Patient Handling Safety for Nursing Staff

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Don Nielsen
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INTRODUCTION

According to the Bureau of Labor Statistics (2004), there were 345,294 lost time cases (resulting in workers spending time away from their jobs) of back injury in the U.S. in 2002. The National Safety Council (2002) reported that the national average cost of a lower back injury (across all industries) was $11,903 per case in 2000. Back injury is the most frequently reported injury and accounts for approximately half of all reported injuries and illnesses in the health-care industry (Bureau of Labor Statistics, 2004).

Health-care workers engage in many activities that put them at risk for back injury. These activities include assisting or lifting patients, raising or lowering patient beds, lifting or moving heavy objects, and pushing or pulling carts or equipment. Common factors related to back injuries in health-care workers are the force necessary for these activities, repetition of the activities, and awkward positions during the activities (American Federation of State, County, and Municipal Employees, 2002). The estimated annual lost workdays due to back injuries among U.S. nursing personnel is 750,000 days and the average direct costs are estimated to be $20,000 per incident (Quality Continuum, 1999). The costs of health-care worker back injury include direct costs such as medical treatment, wages paid to absent employees (worker’s compensation), property damage, and rehabilitation costs. The indirect costs of health-care worker back injury include overtime pay to cover the work of the injured employee, scheduling work tasks to cover for the injured employee, administrative costs, and costs of losing a skilled employee, extra supervision for scheduling and planning, and retraining and real adjustment for employees returning to work. Despite the fact that nursing personnel engage in many
strenuous activities, patient lifting is often identified as the primary cause of their back injuries (Brophy, Achimore, & Moore-Dawson, 2001; Engels et al., 1994; Stobbe, Plummer, Jensen, & Atfield, 1988).

Health-care safety programs designed to address the prevention of back injuries include identifying the rate of occurrence of back injuries and developing general hospital personnel policies that outline guidelines for preventing accident and injury. Traditional safety programs have used several approaches to improve safety including informal feedback on compliance with safety procedures, safety meetings and training, safety awards, safety audits, written procedures, and special programs (McSween, 2003). Many health-care facilities have developed organizational policies that identify approaches based on the most current proper lifting techniques (Parnianpour, Bejjani, & Pavlidid, 1987). However, policies are often presented to employees without any systematic training. That is, sometimes a “show and go” approach is presented to hospital workers without any practice or demonstration of mastery and the effectiveness of this type of approach is unknown. According to Brethower and Smalley (1998), training (called performance-based instruction) is most effective when carried out in three phases: guided observation, guided practice, and demonstration of mastery. When presented in this manner, each employee understands the desired activity, rehearses the activity, and is eventually required to demonstrate mastery of it.

The typical health-care worker safety program specific to patient lifting and transfer includes five steps (Channing L. Bete Co., 2001). These include: (1) assessing the situation; (2) preparing for the move; (3) preparing the patient; (4) positioning and adjusting equipment; and (5) using proper body mechanics. In order to assess the situation, the health-care worker assesses the patient’s abilities and
limitations, the worker’s own abilities and limitations, and the safety of the environment in which the lift is to occur. Safety of the environment includes checking for hazards such as slip hazards (e.g., wet surfaces), trip hazards (e.g., electrical cords), and lighting conditions. In order to prepare for the move, the worker obtains assistance from another staff person, if necessary, and retrieves the appropriate equipment. Patient lifting and transfer equipment typically includes hoists, transfer belts, and other mechanical assistance devices. The health-care worker prepares the patient by explaining to the patient what will happen during the lift or transfer. Instructions are provided to the patient if he or she is to assist in the move. Positioning and adjusting is accomplished by adjusting the surface moving from, the surface being moved to, and the necessary transfer equipment. Proper body mechanics involves maintaining balance, getting a firm grip of the patient, keeping loads as close to the worker’s body as possible, using legs to lift, and avoiding twisting, overreaching, and bending forward.

In a risk management program (State of California, 1997), additional guidelines are presented to health-care workers for lifting and moving patients in an attempt to reduce potential back injuries. These include assessing patient needs, eliminating or reducing manual lifting of patients whenever possible, getting patients to assist with the lift as much as possible, avoiding the limits of the health-care worker’s physical abilities, getting help from other workers whenever possible, mentally preparing for the move, and using proper body mechanics.

Several studies have focused attention on reducing back injuries of health-care workers. In a survey of air ambulance crews (Olson, Krawczyk, et al., 2001), 199 full time employees of 271 air ambulance services in the United States completed a survey regarding discomfort levels for 25 locations throughout their bodies. The
study presented evidence that air ambulance crews experienced body discomfort related to their lifting tasks. Suggestions for reducing lifting-related injuries were provided, including limiting the total amount of weight that each person was required to lift and providing the necessary equipment and appropriate number of workers to lift the combined weight of the patient.

In a survey of eight nursing homes (Mutawe, Tsunehara, Hockett, & Hatch, 2000), work-related back injuries were prevalent among employees in all eight facilities. Incidence rates and injury severity were identified and were compared to private industry and health-care facilities. The authors reported high rates and severity of back injury compared to other industries. The study identified the need for nursing homes to develop effective patient handling practices, including periodic self-inspection, to reduce deficiencies.

A study conducted in an acute care hospital by Stobbe et al. (1988) compared reported low-back injuries among employees who frequently lifted patients with those reported by employees who infrequently lifted patients. The authors compared three groups of employees, licensed practical nurses, nurses’ aides, and attendants. For all three groups of employees, those who frequently lifted patients had a much higher incidence of back injury, suggesting that patient lifting is a significant factor contributing to low back injury in health-care workers.

In a low-back injury reduction intervention (Schibye et al., 2003), the use of recommended patient-handling techniques in place of techniques typically used by health-care workers was believed to have the potential to be safer for the workers. Using a 3D biomechanical model of the lower part of the back, compressions and force at the L4/L5 joint were compared between the recommended approaches and the approaches typically used by health-care workers. Comparisons were made over
eight lifting tasks. The participants were nine female health-care workers. The authors suggested that using the recommended patient-handling techniques would result in a decrease of low-back pain and injury on the job. The authors recommended: (1) handling patients in specific steps instead of one continual process; (2) avoiding twisting of the lower back; and (3) transferring weight from one leg to another during the transfer.

After a back injury reduction intervention was conducted in a 440-bed acute-care hospital (Lynch & Freund, 2000), the number of back injuries was 30% below the average of the prior three years. A training program was produced on 35-mm slides and this train-the-trainer program was administered to 30 volunteers from among hospital employees. Trainers received information about risk factors associated with transferring patients and the proper use of mechanical devices to transfer patients. The amount of training that the trainers received was not indicated. These trainers then provided one hour training sessions to other hospital employees. The dependent variables were the number of unnecessary patient transfers that were occurring and the frequency of the use of mechanical equipment for patient lifts. Prior to the training, a pre-test was given to employees. A post-test was administered 30 to 60 days following training. The results were compared in a two group pre-test/post-test design. The results of the one hour training sessions demonstrated a decrease in the number of unnecessary patient transfers and a slight, but not significant, increase in the use of mechanical equipment. In the year following the intervention, the hospital reported a 30% reduction in back injuries, based on injuries reported by the hospital personnel department, suggesting a correlation between training and a reduction in lost-time back injuries. This study had design limitations, but what may be significant is the use of a hospital safety training program delivered
by internal personnel who used a slide presentation to model safe behaviors and to potentially reduce the number of back injuries among health-care workers. This is significant because a recent literature review suggested that the use of internal personnel to implement new programs is positively correlated to program longevity (Sigurdsson & Austin, 2006).

Behavior-Based Safety

Behavior-based safety (BBS) is the application of applied behavior analysis (ABA) in order to improve safe behaviors in a variety of settings. ABA is a scientific approach that requires identification of socially important behaviors to be changed, definitions of the behavior, identification of the manipulations responsible for behavior change, and demonstration of the generality of the behavior change (Baer, Wolf, & Risley, 1968). The behavior to be changed needs to be described in accurate terms so that it can be observed and measured reliably. Specific behaviors are observed and recorded before, during, and after an intervention is applied. Specific actions (independent variables) which result in behavior change are generally implemented following a baseline phase and sometimes involve one or more reversals between the baseline and intervention phases. Baer et al. reported that a behavior change had generality if it proved to be durable over time, if it appeared in a wide variety of environments, and/or if it spread to a wide variety of related behaviors.

Sulzer-Azaroff and Austin (2000) reported that the typical BBS intervention includes several fundamental elements. The elements include the identification of behaviors that impact safety, definition of the behaviors well enough to measure them reliably, development of behavior checklists and the implementation of measurement systems to determine the current status of behaviors, and the encouragement (often through goal setting, feedback, and reinforcement) of desirable behaviors that reduce
risk and improve worker safety.

