which translates into improved quality of care for the patient due to higher staff productivity and reduced turnover. These benefits can be achieved through a well-designed Ergonomic Management Program similar to the one embodied in OSHA's rescinded Ergonomics Rule (U.S. Department of Labor, 2000). These improvements through ergonomics should come as no surprise; many non-health care organizations have reaped benefits from ergonomics for many years. The VHA has an opportunity to be one of the first large healthcare systems to adopt this sound ergonomic approach and to transfer this technology to enhance safety and health.

Chapter 3

ERGONOMIC WORKPLACE ASSESSMENTS OF NURSING ENVIRONMENTS

❖ INTRODUCTION

Ergonomics, matching job tasks to workers' capabilities, is receiving much attention today. The Occupational Safety and Health Administration (OSHA) made ergonomics an emphasis in the 1990's. Ideas presented for proposed standards on Ergonomics ask employers to study their workplace for the presence of risk factors. One principal risk factor is frequent or forceful manual lifting, as is found in patient handling and movement tasks. Once a job-related risk factor is identified in the workplace, OSHA recommended it be analyzed and a method to improve the job developed. Through the principles of ergonomics, jobs can be redesigned and improved to be within reasonable limits of human capabilities. The basic principles of ergonomics seem to offer the best hope in improving the problems associated with occupational musculoskeletal disorders in nursing. However, ergonomics is not a magical solution and to be effective, a well thought out system of implementation or an ergonomics management program must be developed. The purpose of this chapter is to present a protocol for conducting an ergonomic assessment of patient care environments. This approach represents one facet of safe patient handling and movement and is a step towards the goal of decreasing the incidence and severity of job-related injuries in nursing practice.

❖ POTENTIAL BENEFITS OF AN ERGONOMICS PROGRAM

In order to secure commitment from top management, some groundwork may be necessary to establish the need for a back injury prevention program. A review of injury statistics and costs are probably the two most important factors in establishing this need. This data can then be used to identify the units with the highest level of risk and establish a baseline from which you can evaluate the effectiveness of your interventions. As with any program, goals and objectives should be developed.

Key objectives for a comprehensive ergonomic program are delineated below. Each facility needs to select targets that are meaningful, e.g., you may target a 30% reduction in lost workdays related to patient handling and movement tasks.

- Reduce the incidence of employee injuries related to patient handling and movement tasks by ___%.
- Reduce the number of lost workdays related to patient handling and movement tasks by ___%.
- Eliminate by ___% of all manual patient transfers.
- Reduce direct costs by ___%.
- Decrease nursing turnover by ___%.
- Decrease musculoskeletal discomfort in patient care providers by ___%.

Opportunities to improve quality of care through ergonomics programs also exist. For example, the following patient benefits can be realized:

- Increase patient comfort, security, and dignity during lifts and transfers.
- Enhance patient safety during transfers as evidenced by decrease in patient falls, skin tears, or abrasions.
- Promote patient mobility and independence.
- Enhance toileting outcomes and decrease incontinence
- Improve quality of life for patients.

Lastly, ergonomic programs can address several organizational goals, including:

- Become an employer of choice (e.g., improve recruitment, retention, safety, and satisfaction of staff)
- Enhance regulatory compliance
- Improve staff efficiency

❖ ERGONOMIC SYSTEMS APPROACH

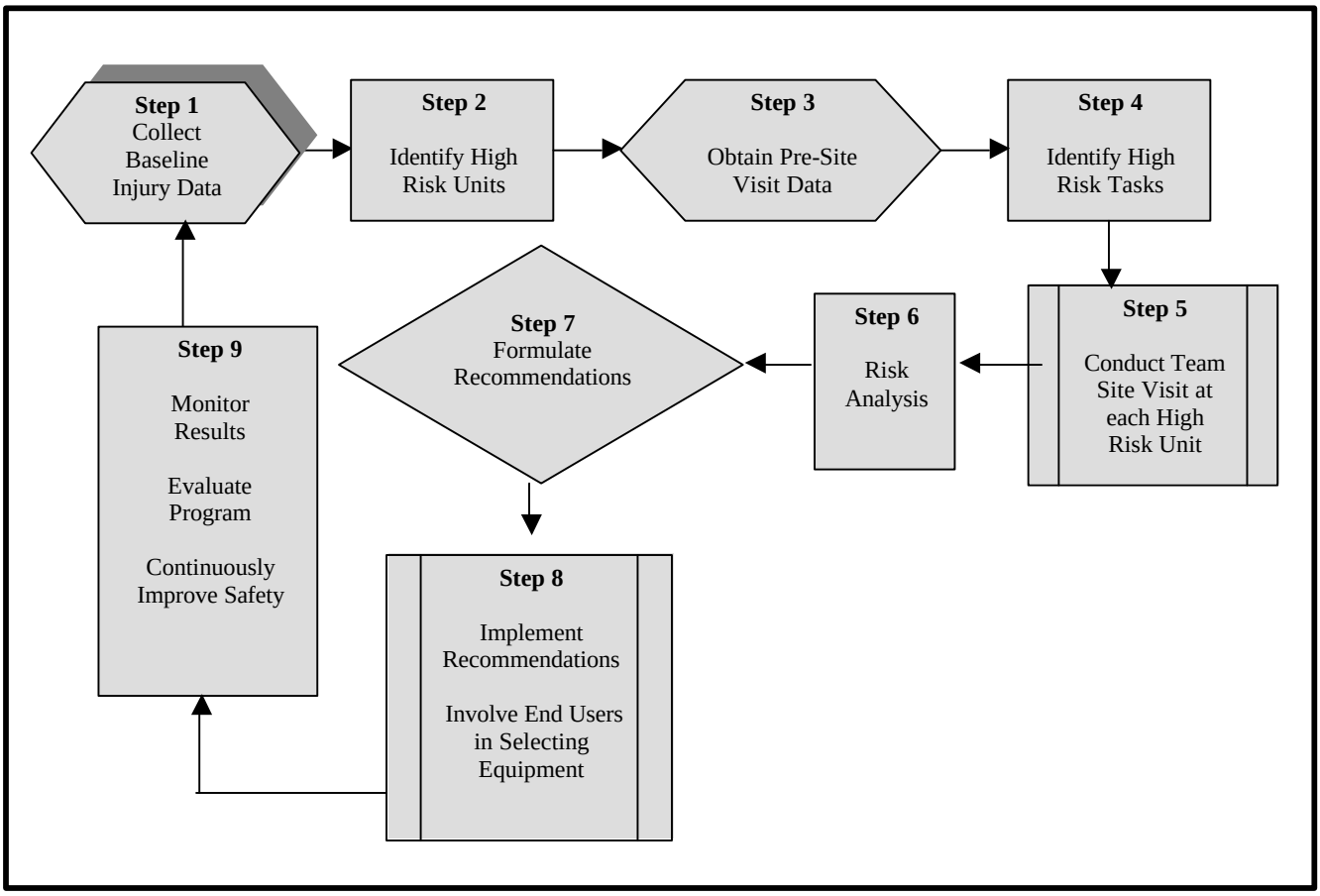
Before beginning the actual implementation of an ergonomics systems approach, an appropriate foundation must be laid in order for the program to have a chance to succeed. The key to effective back injury prevention programs is the use of Ergonomic-based approaches that analyze job tasks and identify prominent risk factors with the purpose of changing unacceptable job demands. Ergonomic approaches are used to (1) design jobs

and job tasks to fit people rather than expecting people to adapt to poor work designs, (2) achieve a proper match between the worker and their job by understanding and incorporating the limits of people, and (3) take into account that when job demands exceed the limits of workers, there are problems. Manual patient handling tasks are intrinsically unsafe because they are beyond the capabilities of the general work force; therefore, traditional injury prevention programs based primarily on training and attempts to modify behavior of workers have not demonstrated widespread success.

As with any program within an organizational structure, top management must be committed to the implementation of an ergonomics-based systems approach aimed at the prevention of back injuries. Without this support, chances for success will be limited. Some managers may be very well aware of the problems with musculoskeletal injuries within their organizations, and others may not be aware of the magnitude of the problem or may have the issue low on their list of priorities.

Next, the personnel who will work on this problem within the organization must be identified. In a large organization, it may be assigned to an appropriate operational unit. In a smaller organization, a committee or task force may be organized to work on the problem. With this groundwork in place, the organization is now prepared to embark on the implementation of an ergonomics based system. A summary of the ergonomic environment assessment protocol for patient care units can be found in Figure 3-1. Each step will be described.

FIGURE 3-1: OVERVIEW OF ERGONOMIC WORKPLACE ASSESSMENT PROTOCOL FOR PATIENT CARE ENVIRONMENTS



❖ STEP 1: COLLECT BASELINE INJURY DATA

There are several methods for collecting baseline injury data, including retrospective review of incident reports and OSHA Logs. Unfortunately, it is often difficult to understand the etiology of risk using retrospective injury data collection methods. For example, incident reports may not include critical information about staffing levels, whether equipment was being used, and other contributing factors. Prospective data collection, defined as collecting data as each injury occurs, allows you to ascertain details while the person is able to easily recall details. However, prospective data collection can be a time-consuming process.

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 (bathing, repositioning, transfer from bed to chair, etc.), cause of injury (pull, push, reach, struck, etc.), type of injury (sprain/strain, contusion, etc.), time of the incident, unit/location where incident occurred, body part/s affected, days of work lost, and modified duty days. A sample Injury Data Collection tool is found as Attachment 3-2. Typically, one year of data is collected and analyzed so that trends can be identified. Analysis should first be performed by unit to characterize each unit and then aggregated across units to assess a

facility. Unit analysis will minimally address the incidence, severity (defined as lost and modified duty days), primary task/s involved in injuries, and the primary cause/s of injuries on the unit. Those units with high incidence and severity of injuries are classified as high-risk units. These units should be the initial focus of ergonomic interventions. Identifying the primary cause/s of injuries as well as the primary tasks performed when injuries are occurring will provide direction when making ergonomic recommendations.

Caregiver opinion regarding factors contributing to injuries can be collected through the use of staff surveys. A simple open-ended staff survey asking staff something like: "What is contributing to the injuries occurring on your unit?" may bring up significant issues such as lack of equipment, equipment maintenance and repair, storage, staffing, or problems with modified duty assignments. Management interviews may also bring up pertinent issues that cannot be gleaned from injury data. Ideally, such a management interview takes place during a walk-through of the unit.

The easiest method to judge relative cost associated with injuries is to utilize number of lost and modified duty days. It's easy to generalize that the more lost and modified duty days, the higher the costs. Injury costs can be estimated though, by multiplying the lost and/or modified duty days by the average daily salary of the injured employee. Another source of cost data is facility OWCP costs. This data is readily available, however because of its general scope, is quite limited in usefulness here. As opposed to facility-wide cost data collection, unit cost data collection requires the development of a comprehensive cost data collection tool. Cost data analysis by unit requires prospective analysis and therefore is time-consuming. Such analysis is complex and should be undertaken only by an expert. Figure 3-2 is a sample form for collecting baseline data from the OSHA log, nurse manager files, facility accident stats, and/or OWCP.

See Chapter 11 for more details on evaluation. It is important to integrate data collection into existing data sets available at your facility.

FIGURE 3-2
PATIENT CARE INCIDENT/INJURY PROFILE

Patient Care Activity	Cause of Injury	Type of Injury	Body Part(s)	Location	Time of Injury	Lost Days	Modified Duty Days
Sample: Patient transfer bed to stretcher	Reaching across stretcher for patient	Strain	Upper back	Patient bedside	0930	3	5

❖ STEP 2: IDENTIFY HIGH-RISK UNITS

Using baseline data on the incidence and severity of injuries, identify the high-risk units at your facility. While eventually you will want to include every unit in an ergonomic assessment, prioritizing time and resources are frequently necessary. High-risk units will have the highest incidence of patient handling injuries, the most workdays lost, and the highest concentration of staff on modified duty.

❖ STEP 3: OBTAIN PRE-SITE VISIT DATA ON HIGH-RISK UNITS

A Site Visit Team will perform an ergonomic analysis of each unit to determine what improvements can be instituted to decrease risk. These recommendations will be made based on a walk-through (site visit) of each area, interviews with management and other staff, and through the evaluation of unit-specific information. In order to have a smooth and productive site visit, this unit-specific information should be collected 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/repair issues. Other factors such as patient population, and staffing information are needed to determine unit characteristics that will influence intervention needs.

The following data collection tools will aid in the collection of this information. In order to give nursing management adequate time to locate and compile information, these tools should be given to the nurse manager at least a few weeks prior to the site visit. This pre-site visit data should be submitted to the Site Visit Team at least one week in advance. **Figure 3-3** is the Pre-Site Visit Unit Profile. Part I of this tool describes the unit and includes information on space, storage, structure, and maintenance/repair issues. Part II collects information related to the patient population and staff.

While most of the questions on this survey are self-explanatory, one area, percentage of dependent patients, may need additional explanation. One approach for determining the percentage of patients on a unit who are physically dependent is the classifications in the Healthcare Finance Association (HCFA) Patient Assessment System, Section G entitled, Physical Functioning and Structural Problems. This coding is consistent with Activities of Daily Living (ADL) Self-Performance Codes for a patient's performance over all shifts during the last seven days and can be used in other patient care areas. It is important to note that physical dependency is not the same as patient acuity. Definitions for levels of dependency are included in the tool and are also outlined below.

4 **Total Dependence** – cannot help at all with transfers; full staff assistance for activity during entire seven-day period. Requires total transfer at all times.

3 **Extensive Assistance** – can perform part of activity, usually can follow simple directions may require tactile cueing, can bear some weight, sit up with assistance, has some upper body strength, may be able to pivot transfer. Over the last seven-day period, help provided three or more times for weight-bearing transfers or may have required a total transfer.

2 **Limited Assistance** – Highly involved in activity, able to pivot transfer and has considerable upper body strength and bears some weight on legs. Can sit up well, but may need some assistance. Guided maneuvering of limbs or other non-weight bearing assistance three or more times; help provided one or two times during the last seven days.

1 **Supervision** – Oversight, encouragement, or cueing provided three or more times during the last seven days or physical assistance provided only one or two times during the last seven days.

0 **Independent** – can ambulate normally without assistance, in unusual situations may need some limited assistance. Help or oversight may have been provided only one or two times in the last seven days.

In addition, each patient will be assessed with regard to such factors as mental acuity, ability to comprehend instructions and cooperate in lifts and transfers, combativeness, weight, upper extremity strength, ability to bear weight and specific medical conditions which may affect the selection of an appropriate means for lifting and transferring. For purposes to determine the percentage of patients on these units who are physically dependent, only Class 4 and 3 patients are considered dependent. The other factors mentioned will be considered when determining the appropriate method of transfer of a patient.

FIGURE 3-3
PRE-SITE VISIT UNIT PROFILE

Describe Unit, including # beds, room configurations (private, semi-private, 4-bed, etc), and bathrooms:

Part I - Space/Maintenance/Storage

1. Describe current storage conditions and problems you have with storage. If new equipment is purchased, where would it be stored?

2. Identify anticipated changes in the physical layout of your unit, such as planned unit renovations.

3. Describe space constraints for patient care tasks; focus on patient rooms, bathrooms, shower/bathing areas.

4. Describe any routine equipment maintenance program or process for fixing broken equipment. What is the Reporting Mechanism/ procedure for identifying, marking, and getting broken equipment to shop for repair?

5. If potential for installation of overhead lifting equipment exists, describe any structural factors that may influence this installation, such as structural load limits, presence of asbestos, etc.

Part II - Patient Population/Staffing/Equipment Use

1. Describe the patients on your unit.

2. List your existing FTEE and also the typical number of filled positions.

   FTEE Assigned Ceiling: ____RN ____LPN ____NA ____Transport ____Other (list

   Typical positions filled: ____RN ____LPN ____NA ____Transport ____Other (list

3. Discuss projected plans or upcoming changes in staffing, patient population, or bed closures.

4. Discuss proposed changes in the average daily census over the next two years.

5. Identify typical distribution of patients by physical dependency level according to the definitions below. Note: This is not the same as patient acuity. The total for the 5 categories should equal your average daily census.

   ____**Total Dependence-** Cannot help at all with transfers, full staff assistance for activity during entire seven-day period. Requires total transfer at all times.

   ____ **Extensive Assistance-** Can perform part of activity, usually can follow simple directions, may require tactile cueing, can bear some weight, sit up with assistance, has some upper body strength, or may be able to pivot transfer. Over the last seven-day period, help provided three or more times for weight-bearing transfers or may have required a total transfer.

   ____**Limited Assistance**- Highly involved in activity, able to pivot transfer and has considerable upper body strength and bears some weight on legs. Can sit up well, but may need some assistance. Guided maneuvering of limbs or other non-weight bearing assistance three or more times, or help provided one or two times during the last seven days.

____ **Supervision** – Oversight, encouragement, or cueing provided three or more times during the last seven days or physical assistance provided only one or two times during the last seven days.

____ **Independent** – Can ambulate normally without assistance in unusual situations may need some limited assistance. Help or oversight may have been provided only one or two times in the last seven days.

6. Provide inventory of all patient care equipment; describe working condition and how frequently equipment is used.

Patient Care Equipment	Manufacturer	Qty	In working order? Comment:	Describe whether it is used and why	Recommendations
Sample: Mechanical Lifts	ARJO	3	yes	Used frequently, but there are not enough slings for all patients	Need 1-2 additional lifts and 12 additional XL size slings.
Sample: Surfboard friction reducing device	Not sure	1	yes	Rarely used—inconvenient to obtain and too heavy to carry to bedside	Need easy to use friction reducing devices stored at bedside for patients who require assistance with lateral transfers.

7. Perception of Problem Areas – what do you think are your problem areas?

8. What equipment do you think you need?

Person Completing this Report: _____

Title: _____

Date: _____

❖ STEP 4: IDENTIFY HIGH RISK TASKS

Next, 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. For example, some studies have indicated that bathing tasks, toileting tasks and transfers from beds to chairs are high stress tasks for patient handlers. Other units may prioritize lateral transfers from bed to stretcher, or turning patients from side to side in bed.

Through job observation, questionnaires to employees or brainstorming sessions with patient handlers, individual sites should determine what are the high-risk activities within their organization. **Figure 3-4** is a tool that can be used with nursing staff to identify and prioritize high-risk tasks.

You may consider this part of the Pre-Site Visit Data Collection process, however, it is important to include as many direct patient care providers as possible in delineating high-risk tasks. Keep in mind that there are likely to be variations by unit as well as by shift.

FIGURE 3-4
TOOL FOR PRIORITIZING HIGH-RISK PATIENT HANDLING TASKS

Directions: Assign a rank (from 1 to 10) to the tasks you consider to be the highest risk tasks contributing to musculoskeletal injuries for persons providing direct patient care. A "1" should represent the highest risk, "2" for the second highest, etc. For each task, consider the frequency of the task (high, moderate, low) and musculoskeletal stress (high, moderate, low) of each task when assigning a rank. Delete tasks not typically performed on your unit. You can have each nursing staff member complete the form and summarize the data, or you can have staff work together by shift to develop the rank by consensus.

