Patient Handling & Safety

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Speaker Disclosure

- Ms. Matz does not endorse any specific vendor or manufacturer of patient handling equipment or devices.

- Ms. Matz has no financial relationships or interests with any commercial topics that are discussed in this activity.

- The opinions expressed in this presentation are the opinions of Ms. Matz, and do not represent the views/opinions of the Veterans Health Administration.
Facts? about Patient Handling & Risks of Injury
In an eight hour shift, the cumulative weight that nurses lift equal to an average of ??? per day.
“Patient care providers are stronger than warehouse workers.”
Providing Patient Care is High Risk
Patient Care is High Risk
(Injuries per 100 full-time workers)

Source: Annual Survey of Occupational Injuries and Illnesses (BLS)  *Baseline
### 2001 Injury Incident Rates* (per 100 full time workers)

<table>
<thead>
<tr>
<th>Category</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Homes</td>
<td>13.5</td>
</tr>
<tr>
<td>Nursing</td>
<td>12.6</td>
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<tr>
<td>Hospital Workers</td>
<td>8.8</td>
</tr>
<tr>
<td>Construction Industry</td>
<td>7.9</td>
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<tr>
<td>Manufacturing Industry</td>
<td>8.1</td>
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<tr>
<td>Mining Industry</td>
<td>4.0</td>
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Patient Care is High Risk

# of nonfatal Injuries & illnesses involving musculoskeletal disorders with days away from work

- Nurses aides/orderlies & attendants: 29,980
- Registered Nurses: 8,810
- Licensed Practical & Vocational Nurses: 3,400
  Nursing TOTAL: 42,190

- Laborers/Freight-Stock-Materials Movers: 33,590
- Truck Drivers (Heavy/Tractor-Trailer): 17,770
- Truck Drivers (Light-Delivery Services): 12,450
- Construction/Laborers: 9,190

*Bureau of Labor Statistics (BLS) 2004*
Patient Care is High Risk

There is a high prevalence of back pain among nurses*

- 81% of nurses are affected**
- Prevalence of upper body symptoms (24-60%)***
- Prevalence of lower body symptoms (33-72%)***
- Many MSIs are not reported**

*Yassi, Khokhar, Tate, Cooper, Snow, & Vallentyne (1995)
*French, Flora, Ping, Bo, & Rita (1997)
**OHSAH in British Columbia (2006)
***Koehoom & Sullivan (2002)
Overexertion resulting in sprains/strains to the back are the leading and most costly occupational health problem in the United States.

(Smedley, Egger, Cooper, & Coggon, 1995; Marras, 1999).
Why are Patient Care Providers at High Risk?

For Nurses, causes of these disorders are:

- Overexertion due to lifting of excessive loads
- Cumulative effects of repeated patient handling tasks

(Smedley, Egger, Cooper, & Coggon, 1995; Marras, 1999).
Why are Patient Care Providers at High Risk?

- OSHA targets manual patient handling as ‘the greatest risk factor contributing to the majority of injuries, lost & restricted workdays, and worker’s comp costs in Nursing Homes’.

OSHA Ergonomic Guidelines for Nursing Homes
www.osha.gov/ergonomics/guidelines/nursinghome/index.html
High Risk Manual Patient Handling Tasks w/ Technology Solutions

**Vertical Transfers**
- Seated to Seated positions: To/From: Bed/Chair, Chair/Toilet, Chair/Chair, Car/Chair, Chair/Stretcher, Chair/Exam Table
- Transfer up from floor

**Lateral (Horizontal) Transfers**
- Supine (flat) to Supine positions
- To/From: Bed/Stretcher/Trolley
High Risk Manual Patient Handling Tasks w/ Technology Solutions

**Repositioning in Bed**

- Side to Side, Up in Bed

**Repositioning in Chairs**

- Wheelchairs, Dependency

Chairs, Chairs
High Risk Manual Patient Handling
Tasks w/ Technology Solutions

Wound Care/Lifting Appendages

Bathing a patient in Bed

Making an occupied bed

Dressing/Undressing Patients

Toileting Patients

Car Extractions
Why are Patient Care Providers at High Risk?