The implementation of BBS has resulted in substantial improvement of specific safe behaviors and reduced injury occurrence. In a meta-analysis of 73 applications in a wide variety of industries, Krause, Seymour, and Sloat (1999) reported a 20 – 25% year-over-year decrease in injuries for the first five years after implementing a behavioral approach to safety. Further, Sulzer-Azaroff and Austin (2000) found that 32 of 33 behavioral safety research studies they reviewed reported decreases in injury rates. Behavior-based interventions have been successfully implemented in a variety of settings including: with roofing crews (Austin, Kessler, Riccobono, & Bailey, 1996), with bus drivers (Olson & Austin, 2001), with nursing staff (DeVries, Burnette, & Redmon, 1991), in a large industrial plant (Sulzer-Azaroff, Loafman, Merante, & Hlavacek, 1990), with restaurant patrons (Austin, Alvero, & Olson, 1998), and with pizza deliverers (Ludwig, Biggs, Wagner, & Geller, 2001). In each of these interventions, feedback about performance was provided to each participant.

Behavior change strategies designed to help employees identify and fix potential hazards and increase safety generally involve several critical dimensions such as goal setting and reinforcement. However, perhaps the most important of these techniques is feedback about performance. Nolan, Jarema, and Austin (1999) conducted a comprehensive review of organizational behavior management studies and reported that over 70% used feedback as at least one independent variable. Some examples of these studies are described below.

In a manufacturing setting, six department supervisors received feedback along with verbal approval and suggestions for improvement with the goal of reducing the frequency of hazardous conditions (Sulzer-Azaroff & de Santamaria,
In a vehicle maintenance division of a city department of public works, privately delivered feedback improved overall performance of 55 workers (Komaki, Heinzmann, & Lawson, 1980). In a private acute head-injury treatment program, five nurses (supervisors) were trained to distribute written feedback to 12 nursing assistants about the use of gloves in hazardous situations. Feedback to the nurses resulted in an increase in the number of written feedback forms provided to their assistants, which in turn resulted in an increase in glove use by the assistants (Babcock, Sulzer-Azaroff, & Sanderson, 1992). In each of these studies, feedback was used to improve the desired organizational behaviors.

Three behavior-based studies addressed lifting and transfer behaviors of staff in human service settings. In a state residential school for mentally impaired clients, an intervention was implemented with six direct service providers (Alavosius & Sulzer-Azaroff, 1986). Two client transfer techniques, total-lift and stand-pivot transfer served as dependent variables. The techniques were divided into four sections: (1) positioning the wheelchair and preparing the client; (2) employee posture; (3) client lift and transfer; and (4) lowering and positioning the client. The critical components of the techniques were bending knees and pivoting during the transfer process. Written and verbal feedback was provided to each participant until the participant was determined to be 90% safe for five consecutive sessions. Feedback was consistently followed by improvement in safe performance of direct service providers in lifting and transfer behaviors.

In a similar setting, an investigation was implemented with four direct-care workers (Alavosius & Sulzer-Azaroff, 1990). The dependent variables were three direct-care worker activities: patient transfer, patient positioning, and patient feeding. The intervention began with an instruction phase during which participants received
written instructions on how to conduct the selected activities. Intermittent and then continuous feedback was applied to the three activities until they were 90% correct over two consecutive work days. Some short-term improvement occurred during the instruction phase but the changes were weak and short-lived. Both intermittent and continuous feedback established and maintained improvements in all three activities. The correct behaviors were established much more quickly under continuous feedback than they were with intermittent feedback. Correct behaviors continued to be used by the participants for all three activities over a seven-month follow-up period, regardless of which schedule was used.

In a day treatment center for adults with disabilities, an intervention package including employee training, and supervisory and graphic feedback was developed to increase employees' safe patient-transfers (Austin, Rost, Shier, Lebbon, & Beebe, in press). The dependent variables were the three consumer transfers which occurred with the greatest frequency at the facility. The intervention package for this study included two one-hour employee training sessions on safe lifting, managerial training in the use of the checklist and in delivering effective verbal feedback, graphic feedback posted weekly, and verbal feedback delivered daily by the center's director. The results indicated a substantial increase in the safe performance of the two targeted patient transfers. The mean percentage increase in safe performance following intervention for the target transfers was 29.53% over baseline measures. An increase in safe performance of the non-targeted patient transfer was also observed.

*Video Modeling*

Modeling is often a strategy effective in promoting acquisition of new behavior. Baer, Peterson, and Sherman (1967) defined modeling as a behavior with its topography functionally controlled by the topography of a model's behavior.
Modeling has been used in a variety of settings including: to help teachers to acquire functional analysis skills (Moore et al., 2002), to help children with autism to develop question asking skills (Williams, Donley, & Keller, 2000), to help families of children with problem behavior teach more appropriate public behavior (Kuhn, Lerman, & Vorndran, 2003), and to help preschool dance students learn gross-motor skills (Vintere, Hemmes, Brown, & Poulson, 2004).

Video modeling involves showing a video of the desired behavior or behaviors, and using video tape, DVD, or a similar medium, for participants to imitate. It has an advantage over using a live model in that it is more cost effective, and once recorded, the video format is available for learners at any time. That is, a live model is not necessary if a video is available. Video modeling may not have the advantage of using a live model in that the video model may have been recorded under conditions slightly different than those optimal for learning new behaviors.

The efficacy of video modeling was demonstrated by Haring, Kennedy, Adams, and Pitts-Conway (1987). Purchasing skills were generalized to community settings by young adults diagnosed with autism as a result of showing the participants video segments of other young adults making purchases. During a baseline phase, a shopping training phase was introduced during which participants completed a sequence of shopping behaviors. During this phase, instructors prompted the participants to complete a specific behavior if they failed to perform it. Following the baseline phase, a shopping training phase was introduced, which was the same as the baseline phase with the addition of verbal praise from the instructors whenever the participants made correct responses. Video generalization was the next phase, during which tapes depicting shopping behaviors of other students were shown to the participants. The video segments ranged in length from one and a half to three min...
and depicted standard sequences of purchasing behaviors such as locating items for purchase, moving to the cash register, handing the cashier money, and so on. As the participants viewed the videotapes, instructors asked the participants questions specific to the sequences of the shopping behaviors. The participants received verbal praise for correct answers. Participants continued to view videotapes until they correctly answered 90% of the instructor's questions over three consecutive sessions. The investigators demonstrated that video modeling in conjunction with other shopping training in a community retail setting was effective in promoting generalization of purchasing skills to community stores in the participants' home neighborhoods.

Video modeling was used by Charlop and Milstein (1989) to teach conversational speech to three students diagnosed with autism. During a baseline phase, participants and instructors engaged in predetermined conversations based on topics chosen by each participant. Appropriate responses were acknowledged by the instructors and the participants were given access to toys that were requested. During the next phase, video modelings, participants viewed predetermined conversations three times and were then asked to engage in the same conversation that they had viewed on the videotape. As in the first phase, correct responses were acknowledged and the participants had access to requested toys. The average length of the videotapes was 45 s, and the treatments were delivered in a multiple-baseline design across participants. The results indicated that the participants learned conversational skills through video modeling, generalized their conversational skills, and maintained these skills over a 15-month period.

In another application, video modeling was used to teach sign identification and generalization to various community sites to mentally handicapped students.
(Cuvo & Klatt, 1992). In a multiple baseline design across participants, junior high students diagnosed with developmental disabilities were taught the meaning of various signs with training consisting of flash cards and 15 s videotape recordings. The investigators then determined each student’s recognitions of the signs in different community settings. Responding to signs, acquired in the flash card and videotape conditions, generalized to community settings and performance was generally maintained at 100% correct. The investigators reported that the use of videotape more closely approximated the natural environment than the use of flash cards alone. Because of the approximation to the natural environment, the authors surmised that there was generalization to community settings.

Video modeling was used along with tutoring to improve the reading skills of four first-grade students experiencing reading difficulties (Hitchcock, Prater, & Dowrick, 2004). Using a multiple baseline design across two behaviors (reading and comprehension), two 2-min videotapes were used to improve reading skills. The authors reported that the use of videotape was associated with reduced variability and maintenance of new skills.

Video modeling and reinforcement were used to teach perspective-taking skills to children with autism (LeBlanc et al., 2003). Using a multiple-baseline design across individuals, perspective-taking skills were taught to three students. Video modeling and reinforcement were effective, but generalization was indicated with only 2 of the 3 students. The investigators reported that researchers need to continue to develop strategies for enhancing the generalization of these skills.

Video modeling has been used in other settings including: to help supermarket shoppers make healthier purchases (Winett et al., 1991), to help an individual diagnosed with developmental disabilities learn to be more productive with janitorial
duties (Cavaiuolo & Gradel, 1990), and to help staff members employed in a group home setting to improve their interactions with adults diagnosed with developmental disabilities (Harchik, Sherman, Sheldon, & Strouse, 1992). In each of these investigations, participants viewed short videotapes showing the desired behaviors and were then asked to identify correct skills associated with the desired behaviors. The general findings of these studies were improvement of specific, desirable behaviors as a result of video modeling.