FREQUENCY OF TASK H= high M= moderate L= low	STRESS OF TASK H= high M= moderate L= low	RANK 1= high-risk 10= low risk	PATIENT HANDLING TASKS
			Transferring patient from bathtub to chair
			Transferring patient from wheelchair or shower/commode chair to bed
			Transferring patient from wheelchair to toile
			Transferring a patient from bed to stretcher
			Lifting a patient up from the floor
			Weighing a patient
			Bathing a patient in bed
			Bathing a patient in a shower chair
			Bathing a patient on a shower trolley or stre
			Undressing/dressing a patient
			Applying antiembolism stockings
			Lifting patient to the head of the bed
			Repositioning patient in bed from side to si
			Repositioning patient in geriatric chair or wheelchair
			Making an occupied bed
			Feeding bed-ridden patient
			Changing absorbent pad
			Transporting patient off unit
			Other Task:
			Other Task:
			Other Task:

Adapted from Owen, B.D. & Garg, A. (1991). *AAOHN Journal*, *39*, (1).

❖ STEP 5: CONDUCT TEAM SITE VISIT FOR ERGONOMIC ASSESSMENT

Following identification of high-risk units from historical data, the ergonomics assessment team is convened for the purpose of conducting an on-site 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. The following process is completed for each high-risk unit.

Team members must understand the philosophy of ergonomics and ergonomic processes specific to patient care environments, therefore, appropriate training, as offered in this tool, must be completed. Site Visit Team members include persons with training in the ergonomic process such as Industrial Hygienists, Occupational Medicine Practitioners and Ergonomists. At least one nursing service safety appointee should receive training and become a site team member. During the site visit on each unit, the Nurse Manager or designee from that unit will join the Team in order to answer questions specific to the unit. Additional staff involvement is suggested and important to accurately characterize a unit, so nursing staff members from each unit should also be invited. At a minimum, additional staff members should take part in the pre-site visit data collection process. These staff will offer information through group and individual interviews. As many nursing staff as are available will broaden the scope of understanding of the unit.

Each unit begins the Site Visit process with an Opening Conference and may end with a Closing Conference. These meetings include Site Visit Team members and other designated nursing staff. The actual Site Visit walk-through takes place after the Opening Conference. The Opening Conference discusses and clarifies information obtained from the Pre-Site Visit Data Collection Tools and gathers additional information through interviews with nurse managers and nursing staff. If used, the closing conference summarizes information captured previously for accuracy and is helpful in prioritizing issues.

Key staff from the unit, including the nurse manager, supervisor, site coordinator and the back injury resource nurse meet with the ergonomics team to discuss operational issues and review data that was prepared in preparation for the site visit. This meeting may last from 30 minutes to 1 hour. Operational issues discussed include (1) future plans of the unit; whether the unit is to be expanded or reduced, increase or decrease in staffing, change in the type or number of patients, etc.; (2) patient transport issues, how and whose responsibility it is to transport patients for consults and treatments; (3) general equipment condition, storage and preventative maintenance programs (if any). (4) Staffing considerations. During this meeting, staffing levels, scheduling practices and patient assignments are revisited in which we learn about (1) ceiling and typical patient census, (2) staffing levels by shift, (3) unique shift patterns, (4) typical number of staff on modified or light duty assignment, (5) staff turnover, (6) peak workload periods, and (7) workload distribution using special teams such as shower or lift teams.

Once you have the group of staff convened, solicit staff input into risks related to patient care activities. Samples of general questions are outlined below.

- What conditions or situations put you at risk to back strain and injuries?
- Which lifts or transfers are the most difficult and present the highest risk?
- What are the factors that make a lift or transfer a high-risk activity?

- What types of patient conditions contribute to high-risk situations?
- What do you think can be done to reduce or minimize a high-risk situation?
- How can we more effectively use lifting aid devices?
- What are the important features to look for in a lifting aid device?

With a more complete understanding of operational issues specific to the unit, the ergonomics team requests a guided tour of the unit, which may take approximately 30 minutes. During this tour, the team pays particular attention to (1) the availability, size and configuration of storage space, (2) showering processes and equipment, whether private or communal, (3) toileting processes and equipment, (4) patient room sizes and configurations, and (5) provision and condition of equipment for patient transfer, including mechanical lifts, stand assist lifts, lateral transfer aids, etc.

Information derived from the site visits are compiled, by unit, into a summary data sheet (**Figure 3-5**). On this data sheet, the patient population and unit type is described, along with miscellaneous pertinent information, such as future plans of the unit. Availability and condition of equipment on-hand is noted. Problems identified by the ergonomics team are recorded in detail, allowing for the development and recording of proposed solutions.

FIGURE 3-5
SAMPLE SUMMARY DATA FROM SITE VISIT

Unit: _____

Patient Description	Unit Description	Misc. Info	Equipment	Problems Identified	Solutions
Sample: Spinal Cord Injury—includes new injuries and 4-6 ventilator dependent patients. 60% of patients are totally dependent.	This 34-bed SCI unit has two wings, 7 private rooms, 3 semi-private and 5 three-bed rooms. Showers are communal (2 areas), as are bathrooms.	Unit will be moving in 8 months.	3 ARJO Maxilifts 1 TotalLift II Not Used: Mobilizer, surfboard	Most of injuries are from repositioning patient in bed. Lateral transfers are also problematic and there is no equipment staff have found useful. No preventative maintenance program for equipment. One additional lift need for peak periods on each shift; batteries on existing lifts are old and not all lifts have scales.	Pneu-Care mattresses for 10 beds – or—ceiling lift with clamps on sheets to pull pt up in bed—or parachute material for sheets. Get estimate of current mattress expenditures and get turn assist or rotational therapy added on. Explore best surface for pulling up in bed. Two Gait belts with handles 1 powered lateral assist device Explore value of friction reducing devices Additional Maxi Lift with scale New batteries, two XXL slings, and one scale for ARJO Lift Preventative maintenance program needed

❖ STEP 6: RISK ANALYSIS

Risk analysis involves careful review of the baseline 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. Risk factors specific to the healthcare industry might include (1) reaching and lifting with loads far from the body; (2) lifting heavy loads; (3) twisting while lifting; (4) unexpected changes in load demand during the lift; (5) reaching low or high to begin a lift, and (6) moving/carrying a load a significant distance. Environmental hazards are also identified, such as cluttered patient care areas, confined space in bathrooms, or broken equipment.

❖ 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 or administrative controls. Each will be briefly described.

A. Engineering Design Solutions. These solutions usually involve a physical change to the way a job task is conducted or physical modification to the workplace. The changes can be observed as caregivers conduct the job task in a new way. Examples might include the introduction of lateral transfer aids, mechanical lifting aids, height adjustable beds to match with stretcher heights, or the use of wheelchairs that can be converted into stretchers.

These aids are usually more permanent solutions to problems. They may have a higher initial cost but may have a lower cost over the long term as a result of cost reductions realized from the implementation of the changes.

Through engineering controls, changes are made in job design to minimize or eliminate risk factors. Consider some high-risk patient handling activities with the idea of changing the high-risk components of the job. Tasks involving a bed to chair or chair to bed transfer can be very difficult. First, consider moving someone out of a bed and into a chair. The difficulty of the task will vary relative to the dependency level of the person to be moved. Considering a totally dependent person, staff members must reach across an obstacle (the bed) to access the person they need to assist. This involves reaching, and it is usually not possible to position oneself with bent knees since the caregiver is usually leaning up against a bed. The patient needs to be physically lifted and considering weight, the loads involved in the lift are unacceptable. Movement into a chair involves moving the person to a different height level, and there is usually some carrying involved. The unacceptable risk factors of this job task involve reaching, lifting a heavy load, sub-optimal lifting postures, and carrying a load a significant distance. In order to redesign this task effectively, the optimum solution would be to eliminate these high-risk activities. Where task elimination is not an option, lifting aid devices can be applicable to this situation. Lifting aid devices include full body slings, which are very useful for the totally dependent patient. In addition, the bed to chair transfer can be converted into a bed to stretcher transfer. Through the use of convertible wheelchairs that bend back and convert into stretchers and with height adjustment capabilities, a slide transfer rather than a lift may result.

If the patient is not totally dependent, a transfer such as bed to chair may be done by first getting the patient to a sitting posture. Again the amount of assistance required will depend upon the patient's status. Once to a sitting posture, a stand and pivot transfer can be conducted. Some healthcare workers are highly skilled in this transfer technique and have done it many times without suffering any occupational injuries. However, loads involved are heavy and if the patient does something unexpectedly, such as, collapses from a weakness in the legs, the healthcare worker must react and often times these unexpected occurrences can result in occupational injuries. Again through application of some lifting aid devices, the risk associated with this type of transfer can be minimized. A device that could be considered in this situation would be a standing and repositioning lift, which is a lifting device with a simpler sling for patients with weight bearing capabilities.

B. Administrative Solutions. These usually involve the caregivers only in the way the work is done and do not involve a physical change to the workplace. Changes are apparent by watching how the work is conducted or how caregivers perform their jobs. Examples might include changes in scheduling, minimizing the amount of times a patient or resident must be transferred, job rotation where more people are involved in the process of transfers, or the introduction of lifting teams.

These recommendations are usually relatively fast and easy to implement and may have a low initial cost. However, implementation requires continual enforcement and re-enforcement and, although short-term successes may be realized, it is difficult to achieve long-term change and improvement.

Administrative controls may be applied to patient handling tasks. For example, the number of patient transfers may be reduced by effectively scheduling procedures that patients may require over the day. Rather than transferring patients from a bed to a wheelchair or transport device for a particular procedure or diagnostic test and then bringing them back to their room, putting them back to bed and redoing the transfer for a number of other procedures during the day, scheduling could be planned better. Scheduling might be done so that the patients will be transferred out of bed, brought from place to place for various necessary procedures, and then returned to their room.

Here is an example of how administrative controls can be used, involving rescheduling to minimize a high concentration of lifting activities for direct patient care staff. It takes place at a state department for the developmentally disabled involving facilities housing highly dependent patients who are in need of much assistance to be moved. One of the most demanding times for patient transfers involved the part of the day when staff members were preparing patients to be picked up in buses and transported to their daily activities. Because of the way activities were scheduled and how the buses ran, staff members were rushing and highly stressed to prepare patients for transport in a short time period. Lifting aid equipment was considered and did improve the situation; however, the short window of time to get patients out of bed and prepared for transport was creating the problem. This was not an issue that staff caring for the patients could solve themselves. It involved many people throughout the entire facility, including those responsible for scheduling patient activity programs and meals, as well as the organization that had been contracted to provide transport services. Other than the direct patient care staff, the other groups were unaware of the problems encountered with the short time window provided to prepare patients for transport. After an initial

meeting was held with these other operational groups at the facility, they understood the problem and were more than willing to consider options to improve the situation. Scheduled activities were adjusted and methods of transport pickups were also changed. This resulted in distributing the number of required transfers over a larger period of the workday and allowed for better use of lifting aid equipment. The implementation of this administrative control required some careful planning and presentation of the problem as well as cooperation from a wide segment of many operational groups within the facility. The end results were positive to all involved including the patients, who received better care. This was due to the fact that direct patient care staff had more time in preparation for the transport process and they could give more individual attention to patients.

Selecting Appropriate Lifting Aids. Based on the dependency levels of patients on the unit, specific methods of transferring and lifting will be designated. Based on the above assessments, the following methods of lifting and transfer should be employed at facilities.

1. **Total Dependence Patients Level 4.** All patients classified as total dependence (Class 4) should be lifted and transferred between beds, chairs, toilets, and bathing and weighing facilities by means of a full-sling mechanical lift device. In some situations, if another means of transfer might be required, as the first option considered should not involve manual lifting. Such an option might include use of a transfer chair that can convert into a stretcher configuration along with a powered lateral assist transfer device. Determining the average number of Level 4 patients on a unit will help you determine how many devices are needed.

2. **Extensive Assistance Level 3.** All patients classified as extensive assistance (Level 3) should be lifted and transferred between beds, chairs, toilets, and bathing and weighing facilities with the aid of a mechanical lift device. A full body sling lift is appropriate for all transfers. However, depending upon the patient's condition and weight bearing capabilities, a stand assist lift might be used if determined appropriate by professional staff conducting patient assessments. The determination of which lift to use should be noted and communicated to nursing staff in a standardized way by the facility. Use of a full sling lift may always be substituted for the stand assist lift at the discretion of the caregiver for the protection of the patient or caregiver. When mechanical lifts are determined to be not appropriate, the first options considered should not involve manual lifting and transferring. Such an option might include use of a transfer chair that can transfer back into a stretcher configuration and a powered lateral assist transfer device.

3. **Supervision/Limited Assisted Patients Levels 2 and 1**. An individual patient handling plan should be developed for each patient whose mobility level is assessed as requiring supervision or limited assistance (Level 2 or 1). This plan should be developed by professional medical staff, which may include nurses or physical therapists based on the individual assessment of the patient. The basics of this plan should be accessible and communicated to the nursing staff in a standardized way by the facility. In some cases, supervision/limited assessment patients may require a stand assist lift. Depending on the patient's condition, stand assist aids may be appropriate. These might be mounted on the bed or free standing and include walking aid devices. The electric height adjustment of a bed may also be used to assist these patients to a standing position. Those patients who require assistance in standing may also be unsteady on their feet and require a walker for assistance. These non-powered assist devices provide safety and support to patients while allowing them to use and maintain their current abilities.

The use of gait belts with handles or transfer belts that allow the caregiver to get a firm grasp on the patient may also be appropriate for this class of patient. Other lifting aid devices such as sliding boards, which provide a bridge and means for the patient to slide from a bed to chair in a seated position, can also be considered. The patient's handling plan should specify what transfer or lifting devices are needed, as well as the number of caregivers required to assist in the transfer. Depending on the patient's condition and ability to assist in the transfer process, at times two caregivers may be required for the transfer. In some situations, because of a patient's weight, a mechanical lift might be specified for safety to protect against an unexpected event during the transfer process.

4. **Independent Patients (Level 0).** Independent patients (Level 0) are normally capable of bearing their own weight and walking without assistance. They do not normally require mechanical assistance for transferring, lifting, or repositioning. However, a patient's condition may vary due to any number of factors, and caregivers should be trained to be alert to a patient's changing abilities. Anytime a patient is unable to bear weight or come to a standing position and must therefore be lifted, regardless of how that patient was originally assessed, and extensive assistance is required during the lift or transfer process, both the patient and caregiver are at risk of injury. Therefore, mechanical lifting devices and lifting aids may be required.

5. **Lifts from Floor.** In almost all situations where a patient must be lifted from the floor, a full sling mechanical lift will be required. A patient who has fallen to the floor should be assessed for injury prior to being lifted. Training will be provided to nursing staff regarding when a patient should not be moved at all and when a mechanical lift should not be used due to patient injury. A plan should be specified in advance for moving and lifting patients in these situations. The plan should specify a minimum number of caregivers needed to assist in any manual lift, as well as the need for specially trained or selected caregivers. Special training should be provided when such manual lifts are required. Where a patient has fallen and can regain a standing position with minimal assistance, a transfer belt or gait belt with handles can be used as a lifting aid, provided an adequate number of staff members are available to provide needed assistance.

6. **Repositioning**. Where possible, attempts should be made to minimize the need for repositioning of patients. Where patients require frequent turning or repositioning for therapeutic needs, treatment surfaces on beds should be sought which can meet therapeutic needs and minimize the need for repositioning. Proper and optimum use of bed control adjustments should also be used to minimize the need for repositioning. Proper bed adjustment can minimize a patient sliding down in bed. When a patient does slide down to the foot end of the bed, and repositioning in bed is required, bed controls and features should be evaluated and utilized to the full extent possible to maximize ergonomic advantage to the caregiver during these activities. Where possible, beds should be raised to the height of the caregiver's elbow. When beds have a capability of assuming the Trendelenburg position (where the head of the bed is lower than the foot of the bed), this position should be used to facilitate the repositioning process. A variety of friction reducing devices and small hand slings are also available to assist in the repositioning process. Where possible, the use of a mechanical lift should be considered when a major bed repositioning is required. All repositioning in beds should be performed by at least two caregivers. Where patients are capable of assisting, they should be involved in the repositioning process.

Appropriate chairs and chair adjustments should be used to minimize the need for repositioning of patients in chairs. Features such as the tilt in space should be sought for chairs to help maintain proper positioning of a patient. When there is a need to reposition a patient in a chair, proper use of a stand assist lift should be considered as a first option. Gait belts, transfer belts and hand slings may be used to facilitate the repositioning process. Where these lifting aids are used, at least two caregivers should be involved in the repositioning process.

7. **Situations in Which Mechanical Lift Devices Cannot Be Used.** Unusual situations in which mechanical lift devices cannot be used should be identified in advance and specific lifting procedures should be designated for those situations. For example, when a patient weighs in excess of the safe lifting capacity for the standard mechanical lifts at a facility, appropriate mechanical lifts able to accommodate higher weight limits should be obtained. Standard mechanical lifts will normally accommodate 350 to 400 pound patients. More substantial lifts will accommodate 600 pound patients, and bariatric lifts are available that can lift patients up to 1000 pounds.

   A mechanical lift might not be appropriate due to a patient's medical condition. Other methods of transfer might include the use of transfer chairs. These chairs convert into a stretcher configuration transforming a standard bed to chair transfer to a lateral transfer. Where these transfer chairs are employed, lateral transfer devices should be used. These include; mechanically powered transfer devices, which pull the patient across from one surface to the other, and friction reducing devices that aid the sliding of a patient from one flat surface to another. In other situations where mechanical lifting devices are not appropriate, lifting aids such as sliding boards, transfer belts, and gait belts with handles may be specified by the medical professional. In these situations, the minimum number of caregivers needed to assist in the transfer as well as the need for specially trained or selected caregivers will be identified. Special training should be provided for such assisted manual lifts.

8. **Combative and Mentally Impaired Patients**. It is expected that in most situations, a combative or mentally impaired patient requiring a lift based on dependency needs can be lifted using the appropriate mechanical lifting aid device. Combative or uncooperative patients may require more caregivers to assist in the process. In the unusual circumstance where a mechanical lift is deemed not appropriate for a particular patient due to the patients mental condition or behavior, that determination should be made by a member of the facilities professional staff and noted in the accessible records for that patient. Under such circumstances a specific plan for lifting and transferring that patient should be developed in advance, specifying the number and type of caregivers needed to assist.

