Patient Care Ergonomics: Why OSHA includes it as a TOP Priority

Applied Ergonomics Conference / GOErgo
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Presentation Summary

- Risks and Outcomes associated with ‘Manual’ Patient Handling and Movement
- OSHA and other national involvement in Patient Care Ergonomics [Safe Patient Handling and Mobility (SPHM)]
- Ergonomics/Biomechanics of Patient Handling
- Ergonomic Risk Control Measures for High Risk Patient Handling Tasks
Faculty 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.

- This activity includes no discussion of uses of FDA regulated drugs or medical devices which are experimental or off-label.
Risks and Outcomes associated with ‘Manual’ Patient Handling and Movement
Manual Patient Handling
Facts? About Patient Handling & Risk of Injury
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.
Facts? about Patient Handling & Risks of Injury

- In an eight hour shift, the cumulative weight that nurses lift equal to an average of 1.8 tons per day.
Facts? about Patient Handling & Risks of Injury

“Patient care providers are stronger than warehouse workers.”
Facts? about Patient Handling & Risks of Injury

“Patient care providers are stronger than warehouse workers.”

No... but warehouse workers use lifts to move & lift boxes that can weigh LESS than patients!
Facts? about Patient Handling & Risks of Injury

“Classes in body mechanics and lifting techniques are effective in reducing injuries”.

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Facts? about Patient Handling & Risks of Injury

“Classes in body mechanics and lifting techniques are effective in reducing injuries”.

45+ years of experience shows training alone is not effective.
Facts? about Patient Handling & Risks of Injury

“Manual Patient Handling and Mobilization is HIGH RISK.”
The Safety Culture Connection

“Patient safety can not be adequately addressed if employee safety is not adequately addressed.”

Institute for Healthcare Improvement, 2007
Risks from Manual Patient Handling - Patients

- dislodgement of invasive tubes and lines
- dislocation of shoulders
- fractures of fragile bones
- bruising
- patients being dropped
- skin tears and abrasion
Risks from **Manual** Patient Handling - Caregivers

*Patients have changed...*

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

- So.... there is more risk of injury to staff.
Risks from Manual Patient Handling - Caregivers

- Many manual moving strategies 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
Risks from **Manual Patient Handling** - Caregivers

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

(Smedley, Egger, Cooper, & Coggon, 1995; Marras, 1999, OSHA 2003)
Risks from Manual Patient Handling - Caregivers

- The sheer volume of lifting & turning of patients leads to fatigue, muscle strain, and injury.
- Manual patient handling tasks are...
  - intrinsically unsafe
  - beyond biomechanical and physiological capabilities of workers
Outcomes from Manual Patient Handling

2013 Nonfatal injuries & illnesses resulting in lost work days (per 10,000 full-time workers)

- Registered Nurses: 55.7
- Personal Care Aides: 61.1
- Construction Laborers: 72.3
- Nursing Assistants: 208.4
- Firefighters: 231.8
- Orderlies: 241

Source: BLS (2014); Credit: NPR
Outcomes from **Manual Patient Handling**

**Type of Incident by Skill Mix**

- **Lifting & moving patients** – most freq. reported injury
Outcomes from **Manual Patient Handling**

- More nursing assistants are injured each year than any other occupation\(^1\)
  - Nurses rank 5\(^{th}\)
  - LPNs rank 1\(^{st}\)
- 67,000 caregivers were injured last year alone\(^2\)
- Musculoskeletal injuries are responsible for more lost work time and permanent disability than any other reported injury in healthcare.\(^3\)
- 12% of nurses leave the bedside every year due to a career-ending injury.\(^4\)

2. Davis, 2015
3. Conti, MT and Johnsen V. *Nursing Management*. 2011
OSHA and other national involvement in Patient Care Ergonomics [Safe Patient Handling and Mobility (SPHM)]

Program Implementation, Training Recommendations, and Equipment Selection Guidance
OSHA Guidelines for Nursing Homes

Primary Goal...

“Providing an alternative to manual Patient lifting is the primary goal of the ergonomic process in the nursing home setting and of these Guidelines.”
OSHA Guidelines for Nursing Homes

“OSHA recommends that manual lifting of Patients be minimized in ALL cases and eliminated when feasible.”
OSHA National Emphasis Program (NEP)

Inspection Guidance for Inpatient Healthcare Settings
OSHA NEP

- OSHA released memorandum June 25, 2015
- Establishes guidance for inspections conducted in inpatient healthcare settings (hospitals and nursing/residential care facilities).
- All inspections, programmed and unprogrammed, cover the following hazards:
  - Musculoskeletal disorders (MSDs) relating to patient or resident handling,
  - Workplace violence (WPV),
  - Bloodborne pathogens (BBP),
  - Tuberculosis (TB), and
  - Slips, trips and falls (STFs).
OSHA NEP

- Patient Handling Inspections include:
  - Establishment Evaluation
    - Injury rates & *processes to address hazards*
  - Program Evaluation
    - Program Management
    - Program Implementation
    - Employee Training
  - Occupational Health Management
    - Is there a recognized process to ensure work-related disorders are identified and treated early to prevent the development of more serious problems?
    - Does this process includes restricted or accommodated work assignments?
Patient handling injuries are receiving increased regulatory/government attention