Although considerable research has been conducted using video modeling in developmental disabilities, our literature search revealed no studies using video modeling as a performance improvement strategy in organizations. However, a variant on the video modeling paradigm used in applied behavior analysis was conducted by Alvero and Austin (2004). The investigators used an ABC multiple baseline design counterbalanced across two sets of behaviors, in a simulated office setting. Beginning with a baseline phase, participants were given a list of instructions and were asked to perform the tasks described in the instructions. During an instruction phase, participants of group A received information about one set of four behaviors and participants of group B received information on the other three behaviors. During the observation phase, participants viewed and scored five min videotapes of an experimental confederate performing tasks similar to those the participant performed during each session. All videotapes included random combinations of safe and unsafe behaviors. After each time they scored a videotape, participants were asked to perform the tasks as in the baseline phase. The investigators reported substantial improvements in safety performance. Training employees to view and score a videotape of a confederate in this way could have several advantages in application, including the efficiency of allowing employees to
score videos during down-time. Further, observations and scoring can be completed in less time than in other, more popular, peer-based applications. The Alvero and Austin investigation required no expertise on behalf of participants in delivering feedback about safe and unsafe behavior (and therefore required no time for feedback delivery training) and it required less expertise to administer as a trainer.

Based on a review of the research conducted for the purposes of this study, we speculated that a variant of the typical video modeling paradigm (similar to that used by Alvero & Austin, 2004) could be used to demonstrate the dimensions of safe behavior in a variety of safety applications, including patient transfers in an acute care hospital setting.

In the hospital environment, staff is busy with a variety of patient care tasks, and they often work alone, so it is inconvenient to conduct peer-safety observations. People in general, including hospital employees, are often uncomfortable with peer observations – both in being observed and in observing others. Due to staffing and planning constraints, nursing staff often transfer a patient without assistance from other staff. It would be unethical to ask another employee to stand by for the sake of completing an observation and allow a coworker to lift alone, since team-based lifting is typically safer. For these reasons, a quick, yet effective video-based solution for lifting safety that closely approximated the natural environment could be of great value to health-care professionals.

Guidelines for appropriate patient lifting and transfer have been established and widely disseminated, and acute care hospitals have adopted policies that specify correct lifting procedures. However, back-related injuries due to patient lifting remain the most common injuries among health-care workers. Researchers have shown the beneficial effects of modeling (e.g., Charlop & Milstein, 1989; Cuvo &
Klatt, 1992; LeBlanc et al., 2003) and feedback (e.g., Alavosius & Sulzer-Azaroff, 1986, 1990; Austin et al., 1996; Olson & Austin, 2001) on a variety of behaviors, but none have shown these effects on the safety of lifting and patient transfers of healthcare workers. The behavioral techniques that have proven effective tend to involve time consuming and intrusive methods such as peer-to-peer observations, verbal feedback, and graphic feedback. If a worker could score a video of a confederate’s performance rather than scoring the performance live, the worker could engage in the scoring when time permitted, and the scoring may indeed be more accurate and effective. The worker scoring the tape could get immediate feedback by referring to a standard (i.e., a pre-scored video). By using the video-format, workers would not have to become adept at delivering verbal feedback to peers in potentially uncomfortable situations. Such verbal feedback could be reserved as a job for staff or supervisors with more in-depth training and skills in the area. The type of video-based intervention described above, on the other hand, could be administered and received by hospital staff with very little training.

The current study evaluated the effectiveness of video scoring of and feedback about the scoring of the components of safe patient transfers, on the patient transfers of staff in a skilled nursing facility within an acute-care hospital setting. Scoring of patient transfers could have been accomplished using either video scoring or live peer observations. In addition, given the previous research in this area, we suspect that if staff received feedback on their lifting performance, their lifts would become safer. Video scoring was used in this study because it required less time and less skill (than observing behavior and delivering feedback) for participants, it eliminated potential social awkwardness associated with directly scoring the behavior of peers, and it eliminated the potential ethical issues involved in observing a coworker complete a
patient transfer without assisting (two-person transfers are often safer).
METHOD

Participants

Eight employees were initially recruited from a skilled nursing department within an acute care hospital (see Appendix A for the recruitment announcement). Employees eligible for recruitment were Registered Nurses (RNs), Technically Advanced Personnel (TAPs), and Patient Care Assistants (PCAs). The director of the unit posted the recruitment announcement in the documentation room. Employees who were interested in participating in the study contacted the Student Investigator (SI) at his office number. The SI asked the employee for a convenient time to meet and the consent meeting occurred privately in the SI’s office during regular work hours. The consent meeting took approximately five minutes per each volunteer. Informed consent was secured from participants prior to their participation in the study (see Appendix B for consent to participate script and Appendix C for consent form). After eight volunteers agreed to participate in the study, they were randomly assigned into two groups (A and B). The SI made the assignments by drawing a letter A or letter B from a bag containing four As and four Bs. Participants were assigned identification numbers (ID) by the SI. The SI maintained a master list of participant’s names and IDs until data collection and exit reviews were completed, at which time the master list was destroyed. During the first month of the investigation, one of the participants from group B decided to withdraw from further participation for reasons unrelated to the study. A volunteer replacement participant was secured, using the same recruitment techniques described above. During the third month of the investigation, one of the participants from group A resigned her position in order to take a job at another location. This participant was not replaced, leaving three
participants in group A and four participants in group B. All of the participants were female. The ages of the participants ranged from 20 to 49 years (mean = 32 years) and their number of years employed at this particular facility ranged from six months to six years (mean = 2.6 years). All of the participants had received annual, brief in-service training, using the five-step approach to patient lifting and transfers, described above.

All of the patients served were adults who required partial assistance in order to stand from a sitting or lying position or to go from a standing position to a sitting or lying position. About half of the patients were long-term patients of the skilled nursing unit and half were there for short-term rehabilitation purposes. All had diagnoses which necessitated assistance in a skilled nursing department. All patients consented to videotaping when they were admitted to the hospital, as part of normal hospital procedures.

**Materials and Equipment**

The SI video recorded all patient transfers assessed in this investigation, using a Sony® Video 8XR Handy Cam video camera, in plain view of the target participants. Twenty example videos of each of the two primary types of patient transfers were created using confederates from the hospital’s physical therapy department. These examples included correct and incorrect components of each transfer. The SI reviewed and scored all videos, using checklists, to determine which components were correct and incorrect for each example, and so that a verifiable standard score could be applied to each video recording.

**Setting**

The experimental setting was a 21-bed skilled nursing unit in a rural acute care hospital located in south-central Michigan. The unit was made up of 10
semiprivate rooms, 1 private room, bathrooms in each patient room, a nursing station, a
medicine supply room, a general supply room, a staff break/conference room, a unit
director's office, a support staff office, and a large community room (see Appendix D for
the floor plan).

Independent Variables

The treatments for this study included an information phase for each participant followed by a video scoring phase. One participant from group A and one participant from group B also received a feedback phase. The information phase involved showing the participants a checklist and definitions of the safe components of lift type 1 to participants of group A and safe components of lift type 2 to participants of group B. The video scoring phase involved having each participant use a checklist to score the lifting behavior of an experimental confederate shown on videotape. This involved scoring one (of 21 prerecorded) video transfer at the beginning of each shift. Participants from group A viewed and scored models completing transfer type 1. Participants from group B viewed and scored models completing transfer type 2. The feedback phase consisted of the SI meeting individually with participants for whom the video scoring phase did not result in substantial improvement. During this phase, two participants reviewed graphed data showing the percentage of safe components of the patient transfer from their previous shift that were safe. They did not view and score the video transfers during this phase.

Dependent Variables

An injury assessment was conducted in the hospital where the skilled nursing unit is located. The result was an average of nine nursing staff injuries per year, during the past three fiscal years, due to patient transfer activities. Nursing staff injuries as a result of patient transfers, for the 2004/2005 fiscal year, accounted for
31% of total injuries. Therefore, lifting appeared to be a reasonable dependent variable to target, given the overall goal of reducing the injuries and related costs at this location. Pivot transfers and standing/sitting transfers’ occurred frequently in the skilled nursing unit. Four different types of one-person transfers were completed for each patient, several times daily, and were identified as the dependent variables. The four transfers include from a wheelchair to a standing position (type 1), from a standing position to a wheelchair (type 2), from a bed to a wheelchair (type 3), and from a wheelchair to a bed (type 4). These four transfers were identified by the hospital’s physical therapy department as the most frequently occurring in this department. For this study, a standardized checklist for each of the transfers was used (see Appendices F-I for the checklists). Although injury reduction is the ultimate goal of behavioral safety techniques, measuring injury reduction is often difficult, especially when injuries occur very infrequently, as in this setting. During the intervention period, there were no lifting-related back injuries in the skilled nursing unit. There were also no lifting-related back injuries in this unit for the same period, one year earlier. The dependent variable for the current study was the percentage of safe lifting components, defined as the number of safe components for each lift type divided by the total number of components for the lift. Each lift varied in the number of components, ranging from 17 to 24. Participants A-1 and A-2 from group A were videotaped one time per shift, near the beginning of each shift, as they completed lift type 1 through all three phases of the study. Participant A-4 was videotaped at the beginning of each shift for two phases of the study. In addition, several probes of lift type 3 were videotaped throughout the study. Likewise, participants B-6, B-7, and B-9 from group B were videotaped one time per shift, near the beginning of each shift, as they completed lift type 2 for all three phases. Participant B-5 was videotaped at
the beginning of each shift for two phases of the study. Several probes of lift type 4 were videotaped throughout the study for group B. Lifts 1 and 2 were the targeted lifts (primary DVs). Lifts 3 and 4 were secondary lifts (secondary DVs) and were assessed for covariation with the primary lifts.