9. **Equipment Availability.** An adequate quantity of appropriate equipment should be available for use. Equipment should be stored and available in accessible areas. An appropriate maintenance program should be instituted to ensure that equipment is in good working order and that batteries are charged regularly and are readily available. An adequate amount of equipment accessories such as slings must be available in a convenient location. An adequate variety of slings including various sizes as well as toileting and bathing mesh slings should be made available. In addition to mechanical lifts, facilities should seek out appropriate friction reducing devices, sliding boards, transfer belts, and gait belts with handles.

ALLOCATION OF RESOURCES. There are many issues to be considered by the evaluations team in determining the best and most appropriate use of available funds:

1. Are appropriations best utilized for the acquisition of new technologies, or for the upgrade or replacement of old equipment? Assuming that an effective maintenance program is in place, older equipment will have a long operational life. Certainly, technological developments lead to substantial improvements in patient handling equipment that can lessen the burden on caregivers. If existing equipment is properly functioning, then cost of upgrades, other than those required through FDA audit are typically cost-prohibitive and so funds may be best spent on the acquisition of new technologies rather than on the replacement of old.

2. Should you purchase or lease patient handling equipment? The answer to this question lies in demand. If a product is needed for frequent use, then the best return on capital investment would be to purchase the products outright. For equipment less in demand, such as bariatric care products, leasing may suffice. As a general rule of thumb, if the anticipated costs of periodic leasing of a product over a four-year span exceed the purchase price of the product, then purchasing might be the most cost-effective long-term solution.

3. Is it better to purchase ceiling-mounted lifts or portable floor lifts? Laboratory-based studies at the Tampa VA have shown that ceiling mounted lifts require 55% less effort that portable floor lifts. In the clinical setting, use of floor lifts typically decreases the number of patient handling injuries by 30% over 12 months, while ceiling mounted lifts reduced injuries on one 60 bed nursing home by 100% over 12 months. The costs for these two types of lifts are comparable, but more ceiling lifts may need to be purchased to provide full coverage for the unit.

4. Should you provide ceiling-mounted lifts throughout the unit? Not necessarily. We have discovered that an appropriate coverage for a unit is equal to the proportion of totally dependent patients. This provides for at minimum adequate coverage for those patients whose care is most demanding on nursing staff. A typical medical-surgical unit may have 40% dependent patients. If this unit has an average daily census of 40, 16 beds would need ceiling lifts, which would be accomplished by installing four ceiling lifts, one in each 4-bed room.

5. What features are needed for ceiling lifts? In laboratory and field studies conducted at the Tampa VAMC, staff preferred the two function (up/down) lifts. When offered the multi-functional systems with powered tracking, we found that the nurses actually worked against the motor because the powered tracking was too slow. Furthermore, the absence of powered tracking requires that the caregiver manually move the patient around the room. This requires minimal effort, but the nurse has hands on involvement with the patient at all times, which both makes the patient feel more secure and is in compliance with VA policy. The slight additional capital investment in H-track or transverse track systems provides much greater flexibility for tasks than the single-track systems. However, this poses some logistical problems with existing light fixtures and privacy curtains.

6. A number of accessories are available for lifting systems. These accessories can add significantly to the overall cost. We have found that there is worthwhile benefit in adding scales to the lift systems, where patients are weighed frequently or daily. The availability

of this technology replaces a task which can otherwise be stressful to the nursing staff, can place the patient at risk for falls, and allows the caregiver to spend more time addressing other patient needs.

7. Aging or inadequate quantities of battery packs can affect the availability of powered lifting systems. Where existing equipment on the units is not fully utilized due to battery problems, purchasing of additional or replacement battery packs might be a very wise investment. An actual schedule or procedure may be necessary to assure a reliable system for switching and recharging batteries. Depending on the types of batteries and charging technologies used by the lifting systems, additional battery packs might be warranted. For example, if the type of battery requires total discharge before recharging to extend battery life, then the system would be out of commission until the battery again reaches full charge. An additional battery pack would be warranted in this case and would add to the overall purchase price of the system. Engineering staff are available to assist in this determination. In one case there was an increase in staff injuries on night shift. Investigation revealed that the batteries for the patient lifts needed to be recharged overnight and were not available to staff on this shift. A back-up battery was purchased to allow the lift to be in use 24 hours/day and resulted in a significant reduction in injuries.

8. Slings for ceiling, floor-based and stand-assist lifting systems, are available in a variety of amputees, or special applications, e.g. bathing, that the general use slings are widely applicable. Careful consideration needs to be given to the number, sizes, and types of slings selected for each lift. Laundering procedures may necessitate purchase of extra slings if laundering is accomplished off the unit and delays access to a set number of slings/day. Infection control policies may mandate separate slings for each patient. Insufficient numbers of slings has been identified as one reason staff do not use existing lifting equipment.

9. Lateral transfer of dependent patients, e.g. from bed to stretcher or convertible dependency chair, is a problem within the health care industry that is beginning to receive recognition. Prior to the availability of powered lifts, the risk of injury associated with lateral transfer was moderate compared with the major risk of manual lifting. Now that patient lifting is being properly addressed with advanced powered lifting systems, the new issue of lateral transfer is emerging. In laboratory studies at the Tampa VAMC, we have discovered that forces required to perform an unassisted lateral transfer using a draw sheet equate to approximately 70% of the weight of the patient. Even if three nurses perform this task, the risk of cumulative injury to the back is unacceptable. To address this problem, new technologies are now reaching the marketplace. These technologies include a variety of friction reducing devices and mechanical and powered lateral transfer equipment. Presently the operation of mechanical lateral transfer devices is inadequate where the forces, while minimized are transferred to lesser capable joint, such as the shoulders. This is an unacceptable solution. The high cost of powered lateral transfer technologies may be warranted where a high-volume of lateral transfers are regularly performed on a unit. Up to 30 low-cost friction reducing devices may be acquisitioned for the same price as a single powered lateral transfer technology.

10. The quantity of various devices should be determined as a function of both patient needs and concurrent responsibilities of nursing teams. If, for example, during the morning shift, several teams require the availability and continuous use of a particular product then sufficient quantities must be acquisitioned to satisfy this need. When not in use,

product should ideally be stored central to all operations, such as in a storage room or rooms mid-way along the length of the unit.

11. With the elimination of bed rails as a high-risk entrapment hazard, the concern of patient falls from beds has risen. In addressing this problem, some units have adopted low beds and/or fall injury prevention matting that is placed on the floor. Both solutions are commendable, but in addressing patient injury concerns, risk of injury to nursing staff has been grossly ignored. Where low beds are used, those beds must have the capability to be raised to an acceptable working height. Nursing staff, must be encouraged to utilize this function rather than addressing patient needs at a low level. Where mats are used, nurses might either first move the sometimes heavy mats before addressing patient needs, or walk across the mats, which presents a cause for instability. Furthermore, these mats must be frequently moved by housekeeping staff for cleaning purposes. Low weight, more stable mats are now becoming available, but this is an interim solution until the larger issue of patient fall risk can be adequately addressed without restraint.

❖ STEP 8: IMPLEMENT 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 (Refer to Chapter 1 for suggested team member composition.)

The objective of this ergonomic-based injury prevention program is to redesign high-risk job tasks related to manual handling or patient transfers. Through educational awareness sessions, this message should be delivered throughout the organization. Through hands-on training sessions, staff must be taught to use the new equipment competently and confidently. During this implementation phase, remember that changes are being made in the way work is done. To achieve success, staff must feel like they are part of the program development. In this implementation phase, through new directions of training, patient care handling staff should learn to assess risk factors in their job and be encouraged to minimize these risk factors with the assistance of management and the implementation team.

When back pain does occur, case management will continue to be an important part of the overall program. Through effective medical management, lost time can be reduced, and caregivers can return to work without lengthy disability. For injury prevention, set up systems for early intervention to detect any early symptoms, and when injuries do occur, develop mechanisms for close follow-up to monitor progress. The objective should be to get caregivers back in the workplace as soon as possible. To accommodate any temporary occupational disability a caregiver might experience, modified duties should be designed to allow them to return to the workplace. Recognizing that while a caregiver may not be at 100 percent physical capacity, he or she can still be a productive contributor.

The implementation team will be the group whose responsibility is to formulate recommendations and integrate into the operational activities at the facility. Members of the

implementation team may be selected from the initiation team or new members with new ideas and much enthusiasm can be added. All of the work done thus far will depend on the plans and efforts of the implementation team. Below are ideas offered for implementation.

Successful Ergonomics Programs

Experience has shown that essential elements of an ergonomics program are not technical systems, but rather it is the ability to motivate participation and the use of other fundamental management skills and practices that are most critical to success.

A. Disseminate Information Across Stakeholder Groups: In order for the overall program to be successful, a careful plan of introduction is necessary. Before any new lifting or bathing equipment is placed in service, much groundwork is necessary. Two sets of educational awareness programs should be conducted:

1. Education for managers of direct patient care staff: Management must be convinced of the value of the equipment and understand how new equipment will play an important part in the overall back injury prevention program for the organization and improving the quality of care.

2. Education for direct patient care staff: Before new equipment is introduced, direct patient care staff should receive in-service education on the philosophies of an ergonomic program, as well as why the new equipment is being introduced into their work site. Many caregivers may have been involved in the risk assessment phase. However, at this implementation phase, heavy involvement with the work force is needed in order for equipment to be accepted by staff. The benefits that equipment will have for the caregiver and patients should be highlighted.

3. Education for patients: Plans should be discussed on the new equipment will be introduced to patients for better acceptance. Patients may be concerned with:
   - Safety
   - Loss of independence
   - Dignity issues
   - Comfort

B. Involve End-Users in Selection of Equipment: To be most effective, it is paramount that ergonomic interventions for injury risk reduction meet the formal or informal approval of the end-users. In the healthcare industry, there are two end-user groups; the nurse/caregiver and the patient. The common thread of strategies for acceptance of ergonomic interventions is that the end-user participates in the decision making process. Such strategies could include equipment fairs and clinical trials.

Equipment fairs are a process by which multiple vendors are given the opportunity to demonstrate their products at a facility. Oftentimes, vendor-initiated demonstrations offer no comparative measure. Therefore, if a facility foresees the acquisition of multiple units of a particular type of product, it would be of tremendous benefit and timesaving advantage to invite all known vendors of applicable products to exhibit their technologies simultaneously. A conference facility or large meeting hall at the hospital might be an appropriate venue for

such an event, which hospital administrators, engineering and contracting representatives, and involved caregivers are invited to attend. Much like an exposition, at this event, staff have the opportunity for hand-on interaction with like technologies, to learn from and ask questions of the vendors. We have found that a most useful method for capturing the perceptions of the staff is to ask that a simple questionnaire be completed for each reviewed technology. Following the equipment fair, questionnaire results can be compiled to learn the expressed wishes of the staff. Chapter 5 outlines strategies for end-user evaluations.

Similar to an equipment fair, clinical trials offer the opportunity to learn about staff perceptions regarding particular products. This strategy may be employed where there are few competitive products that directly meet defined needs, or if findings of the equipment fair do not clearly identify a preferred solution. Clinical trials involve operational trials of products for patient handling and movement tasks. Vendor(s) are invited to trial their product at a facility for a pre-determined period, typically one month. During this period, staff are invited to use the new equipment for appropriate tasks. Feedback may be solicited from the staff either by structured or unstructured interview techniques following the completion of the trial, or by questionnaires, similar to those used in the equipment fairs. Patients might also be invited to express their opinions using similar techniques

❖ 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. Chapter 11 outlines the evaluation process in detail.

Chapter 4

EQUIPMENT AND DEVICES FOR SAFE PATIENT HANDLING AND MOVEMENT

❖ EQUIPMENT CATEGORIES FOR SAFE PATIENT HANDLING AND MOVEMENT

Below is a brief definition of each category of equipment.

Air Assisted Lateral Sliding Aids:

These are devices where a flexible mattress is placed under a patient in the same manner as a transfer board. There is a portable air supply attached to the mattress that inflates the mattress. Air flows through perforations in the mattress and the patient is moved on a cushioned film of air allowing staff members to perform the task with much less effort. These technologies are particular suitable when performing lateral transfers involving patients with special medical conditions, such as pressure sores.

Friction Reducing Lateral Sliding Aids:

Friction Reducing Lateral Sliding Aids can assist with bed to stretcher type transfers. These devices can be positioned beneath the patient or resident similar to a transfer board and provide a surface for the patient to be slid over more easily due to the friction reducing properties of the device. These are simple low cost devices, usually made of a smooth fabric that is foldable and very easy to store. Properly designed handles can reduce horizontal reach, as shown in the example.

Mechanical Lateral Transfer Aids:

Stretchers are available that are height adjustable and have a mechanical means of transferring a patient on and off the stretcher. Some are motorized and some use a hand crank mechanical device. Mechanical means of mechanizing the lateral transfer are also available as independent options able to be used with most beds and stretchers, as shown. These devices eliminate the need to manually slide the patient, minimizing risk to the caregiver.

Transfer Chairs:

Some new wheelchairs and dependency chairs can convert into stretchers where the back of the chair pulls down and the leg supports come up to form a flat stretcher. These devices facilitate lateral transfer of the patient or resident and eliminate the need to perform lift transfer in and out of wheelchairs. There are wheelchair devices that convert to stretchers which also have a mechanical transfer aid built in for a bed to stretcher or stretcher to bed type transfer.

Powered Full Body Sling Lifts:

Probably the most common lifting aid device in use is a full body sling lift. A number of models and configurations are available. The majority of sling lifts are mounted on a portable base, however, use of ceiling mounted sling lifts is growing. The portable base and the ceiling mounted devices have their advantages. With a ceiling mounted device, there is no need to maneuver over floors and around furniture. These units are quite easy to use, however, transfers are limited to where overhead tracks have been installed. Where overhead tracks are not available or practical, portable bases can be used to suspend full body sling lifts. Sling lifts are usually used for highly dependent patients. They can be used to move patients out of beds, into and out of chairs, for toileting tasks, bathing tasks, and for any type of lift transfer. These lifts are available with many features and there is a wide variation in the types of slings available. The newer sling designs are much easier to install beneath the patient or resident.

Powered Standing Assist and Repositioning Lifts:

These lifts provide an alternative to full body sling lifts. These types of lifts are very useful where patients are partially dependent and have some weight bearing capabilities. They are excellent to move patients in and out of chairs and for toileting tasks. Powered standing assist and repositioning lifts are easily maneuvered in restricted areas, such as small bathrooms. There are some variations in the sling design, but the basic concept is of simple design, as illustrated and very easy to place around the patient.

Standing Assist and Repositioning Aids:

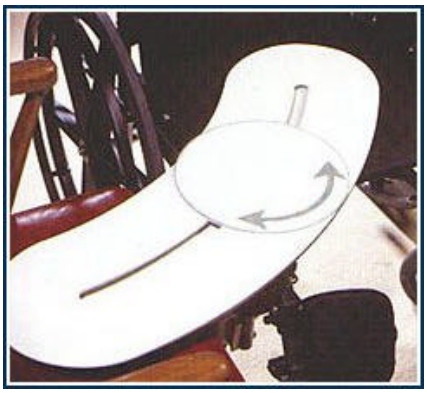
Some patients or residents may only need a little support to stand. In this case, they can help themselves if they have a support to grasp. Various types of devices can be provided to assist a patient from a seated to standing position by allowing them to hold on to a secure device and pull themselves up,

such as demonstrated in the figure. These devices may be freestanding or attached to beds.

Bed Improvements to Facilitate Transfer or Repositioning:

Current bed technologies incorporate many ergonomic improvements. Some examples include beds that eliminate the need for bed to chair transfers by easily converting to a chair configuration. Another innovation in bed design, referred to as shearless pivot, reduces the need to constantly reposition a patient in the bed by minimizing the amount of slippage down to the foot of the bed experienced by the patient when raising the head of the bed. Further innovations with bed mattress surfaces can aid rotation and move a patient as needed in many intensive care units, by utilizing air bladders incorporated into the mattress surface. The above example shows a transfer conveyor system integrated into bed frame, which moves the patient from the bed into a wheelchair and back.

Sliding Boards:



For seated bed to chair or chair to toilet type transfers, low cost sliding boards are available. Sliding boards are usually made of a smooth rigid material with a low coefficient to friction. The lower coefficient of friction allows for an easier sliding process. These boards act as a supporting bridge when seated slide transfers are performed. Some, but substantially reduced, manual lifting is still required to move the patient, however, sliding boards do offer considerable improvement at a minimal cost. The illustrated example is suitable for independent or assisted transfers from wheelchair to bed

Gait/Transfer Belt with Handles:

An object with handles improves the grasp opportunity for the worker and thereby reduces the risk. Gait/transfer belts are installed on patients or residents, usually around the area of the waist providing handles for a worker to grasp when assisting or transferring a partially dependent patient or resident, as shown. Small hand-held slings that go around the patient can also facilitate a transfer by providing handles. These options are available for patients with weight bearing capability that needs only minimal assistance.

❖ EQUIPMENT EVALUATION PROCESS

Equipment evaluations are typically used to compare the usability of competitive equipment types for a specific application. As such, development of an equipment evaluation protocol is highly dependent on equipment type and application. The Safe Patient Movement TAG has defined twelve equipment categories. . Further, eight product applications have been defined by this group. This presents 90 or more equipment type / application combinations, each requiring an individualized evaluation protocol.

Patient Handling Equipment

- Sliding boards
- Air assisted lateral sliding aids
- Friction reducing lateral sliding aids
- Mechanical lateral transfer aids
- Transfer chairs
- Gait belts with handles
- Powered full body sling lifts
- Powered standing assist and repositioning lifts
- Standing assist and repositioning aids
- Other ergonomic transfer devices
- Bed improvements to support transfers or repositioning
- Dependency or geriatric chairs

Equipment Applications

- Nursing Home Care Units
- General Rehabilitation Units
- Acute Medical / Surgical Units
- Operating and Recovery Rooms
- Spinal Cord Injury Units
- Outpatient Clinics
- Inpatient (general)
- Intensive Care Unit (ICU)
- Home Care

❖ Evaluation Team

Three possible team options are available for conducting equipment evaluations:

- Central evaluation team – a core group, consisting of, at minimum, an Ergonomist, risk manager, health and safety officer, and nursing professional
- On-site evaluation team – a group comprised of members from the clinical site
- Central evaluation team with on-site champion

Utilization of a central evaluation team, while an excellent means of standardizing subjective influences would be personnel intensive. For field studies, at least one member of the central evaluation team would need to be on-site throughout the process. Further, since outsiders to the facility, the team may not have the full cooperation of site staff and patients.

While it is hoped that an on-site evaluation team would have the full-cooperation of facility staff and patients, this approach would introduce substantial training needs. It is also anticipated that this would introduce uncontrolled subjective variability into the process, such that the findings from one site may not be directly applicable across other clinics with the same intended equipment application.

A central evaluation team with an on-site champion appears to be a reasonable solution, drawing on the strengths of each approach.

