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Ergonomics in Safe Patient Handling

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Goals for this presentation:

- ▶ Summarize research on work-related musculoskeletal disorders in Health Care workers.
- ▶ Describe preventive interventions.

Definition:

Work-related musculoskeletal disorder: "...An **injury** or illness of the muscles, tendons, ligaments, nerves, joints, cartilage, bone, and/or supporting blood vessels in the upper or lower extremities or back that is **caused or aggravated** by exposure to **risk factors** in the workplace..." (Orr, 1997, p.687)

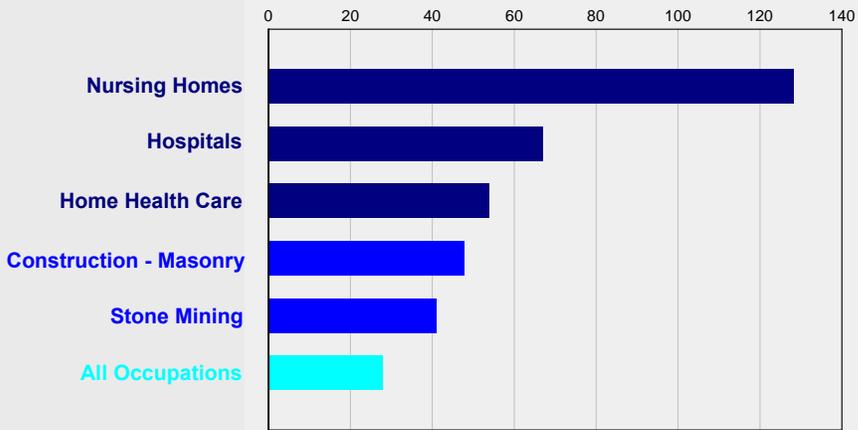
Most common in Health Care:

Overexertion injuries in the back, neck, shoulders



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Overexertion Injuries per 10,000 Workers
Bureau of Labor Statistics (2007)



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Manually lifting and moving patients (“Patient Handling” “Patient Transfers”) is characterized by **forceful exertions** and **awkward postures** – the two primary **risk factors** for musculoskeletal injury.



Photos courtesy of Arun Garg



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Biomechanical analyses of manual patient transfers:

Spinal compressive forces exceed safety limits specified by NIOSH
... even when 2 workers perform the task together (Marras et al., 1999).

NIOSH Lifting Equation:

“... the revised equation yields a recommended 35-lb. maximum weight limit for use in patient-handling tasks” (Waters, 2007).



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Complications of Patient Transfer Tasks:

- Human body not uniform or compact
- Shapes and weights of body parts unevenly distributed
- No convenient handholds
- Elderly, frail patients
- Contracted body parts
- Obstacles such as furniture, equipment, tubes, catheters, wires
- Uncooperative or combative patients



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Other Tasks Requiring Forceful Exertions and Awkward Postures:

- Moving heavy equipment
- Bathing, dressing, and feeding patients

“High-risk” tasks (transferring, bathing, dressing, feeding) are performed most often by nursing assistants, aides, and geriatric nursing personnel.

. . . Several studies have shown that compared to other health care workers, workers in these categories have the highest rates of work-related musculoskeletal injuries (Galinsky et al, 2001).



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The Obesity Epidemic



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Photos courtesy of Susan Gallagher, Ph.D.



Overweight = BMI \geq 25
Obese = BMI \geq 30
Morbidly Obese = BMI \geq 40

$$\text{Body Mass Index (BMI)} = \frac{\text{Weight in kilograms}}{\text{Height in meters}^2}$$

Data from the National Health and Nutrition Examination Survey:

As of 2004, approximately 66 percent of adult Americans were overweight or obese.

	Average Prevalence (%) of	
	Obesity	Morbid Obesity
1988	23	3
2004	32	5

2004 Prevalence of Morbid Obesity: 2.8% of White Men

5.4% of Black Men

5.8% of White Women

14.7% of Black Women



Bariatric Patients

The term “bariatric” is used to describe weight loss (e.g., gastric bypass) surgery. It’s also used generally to refer to patients who are limited in health, mobility, or environmental access due to their weight and/or size.



Photos courtesy of Susan Gallagher, Ph.D.



Special Healthcare Concerns and Challenges for Bariatric Patients

Co-Morbid Conditions:

diabetes hypertension heart disease cancer
lymphedema lipedema pressure ulcers
incontinence skin infections joint disease dementia
sleep apnea gastric reflux respiratory problems

In 2002, 25% percent of morbidly obese patients were treated for six or more co-morbid conditions (Obesity Action Coalition, 2007).

Access to care is often delayed due to patients' embarrassment and/or lack of bariatric accommodations and equipment.



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Lipedema



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Photos courtesy of Susan Gallagher, Ph.D.





Lymphedema



Photos courtesy of Susan Gallagher, Ph.D.



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Lymphedema

with pressure ulcer



Photos courtesy of Susan Gallagher, Ph.D.