**Procedure**

*Baseline phase.* Following the initial screening and consent meeting, the SI privately read to each participant an introductory script for the baseline phase (see Appendix E for a copy of the script). The introductory script informed participants that the camera used during the study was being used to collect data on patient transfers. Participants from group A were recorded making type 1 patient transfers (the safety of which represented a primary dependent variable) and probes of type 3 transfers. Participants from group B were recorded making type 2 transfers (the safety of which was a primary dependent variable). Three of the four participants from group B were recorded for probes of type 4 transfers. All transfers were conducted with patients who needed assistance but who were able to complete approximately 50% or more of the work necessary for the transfer. The patient’s ability to assist in their own transfers was identified by the physical therapy department of the hospital, for all patients, on an ongoing basis. Transfers occurred as patients left or returned to their beds or as they entered or left the community room. Transfers were not videotaped in situations where there was an expectation of privacy (e.g., when using the bathroom). No lifting data were reviewed with the participants during the first three phases of the study. The video taped transfers were scored by the SI and a research assistant using the appropriate checklist for each lift type (see Appendices F-I for copies of the checklists). The scoring data were then graphed by the SI for visual inspection and reviews by the Principle Investigator (PI) and the SI.
This phase continued until the performance of each participant was stable, according to visual inspection of the trend and variability of each participant's graph. This phase ranged from 9 to 11 shifts for participants in group A, and from 6 to 11 shifts for participants in group B.

Information phase. Following the baseline phase, the SI privately read to each participant an introductory script for the information phase (see Appendix J for a copy of the script). On an individual basis, employees from group A reviewed the checklist and discussed, with the SI, each component of the lift for patient transfer type 1. Employees from group B individually reviewed the scoring checklist for patient transfer type 2, also discussing each component of the lift with the SI. As in the baseline phase, participants from group A were recorded making type 1 transfers and probes of type 3 transfers. Participants from group B were recorded making type 2 transfers. One of the participants from this group was recorded for a probe of the type 4 transfer. This phase continued for each participant until performance was stable according to visual inspection of the graphed data. This phase continued for 5 to 10 sessions for participants in group A and 9 to 17 sessions for participants in group B. The SI conducted training sessions for group A participants as close in time to each other as possible, and likewise for group B. The group B information phase staggered in time after that of group A.

Video scoring phase. Following the information phase, the SI read to each participant, on an individual basis, an introductory script for the video scoring phase (see Appendix K for a copy of the script). At the beginning of this phase, participants from group A individually reviewed one videotape showing a model completing one patient transfer type 1 and participants from group B individually reviewed a videotape of a model completing one transfer type 2. These sessions occurred at the
beginning of each shift for each participant. As in the information phase, the onset of the video scoring treatment was staggered across groups.

During this treatment, each participant scored the transfer using the appropriate checklist. Participants’ scoring was compared on an item-by-item basis to checklists completed for each model video by the SI, after scoring was complete. The SI provided private feedback to the participant’s scoring of each item of the checklist, asking why she scored the item in the manner that she did. The private feedback sessions occurred in the staff break/conference room with no one else present. Correct responses resulted in verbal agreement and praise. Incorrect scoring was identified and the correct score was explained. Each participant continued scoring the models demonstrating transfer type 1 (for group A) or 2 (for group B) at the beginning of each shift throughout the phase. This phase continued for 11 to 20 sessions for participants in group A and for 3 to 20 sessions for participants from group B. Each individual in each group was exposed to the same sequence of videos to be scored.

Throughout this phase, two of the participants from group A were videotaped on various occasions to probe for covariation of components of transfer type 3. In a similar fashion, two of the participants from group B were videotaped on various occasions as they completed transfer type 4. As in previous phases, transfers were not videotaped in situations where there was an expectation of privacy. Participants were recorded one time each day during their regular work schedule. Data on transfer types 3 and 4 were designed to assess for covariation between these and the targeted lifts (i.e., lifts 1 and 2).

**Graphic and verbal feedback.** Video scoring was not as effective in improving the safety of patient transfers for participants A-2 and B-6 during the video-scoring
phase as it had been for the other participants. Both experienced repeated difficulty with specific components. Therefore, these two participants received private graphic and verbal feedback, at the beginning of each shift, on the percentage of lift components they were observed performing safely during their previous shifts. On these occasions, the SI met with each participant, on an individual basis at the start of each shift, and discussed the lifts that were scored for the previous shifts, showing the participant a performance graph (showing percentage of each lift component performed safely during each of the previous phases) and discussing the specific behaviors for which the person could improve in order to improve her overall safety percentage (see Appendix L for an example of a performance chart). The private sessions occurred in the staff break/conference room with no one else present.

Follow-up. Follow-up (withdrawal) sessions were completed for six of the participants. Two of the participants resigned their positions at the hospital during the study. The participants' behavior was recorded as they completed patient transfers just as in the baseline phase. At the end of the study, an exit interview was conducted by the SI with each participant (see Appendix M for the exit interview script).

Data Collection

Videos depicting participants completing the various patient transfers were scored by the SI and one of two graduate assistants, using the appropriate checklist for each patient transfer. The primary observer was pre-assigned in a simple alternating fashion prior to the collection of the data. Data were plotted on graphs showing the percentage of safe components completed by each participant across each shift for each of the four types of patient transfers, across all phases of the investigation.
Duration of Experimental Sessions

All experimental sessions across all phases occurred during the daily shift for each participant over the course of approximately seven months. One lift was recorded for each participant during each shift, near the beginning of the shift. Each patient lift required approximately 1 to 3 min to complete. In general, a new phase was not introduced until behavior was stable or down trending.

Experimental Design

An ABCA (and sometimes ABCDA), multiple baseline design across individuals was used to evaluate the effectiveness of the treatment package on safe patient transfers. In addition, multiple probes were collected on the performance of two related lifts to assess for covariation across lifts. The phases of this study were baseline, information, video scoring, feedback, and follow-up.

Interobserver Agreement

Interobserver agreement was collected for 33% of the sessions. Interobserver agreement was calculated using the standard formula:

\[
\text{Number of Agreements} \quad \frac{\text{X} \quad 100}{\text{Number of Agreements} + \text{Number of Disagreements}}
\]

Agreement for baseline phase, information phase, video scoring phase, and feedback phase was 95%, 95%, 97%, and 96%, respectively for group A and 96%, 94%, 99%, and 95%, respectively for group B.

Informed Consent

Participants' consent was formally sought before this study was carried out, and participants were asked to sign an informed consent form prior to participating (see Appendix C).
HSIRB Approval

Protocol clearance from the Human Subjects Institutional Review Board was obtained before the study was conducted (see Appendix M). The HIPAA Officer of Hillsdale Community Health Center ensured that patient’s right to privacy on the skilled nursing unit was protected using the proposed procedures described in this study (see Appendix N). Letters of support from the President/CEO of the participating organization and from the supervisor of the skilled nursing unit were secured (see Appendices O and P).
RESULTS

Figure 1 displays the results of the intervention on transfer types 1 and 3 for group A.

Figure 1. Percentage of safe components for group A for lifts 1 and 3.
Figure 2 displays the results of the intervention on transfer types 2 and 4 for group B.

Figure 2. Percentage of safe components for group B for lifts 2 and 4.
Table 1 shows the mean percentage of safe components for each participant across phases.