Train the trainer meetings might be appropriate to introduce on-site champions to the central evaluation team and provide educational resources to those individuals. Further, an electronic resource such as a newsgroup or list serve could be set up to encourage communication and sharing of ideas / solutions among site champions.

❖ Sources of Information

Information may be derived from a variety of sources, each with unique advantages and disadvantages. These information sources are outlined in Table 2.

Table 2: Strengths and Weaknesses of Sources of Information

Sources of Information	Strengths	Weaknesses
Product Information	Rapid assessment	Biased information
External Evaluations / Literature Review	Rapid source of information	Typically conducted by manufacturer and therefore may be biased
Maintenance	Objective accounting Cost of operation	Information may be difficult to attain from references; references typically provided by manufacturer
References	Rapid assessment	References typically selected by manufacturer; Highly subjective
Field evaluations	Caregiver input Patient input Moderate timeframe	Typically subjective Must be comparative, either control or competitive products, to be meaningful
Lab based evaluation	Comprehensive approach Objective Caregiver input Patient input	Time-consuming Costly Must be comparative, either control or competitive products, to be meaningful

The complexity of a particular evaluation may be determined based upon anticipated equipment use and caregiver/patient risk. For example, if a particular product is anticipated to be used only periodically and the expected risk to the caregiver and patient is expected to be minimal, then it would be an unjustified use of resources to perform a comprehensive laboratory-based evaluation of competitive products. Any evaluation should include a variety of the above information sources.

❖ Preliminary Equipment Evaluation Process

The process should typically be initiated by identifying all products that could be used to perform the desired application in a reasonable and safe manner. It will be useful to develop criteria for the desired product type. (See attached criteria worksheet.) A Request for Information (RFI) based on these criteria may be published in Commerce Business Daily. Local contracting staff

can assist with this process. Literature for each of these product types should then be requested from each identified product manufacturer.

Following an initial review of the product literature to eliminate those products that would not be suitable for the intended application, the evaluation team should approach each manufacturer requesting information on any previously performed or ongoing field and laboratory-based equipment evaluations. Be aware that if the product manufacturer has performed the equipment evaluation, not an outside research facility, then the findings of such evaluations might be biased or incomplete. A literature search, both peer review and newspaper / industry magazine, should be conducted to determine if other information is available for each product.

Local contracting staff should be involved early in the process and may assist with performance or cost of operation measures pertaining to both the equipment and vendor. Performance measures considered by contracting staff include:

- Special features of the product not offered by comparable products
- Trade-in considerations
- Probable life of the product compared to comparable products
- Warranty considerations
- Maintenance requirements and availability
- Past-performance
- Environmental and energy efficient considerations

Contracting staff may also contact the Federal Drug Administration (FDA) and National Reporting Office for any information pertaining to equipment-related incidents and recall information.

Discussion with vendor customers / equipment owners, by referral from the vendor, can present very useful information for the evaluation process. If possible, follow-up meetings with select referred facilities might be conducted at their site. The purpose of such meetings would be to view operation of the equipment, discuss with facility staff and patients, and try to attain cost of operation information (incidence / maintenance and adverse events). An unstructured form is attached to this document to facilitate note-taking for cost of operation reporting. A referred facility might be even be willing to provide access to patients and staff for a field study of mutual benefit.

❖ Selection of Products for Field or Laboratory-Based Evaluation

Before embarking upon either a field or laboratory-based evaluation, it will be necessary to reduce the number of products to be tested to ideally three and at most five competitive products. Often, due to the specialized nature of the equipment, this will be achieved by carrying out an effective preliminary equipment evaluation. If the preliminary process yields only one suitable product, and that product appears to reasonably satisfy the task requirements without imposing increased risk to either the patient or caregiver, then the evaluation is probably complete. If the preliminary process identifies more than three suitable products, it will be necessary to further select products for inclusion in a field or laboratory-based assessment.

There is no set rule as to how to identify a select few products for further evaluation, but a good rule of thumb is to identify the:

1. Best choice based upon the preliminary evaluation
2. Most popular based on sales information

3. Upper and lower functionality extremes – e.g., most basic and most comprehensive products on the market
4. Any product which presents an innovative approach to the task

Oftentimes, one particular product will satisfy two or more of the above criteria, thereby reducing the overall number of products for further evaluation.

Equipment vendors might also be invited to present their products on-site to the entire nursing staff and appropriate patient populations at an "Equipment Day" exhibition. Product samples may be setup and demonstrated within the hospital auditorium. Nurses and patients should be encouraged to examine each product and to provide feedback via a structured evaluation questionnaire. Compilation of results from this rapid evaluation process can be useful in identifying the top three to five products for further evaluation.

❖ Field Evaluations

Field evaluations are the preferred method for comparative equipment evaluations as they yield reasonable results for minimal time and resource investment. See Attachments 4-1 through 4-5 for tools to facilitate a field evaluation.

Contact manufacturers of products identified from the above preliminary evaluation and pre-selection processes to provide a product sample for on-site evaluation purposes. It is highly likely that all manufacturers will be eager to provide a sample for the chance of future sales.

The number of groups involved in the field study should equal the number of products available for testing, plus a control group, that performs the task in the same manner as typically performed. The groups should be balanced, where each study group should include 25-30 participants. This number is not determined based on any statistical power analysis, but is based on experience and should provide reasonably reliable results. If selected products are quite dissimilar, it may be possible to reduce the number of subjects to 10-15, whereas if the products are highly similar, it might be necessary to increase the number of patients. If there are not enough caregivers and patients within the facility (or department) to provide adequate numbers of subjects for each group then it will be necessary to perform evaluations on each product in random order.

Institutional Review Board (IRB) approval may be necessary before enrolling any caregivers or patients in the field evaluation study. If a product already has FDA approval for its intended application, the evaluation may be exempt from IRB review. Check with your local IRB office for clarification at the earliest opportunity.

Caregivers should be provided training in the appropriate use of the equipment, typically provided by the product manufacturer immediately preceding use of that equipment. If the equipment is highly complex, it might be necessary to provide a resource for questions and a follow-up training session several weeks after introduction of the equipment. A follow-up training session also provides an opportunity to train staff who may have been off-duty during the initial training session.

Objective methods of data collection are rarely utilized in field studies, though simple measurement systems, such as EMG (muscle activity monitoring) or video / photography might be utilized for a select few subjects as an alternative to performing a costly laboratory-based

evaluation. Data for field evaluations is often compiled based on caregiver and patient reporting. To minimize subjective variability, a structured form is often developed for this purpose. Dedicated forms are developed for caregiver and patient populations. See Attachments 4-1 through 4-5 for tools to facilitate a field evaluation.

One method is to identify the key features across product types and ask each caregiver and patient to report their perceived findings on a structured scale. Key features might include: length, balance, texture, grip, aesthetics, safety, stability, durability, comfort and ease-of-use, etc. Reporting scales may be numerical, 0 to 10, where the subject circles the number that meets their perception of acceptability of that feature, or might be a continuous line where a mark is placed between the two end-points indicating perception of acceptability. While the latter method is more sensitive to differences among products, it is an often-misunderstood method and therefore requires vigilance by the evaluation team or local peer-leader. The first method is used when constant vigilance is not available, as is often the case. An alternative approach could be to present categories or indicators that are highlighted by the subject to represent their perception of acceptability. Such indicators might be ”reasonably comfortable,” “very comfortable,” etc.

Questionnaires may be presented to each subject at defined intervals throughout the evaluation process. These intervals should be determined by the evaluation team based upon the protocol and may be weekly, monthly, or at the commencement and conclusion of the evaluation period.

One advantage of the cross-design method is that it allows caregivers and patients to rank design features across all products tested, since they have had the opportunity to personally experience each product. At the conclusion of the study, all product samples should be made available to the participants, who are asked to rank their preferences for each feature.

As discussed earlier, protocol development is highly dependent upon equipment types and applications. As such, it is not possible to present one questionnaire that could be used across all equipment evaluations. These questionnaires should be developed with the assistance of the central evaluation team for each equipment evaluation. Examples of Product Rating Forms for both caregiver and patient are attached.

❖ Laboratory-Based Evaluation

In certain circumstances it might be necessary to perform a comprehensive laboratory-based evaluation of competitive products. Such evaluations are typically costly and time-intensive, and often require grant support. A laboratory-based evaluation would be justified under the following conditions:

1. field evaluations do not yield easily interpreted findings
2. risk of injury to caregiver and / or patient is high under current methods
3. considerable equipment acquisition is anticipated

Laboratory evaluations involve complex biomechanical and subjective assessment of various features of the selected products. Due to the nature of laboratory evaluations, there may be dissimilarities between evaluation protocols and field use due to compromises demanded by limitations of the measurement systems. The Department of Veterans Affairs has constructed a state-of-the-art biomechanics research facility at the James A Haley VA Hospital in Tampa, which is an available resource to assist in such evaluations.

❖ Purchasing Decision

Once a decision has been reached, local contracting staff must be consulted to assist with negotiating the purchasing procedures. Since the procurement of assistive transfer devices is intended to reduce risk of injury to caregivers and patients, we have, in the past, successfully negotiated a guarantee with equipment vendors. Knowledge of this process might prove to be useful in your own purchasing negotiations. Essentially, vendors are asked to guarantee that procurement of their product will lead to a certain percentage reduction in injuries among staff. Anticipated injury reduction may range from 20% to 50% and is dependent upon the equipment type and application. If the negotiated injury reduction potential is not achieved within a specified time frame, then the contract would call for a purchase refund. This process achieves many objectives, including capital investment justification to equipment procurement committees and enhanced after-sales service from the equipment vendor.

❖ CRITERIA FOR SELECTION OF LIFTING AND TRANSFERING DEVICES

1. The devices should be appropriate for the task that is to be accomplished
2. The device must be safe for both the patient and the caregiver. It must be stable, strong enough to secure and hold the patient, and permit the caregiver to use good body mechanics
3. The device must be comfortable for the patient. It should not produce or intensify pain, contribute to bruising of the skin, or tear the skin.
4. The device should be understood and managed with relative ease
5. The device must be efficient in the use of time
6. Need for maintenance should be minimal
7. Storage requirements should be reasonable
8. The device must be maneuverable in a confined work space
9. The device should be versatile
10. The device must be able to be kept clean easily
11. The device must be adequate in number so that it is accessible
12. Cost.

❖ Common Challenges in Bariatric Care

Between 5% and 10% of the population is considered obese. Managing obese patients provide special challenges to nursing care staff. For example, difficulties in turning, transferring, or ambulating patients can lead to immobility-related skin breakdown, such as pressure ulcers. Overweight hypoventilation syndrome from excess fat on the rib cage and chest results in respiratory insufficiency. Colostomy care can be difficult due to the presence of skin folds and a large abdominal apron of fat. The best way to provide safe patient handling and movement is through the use of special mechanical equipment designed for the obese.

Is the Patient Obese?
Determine whether the patient is obese by dividing patient body weight (kg) by height squared (m^2). A Body Mass Index (BMI) greater than 38 predicts the possible need for special bariatric equipment. For example, a patient who is 5'8" tall and weighs 255 pounds has a BMI of 39. Patients with BMIs of greater than 49 are considered morbidly obese and will almost always require special bariatric equipment. For example, a patient who is 5'8" tall and weighs 325 has a BMI of 50, is morbidly obese, and should be evaluated for the need for bariatric equipment. For on-line BMI calculators, go to:
http://www.kci1.com/body_mass_index_calculator.html or
http://www.sizewiserentals.com/bmicalculator.htm.

❖ WHAT IS BARIATRIC EQUIPMENT?

Bariatric equipment is equipment that has been manufactured to meet the special size and weight requirements of the obese patient. The types of equipment available include:

- beds (rehab platforms) in a variety of widths and lengths (with built in scales)
- low-air-loss mattresses for treatment and prevention of pressure ulcers
- full body lateral rotation mattresses for turning patient from side to side
- lift systems (with built in scales)
- stand assist systems (patient must be able to bear some weight)
- full frame trapeze systems
- wheelchairs
- recliner-wheelchairs
- walkers
- shower/commode chairs

❖ ASSESSMENT OF THE BARIATRIC PATIENT

- To determine whether the standard hospital bed is wide enough, measure the recumbent patient in a supine position. Using a yardstick, measure body width at widest point. To determine which width bed is best, consider that wide beds are available in 39", 48", 54", and 60" widths. (A standard bed is 35" wide.) If you decide to select a bed wider than 39", keep in mind that 48" and above width beds are too wide to fit through a doorway and arrive in several pieces that must be assembled. Although having a wide bed is desirable to provide space for turning the patient, it may pose back injury risks for the staff, who must reach across it to provide care. Very wide beds also take up extra space in a patient care room, compromising the space available to provide safe care. SizeWise Rentals offers measuring tips at http://www.sizewiserentals.com/measure1.htm.

- If the patient is over 6'5", order an extra long (86") bed
- To determine the required weight capacity of bed, weigh the patient if equipment is available to do so. If not, estimate weight by asking patient or family members. Each manufacturer's equipment has a specified weight limit from 600 to 1000 pounds.
- Use the Algorithm for Safe Patient Handling and Movement to determine whether the bariatric patient will need the use of mechanical assistance. [Refer to Chapter 5]
- Identify the types of equipment needed for lifting and moving. SizeWise Rentals offers some online tools for determining what pieces of equipment might be needed according to BMI and other factors: http://www.sizewiserentals.com/bariatricprotocol.htm
- Keep in mind that the highest risk for staff occurs when installing a lift sling under the patient; make sure there are a sufficient number of staff members to perform this and that the bed is wide enough to allow the patient to be turned to the side.
- Identify any special needs the patient may have, such as toileting or x-rays

❖ BARIATRIC EQUIPMENT PROVIDERS

The Veterans Administration has not conducted tests on this equipment to verify it meets manufacturers' performance claims and specifications. Until this is done, individual facilities should choose a vendor based on patient needs, whether the equipment is available for rental or purchase, immediate availability of equipment, and availability and willingness of vendor staff to provide in-service, price, and the existence of a VA contract. Facilities who admit bariatric patients frequently should consider buying a bed, walker, commode chair, and wheelchair to have on hand. Infrequent users should consider renting as the demand arises. Rental vendors promise to have the equipment to the facility within 24 hours.

ATTACHMENT 4-1
PRODUCT FEATURE RATING SURVEY (CAREGIVER)

Caregiver #: _____	Product #: _____	Date _____

Please examine the product very carefully and answer the following questions as they relate to this product ONLY. Please answer each question using a scale from 0 to 10, by circling the number that matches your impression, where 0 indicates a very poor design and 10 indicates a very well designed feature.

We encourage you to express any ideas you may have for improving the product design. Please make your comments alongside the appropriate feature rating.

1. How would you rate your OVERALL COMFORT while using this product?

Very Poor — **Average** — **Very Good**

0 1 2 3 4 5 6 7 8 9 10

2. What is your impression of this product's OVERALL EASE-OF-USE?

Very Poor — **Average** — **Very Good**

0 1 2 3 4 5 6 7 8 9 10

3. How EFFECTIVE do you think this product will be in reducing INJURIES?

Very Poor — **Average** — **Very Good**

0 1 2 3 4 5 6 7 8 9 10

4. How EFFICIENT do you feel this product will be in use of your TIME?

Very Poor — **Average** — **Very Good**

0 1 2 3 4 5 6 7 8 9 10

5. How SAFE do you feel this product would be for the PATIENT?

Very Poor — **Average** — **Very Good**

0 1 2 3 4 5 6 7 8 9 10

ATTACHMENT 4-2
PRODUCT RANKING SURVEY (CAREGIVER)

Caregiver #: _____	Date: _____

Finally, look at each of the five products you have just used. We would like you to rank each of these products, in order of preference. Placing the letter assigned to each produce (A-E) alongside the rank order which you feel is most appropriate, where 1 is your most preferred design, and 5 is your least preferred design. Note any comments you may have in the space provided. *[Note this form can be revised if more or less than 5 products are being evaluated.]*

Overall Comfort : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

Ease-of-Use : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

Stability : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

Durability : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

Versatility : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

ATTACHMENT 4-3

PRODUCT FEATURE RATING SURVEY (PATIENT)

Patient #: _____	Product #: _____	Date _____

This questionnaire examines ONLY the product that you have just used. Please rate each of the following design features on a scale from 0 to 10, by placing a mark along the line, where 0 indicates a very poor design and 10 indicates a very well designed feature.

We would also appreciate any ideas you may have for improving the product design. Please make your comments alongside the appropriate feature rating, or overleaf is more space is required.

1. Overall Comfort

Very Poor **Average** **Very Good**

0 1 2 3 4 5 6 7 8 9 10

3. Security

Very Poor **Average** **Very Good**

0 1 2 3 4 5 6 7 8 9 10

4. Safety

Very Poor **Average** **Very Good**

0 1 2 3 4 5 6 7 8 9 10

5. ----------

Very Poor **Average** **Very Good**

0 1 2 3 4 5 6 7 8 9 10

6. ----------

Very Poor **Average** **Very Good**

0 1 2 3 4 5 6 7 8 9 10

ATTACHMENT 4-4
PRODUCT RANKING SURVEY (PATIENT)

Patient #: _____	Date: _____

Finally, look at each of the five products you have just used. We would like you to rank each of these products, in order of preference. Placing the letter assigned to each produce (A-E) alongside the rank order which you feel is most appropriate, where 1 is your most preferred design, and 5 is your least preferred design. Note any comments you may have in the space provided.

Overall Comfort : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

Security : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

Safety : 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

----------: 1: _____ 2: _____ 3: _____ 4: _____ 5: _____

Comments:

_____

_____

ATTACHMENT 4-5

INCIDENCE, MAINTENANCE, AND ADVERSE EVENTS FOR PATIENT HANDLING EQUIPMENT AND DEVICES

Product: _____

Incidence Reporting:

_____

_____

_____

_____

Maintenance Issues:

_____

_____

_____

_____

Adverse Events:

_____

_____

_____

_____

Storage Requirements:

_____

_____

Chapter 5

PATIENT ASSESSMENT, CARE PLANNING & ALGORITHMS FOR SAFE PATIENT HANDLING AND MOVEMENT

❖ Purpose of Patient Assessment Criteria

The following patient assessment criteria will assist health care staff in considering critical patient characteristics that affect decisions for selecting the safest equipment and techniques for patient handling and movement tasks. Health care staff members have become accustomed to using whatever limited lifting aids are available, rather than carefully matching equipment to specific patient characteristics. It is expected that careful use of this assessment and planning tool will improve safety for both patients and caregivers. Patients will receive assistance appropriate for their functional level, assuring safety and comfort. For caregivers, the goals are to decrease the incidence, severity, and costs associated with job-related injuries, as well as decreasing the intensity, duration, and frequency of job-related musculoskeletal pain and discomfort.