### OSHA

- National Emphasis Program - national initiative for increased inspections of nursing homes and hospitals with focus on patient handling and mobilization
- Nursing Home Ergonomic Guidelines
- General-duty Clause – requires employers to provide a safe and hazard-free work environment

OSHA - Occupational Safety and Health Administration

### Legislation

- 10 States enacted legislation/1 resolution supporting safe patient handling initiatives
- Proposed national SPHM legislation

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2. OSHA to focus on improving safety and health at nursing home facilities [press release]. Washington, DC: Occupational Safety and Health Administration; November 9, 2011.
3. Enacted safe patient handling (SPH) legislation. American Nurses Association's Nursing World
Patient handling injuries are receiving increased regulatory/government attention

**International Organization for Standardization (ISO) TR 12296**

Programs must include many strategies to decrease risk
• Policy/Program
• Ergonomic Evaluation
• Equipment/Aids
• Leadership/Oversight (facility/unit)
• Training/Education
• Building/Unit Design and Construction
• Effectiveness/Evaluation

**Facilities Guidelines Institute**

2010 & 2014 & 2018 Healthcare Design Guidelines include...

*Patient Handling and Movement Assessment (PHAMA):*
• *Phase 1: Patient Handling and Movement Needs Assessment*
  Identify equipment needs
• *Phase 2: Design Considerations*
  Defines space, structural, other design requirements

[http://www.fgiguidelines.org](http://www.fgiguidelines.org)

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Patient handling injuries are receiving increased regulatory/government attention

Patient Handling and Movement Assessment: A White Paper

- Resource for users of the FGI Design Guidelines
- Comprehensive guide to develop and implement patient handling programs
- Guide to develop SPHM Business Case

http://www.fgiguidelines.org/pdfs/FGI_PHAMA_whitepaper_042810.pdf

Patient handling injuries are receiving increased regulatory/government attention

The Joint Commission
- TJC - EC.02.06.05, #1
- Must use FGI or State Healthcare Construction Guidelines

NIOSH Prevention through Design (PtD)¹
- Promotes the use of ergonomic design principles
- Addresses occupational safety and health needs during design process
- Prevents or minimizes work-related hazards and risks associated with the construction, manufacture, use, maintenance, and disposal of facilities, materials, and equipment.

¹ NIOSH- National Institute for Occupational Safety & Health
http://www.cdc.gov/niosh/topics/PTD/
Patient handling injuries are receiving increased regulatory/government attention

<table>
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<th>SPHM Interprofessional National Standards ¹</th>
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<td>1. Establish a Culture of Safety</td>
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<td>2. Implement and Sustain a SPHM Program</td>
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<td>3. Incorporate Ergonomic Design Principles to Provide a Safe Environment of Care</td>
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<td>4. Select, Install, and Maintain SPHM Technology</td>
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<td>5. Establish a System for Education, Training and Maintaining Competence</td>
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<td>6. Integrate Patient Centered Assessment, Care Planning, and Use of SPHM Technology</td>
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<td>7. Include SPHM in Reasonable Accommodation and Post Injury Return to Work</td>
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<td>8. Establish a Comprehensive Evaluation Program</td>
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Ergonomics/Biomechanics of Patient Handling
"Ergonomics is the scientific study of the relation between people and their..."

- Occupation
- Equipment
- Environment“

(Shackel)
Patient Care Ergonomic Hazards

What are Ergonomic Hazards?

- Excessive Forces/Stressors
- Impact the musculoskeletal system
- Exceed the biomechanical limits of the human body
What Do “Patient Care” Ergonomic Hazards result from?

- performing tasks that require lifting heavy loads
- horizontal & vertical lifting
- Twisting, bending, reaching
- holding body parts for long periods of time
- standing for long periods of time
- pushing, pulling
- awkward postures
- repetitive motions
- others…. 
Manual patient handling results in musculoskeletal impact/stress on...

- Lower Back*
- Upper Back
- Mid Back
- Shoulders
- Neck
- Wrist
- Hand
- Knees
- Other body parts…
Ergonomic Hazard: Spinal Loading & Stress

One of the main contributors to spinal loading & stress is the distance a load is carried away from the body.
Simple Biomechanical Model related to manual patient handling

\[ W = F \times d \]

Work = Force \times Distance

F = ma
Maximum force on low back

Load far from fulcrum

Minimal force on low back

Fulcrum

Lever distance

Load near fulcrum
Ergonomic Hazard: Spinal Loading & Stress

Another main contributor to spinal loading & stress is a person’s posture while lifting.
Ergonomic Hazard: Patient Care

- “Safe” lifting rules don’t apply (horizontal and vertical lifting)

- Patients:
  - are asymmetric & bulky
  - can’t be held close to the body
  - have no handles

- Patient assistance varies
Ergonomic Hazard: Patient Care

- It is difficult to determine the exact amount of weight being handled by a caregiver when lifting a patient or assisting a person to stand.