### Table 1

**Mean Percentage of Correct Components for Each Participant Across Phases**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline Phase</th>
<th>Information Phase</th>
<th>Video Scoring Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>Mean 58.40%</td>
<td>77.70%</td>
<td>89.70%</td>
</tr>
<tr>
<td></td>
<td>SD 11.5</td>
<td>4.4</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>Range 31.3-68.8</td>
<td>70.6-82.4</td>
<td>83.3-100</td>
</tr>
<tr>
<td>A-2</td>
<td>Mean 35.70%</td>
<td>52.10%</td>
<td>68.30%</td>
</tr>
<tr>
<td></td>
<td>SD 8.8</td>
<td>10</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Range 25.0-56.3</td>
<td>41.2-73.7</td>
<td>52.9-93.8</td>
</tr>
<tr>
<td>A-3</td>
<td>Mean 77.40%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>SD 8.1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Range 64.7-94.1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>A-4</td>
<td>Mean 61.10%</td>
<td>n/a</td>
<td>66.20%</td>
</tr>
<tr>
<td></td>
<td>SD 15</td>
<td>n/a</td>
<td>15.1</td>
</tr>
<tr>
<td></td>
<td>Range 29.4-78.9</td>
<td>n/a</td>
<td>37.5-88.9</td>
</tr>
<tr>
<td>B-5</td>
<td>Mean 28.70%</td>
<td>68.40%</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>SD 12</td>
<td>19</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Range 14.3-50.0</td>
<td>35.7-85.7</td>
<td>n/a</td>
</tr>
<tr>
<td>B-6</td>
<td>Mean 21.40%</td>
<td>43.10%</td>
<td>61.10%</td>
</tr>
<tr>
<td></td>
<td>SD 11</td>
<td>9.5</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>Range 7.1-42.8</td>
<td>21.4-57.1</td>
<td>50.0-78.6</td>
</tr>
<tr>
<td>B-7</td>
<td>Mean 42.70%</td>
<td>67.90%</td>
<td>93.60%</td>
</tr>
<tr>
<td></td>
<td>SD 14.6</td>
<td>9.6</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>Range 28.6-70.6</td>
<td>50.0-82.4</td>
<td>64.3-100</td>
</tr>
<tr>
<td>B-9</td>
<td>Mean 28.70%</td>
<td>51.60%</td>
<td>76.20%</td>
</tr>
<tr>
<td></td>
<td>SD 14.3</td>
<td>17.3</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Range 14.3-58.8</td>
<td>21.4-85.7</td>
<td>71.4-78.6</td>
</tr>
</tbody>
</table>

An analysis of the components of all four transfers was completed (see Appendix R), revealing a number of common components for all four patient
transfers. There were 13 components common to transfers 1 and 3, and 12 components common to transfers 2 and 4. Because of the number of similar components across transfers 1 and 3, it was surmised that a potential increase of safe behavior for transfer 1 may carry over to transfer 3 for participants of group A, and likewise, an increase of safe behavior for transfer 2 may carry over to transfer 4 for participants of group B.

Figure 3 shows the results of the covariation analysis for lifts 1 and 3 of group A, and lifts 2 and 4 of group B, for common components and unique components for each patient transfer type for each group. Caution should be used when attempting to draw conclusions about covariation between the lifts since there are only a few observation points for lifts 2 and 4. The percentage of components common to lifts 1 and 3 (group A), completed correctly during baseline was 59.9% and 68.6%. During the information phase, the percentage of correct components was 56.6% and 85.7% for lifts 1 and 3. During the video scoring phase, the percentage of correct components was 79.8% and 82.1% for lifts 1 and 3. As the percentage of components unique to lift 1, completed correctly, decreased slightly from the baseline to the information phase (57.3% to 56.6%), the percentage of components unique to lift 3, completed correctly, increased (76% to 90%). The percentage of safe components unique to lift 1, increased from the information phase to the video scoring phase (72.2% to 79.5%). During this same period, the percentage of safe components unique to lift 3, decreased (90% to 86.7%).

The percentage of components common to lifts 2 and 4 (group B), completed safely during baseline was 37.3% and 78.6%. During the information phase, the
Figure 3. Covariation analysis comparing results for lifts 1 and 3, and for lifts 2 and 4. The percentage of safe components was 77.2% and 85.7% for lifts 2 and 4. During the video scoring phase, the percentage of safe components was 78.4% and 89.3% for...
lifts 2 and 4. The percentage of components unique to lift 2, completed safely, increased from the baseline to the information phase (17.2% to 35.2%), and the percentage of components for lift 4 completed safely increased (68.9% to 87.5%). The percentage of safe components unique to lift 3 increased from the information phase to the video scoring phase (35.2% to 52.1%). During this same period, the percentage of safe components unique to lift 4 decreased (87.5% to 75%).

The accuracy of video scoring by the participants was also recorded. Figure 4 shows a comparison of video scoring accuracy and safety performance for participants 1, 2, and 4 of group A and participants 6, 7, and 9 of group B during the video scoring phase. The video scoring mean accuracy for participant 1 was 78.1% (SD=9.3; range, 55.6 to 94.7). The video scoring mean accuracy for participant 2 was 85.1% (SD=6.2; range, 73.4 to 94.7). The video scoring mean accuracy for participant 4 was 88% (SD=7.7; range, 75 to 100). The video scoring mean accuracy for participant 6

Figure 4. Relationship of scoring accuracy and safe performance for all participants.
was 72.2 (SD=11.1; range, 52.9 to 94.4). The video scoring mean accuracy for participant 7 was 84.6% (SD=13.2; range, 64.7 to 100). The video scoring mean accuracy for participant 9 was 92.2% (SD=2.9; range, 88.2 to 94.4).

During exit interviews, six participants were asked if they thought their behavior changed as a result of their participation in this study. Four of the participants (A-1, B-5, B-6, and B-7) reported that they believed their behavior had improved, in general, because they were thinking more carefully about the correct way to complete patient transfers. The results show improvement for these four participants. One of these four participants (B-7) reported that the video scoring phase was especially useful in reminding her of the correct way to complete a patient transfer. This participant’s behavior was 100 percent safe on 9 occasions. Two of the participants (A-2 and B-9) reported that they believed their behavior had not changed as a result of participation in this study. Both reported that they thought they were correctly completing patient transfers through all phases of the study. Improvement was demonstrated for participant A-2. Some improvement was demonstrated for participant B-9, especially during a brief video scoring phase.
DISCUSSION

The results suggest that information, video scoring, and feedback delivered in the present study may have increased safe patient transfers completed by staff in a skilled nursing facility within an acute-care hospital setting. A slight improvement in performance appears to have occurred for all participants who were exposed to the information intervention. Overall improvement in performance, beyond that produced by information alone, appears to have occurred for two of three participants from group A who were exposed to the video scoring intervention and for all three participants from group B who were exposed to the video scoring intervention. Participant A-4 worked a limited number of shifts and was not exposed to the information phase. Her performance did not improve during the video scoring phase. Participants A-2 and B-6 were exposed to a feedback only phase because their lifting behavior appeared to have substantial room for improvement after reviewing and scoring all 21 video examples of the video scoring phase. During the feedback phase, the participants were no longer viewing and scoring video examples of patient transfers. Performance appears to have further improved for these two participants. Overall improvement in the safety of patient transfer behaviors is important in that safer performance may result in a lower risk of back injury. This reduced risk would be a benefit to health care workers, the institutions who employ them, and to the patients who are assisted in transfers.

The information, video scoring, and feedback phases of this study resulted in improvement of safe patient transfer behaviors for all participants with the exception of A-4. For reasons unknown, her performance did not improve during the video scoring phase. However, participant A-4 was not exposed to the information phase and safe performance did not improve during the video scoring phase as it did for
participants A-1 and A-2.

There appeared to be two possible factors that might explain why performance failed to improve during the video scoring phase for this participant. During sessions 9, 10, and 11 of this phase, participant 4 was video taped as she assisted the same patient each session. During session nine she reported that this patient required less assistance, in her opinion, than other patients and she therefore completed fewer of the components of the transfer in a safe manner. If these three sessions were factored out, her percentage of correct patient transfer components would have been 72.3%, (an 11.1 percentage point increase over baseline).

A second factor is that it was possible that the sequence of all three phases was important in improving safe behavior during patient transfers, at least for some health care workers. Future research should examine this possibility by having several participants complete the baseline, information, and video scoring phases similar to this study and comparing the results to participants exposed only to the baseline and video scoring only phases. Although we believed the videos represented situations that were very similar to those typically encountered by participants, future research might show an increased effectiveness of video scoring by using more high fidelity video examples. That is, video examples might show models completing patient transfers that more closely resemble the settings and circumstances in which the participants complete patient transfers.

With the exception of participant A-4, improvement may have occurred for the other participants because each of these phases offered increasingly clear prompts for safe behavior. During the information phase, the written components of a patient transfer served an instructional or prompting function. However, 4 of the 6 participants had a downward trend in safe performance during this phase even
through they received the information every session. This suggests that providing information about the various components of safe patient transfers may improve performance. It appears, however, that information alone does not sustain safe behavior during patient transfers over a period of time. During the video scoring phase, visual examples of models completing transfers, both correctly and incorrectly, may have served as more effective prompts because of the video delivering instruction in a more detailed manner (through visual example and non-example), and/or because participants received feedback on the accuracy of their scoring of the videos, resulting in higher quality active instruction of the safe lifting steps. In addition, the video scoring may have occasioned self-monitoring by participants. Previous research suggests that evaluating the behavior of others may promote self-evaluative or self-monitoring behavior on behalf of the observer, leading to changes in observer behavior when the observer engages in tasks similar to those scored on the videotape (Alvero & Austin, 2006). Finally, for two of the participants, feedback about their own performance identified the components they were completing correctly and those that needed improvement. Future studies should arrange feedback phases for several participants to replicate this apparent effect.