Still using unsafe ‘manual’ patient handling techniques…

- Many ‘manual’ moving techniques have been outlawed in other countries
- Under Axilla Lift, Hook & Toss, Orthodox lift, Lift w/ patients’ arms around caregiver’s neck
- UK, Australia, Netherlands, Ireland, British Columbia, S. Africa, Sweden, Denmark
Why are Patient Care Providers at High Risk?

*Patients have changed…*

- Patients are sicker
- Patients are larger
- Patients are more physically dependent on staff

- So…. there is more risk of injury to staff.
Why are Patient Care Providers at High Risk?

Training/Education alone is NOT Effective:

- Brown, 1972
- Dehlin, et al, 1976
- Anderson, 1980
- Daws, 1981
- Buckle, 1981
- Stubbs, et al, 1983
- St. Vincent & Teller, 1989
- Owen & Garg, 1991
- Harber, et al, 1994
- Larese & Fiorito, 1994
- Lagerstrom & Hagberg, 1997
- Daltroy, et al, 1997
Why are Patient Care Providers at High Risk?

Why??

are training and Education alone NOT effective?
Why are Patient Care Providers at High Risk?

- Manual patient handling tasks are... 
  - intrinsically unsafe  
  - beyond biomechanical capabilities of workers

- Biomechanically evaluated High Risk Patient Handling Tasks using a 3-D Body Tracking System
Study Results Proved...

- Patient Handling Tasks are **beyond the physical capabilities** of workers
- Tasks need to be **redesigned using principles of Ergonomics**
  - **Modify work environment**
  - **Institute technology**
Using the NIOSH Lifting Equation, threshold limits for injury are exceeded...
L5/S1 disk compression on a 50th percentile caregiver manually transferring a patient from chair to bed.

Bar chart showing disk compression in pounds-force (lbf) for a 141 lb. patient and a 244 lb. patient. The NIOSH Upper Limit is 1847 lbf, and the Design Limit is 1551 lbf.
**NIOSH Lifting Limits**

- **Manual Materials Handling**
  Maximum Permissible Limit (boxes) – 51 lbs.

- **Patient/Resident Handling Lifting Limit**
  Recommendation – 35 lbs. *
  (best case scenario for dependent patients not able to assist)

*~AORN (2007) AORN Guidance Statement: Safe Patient Handling and Movement in the Perioperative Setting~*
What happens when patient lifting and moving exceeds caregivers’ biomechanical limits...?
Ergonomics/Biomechanics of Patient Handling

Acknowledgement:

William S. Marras, Ph, CPE
Director, Biodynamics Lab
Ohio State University
www.biodynamics.osu.edu
Exceeding Biomechanical Capabilities results in…

- Acute Injuries
- Cumulative Trauma Injuries
  - Muscles
  - Spine
Muscles & Cumulative Stress

Muscles

- Micro-tears accumulate over time
- Result in seemingly ‘acute’ injury
Two forces act on the spine when lifting and moving patients...

- Compressive forces
  - Lifting heavy loads
  - Lifting load for a sustained period of time (feeding, bathing, dressing change, etc.)

- Shear forces
  - Twisting
  - Reaching
Spinal Loading & Stress

- Compressive & shear forces both result in
  - Micro-fractures to the spine
  - Damage to discs
- Over time, these accumulate and serious harm is done = cumulative trauma injury
Biomechanical forces (internal & external)

Vertebral Endplate Microfractures

Scar tissue

Decreased diffusion of nutrients

Disc degeneration

Injury/Decreased tolerance and work capacity
Spinal Loading & Stress

One of the main contributors to spinal loading & stress is the distance a load is carried away from the body.
Patient handling tasks are often tasks with loads (patient body/limbs) held far from the body.

These body positions cannot be altered (as compared to boxing a product differently).
Pushing and pulling result in shear forces on the spine
Less tolerance for shear forces
Ceiling Lifts appear to decrease push-pull forces as compared to floor-based lifts especially on carpeted floors (preliminary results).