❖ Background

A Technical Advisory Group (TAG), working in collaboration with the Public Health and Environmental Hazards, Patient Safety Center of Inquiry (Tampa, FL), and Healthcare Analysis and Information Group, was formed. The TAG developed an algorithm for each of the key transfer and repositioning tasks. The algorithms were tested with different patient populations in a variety of clinical settings. The algorithms are designed to assist health care employees in selecting the safest equipment and techniques based on specific patient characteristics. These guidelines were prepared based on scientific and professional information available in March 2001. Users of this guideline should periodically review this material to ensure the advice herein is consistent with current reasonable clinical practice. As with any guideline, this content provides general direction; professional judgment is

needed to assure safety of patients and caregivers. **Attachment 5-1** depicts a form that can be used in patient care areas for assessing patients.

❖ Key Points for Caregivers

- Assess the patient.
- Assess the area.
- Decide on equipment.
- Know how to use equipment.
- Plan lift and communicate with staff and patient.
- Work together, including actions of more than one caregiver as well as the patient.
- Have the right equipment available, in good working order, and conveniently located.

❖ Key Assessment Criteria

- Ability of the patient to provide assistance.
- Ability of the patient to bear weight.
- Upper extremity strength of the patient.
- Ability of the patient to cooperate and follow instructions.
- Patient height and weight.
- Special circumstances likely to affect transfer or repositioning tasks, such as abdominal wounds, contractures, or presence of tubes, etc.
- Specific physician orders or physical therapy recommendations that relate to transferring or repositioning patients. (For example, a patient with a knee or hip replacement may need a specific order or recommendation to maintain the correct angle of hip or knee flexion during transfer.)

❖ Care Plan Considerations

- Type of task to be completed, e.g., transferring, repositioning, ambulating, or toileting.
- Type of equipment or assistive devices needed.
- Number of caregivers needed to complete the task safely.

❖ Process for Using Assessment and Planning Criteria

The specific process for assessment and care planning may vary by facility, patient population, or level of care. However, key elements need to be considered and integrated into the assessment and care planning process for safe patient handling and movement.

- Who completes the assessment?
- How often assessment is completed.
- Communication plan.
- Updating/revising the plan as needed.

ATTACHMENT 5-1
ASSESSMENT CRITERIA AND CARE PLAN FOR SAFE PATIENT HANDLING AND MOVEMENT

I. Patient's Level of Assistance:

_____ Independent—Patient performs task safely, with or without assistive devices.
_____Partial Assist—Patient requires no more help than stand-by, cueing, or coaxing, or no more than 50% physical assistance by the nurse.
_____ Dependent—Patient requires more than 50% assistance by nurse, or is unpredictable in the amount of assistance offered.

An assessment should be made prior to each task if the patient has varying level of ability to assist due to medical reasons, fatigue, medications, etc. When in doubt, assume the patient cannot assist with the transfer/repositioning.

II. Can the patient bear weight?

_____ Yes, Full
_____ Yes, Partial
_____ No

III. Does the patient have upper extremity strength needed to support his/her weight during transfers?

_____ Yes
_____ No

IV. Patient's level of cooperation and comprehension:

_____ Cooperative — may need prompting; able to follow simple commands.
_____ Unpredictable or varies (patient whose behavior changes frequently should be considered as "unpredictable"), not cooperative, or unable to follow simple commands.

V. Patient's weight: _____ **height:** _____

The presence of the following conditions are likely to affect the transfer/repositioning process and should be considered when identifying equipment and technique needed to move the patient.

VI. Check applicable conditions likely to affect transfer/repositioning techniques.

_____ Abdominal surgery wounds	_____ Hip/knee replacements	_____ Postural Hypotension
_____ Bilateral amputation	_____ History of Falls	_____ Severe Osteoporosis
_____ Colostomy	_____ Paralysis	_____ Splints/traction
_____ Contractures/Spasms	_____ Presence of tubes (IV, chest, etc.)	_____ Unstable spine
_____ Fractures	_____ Pressure Ulcers	_____ Other

Comments:_____

VII. Care Plan:

Algorithm #	Task	Equipment/Assistive Device	# Staff
1	Transfer To and From: Bed to Chair, Chair To Toilet, Chair to Chair, or Car to Chair		
2	Lateral Transfer To and From: Bed to Stretcher, Trolley		
3	Transfer To and From: Chair to Stretcher, Chair to Chair, or Chair to Exam Table		
4	Reposition in Bed: Side-to-Side, Up in Bed		
5	Reposition in Chair: Wheelchair and Dependency Chair		

Sling Type (circle choice): Standard____ Amputation____ Head Support____
Sling Size: _____
Signature: _____ **Date:** _____

❖ PURPOSE OF ALGORITHMS

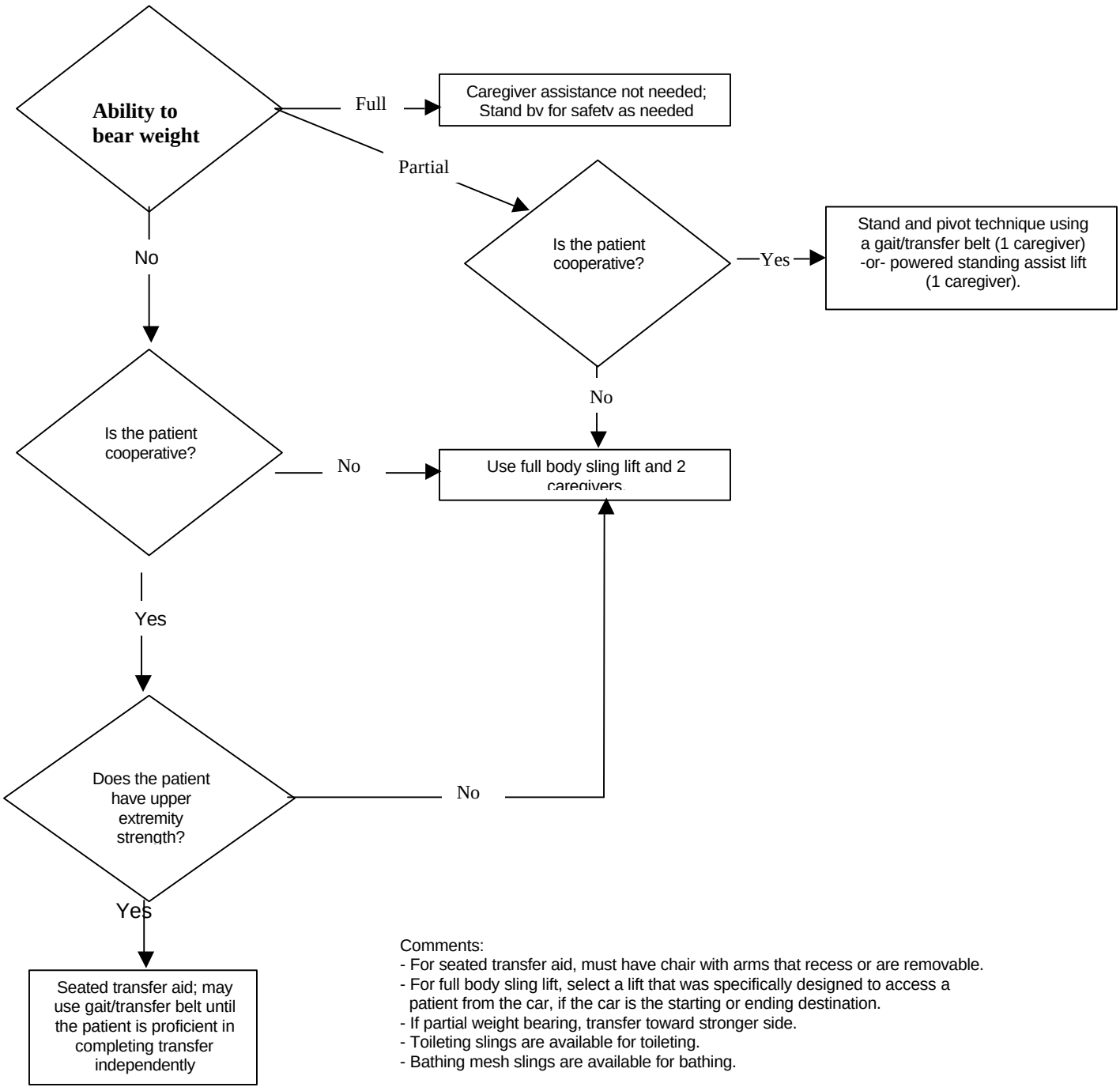
This chapter provides assessment criteria to assist health care staff in the planning for safe handling and movement of each patient. The following algorithms should be used as guides when planning the following patient transfer and repositioning tasks. These algorithms are targeted for persons directly involved with patient handling and movement, such as registered nurses, licensed practical nurses, nursing assistants, orderlies, physical/occupational therapists, radiology technicians, and patient care technicians.

❖ BACKGROUND

The algorithms are designed to assist health care employees in selecting the safest equipment and techniques based on specific patient characteristics. These guidelines were prepared based on scientific and professional information available in March 2001. Users of this guideline should periodically review this material to ensure the advice herein is consistent with current reasonable clinical practice. As with any guideline, this content provides general direction; professional judgment is needed to assure safety of patients and caregivers.

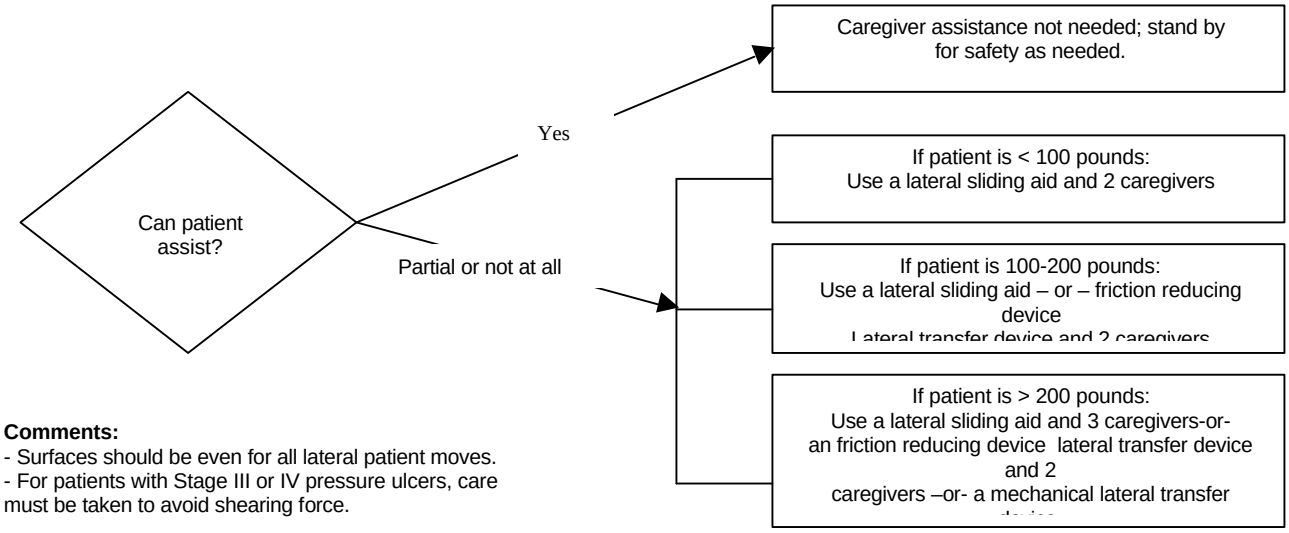
These algorithms were tested with different patient populations in six clinical areas (Intensive Care Units; Acute Care Units; Nursing Home Care Units; Outpatient Areas and Clinics, and Emergency Rooms; Operating and Recovery Rooms; and Spinal Cord Injury Units and Rehabilitation Units). The algorithms were reviewed and approved for use by Veterans Health Administration (VHA) nurse executives.

❖ Figure 4-1: ALGORITHM #1: Transfer to and from: Bed to Chair, Chair to Toilet, Chair to Chair, or Car to Chair



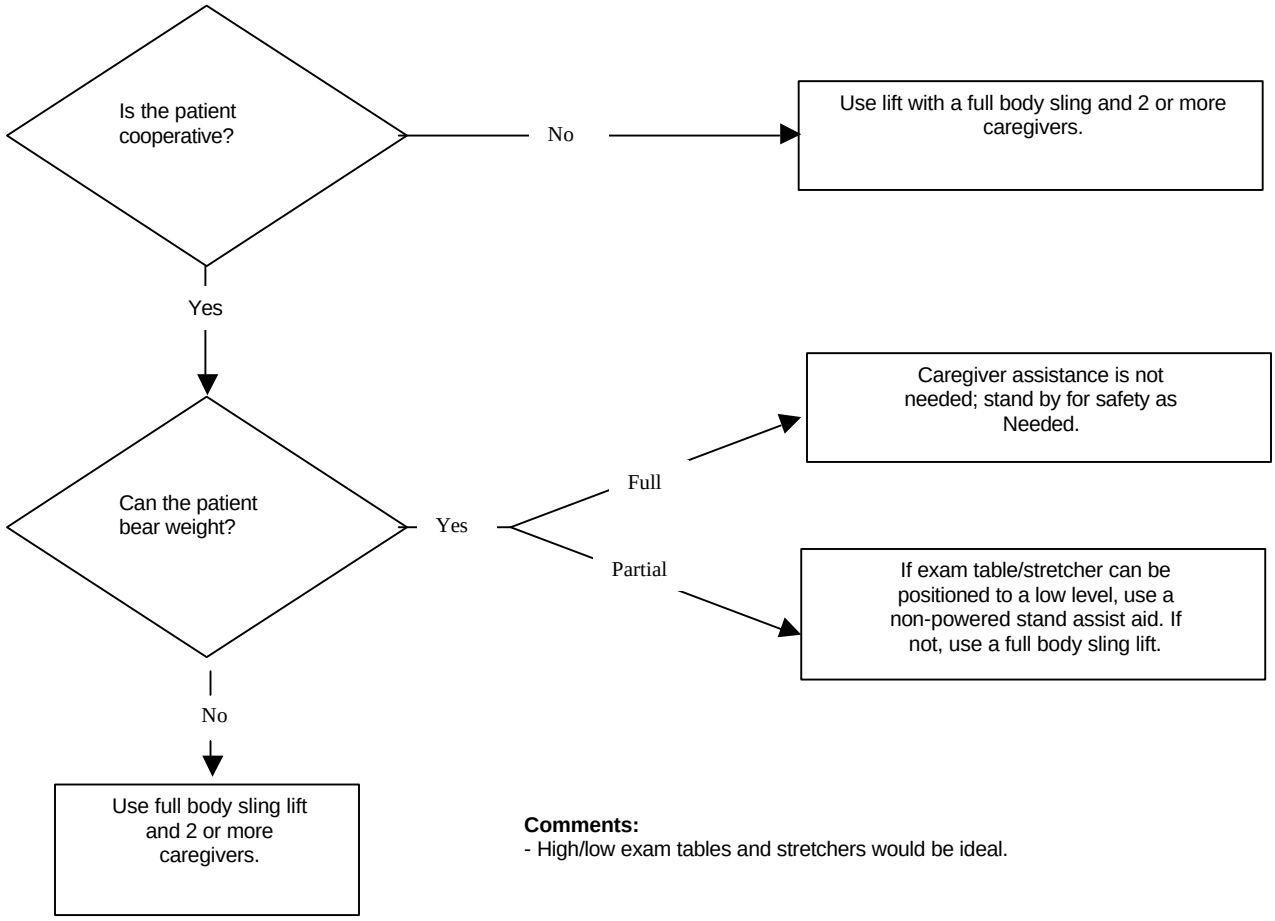
Comments:
- For seated transfer aid, must have chair with arms that recess or are removable.
- For full body sling lift, select a lift that was specifically designed to access a patient from the car, if the car is the starting or ending destination.
- If partial weight bearing, transfer toward stronger side.
- Toileting slings are available for toileting.
- Bathing mesh slings are available for bathing.

❖ Figure 4-2: ALGORITHM #2: Lateral Transfer To and From: Bed to Stretcher, Trolley



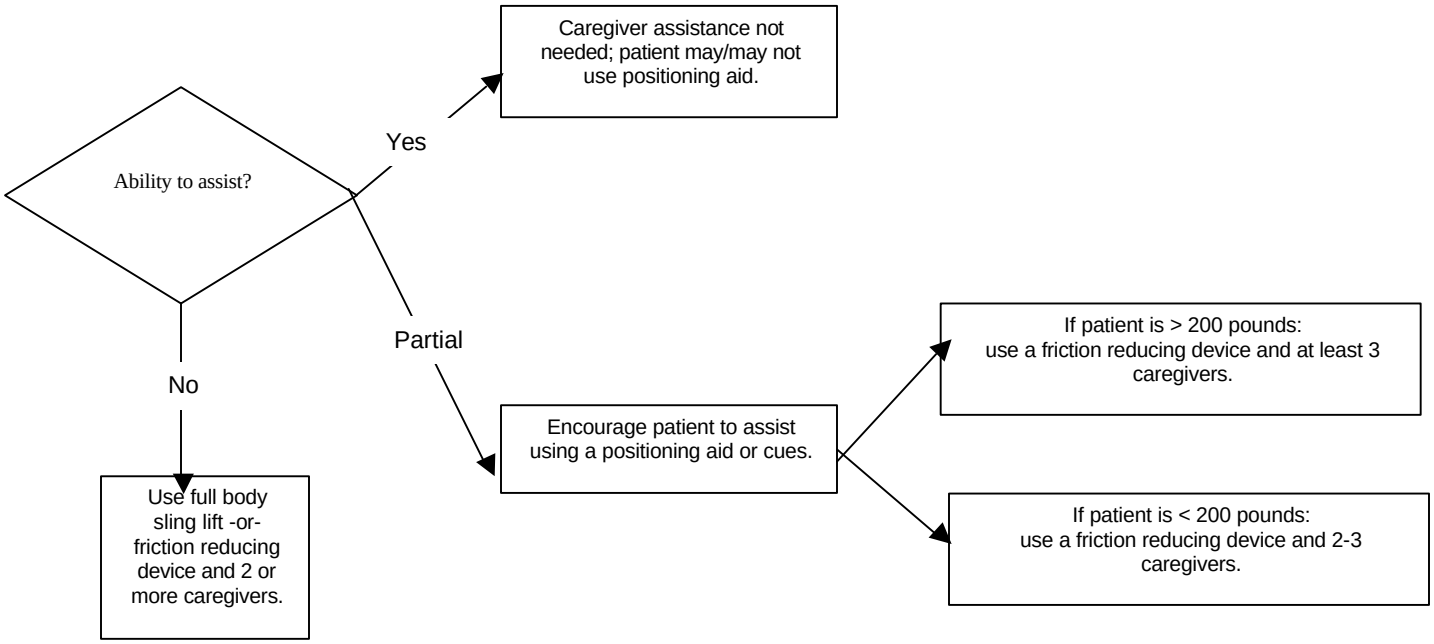
Comments:
- Surfaces should be even for all lateral patient moves.
- For patients with Stage III or IV pressure ulcers, care must be taken to avoid shearing force.