In addition, future research might investigate the effects of having one group of participants transfer the same patients over several sessions and compare the results against another group of participants who transfer different patients for each session. This could reduce one of the variables that may be responsible for variability of lifting behavior. During this study, participants transferred patients on a random basis. Participants were video taped as they completed the first patient transfer of their shift and were therefore exposed to conditions, such as transferring patients with different needs, which could result in variability in their performance.

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One of the strengths of the current study is the focus on a socially important behavior. Manual patient transfers are commonly used in the health care industry, and a leading cause of injury among healthcare workers. The procedures used in assisting patients in transfers in this study are typically used in skilled nursing facilities. They are also used in acute care hospital settings, nursing homes, home health care, and in physical therapy facilities. Therefore, the procedures used in this study could be easily adapted to other settings and would be areas for future research. Another strength of the current study is the limited amount of time needed for participants to review the correct components of a patient transfer (about 1 min during the information phase) and to view and score models completing patient transfers (about 3 to 5 min during the video scoring phase). All of the participants reported that their participation in this study did not interfere with their normal day to day duties.

A withdrawal phase was applied to six of the participants who completed the scheduled intervention phases. Behavior continued at improved, safer levels for 5 of the 6 participants, suggesting the potential for longer term positive effects of the interventions applied in this study. Future research should continue a withdrawal phase over a longer period of time and for additional participants, in order to more systematically assess durability.

It was anticipated that the results would suggest that covariation existed between transfer types 1 and 3, and between transfer types 2 and 4, due to their common components. However, the results suggested little covariation between the lifts. There was an overall improvement from baseline to information phase for group A. However, the components common to lifts 1 and 3 actually decreased slightly from the baseline to the information phases for lift type 1 while they improved for lift type 3. From the information to the video scoring phases, lift type 1 components
improved while lift type 3 decreased. There appeared to be no relationship between components unique to lifts 1 and 3. For group B, there was an improvement in both lift types 2 and 4 from baseline to information phases. There was a slight increase for lifts 2 and 4 from the information to the video scoring phase. The results are not readily apparent however, there may be a slight covariation between lifts 2 and 4. There may be a relationship between components unique to lifts 2 and 4. The relationship between the components common lifts 1 and 3, and lifts 2 and 4, and possible covariation between these lifts is an area that needs further research. These results should be interpreted with caution, however, since there were too few data points of secondary lifts in this study to conduct a thorough analysis of covariation.

Scoring accuracy did not appear to improve over time for the six participants who completed the video scoring phase even though they were receiving feedback about the accuracy of their scoring during this phase. There may have been a ceiling effect in that the participants started with and continued with a high degree of accuracy in scoring videos.

The current study evaluated the effectiveness of video scoring of and feedback about the scoring of the components of safe patient transfers, on the patient transfers of staff in a skilled nursing facility within an acute-care hospital setting. The current study suggests that video scoring and feedback are effective in increasing safe behaviors related to patient transfers and reducing the possibility of back injuries among health care workers in a skilled nursing facility.
Appendix A

Announcement for Recruitment of Participants
Announcement

Study: Patient handling safety for nursing staff.

Student Investigator: Don Nielsen, M.A.
Principle Investigator: John Austin, Ph.D.
Western Michigan University, Department of Psychology

Eight volunteers, from Hillsdale Community Health Center’s RNs and TAPs, who serve on the Skilled Nursing Unit, are needed to participate in a study for the purpose of improving safe patient handling. This project is part of Don Nielsen’s doctoral dissertation. All volunteers will be asked to meet briefly with Don Nielsen during each shift throughout this study to review specific aspects of lifting.

Improved job performance and the possibility of reduced lifting-related injuries are the possible benefits of this study. This project will be approximately 3-5 months in duration. Participants can discontinue participation in the research at any time without prejudice, penalty, or risk or any loss of service that they would otherwise have. Data from this project will be kept confidential and will not become part of the participant’s permanent record.

To volunteer for this research project, or if you have any questions, please contact Don Nielsen at 437-5350.
Appendix B

Script for Consent to Participate
Script for Screening and Consent Process
To be read aloud by the SI

1. “Eight volunteers, from Hillsdale Community Health Center’s RNs and TAPs, who serve on the Skilled Nursing Unit, are needed to participate in a study for the purpose of determining safe patient handling. This project is part of Don Nielsen’s doctoral dissertation. All volunteers will be asked to meet briefly with Don Nielsen during each shift throughout this study to review specific aspects of performance.

Improved job performance is the expected benefit of this study. This project will be approximately 3-5 months in duration. Participants can discontinue participation in the research at any time without prejudice, penalty, or risk or any loss of service that they would otherwise have. Data from this project will not become part of the participant’s permanent record.”

2. “Before you begin participation in this study, you must carefully read a consent form. I will read over the consent form with you. If you have any questions concerning this information, please feel free to ask them at any time. After you have read the consent form, you may either sign it or choose not to participate by not signing. If you choose not to sign, you will not be penalized in any way.”

(Hand the potential participant a consent form and read it aloud to her/him)

3. “Do you have any questions regarding the consent form? Please sign a copy of the consent form for my records and keep the other copy for your records.”
Appendix C

Consent Form to Participate in Study
WESTERN MICHIGAN UNIVERSITY
Department of Psychology

Patient Handling Safety for Nursing Staff

Principal Investigator: John Austin, Ph.D.
Student Investigator: Don Nielsen, M.A.

WESTERN MICHIGAN UNIVERSITY

You have been invited to participate in a research project entitled “Patient Handling Safety for Nursing Staff.” This research is intended to study the effects of training on patient transfer activities. This study will look at assisted patient transfers that you are currently participating in on a regular basis. You will be required to continue assisting patients as you normally would. Participation will require between 5 and 20 minutes of your time each shift. The duration of this study will be approximately three to five months. This project is Don Nielsen’s doctoral dissertation project.

As part of the study, I (Don Nielsen) will videotape you on a regular basis while you are transferring patients. You will be asked to meet briefly with me (Don Nielsen) at the beginning of each shift throughout this study to review various components of patient transfers and you may be asked to have discussions with me about patient transfers.

All of the information and videos collected about your performance will be held strictly confidential. That means that your name will not appear on any papers on which this information is recorded. The forms will be coded and I (Don Nielsen) will keep a master list with the names of participants and the corresponding code numbers. All forms will be retained in a locked file in my (Don Nielsen’s) office. Data concerning your personal activity will be made available to you at the end of the project. Data from this project will not become part of your work record, and no one here at work will see your data or videos. The only way data will ever be shared with others is by grouping the information across everyone who participates, or else by coding the information in other ways so no one can ever determine who participated. You may be asked to meet with me, the Student Investigator, to review the percentage of lift components that you were observed performing safely. The purpose of this will be to discuss the areas in which you could improve in order to improve your safety.

As in all research, there may be unforeseen risks to participants. A potential risk may be mild uneasiness with being video recorded. You will probably become fairly comfortable with being video recorded in a short period of time. The fact that you will be videotaped will prevent the anonymity of your participation in this study. A
second potential risk involves time. Reviewing the components of patient transfers will involve 5 to 20 minutes at the beginning of each shift, over a period of 30 to 50 shifts. If you are too uncomfortable with being video recorded or decide not to spend time at the beginning of each shift in order to participate in this research, then you are free to discontinue your participation in this research without any prejudice, penalty, or risk or any loss of service that you would otherwise have.

You may refuse to participate or quit at any time during the study without penalty. If you have any questions or concerns about this study, you may contact either me, the Student Investigator at 517-437-5395 or Dr. John Austin, the Principal Investigator at 269-387-4495. You may also contact the chair of Western Michigan University Human Subjects Institutional Review Board at 269-387-8293 or the Western Michigan University Vice President for Research at 269-387-8298 with any concerns that you have.

This consent document has been approved for use for one year by the WMU Human Subjects Institutional Review Board as indicated by the stamped date and signature of the board chair in the upper right hand corner. Do not participate in this study if the stamped date is more than one year old.

Participant _______________________________  Student Investigator _______________________________

Date _______________________________  Date _______________________________
Appendix D

Skilled Nursing Unit Floor Plan
Appendix E

Baseline Phase Script
Baseline Phase Script

This script is to be read aloud by the SI prior to the first baseline shift, individually, for each participant.