For more information: www.biodynamics.osu.edu
And, this is why OSHA and others recommend…

“manual lifting of Patients be minimized in ALL cases and eliminated when feasible.”
Patient Handling
Equipment & Aids
Bariatric Equipment
Specialized Beds
Lateral Transfer Devices

Mechanical Lateral Transfer Device

Friction Reducing Device (FRD)

Air Assisted Lateral Transfer Device
Sit to Stand Lifts

With ambulation capability

Non-powered
Ceiling Lift Track Configurations

Overhead system with traverse installed with ceiling fixtures directly on the ceiling

Overhead straight-rail system installed with Slimline support legs
There are differences in use of portable floor lifts as opposed to ceiling lifts

• Biomechanical stress on caregiver is greater when pushing/pulling portable lift & patient.
Full Body Sling Lifts

There are differences in use of portable floor lifts as opposed to ceiling lifts

• Other Risks of Injury are greater.
  • Considerable arm strength & back torsion are required, especially when wheels are not working well.
  • Workers can trip over lifts or run into them.
  • Lifts on wheels are not always stable.

• Other issues....
  • May require more space than available to use & store
  • May not be compatible w/ bed design (bed too low)
  • Are not always available/accessible for use

(Garg, 1991; Garg, 1991; Daynard, 2001)
Full Body Sling Lifts


Full Body Sling Lifts

There are differences in use of portable floor lifts as opposed to ceiling lifts

- Ceiling lift accessibility results in greater use

- Staff prefer ceiling lifts.
Sling Lifts

*Lifts are not ‘presently’ the answer to ALL risks from patient handling…*

- But... they may be soon for most...
- New advances in sling design enable lifts to be more versatile
Sling Categories

- Seated
- Supine
- Repositioning
Sling Categories

- Wound Care/Position/Support
- Ambulation
Patient Care Ergonomic Research Studies
Patient Care Ergonomic Research Studies

Studies show ERGONOMIC approaches

- Reduced staff injuries from 20 - 80%
- Significantly reduced workers compensation costs
- Decreased severity of injuries
  - Reduced lost time days
  - Reduced # of modified duty days

‘Patient Care’ Practice Settings include…

- ALL practice settings that move and lift patients
  - NURSING
    - Acute Care
    - Long Term Care
    - Critical Care
    - OR
    - Others…
  - NON-NURSING
    - PT
    - Radiology
    - Others…

Research Data is applicable to ALL who perform patient handling tasks..!

**Interventions:**
- Mechanical lifts and repositioning aids
- Zero lift policy
- Employee training on lift usage**

**Results:**
- Injury Incidence decrease
- Lost Work Days Incidence decrease
- Workers’ Comp Cost savings
- ROI - 3 years

**Interventions:**
- Mechanical lifts

**Results:**
- Injury Rate decrease
- Lost Work Days Injury Rates decrease
- Workers’ Comp Cost savings
- Improvement in musculoskeletal comfort

**Interventions:**
- Mechanical lifts
  - Full Body Sling Lifts
  - Sit to Stand Lifts

**Results:**
- Injury Rate decrease (6.6 to 5.7/100 FTE)
- Lost Work Day decrease in total # of days/100 FTE (32 to 15 days)
Patient Care Ergonomic Research Studies


**Interventions:**
- Mechanical lifts
- Patient handling aids
- Training

**Results (self-reported):**
- Work fatigue decreased
- Comfort w/ patient handling improved
- Physical demands of job decreased
Patient Care Ergonomic Research Studies

**Studies with Ceiling Lifts as Key Intervention**

- Reduced staff injuries
- Significantly reduced costs from injuries
- Decreased severity of injuries
  - Reduced lost time days
  - Reduced # of modified duty days


Review of Ceiling Lift Literature Findings:

- CLs solve many of the problems associated with floor lifts: minimal physical effort to maneuver, availability/accessibility, and less space to operate & store.