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Increased Work Demands for Bariatric Patient Care Staff: Moving and Repositioning Patients

Frequent moving and careful positioning is necessary in order to prevent:

- Pressure Ulcers →
- Impaired Circulation
- Nerve Damage
- Respiratory Distress
- Cardiopulmonary Decompensation
i.e., “Obesity Supine Death Syndrome”



Photo courtesy of Susan Gallagher, Ph.D.



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WHAT INTERVENTIONS CAN BE USED TO REDUCE OVEREXERTION INJURIES IN HEALTHCARE WORKERS?

2 People Lift?

Reduces risk – but not enough

Marras et al. (1999) regarding manual patient handling: “...an extremely hazardous job that has substantial risk of causing a low-back injury whether with one or two patient handlers.” (p. 904)

Training on Lifting and “Good Body Mechanics”?

Not Effective

Nelson et al. (2001) “Although it is widely accepted that classes in body mechanics and training in lifting techniques prevent job-related injuries, 35 years of research dispute this belief.” (p. 22)



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SO WHAT IS THE ANSWER?



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ERGONOMICS

Design all components of the work environment . . .

Furniture

Equipment

Tools

Tasks

. . . to best accommodate the capabilities of the worker.



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Ergonomics in Patient Care

- Eliminate or reduce forceful exertions and awkward postures
- Enhances safety for workers and patients

Assistive Devices – A few examples:

Hoists/Lifts	Lateral Transfer Aids	Fast-Raising Beds
Triangle Bars	Gait Belts/Slings	Slide Boards
Lift Chairs	Swivel Disks	Grab Bars
Raised Toilets	Shower/Toilet Chairs	Portable Bathing Units



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Ceiling Hoist



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Bariatric Hoist



Photo Courtesy of Sizewise™



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Patient Handling Sling



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Lateral Transfer Aide or “Slide Sheet”



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Air-assisted Lateral Transfer Aide



Photo Courtesy of Sizewise™



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Shower/Toileting Chair



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Air-assisted Vertical Lift and Lateral Transfer

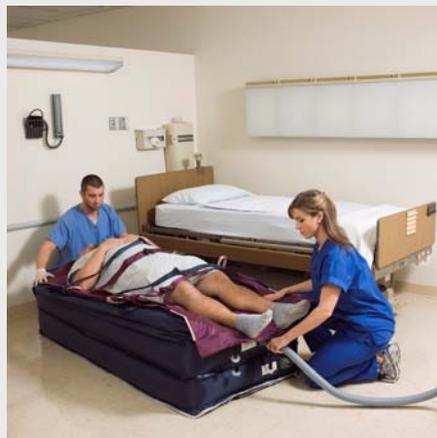


Photo courtesy of Hovertech



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Powered Transport



Photo courtesy of Susan Gallagher, Ph.D.



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Research Evidence:

Effectiveness of Ergonomics Interventions for (Non-Bariatric) Patient Handling

**Numerous studies conducted between 1982 and 2008
have demonstrated positive effects:**

Hignett (2003 – cites 16 studies from 1982-2001)

Spiegel et al. (2002)

Evanoff et al. (2003)

Collins et al. (2004)

Chhokar et al. (2005)

Engst et al. (2005)

Fujishiro et al. (2005)

Santaguida et al. (2005)

Nelson et al. (2006, 2008)



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Research Evidence:

Effectiveness of Ergonomics Interventions for (Non-Bariatric) Patient Handling

Significant reductions (30-95%) in:

Injuries
Lost Work Time
Spinal Loads
Harmful Postures
Perceived Exertion
Staffing Requirements
Assaults by Patients

and significant improvements in:

The Quality of Patient Care



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Research Evidence:

Cost Effectiveness of Ergonomics Interventions for (Non-Bariatric) Patient Handling

**Studies Demonstrating
Cost Effectiveness:**

Nyran (1991)
Head and Levick (1996)
Spiegel et al. (2002)
Collins et al. (2004)
Nelson et al. (2006)
NIOSH (2006)

Implementation Costs for equipment, training, and maintenance are exceeded by savings in Workers' Compensation, lost work time, and staff turnover costs -- typically within 3-4 years.



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Addressing the Need for Research on Ergonomics in *Bariatric* Patient Handling

New NIOSH Study: “Safe Practices for Bariatric Patient Handling”

Results anticipated in 2012



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Information Sources on the Internet

NIOSH Science Blog - Preventing Back Injuries in Healthcare Settings
www.cdc.gov/niosh/blog/nsb092208_lifting.html

www.osha.gov
click N . . . click Nursing Homes . . . under “Hot Topics” see:
Safety and Health Topics: Ergonomics: Guidelines for Nursing Homes

American Nurses Association
www.nursingworld.org
Cursor to Occupational and Environment . . . click Occupational Health . . . click Handle with Care

Safe Lifting Portal
www.safeliftingportal.com

Work-injured Nurses' Group (WING)
www.wingusa.org

Veteran's Administration – Information on Safe Patient Handling and Movement
www.visn8.med.va.gov/patientsafetycenter/safePtHandling/default.asp



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Thank You

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