"During many of your shifts throughout this study, you will be videotaped during patient transfers. Data from these recordings will not become part of your employment record and will not be used against you in any way. When you see the video camera, please simply attempt to continue performing your job as you normally would in the absence to the camera. Do you have any questions?"
Appendix F

Patient Transfer Type 1 Checklist
<table>
<thead>
<tr>
<th>Wheelchair to Standing Transfer</th>
<th>Employee:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-lift</strong></td>
<td>1</td>
</tr>
<tr>
<td>1. Communicate procedure to patient.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>2. Worker’s feet wide apart, more than shoulder width.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>3. Position wheelchair, lock brakes.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>4. Move out footrests.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>5. Apply gait belt.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>6. Face the patient.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>7. Patient’s feet are on the floor, shoulder width apart.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>8. Patient moves to edge of chair.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>9. Patient places hands on armrests.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>10. Squat, bending at the knees in front of patient.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>11. Worker’s hands on gait belt.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>12. Bend at the hips to lean forward.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>13. Lifter’s head up.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td><strong>Lift</strong></td>
<td>1</td>
</tr>
<tr>
<td>14. Instruct the patient to stand.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>15. Knees slightly bent and shoulders above waist.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>16. Torso is still, no twisting at the waist.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>17. Shift weight back.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>18. Assist patient to stand using gentle lift, continuing until consumer is standing.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total # S</th>
<th>S + AR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>03</td>
</tr>
</tbody>
</table>

Circle S, AR, or NA for each behavior.

S=Safe, AR=At Risk, NA=Not Applicable.

% S

Comments: ____________________________
Wheelchair to Standing Transfer

Pre-lift

1. The worker verbally communicates to the patient that she is going to assist the patient to a standing position.
2. The worker's feet are wide apart, at least shoulder width.
3. The worker makes sure the wheelchair is on a level surface, positions it and then locks both wheel brakes.
4. The worker swings both footrests out to the sides of the wheelchair.
5. The worker applies the gait belt around the patient and adjusts the belt accordingly.
6. The worker faces the patient.
7. The worker ensures that the patient's feet are flat on the floor in front of the patient, shoulder width apart.
8. The worker instructs the patient to move to the edge of the chair, assisting as necessary.
9. The worker instructs patient to place hands on the armrests of the wheelchair.
10. The worker squats slightly, bending at the knees, in front of the patient.
11. The worker places hands are on gait belt, one hand on each side of the patient.
12. The worker bends at the hips and leans forward slightly towards the patient.
13. The worker's head is up, in a level position.

Lift

14. The worker instructs the patient to stand.
15. The worker's knees are slightly bent, with shoulders above (over) the waist.
16. The worker's torso is relatively steady and still with no twisting at the waist.
17. The worker slowly shifts weight backwards in a steady motion.
18. The worker assists the patient using a gentle lift, continuing until the patient is standing.
Appendix G

Patient Transfer Type 2 Checklist
<table>
<thead>
<tr>
<th>Standing to Wheelchair Transfer</th>
<th>Employee:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-sit</strong></td>
<td></td>
</tr>
<tr>
<td>1. Communicate procedure to patient.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>2. Position wheelchair, lock brakes.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>3. Move out footrests.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>4. Apply the gait belt, face the patient.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>5. Feet wide apart, more than shoulder width.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>6. Make sure both feet are facing towards chair.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>7. Lifter's head up.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>8. Instruct patient to feel chair against back of legs.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>9. Patient assists by placing hands on armrests.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>10. Worker's hands on the gait belt.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>11. Worker's knees are slightly bent and shoulder width apart.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td><strong>Sit Down</strong></td>
<td></td>
</tr>
<tr>
<td>12. Instruct the patient to sit down.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>13. Lower patient slowly, bending at hips and knees.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>14. Torso is still, no twisting at the waist.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>15. Position the patient.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td>16. Move footrests into place.</td>
<td>S AR NA S AR NA S AR NA</td>
</tr>
<tr>
<td><strong>Total # S</strong></td>
<td></td>
</tr>
<tr>
<td><strong>S + AR</strong></td>
<td></td>
</tr>
</tbody>
</table>

Circle S, AR, or NA for each behavior. S=Safe, AR=At Risk, NA=Not Applicable. %S O1 O2 O3

Comments: ____________________________
Standing to Wheelchair Transfer

Pre-sit

1. The worker verbally communicates that she is going to assist the patient from a position to a wheelchair.
2. The worker makes sure the wheelchair is on a level surface and then locks both wheel brakes.
3. The worker swings both footrests out to the sides.
4. The worker applies the gait belt and then the worker stands in front of the patient, facing the patient.
5. The worker's feet are wide apart, more than shoulder width.
6. The worker's feet are facing towards the wheelchair.
7. The worker's head is up and level.
8. The worker instructs the patient to back against the chair so that the patient feels the chair against the back of their legs.
9. The worker instructs the patient to place their hands on the armrests of the wheelchair.
10. Both of the worker’s hands are on the gait belt.
11. The worker’s knees are slightly bent and the feet are shoulder width apart.

Sit Down

12. The worker instructs the patient to sit down on the wheelchair.
13. The worker lowers the patient slowly, bending at the hips and knees.
14. The worker’s torso is relatively steady and still, with no twisting at the waist.
15. The worker positions the patient as necessary.
16. The worker moves the wheelchair footrests into place.
Appendix H

Patient Transfer Type 3 Checklist
Observer: __________________ Date: __________ Time: __________

<table>
<thead>
<tr>
<th>Bed to Wheelchair Pivot Transfer</th>
<th>Employee:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-lift</strong></td>
<td>1</td>
</tr>
<tr>
<td>1. Communicate procedure to patient.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>2. Position wheelchair at 45 degree angle.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>3. Lock brakes, move out footrests.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>4. Sit the patient up, feet touching the ground.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>5. Apply gait belt.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>7. Feet wide apart, more than shoulder width, with one foot facing the original surface, and the other towards the new surface.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>8. Bend at the hips to lean forward.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>9. Lifter's head up.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>10. Hands on the gait belt, slide the patient to the edge of the bed.</td>
<td>S AR NA</td>
</tr>
<tr>
<td>11. Position the patient's feet flat on the floor, shoulder width apart.</td>
<td>S AR NA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lift and Sit Down</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Instruct the patient to stand, shifting weight back.</td>
</tr>
<tr>
<td>13. Knees slightly bent and shoulders above waist, lifting the patient to a semi-standing position.</td>
</tr>
<tr>
<td>14. Torso is still, no twisting at the waist, shift weight towards new surface (pivot).</td>
</tr>
<tr>
<td>15. Lower the patient slowly, bending at hips and knees.</td>
</tr>
<tr>
<td>16. Position the patient, move footrests into position.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total # S</th>
<th>01</th>
<th>02</th>
<th>03</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + AR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Circle S, AR, or NA for each behavior. S=Safe, AR=At Risk, NA=Not Applicable.

Comments: _____________________________________________________________________
Bed to Wheelchair Pivot Transfer

Pre-lift

1. The worker verbally communicates to the patient that she is going to assist the patient in moving from the bed to a wheelchair.
2. The worker positions the wheelchair at a 45 degree angle to the bed.
3. The worker locks both wheelchair brakes and moves out the footrests.
4. The worker instructs the patient, and/or assists the patient in sitting up, making sure the patient’s feet are touching the floor.
5. The worker applies the gait belt around the patient and adjusts the belt accordingly.
6. The worker squats slightly, bending at the knees in front of the patient, facing the patient.
7. The worker stands with their feet wide apart, more than shoulder width apart, with one foot facing towards the bed and the other foot facing towards the wheelchair.
8. The worker bends slightly at the hips to lean forward toward the patient.
9. The worker’s head is up, in a level position.
10. The worker places hands on the gait belt and assists the patient in sliding to the edge of the bed.
11. The worker makes sure the patient’s feet are positioned flat on the floor, shoulder width apart.

Lift and Sit Down

12. The worker instructs the patient to stand, and then the worker shifts her weight back.
13. The worker’s knees are slightly bent and the shoulders are over the waist. The patient is then lifted to a semi-standing position.
14. The worker lowers the patient slowly, bending at the hips and knees.
15. The worker positions the patient as necessary and moves the footrests into place.
Appendix I

Patient Transfer Type 4 Checklist
### Wheelchair to Bed Pivot Transfer

#### Pre-lift

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Communicate procedure to patient.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>2. Position the wheelchair at a 45 degree angle.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>3. Lock brakes, move out footrests.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>4. Patient's feet are flat on the floor, shoulder width apart.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>5. Apply gait belt.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>6. Squat, bending at the knees in front of patient.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>7. Feet wide apart, more than shoulder width, with one foot facing</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>the original surface, and the other facing the new surface.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>8. Bend at hips to lean forward.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>9. Lifter's head up.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>10. Hands on gait belt, patient's hands are on armrests.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
</tbody>
</table>

#### Lift and Transfer

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Instruct the patient to stand, shifting weight backwards.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>12. Knees slightly bent and shoulders above waist, lifting the</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>patient to a semi-standing position.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>13. Torso is still, no twisting at the waist, shift weight towards</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>new surface (pivot).</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>14. Lower the patient slowly, bending at hips and knees.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
<tr>
<td>15. Position the patient, remove gait belt.</td>
<td>S</td>
<td>AR</td>
<td>NA</td>
</tr>
</tbody>
</table>

#### Total # S

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

Circle S, AR, or NA for each behavior.