❖ Figure 4-3: ALGORITHM #3: Transfer To and From: Chair to Stretcher or Chair to Exam Table



Comments:
- High/low exam tables and stretchers would be ideal.

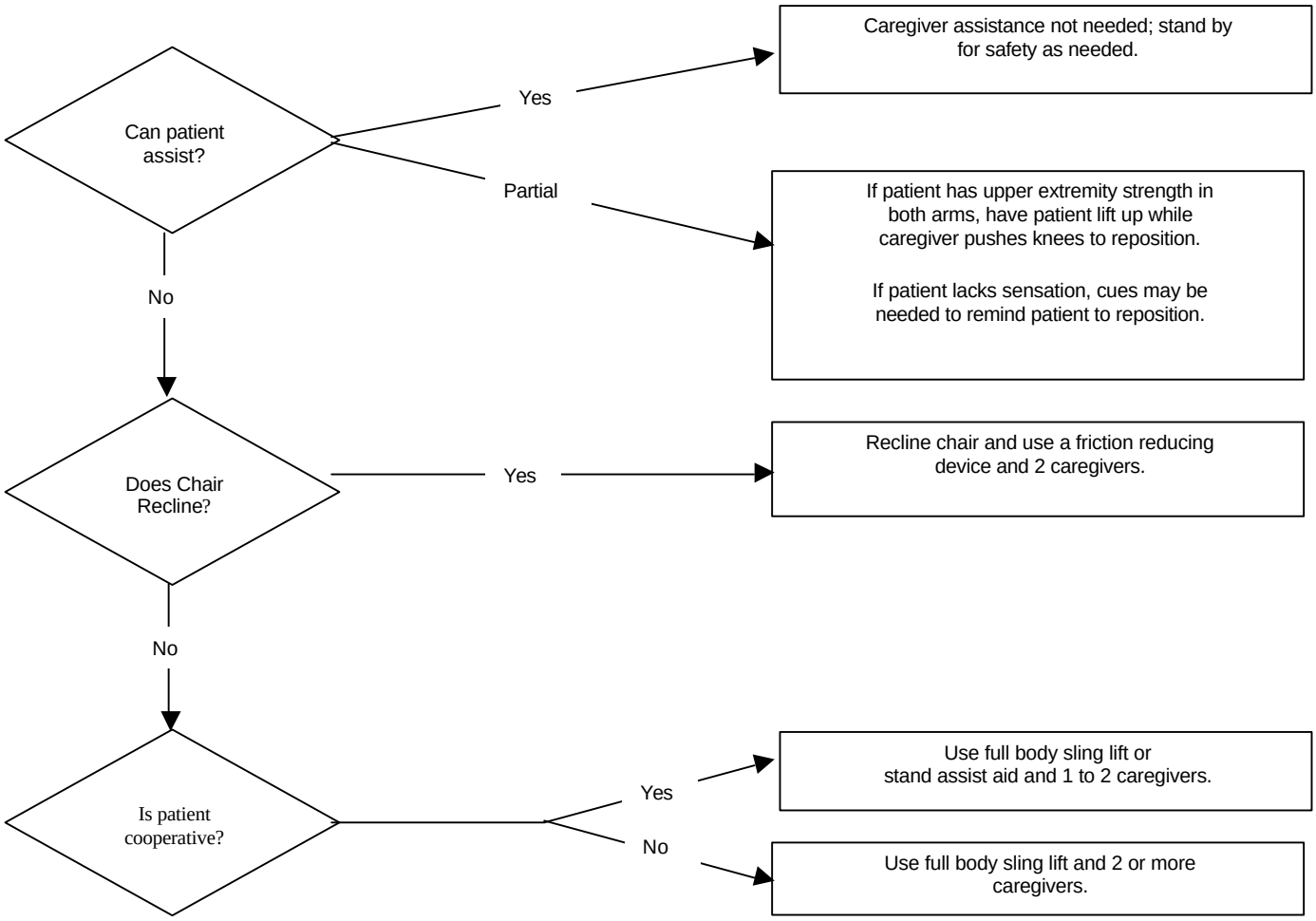
❖ Figure 4-4: ALGORITHM #4: Reposition in Bed: Side-to-Side, Up in Bed



Comments:

- This is not a one person task – DO NOT PULL FROM HEAD OF BED
- When pulling a patient up in bed, the bed should be flat or Trendelenburg position to aid in gravity, with the side rail down.
- . For patients with Stage III or IV pressure ulcers, care should be taken to avoid shearing force.
- The height of bed should be appropriate for staff safety (at the elbows)
- If the patient can assist when repositioning “up in bed”, ask the patient to flex the knees and push on the count of three.

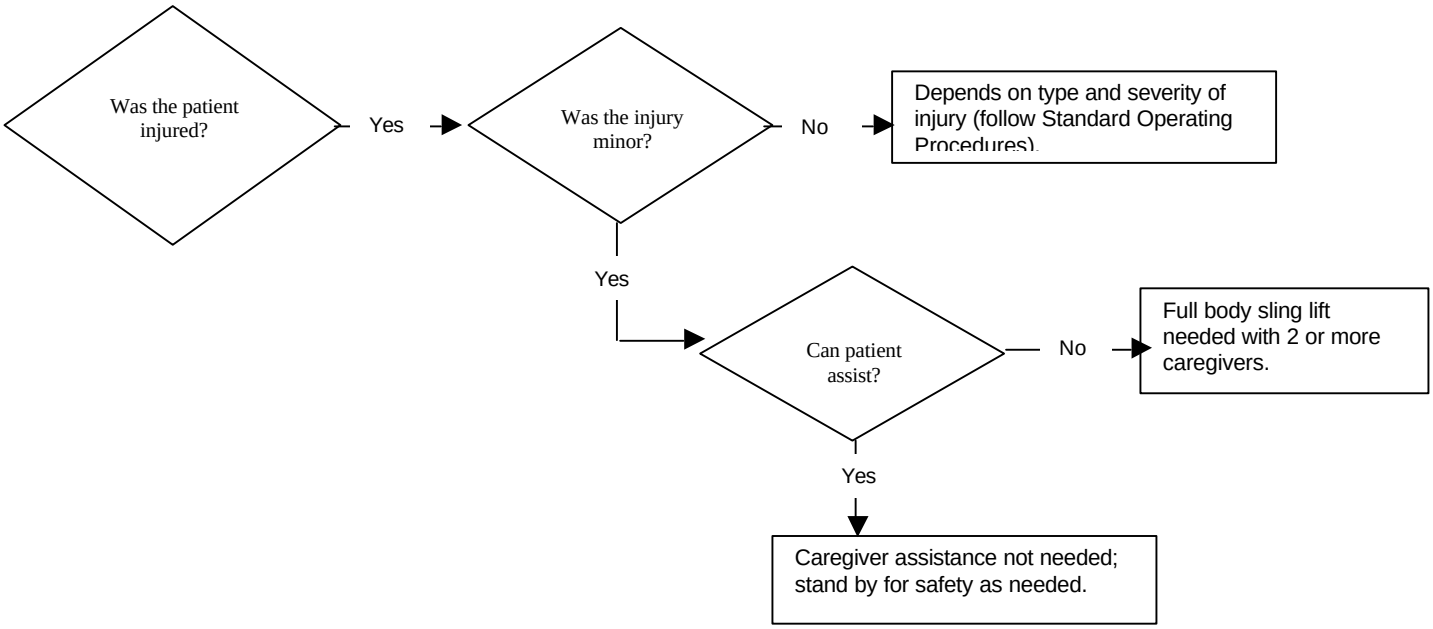
FIGURE 4-3: ALGORITHM #5: REPOSITION IN CHAIR: WHEELCHAIR AND DEPENDENCY CHAIR



Comments:

- This is not a one person task – DO NOT PULL FROM BEHIND CHAIR.
- Take full advantage of chair functions, e.g. chair that reclines, or use of arm rest of chair to facilitate repositioning.
- Make sure the chair wheels are locked.

FIGURE 4-6: ALGORITHM #6: TRANSFER A PATIENT UP FROM THE FLOOR



Comments:
- Use full body sling that goes all the way down to the floor. Most of the newer models are capable of this.

Chapter 6

DEVELOPING A NO-LIFT POLICY

❖ INTRODUCTION

The attached policy is intended for use on high-risk patient care units. It is considered just one part of a comprehensive approach to preventing musculoskeletal injuries in staff and promoting safe patient care.

The purpose of the policy is **not** punitive, but support of both staff and administration. This policy establishes expectations that staff will use the safest techniques to accomplish patient repositioning and that administration will provide equipment and resources to support staff efforts. If supervisors or peers observe direct care staff not following safe protocols for repositioning, this indicates that the staff member needs retraining. This policy is not to be used to discipline employees but to educate them.

The policy spells out duties of employees, facility directors, supervisors, and engineering maintenance personnel to assist in safe patient handling and movement. The policy is modeled after England's successful effort to reduce manual-handling injuries among direct care staff.

This policy is informally known as a "No Lift Policy," because it calls for staff to avoid manual handling in virtually all-patient care situations. However, this No Lift policy cannot succeed unless other components of a Safe Patient Handling and Movement Program have been put in place.

❖ IMPLEMENTATION OF A SAFE PATIENT HANDLING AND MOVEMENT POLICY

To be successful, the policy MUST have required infrastructure in place before the policy is implemented. This includes:

1. Adequate number and variety of patient handling aids and mechanical lifting equipment on each high-risk patient care unit
2. Sufficient numbers of staff trained and competent in the use of these aids and equipment
3. Staff trained and skilled in applying safe patient handling and movement algorithms
4. Administrators and supervisors who support the comprehensive approach.

ATTACHMENT 6-1

TEMPLATE OF A SAFE PATIENT HANDLING AND MOVEMENT POLICY

1. PURPOSE: This policy describes ways to ensure that employees use safe patient handling and movement techniques on _____ Unit/s, designated as high-risk for safe patient handling and movement.

2. POLICY: _____ Medical Center wants to ensure that its patients are cared for safely, while maintaining a safe work environment for employees. To accomplish this, a *Back Injury Prevention Program for Nurses* will be implemented in order to ensure required infrastructure is in place to comply with components of this safe patient handling and movement policy. This infrastructure includes patient handling and movement equipment, employee training, and a "Culture of Safety" approach to safety in the work environment. Direct patient care staff on high-risk patient care areas should assess high-risk patient handling tasks in advance to determine the safest way to accomplish them. Additionally, mechanical lifting equipment and/or other approved patient handling aids should be used to prevent manual lifting and handling of patients except when absolutely necessary, such as in a medical emergency.

3. PROCEDURES:

A. Compliance: It is the duty of employees to take reasonable care of their own health and safety, as well as that of their co-workers and their patients during patient handling activities by following this policy. Non-compliance will indicate a need for retraining.

B. Safe Patient Handling and Movement Requirements:

- Avoid hazardous patient handling and movement tasks whenever possible. If unavoidable, assess them carefully prior to completion.
- Use mechanical lifting devices and other approved patient handling aids for high-risk patient handling and movement tasks except when absolutely necessary, such as in a medical emergency.
- Use mechanical lifting devices and other approved patient handling aids in accordance with instructions and training.

C. Training:

1. Staff will complete and document Safe Patient Handling and Movement training initially, annually, and as required to correct improper use/understanding of safe patient handling and movement. Supervisors should maintain training records for three (3) years.

2. Staff will complete and document safe patient handling and movement equipment training initially and as required to correct improper use/understanding of safe patient handling and movement. Supervisors should maintain training records for three (3) years.

D. Mechanical lifting devices and other equipment/aids:

1. Mechanical lifting devices and other equipment/aids will be accessible to staff.
2. Mechanical lifting devices and other equipment/aids will be maintained regularly and kept in proper working order.
3. Mechanical lifting devices and other equipment/aids shall be stored conveniently and safely.

E. Back Injury Prevention Program

The *Back Injury Prevention Program for Nurses* will be implemented on all high-risk units, including the following key program elements:

1. Ergonomic Workplace Assessments
2. Use of lifting equipment and devices
3. Patient Assessment Criteria and Care Planning for Safe Patient Handling and Movement
4. Algorithms for Safe Patient Handling and Movement
5. Back Injury Resource Nurses
6. After Action Review Process

F. Reporting of Injuries/Incidents

1. Nursing staff shall report all incidents/injuries resulting from patient handling and movement to Occupational Health.
2. Supervisors shall maintain Accident Reports and supplemental injury statistics as required by the facility.

4. DEFINITIONS:

A. High-Risk Patient Handling Tasks: Patient handling tasks that have a high-risk of musculoskeletal injury for staff performing the tasks. These include but are not limited to transferring tasks, lifting tasks, repositioning tasks, bathing patients in bed, making occupied beds, dressing patients, turning patients in bed, and tasks with long durations.

B. High-risk Patient Care Areas: Inpatient hospital wards with a high proportion of dependent patients, requiring full assistance with patient handling tasks and activities of daily living. Designation is based on the dependency level of patients and the frequency with which patients are encouraged to be out of bed. These areas include Spinal Cord Injury Units, Nursing Home Care Units, and other specified areas.

C. Manual Lifting: Lifting, transferring, repositioning, and moving patients using a caregiver's body strength without the use of lifting equipment/aids to reduce forces on the caregiver's musculoskeletal structure.

D. Mechanical Patient Lifting Equipment: Equipment used to lift, transfer, reposition, and move patients. Examples include portable base and ceiling track mounted full body sling lifts, stand assist lifts, and mechanized lateral transfer aids.

E. Patient Handling Aids: Equipment used to assist in the lift or transfer process. Examples include gait belts with handles, stand assist aids, sliding boards, and surface friction-reducing devices.

G. Culture of Safety: Describes the collective attitude of employees taking *shared* responsibility for safety in a work environment and by doing so, providing a safe environment of care for themselves as well as patients.

5. DELEGATION OF AUTHORITY AND RESPONSIBLITY:

A. **FACILITY DIRECTOR** shall:

1. Support the implementation of this policy.
2. Support a "Culture of Safety" within this medical center.
3. Furnish sufficient lifting equipment/aids to allow staff to use them when needed for safe patient handling and movement.
4. Furnish acceptable storage locations for lifting equipment/aids.
5. Provide routine maintenance of equipment
6. Provide staffing levels sufficient to comply with this policy.

B. **SUPERVISORS** shall:

1. Ensure high-risk patient handling tasks are assessed prior to completion and are completed safely, using mechanical lifting devices and other approved patient handling aids and appropriate techniques.
2. Ensure mechanical lifting devices and other equipment/aids are available, maintained regularly, in proper working order, and stored conveniently and safely.
4. Ensure employees complete initial and annual training, and training as required if employees show non-compliance with safe patient handling and movement or equipment use. Maintain training records for a period of three (3) years.
5. Refer all staff reporting injuries due to patient handling tasks to Occupational Health.
6. Maintain Accident Reports and supplemental injury statistics as required by the facility.
7. Support a "Culture of Safety" within their facility.

C. **EMPLOYEES** shall:

1. Comply with all parameters of this policy.
2. Use proper techniques, mechanical lifting devices, and other approved equipment/aids during performance of high-risk patient handling tasks.
3. Notify supervisor of any injury sustained while performing patient handling tasks.
4. Notify supervisor of need for re-training in use of mechanical lifting devices, other equipment/aids and lifting/moving techniques.
5. Notify supervisor of mechanical lifting devices in need of repair.
6. Support a "Culture of Safety" within their facility.

D. **ENGINEERING SERVICE** shall maintain mechanical lifting devices in proper working order.

E. Union officials shall support policy intent and monitor program effectiveness in partnership with administration.

6. REFERENCES:

A. Nelson, A. (1996). Identification of patient handling tasks that contribute to musculoskeletal injuries in SCI nursing practice. JAHVAH Study.
B. Nelson, A., Gross, C., & Lloyd, J. (1997). Preventing musculoskeletal injuries in nurses: Directions for future research. *SCI Journal, 14*(2), 45-52.
C. Royal Wolverhampton Hospitals NHS Trust. (1996). Health and safety: Manual handling. Policy ref: HS 11.
D. United Kingdom Health and Safety Executive. (1992). Manual handling operations regulations.

Chapter 7

BACK INJURY RESOURCE NURSES

❖ BACKGROUND

To be successful, the implementation of any new program necessitates a knowledgeable person with enthusiasm and leadership capabilities to direct the charge. The Back Injury Resource Nurse (BIRN) can take the lead in promoting the elements included in this guide.

Current management philosophy supports the use of peer leaders to effect change and increase staff involvement in management issues (Hammer & Champy, 1993). Similar informal leadership positions can be found elsewhere in the healthcare and other industries. Lead maintenance mechanics, charge nurses, etc. are utilized as peer leaders to increase staff involvement in management and/or assist supervisors in their roles.

❖ DESCRIPTION OF PROGRAM

BIRNs assist in building a "Culture of Safety" to support clinicians in providing safe patient care and safe working environments. BIRNs' roles and responsibilities include facilitating the implementation of elements selected for inclusion in your Safe Patient Handling and Movement Program. They can help to implement Safe Patient Handling and Movement Policy, Algorithms, and other key interventions. They will train co-workers on the program elements and assist in monitoring and evaluating these program elements. They will act as resources, coaches, and team leaders on their unit. In this role, they will share their knowledge gained with co-workers and with other BIRNs in their facility and in the VHA. Linkage of BIRNs is critical. Minimally, monthly BIRN face-to-face or conference call meetings should be held to share new information gained through After Action Reviews and other BIRN activities. Regular discussions allow for maintenance of a "team" atmosphere, a forum for discussion, and mutual support.

❖ LIMITATIONS

The BIRN role is not static. It requires continued exposure to new strategies to maintain safe work environments. Consequently, ongoing training is a must. Additionally, ongoing support is needed. Based on these ongoing needs to maintain an effective BIRN Program, this intervention is probably most applicable for high-risk units.

The degree of success of the BIRN program is limited by the degree of management support. BIRNs must have management backing in order for his/her peers to recognize the BIRN role as an essential one. Also, management must sustain their words of support by

offering BIRNs the time needed to fulfill their roles. The BIRN position is a collateral duty assignment. In this time of staffing shortages it may be challenging for management to see the long-term advantage of endorsing a program that may "appear" to take away from patient care.

It's important that all levels of nursing staff be given the opportunity to fill this role. It has been found though, that RN's with other leadership responsibilities have more flexibility in their schedules, allowing for more consistency in availability and fulfillment of their roles. For BIRNs responsible for direct patient care, management must adjust patient scheduling to ensure they have adequate time to accomplish their roles.