- Researchers found that CLs eliminated many of the risk factors associated with patient handling.
Review of Ceiling Lift Literature Findings
(continued):

- Many dramatic reductions in costs & severity of injuries
- Healthcare staff using CLs found them to be safe & effective.
- CLs were not found to have the same impact in reducing risk or costs when used for repositioning tasks.
Patient Care Ergonomic Review of the Literature


Findings:

- Staff perceived CLs made their job easier to perform
- Staff preferred CLs over both mechanical floor lifts and manual pt handling methods

**Intervention:**
- Ceiling Lifts

**Results:**
- Modified Duty rates decreased (128 to 48 hrs/100,000 hrs worked)
- Lost Workday rates decreased (312 to 0 hrs/100,000 hrs worked)
- Job-related stress decreased
- Direct costs decreased (ROI – 4.8 yrs.)
- User Satisfaction - high

**Intervention:**
- Ceiling Lifts

**Results:**
- Lost Workday rates decreased significantly (24 to 0 hrs/100,000 hrs worked)
- Injury incidence decreased (30%)
- Medical & Indemnity costs decreased significantly
Patient Care Ergonomic Research Studies

Studies with Ceiling Lifts as Key Intervention

- CLs are preferred method for reducing patient lifting injuries
  (Gamble et al, 1998; Engst, et al, 2004; Engst et al, 2005)

- CLs are favored by healthcare workers

- CLs made job easier
Patient Care Ergonomic Research Studies


Findings:

- Ceiling-mounted lifts are increasingly promoted as an alternative to conventional floor lifts for patient handling

**Recommendation:**

- **Proactive installations of CLs in newly built long-term care facilities should be considered as an effective method to reduce patient handling injuries and their associated costs.**

**Intervention Program Strategies:**
- Equipment
- Education/training
- Risk assessment
- Policies/procedures
- Patient assessment system
- Work environment redesign
- Work organization/practice change
Patient Care Ergonomic Research Studies


**Intervention:**

- Safe Patient Handling & Movement (SPHM) Program
VA Safe Patient Handling & Movement Program

- **Key Intervention**
  - Patient Handling Equipment***

- **“Knowledge Transfer” Support Structures**
  - Unit Peer leader (BIRN)**
  - After Action Review*
  - Patient Care Ergonomic Process***
  - Patient Assessment/Algorithms/Care Plan for Safe Patient Handling**
  - SPHM Policy***

Evidence for “Safe Patient Handling & Movement (SPHM) Program” Interventions

*** Evidence-based  ** Promising evidence  * Not Evidence-based
Study Intervention:
VA Safe Patient Handling & Movement Program

- 7 sites in VISN 8
  - Florida
  - Puerto Rico
- 23 participating units
  - 19 Long Term Care/Nursing Home Units
  - 4 Spinal Cord Injury Units
- 2001-2002
Every site/unit was unique
Every site/unit implemented program elements to best fit their
Culture
Staff preferences
Unit physical characteristics
Some were more successful in changing their safety culture than others
Findings:

- Injury Rate decreased significantly (24 - 16.9/100 workers/year)
- Modified Duty days decreased significantly (70%)
- Job Satisfaction Indicators Improved: Professional status & Task Requirements
- Costs decreased – ROI – 4.3 years
- Positively impacted Quality of Care
- CLs were most frequently used technology

Follow-up Study Preliminary Findings:

- Most of injuries were not from lifting patients
  (41%-unexpected, 21%-push/pull, 11% lifts)
- CLs were most frequently used technology
- Repeated Focus Group Comment - Request for ceiling lifts in all resident/patient rooms
Evidence-based Take Home Messages

- High risk patient handling tasks exceed workers biomechanical capabilities
- Ergonomic control measures must be used to decrease risk
  - Redesign of Work Environment
  - Institution of Technology (patient handling equipment)
- Ceiling Lifts/Slings are key technologies to decrease risk
- Workplace Culture transformation is essential
- Knowledge transfer support structures are necessary for
  - Staff buy-in/acceptance of new work practices
  - Staff Compliance/equipment use
  - Successful programs
Thanks