S = Safe, AR = At Risk, NA = Not Applicable.

%S

Comments:
Wheelchair to Bed Pivot Transfer

Pre-lift

1. The worker verbally communicates to the patient that she is going to assist the patient in moving from the wheelchair to the bed.
2. The worker positions the wheelchair at a 45 degree angle to the bed.
3. The worker locks both wheelchair brakes and moves out the footrests.
4. The worker makes sure the patient’s feet are flat on the floor, shoulder width apart.
5. The worker applies the gait belt around the patient and adjusts the belt accordingly.
6. The worker squats, bending slightly at the knees, in front of the patient.
7. The worker’s feet are wide apart, more than shoulder width, with one foot facing the wheelchair and the other foot facing the bed.
8. The worker bends slightly at the hips to lean forward, towards the patient.
9. The worker’s head is up, in a level position.
10. The worker’s hands are on the gait belt and the worker makes sure that the patient’s hands are on the armrests.

Lift and Transfer

11. The worker instructs the patient to stand, and the worker shifts her weight backwards.
12. With the worker’s knees slightly bent and shoulders above the waist, the worker assists the patient to a semi-standing position.
13. The worker’s torso is relatively still, with no twisting at the waist, the worker shifts towards the bed in a pivoting move.
14. The worker lowers the patient slowly, bending at the hips and knees.
15. The worker positions the patient and removes the gait belt.
Appendix J

Information Phase Script
Information Phase Script

This script is to read aloud to each participant individually by the SI at the beginning of the information phase.

"We are going to review the components of one type of patient transfer. This is a patient transfer that is commonly used on this unit of the hospital."

(Hand the participants from group A a checklist for type 1 or type 2 for participants from Group B and read it aloud to the participant)

"Using these components in this order for this type of patient transfer will help you to remain relatively safe and will reduce the risk of injuring yourself. Please initial this checklist in the comments section to indicate that we have reviewed each item of the checklist. I will keep this copy for my records. Do you have any questions?"
Appendix K

Video Scoring Phase Script
Video Scoring Phase Script

This Script is to be read aloud to each participant individually by the SI at the beginning of the video scoring phase.

“We are going to review the components of one type of patient transfer and view a video showing a model completing this type of transfer. We will review this video as many times as you need in order to review each component of this transfer and determine if the model completed each component of the transfer in a safe or unsafe manner. Please let me know when you want me to pause, rewind, or restart the tape”

(Hand the participant an appropriate transfer checklist for the transfer type)

“Using this checklist, you are going to review the video and score the transfer. Remember, you can review part or all of the video as often as needed in order for you accurately score this transfer. I will be providing comments, asking why you scored each item in the manner that you did. In addition, I will be identifying your scoring as correct or incorrect. Do you have any questions?”

(Answer any questions and then run the video, pausing and starting as the participant requests. Collect the checklist when the participant has completed it).
Appendix L

Individual Performance Chart
Participant A1

Baseline Phase

Information Phase

Video Scoring Phase

Percentage Safe

Components
Appendix M

Exit Interview Script
Participant Exit Interview Script

This script is to read aloud by the SI, to all participants, on an individual basis, following the completion of the study.

“This is a brief explanation of the purpose of the study you participated in. Please feel free to ask any questions you may have after the explanation.

The purpose of this study was to examine how effective video scoring is in improving the components of patient lifts, thus improving the safety of nursing staff in a skilled nursing unit. We assure you that all data and identifying information on participants will be kept in strictest confidence. I have just a few questions.”

Participant Questions

1. “As a result of your participation in this study, do you think your behavior changed?” Following their response, indicate if they were correct or not.
   2. If their behavior changed, ask the following question. “Why do you think it did?”
   3. If their behavior did not change, ask the following question. “Why do you think it did not change?”

“I (Don Nielsen) will maintain the security of all data gathered over the course of the study in a locked cabinet inside a locked office at the Three Meadows office building for at least three years before they are destroyed.

You are free to view the visual media of your performance. You are also free to examine your own performance data gathered during the course of the study. If you choose to do so, you can make arrangements with me (Don Nielsen) following this explanation and after asking any questions you may have about the study.

Do you have any questions?”

(Answer any questions the participant may have)

“Thank you for participating in this study.”
Appendix N

HSIRB Approval Letter
Date: January 30, 2006

To: John Austin, Principal Investigator
    Don Nielson, Student Investigator for dissertation

From: Mary Lagerwey, Ph.D., Chair

Re: HSIRB Project Number: 05-10-35

This letter will serve as confirmation that your research project entitled "Patient Handling Safety for Nursing Staff" has been approved under the full category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: November 16, 2006
Appendix O

Privacy Assurance from HCHC HIPAA Officer
Re: Review of proposed study

I have reviewed the study, “Patient Handling Safety for Nursing Staff,” proposed by Principal Investigator John Austin, Ph.D. and Student Investigator Don Nielsen, M.A. I believe that patient’s right to privacy on the skilled nursing unit is protected using the proposed procedures described in the study. The patient’s photograph authorization form ensures that they have the right to give their consent or to refuse consent to be photographed for this study.

Valerie Fetters, HCHC HIPAA Officer

December 5, 2005
Appendix P

Letter of Support from Hillsdale Community Health Center
Letter of Support for the Study Entitled:
“Patient Handling Safety for Nursing Staff”

Principal Investigator: John Austin, Ph.D.
Student Investigator: Don Nielsen, M.A.

Hillsdale Community Health Center has given permission to John Austin, Ph.D. and Don Nielsen, M.A. to complete the study entitled, “Patient Handling Safety for Nursing Staff.” Hillsdale Community Health Center is familiar with the study and is supportive of this project. We believe that this study will not adversely impact the performance or well-being of the employees who participate in this study. Participation data from this study will not become part of any employee’s permanent work record.

Hillsdale Community Health Center may terminate this approval at any time and for any reason without penalty.

Sincerely,

[Signature]
President and CEO

December 5, 2005
Date
Appendix Q

Letter of Support from the Director of the Skilled Nursing Unit,
Hillsdale Community Health Center
Hillsdale Community Health Center

Letter of Support for the Study Entitled:

“Patient Handling Safety for Nursing Staff”

Principal Investigator: John Austin, Ph.D.

Student Investigator: Don Nielsen, M.A.

The Skilled Nursing Facility (SNF) of Hillsdale Community Health Center has given permission to John Austin, Ph.D. and Don Nielsen, M.A. to complete the study entitled, “Patient Handling Safety for Nursing Staff.” Hillsdale Community Health Center is familiar with the study and is supportive of this project. We believe that this study will not adversely impact the performance or well-being of the employees who participate in this study. Participation data from this study will not become part of any employee’s permanent work record.

The SNF of Hillsdale Community Health Center may terminate this approval at any time and for any reason without penalty.

Sincerely,

[Signature]

Sincerely,

Director, SNF

11/22/05

Date
Appendix R

Analysis of Patient Transfer Components
Components Across 4 Lifts

Lift 1: Wheelchair to standing
Lift 2: Standing to wheelchair
Lift 3: Bed to wheelchair
Lift 4: Wheelchair to bed

<table>
<thead>
<tr>
<th>Component</th>
<th>Lift 1</th>
<th>Lift 2</th>
<th>Lift 3</th>
<th>Lift 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Communicate procedure to patient.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. Position wheelchair, lock brakes.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3. Move footrests.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4. Apply/Remove gait belt.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5. Face the patient.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Patient leans forward.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Patient’s feet on floor, shoulder width apart.</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8. Patient moves to edge of chair.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Patient places hands on armrests.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Squat, bending at knees in front of patient.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>11. Worker’s hands on gait belt.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12. Bend at hips to lean forward.</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>13. Lifter’s head up.</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>15. Knees slightly bent and shoulders above waist.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>16. Torso is still, no twisting at the waist.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>17. Shift weight back.</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>18. Continue to assist until patient is standing.</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>19. Worker’s feet wide apart, more than shoulder width.</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>20. Instruct patient to feel chair against legs.</td>
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<tr>
<td>21. Lower patient, bending at hips and knees.</td>
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<tr>
<td>22. Position patient.</td>
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<tr>
<td>23. Position wheelchair at 45 degree angle.</td>
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<tr>
<td>24. Sit the patient up, feet touching the floor.</td>
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</tr>
<tr>
<td>25. One foot facing original surface, other facing new surface.</td>
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</tr>
</tbody>
</table>

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REFERENCES


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Altering supermarket shoppers’ bad purchases to make purchases that are lower