❖ OBTAINING BUY-IN FROM MANAGEMENT

By leading staff in creating safer work environments and promoting a "culture of safety" philosophy, the BIRN Program can address the following goals:

- **Injuries:** Reduce the incidence and severity of nursing injuries
- **Employer of Choice:** Improve job satisfaction, decrease turnover rates, decrease musculoskeletal discomfort, and increase empowerment of nursing staff.
- **Costs:** Reduce direct and indirect costs related to patient handling injuries.
- **Quality of Care:** Increased patient comfort, security, and dignity during transfers. Promotion of patient mobility and independence; Enhance toileting outcomes and increase in continence
- **Patient Safety:** Decrease in patient falls, skin tears, and abrasions.

❖ MONITORING PROGRESS

The Back Injury Resource Nurse Weekly Process Log (**Attachment 7-1**) can be used to capture specifics of BIRN activities. This data should be collected on initial implementation of the BIRN program for baseline information. To follow BIRN increasing involvement, collect one week of BIRN activity per month until the program is established. One week's worth of information is necessary to accurately capture activities performed. It's best to designate a specific week for this, i.e., first or last week of the month.

❖ TOOLS AND STRATEGIES FOR IMPLEMENTATION

A. SELECTION CRITERIA. BIRN selection is not limited to RN's. Any interested staff member has the potential to be selected for this role. They must have an interest in this subject and be considered "informal" leaders on their unit. They must be respected by their co-workers for their nursing skills and based on their personal merit.

B. **TRAINING.** In order to fulfill their role, BIRNS must receive special training in how to train co-workers, how to coach and motivate co-workers, and how to maintain safe work environments. With this knowledge in hand, it is important for BIRNS to be able to share their knowledge and experience. They will be asked to train, act as resources for, and coach co-workers. Beyond this, they will be asked to share their knowledge with BIRNS in their facility, VISN, and VHA.

C. **ADMINISTRATIVE SUPPORT.** Large companies like duPont have found that the secret to successful safety compliance lies in educated and motivated supervisors. The National Safety Council has a supervisors' development program that incorporates this concept. Similar to what has been demonstrated in these programs, the BIRN nurse is a key to successful implementation of ergonomic approaches in healthcare facilities.

ATTACHMENT 7-1

BACK INJURY RESOURCE NURSE
WEEKLY PROCESS LOG

VAMC:
TYPE OF UNIT:
Dates Included in this Report:

PART I: BEING A BIRN FOR YOUR CLINICAL UNIT

1. Indicate the number of times during the past week…	#
a. One of your coworkers asked you for your advice about patient handling & movement	
b. You met in person with a nurse on a *one-to-one* basis about patient handling tasks	
c. You met in person with staff in a *group* setting or meeting about patient handling tasks	
d. You demonstrated the use of patient *lifting* equipment (Portable or Ceiling Mounted Sling lifts, Stand Assist lift, etc.)	
e. You demonstrated the use of *other* patient handling or movement equipment (lateral transfer aids, stand assist aids, transfer/dependency chairs, transfer/gait belts, etc.)	
f. You were asked to deal with a problem in the operation of a lifting device.	

PART II: OTHER ACTIVITIES RELATED TO BEING A BIRN

2. Indicate the number of times during the past week…	#
a. You demonstrated the use of the Algorithms for Safe Patient Handling & Movement or one of your co-workers asked you for your advice about their use.	
b. You were asked to evaluate a potential ergonomic/safety hazard on your	

unit.	
c. You performed an Ergonomic Hazard Evaluation on your unit.	
d. You led an AAR.	
e. You participated in an AAR led by another.	
f. You attended activities related to being a BIRN, other than those above. (Meetings w/ NM, BIRNS, Site Coordinator, or training, etc.)	
g. You completed paperwork related to being a BIRN.	
h. You asked your Nurse Manager for support/info/ help related to being a BIRN.	

PART III: SUPPORT & INTEREST

3. During the past week…	**YES**	**NO**
a. My nurse manager was enthusiastic about the Back Injury Prevention Program and supported my efforts.		
b. Nursing co-workers were enthusiastic about the Back Injury Prevention Program and supported my efforts.		
c. Patients and/or families were enthusiastic about the changes taking place or supported what they knew of my/our efforts.		

PART IV: PROGRAM EFFECTIVENESS

4. How effective do you think these have been in preventing musculoskeletal incidents & injuries?

	NOT AT ALL EFFECTIVE	SOMEWHAT INEFFECTIVE	NO EFFECT	SOMEWHAT EFFECTIVE	EXTREMELY EFFECTIVE	UNSURE
Back Injury Resource Nurses	☐	☐	☐	☐	☐	☐
After Action Reviews	☐	☐	☐	☐	☐	☐
Use of Lifting Equipment	☐	☐	☐	☐	☐	☐
Ergonomic Hazard Analyses	☐	☐	☐	☐	☐	☐

	NOT AT ALL EFFECTIVE	SOMEWHAT INEFFECTIVE	NO EFFECT	SOMEWHAT EFFECTIVE	EXTREMELY EFFECTIVE	UNSURE
Safe Patient Handling & Movement Policy	☐	☐	☐	☐	☐	☐
Algorithms for Safe Patient Handling & Movement	☐	☐	☐	☐	☐	☐

Chapter 8

LIFTING TEAMS

❖ BACKGROUND

Manual lifting and transfer activities are the job tasks most frequently associated with back injuries in nursing personnel (Caska, 1998; Cohen-Mansfield, 1996; Fragala, 1998; Garg, 1992; McAbee, 1988; Stobbe, 1988). Factors contributing to back injuries during lifting and transfer tasks might be organizational, environmental or personal. Examples of organizational factors include time pressure to perform the task, lack of available lifting aids, and lack of personnel to assist with the lift. Environmental factors include space restrictions, inconvenient or inaccessible lifting equipment or transfer devices, and poor condition of such devices. The personal factor most often associated with back injury during lifting is history of previous back injury or recurrent back injury (Caska, 1998).

According to Charney, "…lifting patients is considered a specialized skill performed by expert professional patient movers who have been thoroughly trained in the latest techniques, rather than a hazardous random task required by busy nurses" (1997, p. 300). Efforts to decrease back injuries related to lifting and transferring activities must target organizational, environmental, and personal factors. One such approach with potential to reduce back injuries during lifting and transfer activities in hospital personnel is the lifting team. This approach has been found to be moderately effective in reducing injuries in several studies (Caska, 1998; Charney, 1991, 1992, 1997, 2000; Davis, 2001; Donaldson, 2000; Meittunen et al., 1999).

❖ DESCRIPTION OF PROGRAM

A lifting team has been defined as " two physically fit people, competent in lifting techniques, working together to accomplish high-risk patient transfers" (Meittunen et al., 1999, p. 311). It has also been referred to as a "lift team", "patient transfer team", or various combinations of these terms. The typical lift team described in the literature consists of two employees responsible for patient transfers within a medical center. Members of the lifting team have been male orderlies (Charney, 1991, 1992, 1997), an existing hospital transport team (Charney, 2000), or nursing staff (Caska, Patnode, & Clickner, 1998, 2000). The lift team members are selected using a variety of screening methods, which have included history (e.g., to determine if previous back injury has occurred), physical exam (e.g., range of motion, musculoskeletal strength), and radiograph of the spine to detect abnormalities.

The team is given training in several areas, including anatomy, body mechanics, and use of mechanical lifting and transfer devices. The lifting team has most often been used on the day shift for transfers scheduled ahead of time and conducted during scheduled rounds, as well as for unscheduled lifts at other times via a pager system for the team. Ideally, the lift

team uses mechanical devices for all patient transfers and lifts, except for emergency situations.

There are other necessary components to lift team programs, which include an administrative policy on lifting, mechanical lifting and transfer devices, support of nurse managers, union endorsement, a culture of safety within the facility, and knowledge of the team's existence.

❖ BENEFITS OF PROGRAM

From the studies or program evaluations of lifting teams to date, there have been numerous measurable benefits. These benefits can be divided into three categories: 1) those related to injuries and costs of injuries, 2) staff and patient satisfaction, and 3) capacity of the lifting teams.

The first category of benefits includes reduction in lost time back injuries, lost time work days, restricted workdays, reduction in worker's compensation costs, as well as negligible injuries to lifting team members. In nine program evaluations, there were reductions in lost–time back injuries or injuries related to lifting and transfer of patients. These reductions ranged between 50-100%. Three reports demonstrated reductions in lost work days due to such injuries; two reports demonstrated reductions in restricted workdays due to patient lift and transfer activities. In seven reports, cost savings from either reductions in back injuries, worker's compensation claims, or medical costs associated with back injuries were demonstrated. Finally, there was only one report of a back injury that occurred in a lifting team member (Charney, 2000).

The second category of benefits is satisfaction of various levels of staff as well as patients, with the lifting teams. In Caska's study (1998), for example, 83% of nursing staff respondents rated lift team members to be available as needed to assist with patient lifts; 91% believed the team should continue to be used in the future. In Charney's study (1997), quality assurance questionnaires were distributed and all ten facilities reported excellent nursing satisfaction with the lifting teams. According to Meittunen et al. (1999), all staff surveyed rated their jobs as physically easier and 100 patients rated high satisfaction with the transfer team.

The third category of lifting team benefits relates to the capacity of lifting teams to perform lifts and transfers. Ideally, the lifting team method "specifies that 95% of all responsibility for lifting will be removed from nursing and performed by a lifting team" (Charney, 1991, p. 232). It is also desirable for the lifting teams to perform the high-risk transfers as identified by each facility (See also Chapter 3- "Identify High-risk Tasks"). Lifting teams have been reported to absorb 88-95% of the nurses' exposure to lifting on the shifts that they operate. The number of scheduled lifts performed by the lifting teams has ranged from 29-70 per day. In one program, 4140 lifts were performed per year when one lift team worked day shift Monday through Friday, 6496 lifts/year when 7-day/week coverage was added on day shift, and increased to 25,987/year with 24-hour/day, 7-day/week coverage was provided (Donaldson, 2000). In reports where this was recorded, response time from call to lift ranged from 5-6 minutes; time to complete the lift ranged from 3-4.5 minutes.

Lift teams can be used for the high-risk lifts as designated by the facilities. Bed to chair transfers were the type of lift most frequently reported by the program evaluations on lifting teams.

Different ways to measure capacity include the number of lifts, type of lifts, team response time, and capacity of team to perform lifts (e.g., the percentage of total lifts that the team performs).

❖ LIMITATIONS OF PROGRAM

In the various reports to date, it is clear that there are many benefits to lifting team programs. However, there are several limitations, that need to be mentioned. First of all, lifting teams are not successful unless the infrastructure can support them. As previously mentioned, this support must be in the form of administrative and nursing policies regarding lifting in general and lifting teams specifically; adequate type, availability and working condition of lifting devices and equipment; support by team members, union members and nursing staff for the team concept; a culture of safety for patients and employees that is supported by the facility; and an awareness of the team's existence and availability by all staff that use the team. Lack of one or more of these conditions may limit the success of the lifting team program at any given facility.

Lifting teams may not be appropriate for all settings. For example, extended care facilities with many unscheduled lifts and/ or falls may not benefit from such a program. Units with a high volume of lifts that cannot be accommodated by the lifting team may also not benefit from a lifting team.

Staffing issues need to be addressed regarding lifting teams. In reports where a nurse-staffed lifting team was used, when staffing levels were low, nurses could not be devoted to the team by nurse managers (Caska & Patnode, 2000). In such cases, if use of a lifting team in one area short-staffs other areas and lifts are not being performed by lifting teams in these other areas, the overall effectiveness of the lifting team may be questioned. It may be necessary to base lifting team staffing decisions on type of unit, e.g., high-risk units vs. intermediate to lower risk units, in terms of numbers of scheduled and unscheduled lifts.
In several of the program evaluations, back injuries occurred in nurses during the lifting team shift when nurses chose not to call the lifting team. Reasons for this included not wanting to wait for the team because a patient had fallen or another patient needing to get to a scheduled appointment.

Missed lifts are therefore another potential limitation of the lifting team program. If the team's goal is to absorb 95% of nursing lifts and transfers, and this is not being achieved, there may be problems. Reasons for missed lifts must be explored and interventions targeted to improve the lift capacity of the team so that the effectiveness of the program is improved. For example, if scheduled lifts are frequently missed, the lift team schedule may need to be modified, or another team or shift may need to be added.

The lifting team members are an integral component of the program. In one report, (Caska, 1998), it was found that during their eight week trial, lifting team members felt somewhat isolated from their own units and patients. Others stated that the patient transfer focus became monotonous. These limitations may be overcome by rotating team members on a regular basis or training multiple lifters.

As previously mentioned, the lifting team requires adequate numbers, availability, and proper working conditions of devices. The team may be delayed if there are not sufficient numbers of devices on all of the floors that use the teams. Davis (2001) has recommended that a vertical lift be located on every floor, as well as at least one lift capable of dealing with bariatric patients for each facility.

Finally, lifting team members may sustain back and neck injuries related to lifting and transferring patients. In program evaluations to date, there has been only one reported back injury to a lifting team member. This occurred during the transfer of a heavy patient (Charney, 2000). This underscores the importance of careful selection of lifting team members, adequate training, and maintenance of warm-up exercises to maintain a healthy lifting team.

Thus, the lifting team may not be appropriate or practical in every setting. However, where it is used, efforts to overcome the limitations can be accomplished.

❖ TOOLS AND STRATEGIES FOR IMPLEMENTATION

In order to achieve a successful lifting team program, several key components should be addressed. These include selection of lifting team members, training of the lifting team, and lifting team policy components. Each of these areas is outlined further. In addition, a formula for calculating the required number of lifting/transfer devices is provided.

A. Composition- The facility must determine whether it will use existing or newly hired employees, orderlies, nursing staff, or other job classifications; the number of teams and number of members per team; and the shift(s) to, which the team(s) will be assigned.

B. Selection Criteria- Lifting team members ideally will be free from previous or recurrent back injuries, be physically fit, have normal strength and range of motion, be free from spinal abnormalities that would limit ability to use lifting devices and techniques, work well in teams, be able to assume responsibility, possess good verbal and written communication skills, and be supportive of the program.

C. Screening Techniques

- History (work injuries, back or neck injuries, risk factors for back injury)
- Physical examination with systems review emphasizing neurological and musculoskeletal systems (Meittunen et al., 1999)
- Measurements of range of motion & strength

D. Training Topics

- Anatomy and Physiology (relevant to preventing back injury)
- Biomechanics Relative to Lifting and Transfer
- Principles of Body Mechanics (adapted for lifting persons instead of objects)
- Assessment and Preparation of Patients for Transfer
- Assessment of the Environment
- Hospital Lifting and Lift Team Policies
- Use of Mechanical Transfer and Lifting Devices

- Team Work
- Communication
- Maintenance of Records and Logs
- Warm-up and Stretching Exercises

E. Training Techniques
- Classroom Lecture (e.g., anatomy, biomechanics)
- Hands-On Practice with Lifting Equipment
- Return Demonstration of Team Lifts and Transfers Using Mechanical Aids and Devices
- On-site Orientation to Nursing Units Where Lifts Will Occur
- Discussion
- Questions/Answers

F. Length of Training. The length of the training required for the lifting team may range from 1-2 days to 4-5 days, depending upon whether the lifting team members are new to the facility, their previous experience, size of the facility, type and amount of equipment/devices etc.

G. Additional Training. In addition to lift team members, other departments and job classifications should receive inservice education regarding the availability and utility of the lifting teams. These include administrators, risk managers, nursing managers, and nursing personnel or other caregivers who will be contacting and utilizing the lifting teams.

❖ LIFTING TEAM PROGRAM POLICY COMPONENTS

A. Administrative component supporting team and encouraging that nurses use the team for e.g., all lifts, all high-risk lifts, all scheduled lifts, etc. and requiring that sufficient equipment be available for the lifts.

B. Definitions of high-risk lifts to be performed by lifting team
- Patient falls
- Bed to cart
- Bed to chair
- Obese patient transfer and care activities
- Semi-stand pivot
- Slide-board pivot (Meittunen et al., 1999)

C. Nursing policy should include: not allowing nurses to lift during lifting team shifts, communication with the team (e.g., for scheduled and unscheduled lifts), and how to complete quality assurance reports (Charney, 1997).

D. Lifting team policy including: mandating use of lift equipment, mandated stretching/warm-up exercises prior to start of shift, documentation of activities, and reporting requirements.

E. Policy regarding lifting and transfer devices and equipment availability and required use

❖ MONITORING PROGRESS

Throughout this chapter, various methods for evaluating both the benefits and limitations of lifting teams have been reported. These methods are briefly summarized below:

Indicators Related to Injuries or Costs of Injuries:

- **Work-related injuries**- the number of injuries related to patient lifts and transfers should be measured before and after implementation of the lifting team program. Simple frequencies may be used or rates may be calculated using various formulas.

  Incidence rate = Total # of back injuries x 200,000 person hours (100 employees working 40 hours for 50 weeks) divided by department (e.g., nursing) production hours (actual hours worked by unit measured) (Standardized OSHA formula).

  Accident rate = Total number of back injury cases related to lifting and transferring divided by person years x 1000

- **Lost time work days-** the total number of work days lost due to transfer and lifting-related back injuries

- **Restricted work days-** the total number of days where employees had restricted (not full) workloads due to transfer and lifting-related injuries

- **Lifting team injuries**- Total number of injuries related to transfer and lift activities in lifting team members during lifting team shifts

- **Unnecessary injuries-** Total numbers of injuries related to lifting and transfer activities that occurred in nurses and other personnel when the lifting team was NOT called to perform a lift. In these cases, reasons for not contacting lifting teams need to be explored.

- **Cost Savings-** may include cost of lift team program minus cost of injuries that were reduced, worker' compensation costs that have been reduced, cost saved by preventing injuries, or other measures.

Lifting Team Indicators

- **Scheduled lifts performed-** the number and/or percentage of lifts scheduled to be performed by the lifting team that actually were performed by the team

- **Unscheduled lifts performed**- the total number and/or percentage of unscheduled lifts that the team was able to perform

- **Missed lifts**- the number of lifts the team was scheduled to perform that were not performed; can also measure the number of times a lift was performed without the lift team. As with **unnecessary injuries**, reasons for not calling the lift team should be elicited.

- **Lifting team capacity-** the number of lifts performed by the lifting team divided by the total number of lifts performed by the facility x 100. Can measure this on lifting team shifts only or across all shifts.