- Even more difficult when more than one caregiver is involved with performing the task.
Ergonomic Hazard: Patient Care

- Patient care is unpredictable due to unanticipated patient responses...
  - muscle spasms, combativeness, or resistance
- Results in...
  - Unexpectedly heavy loads
  - Patient Movement
    - When lifting/handling a moving object, loading/stress on the spine increases beyond what it would be for a slow, smooth lift of a stable object.
L5/S1 disk compression on a 50th percentile caregiver manually transferring a patient from chair to bed.
Patient lifting and moving exceed caregivers’ biomechanical limits...
Exceeding Biomechanical Capabilities results in...

Acute Injuries

Cumulative Trauma Injuries

- Muscles
- Spine

For more information: www.biodynamics.osu.edu
Muscles & Cumulative Stress

**Muscles**

- Micro-tears accumulate over time
- Result in seemingly ‘acute’ injury
Spinal Loading & Cumulative Stress

Spine

Two forces act on the spine when lifting and moving patients...

- **Compressive forces**
  - Lifting heavy loads
  - Lifting load for a sustained period time (feeding, bathing, wound prepping appendage, etc.)

- **Shear forces**
  - Twisting - Bending
  - Reaching - Pulling
Spinal Loading Forces

Compression

3400-6400 N Limit

Anterior/Posterior (A/P) Shear

1000 N Limit

Lateral Shear

1000 N Limit
Spinal Loading & Stress

Biomechanical forces (internal & external) → Vertebral Endplate Microfractures → Scar tissue → Decreased diffusion of nutrients → Disc degeneration → Injury/Decreased tolerance and work capacity
Stages of Disc Degeneration
Weight Limits for Manual Materials Handling & Patient Handling Activities

**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)

Through Patient Care Ergonomics...

- High risk tasks are redesigned
- *Patient handling technology is introduced to take the load (patient) off caregivers*
- Jobs are *improved* to be within the biomechanical limits of caregivers
Ergonomic Risk Control Measures for High Risk Patient Handling Tasks
Patient Transport
Risk Control Measures:
• Battery-powered Wheelchair/Bed Pushers
• Motorized Beds/Stretchers
Seated Transfers/Ambulation/Limb Support

Risk Control Measures:

• **Floor-based Lifts**
  • Sit-to-Stand Lifts
  • Full Body Sling Lifts

Sit-to-Stand Lifts
For *Partial Assistance* Patients

Full Body Sling Lift
For *Dependent* Patients
Seated Transfers/Ambulation/Limb Support/Repositioning in Bed/Lateral Transfers

Risk Control Measures:

- Overhead Lifts
  - Ceiling
  - Wall-mounted

For Dependent/Partial Assistance Patients

Wall-mounted Lift

Ceiling-mounted Lift
Why Overhead Lifts?

There are differences in use of portable floor lifts as opposed to overhead (ceiling/wall-mounted) lifts

• Biomechanical stress on caregiver is greater when pushing/pulling portable lift & patient. (1)
• Ceiling lift accessibility results in greater use (2)
• Staff prefer ceiling lifts (3)
• Space Constraints (3)

Ambulation
Risk Control Measures

• Overhead & Floor-based Lifts
  • Lifts w/ Ambulation Slings
  • Sit to Stand Lift w/ Ambulation Capability
Lateral Transfers (Bed to/from stretcher)

Risk Control Measures

• Air Assisted Lateral Transfer Device
• Slide Sheets/Aides
• Overhead Lifts
Repositioning (side to side/up) in Bed
Risk Control Measures

• Overhead & Floor-based Lifts
  • Repositioning Slings
  • Strap/Slings
• Lateral Rotation Beds
Showering, Bathing, Toileting

Risk Control Measures

• Ergonomic Shower Chairs
• Overhead lifts/Bathing lift
• Adequate space for lift/shower trolley & caregiver
• Eliminate transitions at showers
• Powered Toilet Lift Seat
Fall Recovery
Risk Control Measures

• Overhead lifts
• Floor-based Full Body Sling Lifts
• Air-powered lifting devices
Car Extraction
Risk Control Measures

• Overhead Lifts
• Floor-based Full Body Sling Lifts
• Sit-to-Stand Lifts
• Slide Boards
Care & Mobilization of Persons of Size

Risk Control Measures

• Overhead Lifts/Slings
• Motorized rolling equipment
• Expanded capacity equipment, beds, exam tables, stretchers, wheelchairs, toilets, commodes
• Room placement
All types of Patient Care
Risk Control Measures

• Adequate space to move, handle, and mobilize patients!
Thanks
Examples of a multitude of Clinical Areas where we once thought Ceiling Lifts could not be installed or where clinicians didn’t want them until they realized their value…!
SCI Therapy Gym

Single-track ceiling lift over P.T. parallel bars. Scales allow measurement of % weight bearing.
Traverse-track ceiling lift over therapy mat
Dialysis Ceiling Lift Tracks
Radiology Ceiling Lift Tracks
OR Ceiling Lift Tracks
Morgue Lift
Thanks