- **Response time of team**- 1) for scheduled lift- time period between scheduled lift and arrival of lift team to perform scheduled lift 2) for unscheduled lift- period of time between team contact and arrival of team for lift/transfer

- **Lift time**- the time it takes for the lift team to perform lift or transfer

- **Adverse events during lifts-** these may include catheters dislodged, intravenous lines pulled or disrupted, patient falls, injuries to personnel, or malfunctioning of equipment

- **Formula for calculating required number of mechanical lifts**- According to Charney (2000), hospitals could use the following formula for calculating the required number of mechanical lifts necessary:

    # of medical ward x 2 lifts (1 lateral, 1 vertical) = # mechanical lift equipment devices

Satisfaction Indicators. Information regarding the satisfaction of nurses and other caregivers who use the lifting teams, patients who are serviced by the team and the lift team members themselves can be elicited to monitor the team's progress. This information can be elicited by survey, focus groups, or informal one-on-one discussions. For each section below, several examples of information to elicit are presented. This list is not meant to be all-inclusive.

- **Nurse satisfaction**- how nurses or other caregivers perceive utility of team; how they rate availability, response, effectiveness of team; whether they believe lift team program should be continued, and why they do or do not call the lifting team

- **Patient satisfaction**- whether patients are comfortable during lifts/transfers/, waiting time for lift team to arrive, perception by patient of expertise of the lifting team, and overall opinion of the lifting team

- **Lifting team member satisfaction**- how individual lifting team members rate their job satisfaction; any reasons for dissatisfaction; opinions of team effectiveness; whether any injuries have been sustained by team members; and opinions of type, availability and condition of lifting devices/equipment.

Chapter 9

AFTER ACTION REVIEW PROCESS

❖ BACKGROUND

After Action Review (AAR) is a highly successful method of transferring knowledge that is used in high performing organizations, such as the United States Army. AAR is a method for transferring knowledge that a team has learned from doing a task in one setting to the next time that team does the same task in different setting (Dixon, 2000). This process moves unique knowledge that an individual holds into a group setting so that the knowledge can be integrated, understood by the whole team and used when individuals face similar circumstances. Often, knowledge generated in work settings is not shared and therefore not usable to others. AARs provide a structured method for making tacit knowledge explicit among team members, thus usable next time a team member faces a similar. An AAR functions as a vehicle to *share* information between co-workers in order to decrease the risk of a reoccurrence of an injury/incident or a near miss. A whole team can learn from the experience of a single member through the AAR process.

Knowledge management has gained popularity among managers and applied researchers, even though there is no single definition upon which all agree (Shin, et al. 2000; Hackett 2000) or definitive procedure (Pfeffer & Sutton 2000). Put simply, "Knowledge management is a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance" (O'Dell & Grayson, 1988, pg. 6). In this chapter we will present one knowledge management technique, that is, after action review. After action review is a conscious strategy for getting practical knowledge about safe patient handling and movement to other clinicians during the context of the work environment. After action review will help clinicians share knowledge about safe patient handling and movement and put this information into action to reduce subsequent musculoskeletal injuries among staff.

Knowledge management is based on the premise that the most fundamental need of an organization is knowledge; it is the prerequisite to an organization being able to fulfill its mission and to meet operational and strategic goals. In this case knowledge management is directed toward creating and maintaining safe working environments for direct care providers by reducing occupational injuries. Systematic techniques, such as after action review, help clinicians to gather data about safe patient handling and movement in an ongoing and systematic way so that information can be used effectively by others. After action review helps to contextualize data, that is, transform facts about safe patient handling and movement into knowledge that is relevant and useful (Cooke, 1994; Pfeffer & Sutton 2000; Shin, et al., 2001).

❖ DESCRIPTION OF PROGRAM

AAR offers an effective means for learning from both safety mishaps and near misses. It is an informal process in which there are no recriminations, reports are not forwarded to supervisors, and meetings are facilitated locally. In AARs staff should feel free to share knowledge without fear of embarrassment or recrimination. AAR is compatible with established mechanisms for dealing with errors and near misses such as incident-reporting and root cause analysis. The advantage to AAR is that it becomes part of the routine way that a work team goes about its business. Patient safety improvement thus becomes part of usual work routines.

❖ GUIDELINES FOR AFTER ACTION REVIEWS

A. When should AARs be conducted?

The more frequently a team conducts AARs the more comfortable they will become with learning from errors and near misses without blame. Teams may find that routine meetings held frequently may result in brief and highly focused meetings. Meeting times will vary across work units, but they should fit in with the routine of the unit and be at a convenient time so that staff can attend. For example, a medical/surgical unit may decide to conduct AARs once a week after the shift report is given to the oncoming shift. Alternatively, another unit may decide to hold AARs immediately after every patient or staff safety near miss. Whatever timing is decided, the decision should be what is best for the work group.

AARs are most effective when meetings are kept brief. They may be accomplished in as little as 15 minutes.

B. What is the structure of an AAR?

Any team member who has good communication and group process skills and who is well-respected by team members is qualified to be a facilitator. During the meeting, the facilitator asks team members:

1) What happened to threaten patient or staff safety?
2) What should have happened?
3) What accounted for the difference?
4) What corrective actions should be taken? and
5) What is the follow-up plan and who will take responsibility for implementing corrective actions?

The discussion should be open and based on objective facts without blaming individuals. Often corrective actions will be internal to how the team does it's work, however, a skilled facilitator will be able to help the team members recognize systems problems that require action outside of the team.

Recording formal minutes of AARs is not recommended. Team members should feel freer to explore all the circumstances of an error or near miss when they know that their statements are not being recorded and they do not have to risk being blamed or reprisal. Do not formalize notes, nor send them to supervisors. Informal notes can be recorded and made available to other staff if notes will help them to avoid similar patient safety errors and staff injuries. Keep in mind that the focus of AARs is to help the team members learn from their own experiences and mistakes.

All members of a work team should be involved in AAR meetings. Each person's information and ideas are necessary to obtain a complete picture of what happened and to generate ideas and incorporate what was learned into future actions. Poor attendance or limited participation from individuals will undermine group process and ownership and ultimately the success of corrective actions.

❖ BENEFITS AND LIMITATIONS OF PROGRAM

The AAR process provides many positive opportunities and benefits for employees. A very important benefit is that front line staff are given the opportunity to effect changes in their work environment when they are involved in identifying problems and solutions. As importantly, an AAR can provide a means to implement changes quickly, thus having a real effect on injury prevention. Another advantage of AAR is that it is an *informal* process. No official minutes are recorded so no reports are forwarded to management. There is no recrimination or blame resulting from this process. AAR can take the embarrassment out of mistakes and near misses. Also, facilitating an AAR requires little training and simply involves discussions, brainstorming, and similar modes of communication. And beyond staff benefits, the AAR process is compatible with other more formal processes, such as root cause analysis.

The benefits of AAR are great, but to succeed, there must be respect and trust among team members. Also, all members must be given the opportunity to have their voice heard as well as assume leadership if appropriate. For greatest success, the entire work team must be involved. Group process may be hindered if a dominant person tries to take over the process, the team members do not recognize the value of participation nor see positive changes happening in the work setting due to AARs, or management does not give staff the resources or encouragement to conduct AARs.

As previously mentioned, AARs are consistent with formal reporting processes and AAR should not replace the formal processes. Obviously in situations resulting in injury staff must follow the correct reporting procedures, with our without AAR. One challenge for successful implementation is how to motivate busy staff to perform AARs on a regular basis. Managers should give consideration to using incentives that staff identify. Additionally, staff may be intrinsically motivated because through AAR they will be contributing to improving patient care and decreasing injury rates.

❖ TOOLS AND STRATEGIES FOR IMPLEMENTATION

The following case study can be used in training teams in the after action review process. After each scene, questions are suggested to stimulate group discussion and analyze key points of the case study.

Scene 1: The Situation

A nurse manager of a long-term care unit decides to implement after action reviews after she notices an increase in musculoskeletal injuries among the nursing staff. After the nurse manager explains the process to the staff, the team decides to schedule meetings on Monday, Wednesday, and Friday at 11:00 am. This time was selected because most of the morning care is completed by 11:00 and it is before the busy time of care around lunch time. The team also thought that that after action reviews after morning care would might help them to prevent injuries likely to occur during morning care, a high risk time for injury because of the lifting, moving and turning of patients that is required for bathing, getting patients out of bed and feeding.

Point of Discussion: For musculoskeletal injury prevention, what might be other good times to conduct After Action Reviews? How might the times vary with respect to the type of unit, skill mix of staff, other considerations? What makes these good times? Is the content of the After Action Reviews well-defined?

Scene 3. The following day the patient care team assembles after morning care and a facilitator asks the usual questions of an AAR. She begins with, "What happened this morning during morning care this morning related to staff injuries that everyone could learn from.

Sue, an LPN, begins. "I had to get Mr. Walker up because he was lying in a wet bed. You know the problem we've had with his skin...I was late with my meds and the nurse manager was breathing down my neck about getting to an in-service. I *know* I was supposed to use the lift to get him up, but I didn't *see* the sling nearby, so I just got him up myself. While I was lifting him I was thinking…'I am not supposed to be doing this.' I guess I was lucky I didn't hurt myself."

Point of Discussion: What other information might be useful in gaining a systems perspective on the problem?

Scene 3: The facilitator then asks, "What should have happened in this situation?"

Sue responds, "I know I should have looked around for the sling and used the lift, but I was in such a hurry."

Nancy concurs, "It is so frustrating to have all of these new lifts but not having the slings where you need them, when you need them. I know I have had trouble finding slings, too.

Others discuss their experiences related to the lifts and slings. They agree that they like using the lifts, but that finding slings is a problem."

Point of Discussion: Was Nancy's comment supportive? How else could you imagine staff responding to Sue's observation?

Scene 4: Facilitator, "What accounts for the discrepancy?"

Nancy begins, "For starters, the sling should have been on the bed side stand, where we agreed to keep them."

Ron replies, "Uh, oh...I might have taken Mr. Walker's sling to use for Mrs. Thomas when I got her up. I could not find *her* sling. I must have forgotten to put it back."

After more discussion, the group decides that the problems of "disappearing slings" is caused when slings are sent to the laundry and not replaced.

Point of Discussion: Why is Ron likely to "confess" his mistake? What do you think Nancy's response to him would be/should be?

Scene 5: The facilitator asks, "How can the problem of disappearing slings be fixed?"

The charge nurse, Rose, replies, "You know, we always run around looking for slings. Why don't I talk to the supervisor in the laundry and work out a solution. Maybe we can label our slings so we can get back the ones we send. In the meantime, I will order more for the unit.

Sue says, "Then, maybe we can all agree to keep the slings in a consistent place so we know where to look, like in the top drawer of the bedside stand. Then everyone has to agree to replace the sling when we put it in the laundry."

Nancy replies, "Those are good ideas. Rose, if you order 10 slings I will make sure everyone gets the message about storing them."

Ron offers, "And I will see to it that the process gets into the unit orientation packet for new employees."

Scene 6: The facilitator asks, "What is the follow-up plan?"

Charge Nurse: OK, then, I will order the slings and figure out a unit coding system with the laundry. Nancy, you send out an e-mail to all the staff about storage of slings. And Ron, you write up an addition to the orientation packet and I will make sure it gets in the next printing of materials. At next month staff meeting I'll poll everyone to find out if all staff got the message and if anyone is still having the problem with missing slings…Thanks for another successful After Action Review!

Point of Discussion: How likely is it that these changes will be put into effect? Could the charge nurse do anything else to ensure implementation of these actions?

❖ MONITORING PROGRESS

We are collecting evaluation from clinical staff in the frequency they conduct AARs, when AARs are conducted, as well as their perceptions of the process and outcomes of AARs, or effective safety practices that are implemented as a result of AARs. We are interested in knowing others' successes and failures in using this technique in the context of patient safety with different types of teams in different settings. Let us know how you implemented

AAR and your successes and failures [e-mail **gail.powell-cope@med.va.gov**] . We will post your feedback on our website with your permission. The web site address is **patientsafetycenter.com**

Chapter 10

Competency Program to Prevent Musculoskeletal Injuries in Caregivers

❖ Why Training Alone is Not Effective

Although traditional education and training programs are widely believed to have prophylactic value, there is scientific evidence that they are not effective in reducing the frequency or severity of back pain, especially in nursing practice (Brown 1972, Buckle 1982, Dehlin et al. 1976, Snook et al., 1978, Stubbs et al., 1983b, Wood 1987; Owen & Garg, 1991; Venning, 1988; Stubbs, et.al., 1983; Hayne, 1994; Shaw, 1981). Regardless, body mechanics education and training in "proper" lifting techniques remains the most common intervention. There is no evidence supporting the use of one lifting technique over another; therefore, there is no preventive curriculum to prescribe for training. We need a new approach to training, an approach that will be effective.

❖ Designing an Effective Training Program

There are four issues to consider in designing an effective training program: 1) training goals, 2) course content, 3) methods of delivery, and 4) evaluation. To begin, identify the goals of training. Write the outcomes in behavioral objectives that can be measured to determine the success of training. For example, if a goal is to promote the widespread use of the safe patient handling and movement algorithms, a behavioral objective would be: "At the conclusion of this training, attendees will use the appropriate algorithm whenever moving a patient." Then you can measure the effectiveness of the training by observing staff members when they are moving patients.

The content should be based on scientific evidence that the material presented is effective in achieving the desired goals. In the above example, the safe patient handling and movement algorithms have been scientifically tested and found to be effective in reducing risk of injury to both caregiver and patient.

Now that you've identified goals and content of the training, you must determine the most effective way of delivering the content so that the adult learner achieves the goal. Adults learn in a variety of ways; some are visual learners (think pictures), others auditory (think sound). Some learn best by doing (think demonstration/return demonstration). Therefore,

it's best to use a variety of formats to reach the largest percent. The least effective format is lecture because it is not active learning; it does not involve the learner. Most effective methods involve the learner in the process, such as discussions or demonstrations/return demonstrations. Self-study guides (including computer based ones) are effective as well because they allow the learner to progress at his or her own pace and return to areas needing clarification. However, you must establish that the learner is literate in English at least at the 8th grade level. Administering a pre-test of knowledge is one way to determine literacy before offering self-study programs.

Finally, you must evaluate the effectiveness of training. It is possible to give a short quiz (post-test) following training to determine whether the learner has mastered the content. However, if you are measuring an applied skill, such as the use of algorithms, you must go beyond a paper and pencil quiz to observation of practice or to identifying an expected outcome, such as a reduction in the number of musculoskeletal injuries among staff. If training is not having the expected outcome, it's time to adjust goals, content, or delivery methods.

❖ PREVENTION OF INJURIES IN FLOATS OR STUDENTS

Up to this point we have been discussing an ideal situation for prevention of musculoskeletal injuries in staff regularly assigned to high-risk units (one with many dependent patients and a history of high numbers of musculoskeletal injuries and illnesses among staff). Under ideal circumstances, there is time allotted for training staff in the proper use of algorithms and lifting equipment. However, there may be situations when an untrained caregiver is assigned to a high-risk unit unexpectedly; e.g., when a nurse from an outside agency or a low risk unit is assigned to cover for a staff shortage or when a student nurse is assigned to care for a patient on a high-risk unit. These situations should be a red flag for other staff members on the high-risk unit.

The team approach to safety, wherein a culture of safety is inculcated in all team members, should prompt someone who is properly trained to orient the temporary worker about the special procedures used for safe patient handling and movement, which could range from advice to heeding the instructions at the bedside for moving the patient to inquiries as to the temporary worker's familiarity with specialized equipment in use, such as overhead lifting devices. If a Back Injury Resource Nurse (BIRN) is assigned to the unit and on duty, this responsibility would be his or hers. Next in line of responsibility would be the charge nurse. In the rare situation when the untrained caregiver is the charge nurse, then the responsibility would fall on other team members. The temporary worker also has a responsibility to seek out advice and guidance about the special movement and handling equipment and procedures used on the unit with which he or she may be unfamiliar.

❖ TOOL KIT

1. Annual Competency Evaluation Checklist for Safe Use of Equipment

In a recent NIOSH study, the most successful training included a return demonstration on a range of patients (Communication, Jim Collins). The VA uses annual competency evaluations for a variety of skills and abilities. One column from the VA's "Competency Assessment - High Performance Model – Core Competencies" checklist labeled "Competency" has the category "Demonstrates use, set-up, and care of

procedures/equipment according to unit policies and procedures." Under the column "Behaviors" are listed the equipment and procedures specific to a particular position and applicable to the specialty of the unit, if any. As a result, listed behaviors for a Registered Nurse working on an intensive care unit differ from those listed for a nursing assistant working in a nursing home care unit. However, when assessing competency in safe patient handling and movement, all staff members in all high-risk units should have the same behaviors evaluated. Attachment 10-1, Competence Assessment, is a suggested way to expand existing checklists.

ATTACHMENT 10-1

COMPETENCE ASSESSMENT

October 1, _____ - September 30, _____

HIGH PERFORMANCE MODEL – CORE COMPETENCIES

Position Specific Competencies including TECHNICAL SKILLS

COMPETENCY	**BEHAVIORS**	**SELF ASSESSMENT**		**COMP LEVEL**			**Validation Method/Comments Supervisor's Initials & Date**
		I feel I have the knowledge and ability to perform these functions	I request additional education and/or experience	E	S	C	
Demonstrates use, set-up, and care of procedures/equipment according to unit policies and procedures	a. Uses assessment criteria and care plan for safe patient handling and movement appropriately						
	b. Appropriately uses algorithms for safe patient handling and movement						
	c. Selects and operates correctly lifting and moving equipment, including overhead lifts, sit stand lifts, friction-reducing devices, and gait belts.						

A CD-ROM based, interactive multimedia education course addressing the subject of Safe Patient Handling and Movement is under development and will be added to this manual in the very near future. (Refer to patientsafetycenter.com for more information). The purpose of this training is to provide direct patient care staff training in safe patient handling and movement equipment and techniques. In addition, this Computer Based Course (CBT) serves as a review for health care providers, administrators, risk managers, occupational health providers, safety managers, educators, and others interested in improving patient transfer/movement processes. This training resource tool is intended to develop and refresh their knowledge as a readily available, self-study exercise. The course uses an interactive multimedia approach to present a brief, concise overview of safe patient handling and movement. The program focused on how staff can identify hazards, use algorithms, apply engineering solutions (equipment), and create a culture of safety for staff and patients. The topics covered in the training include the following: a brief background on why this is needed, brief background on the safe patient handling & movement program, use of the clinical assessment protocol and algorithms for high risk patient handling tasks, use of an ergonomic evaluation process in healthcare environments, and use of after action reviews in healthcare. This program was coordinated by the EES, Little Rock Employee Education Resource Center in cooperation with Department of Veterans Affairs, VHA Office of Occupational Health Programs (VHA/136).

This training program is designed for participants to develop a better understanding of the proper equipment and ergonomic techniques to use for patient lifting and moving. The goals of this training program are to enable participants to: (1) understand the rationale for this training program and become familiar with background information on patient handling and movement issues; (2) understand why nursing is high risk for injuries; (3) acquire an overview of ergonomics as related to safe patient handling and movement; and (4) demonstrate the application of safe patient handling and movement program elements.