The Role of the Built Environment in Safe Patient Handling and Movement

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RECORDABLE INJURY CASES PER 100 FTE

Private Industry	4.8
Services	4.6
Health Services	**6.2**
Hospitals	**8.3**
Construction	6.4
Manufacturing	6.6

*Bureau of Labor Statistics (BLS) 2007

- Direct and indirect costs associated with back injuries in healthcare more than $20B
- Patient Handling tasks are responsible for a large proportion of these injuries

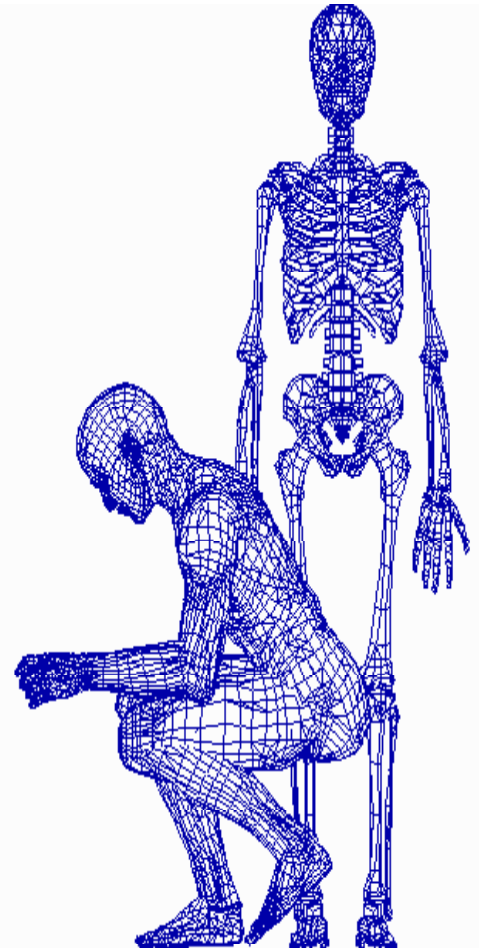
TYPICAL PATIENT HANDLING AND MOVEMENT TASKS

Typical PHAM tasks	
Transferring	Moving patient from one place to another in close vicinity, including lifting patient from floor after falls or from surgical tables, moving patient from vehicle, moving patient from bed to wheelchair
Positioning/Repositioning	Making adjustments to patient body position for multiple purposes such as prevention of bedsore or pressure ulcer, performance of patient care (e.g. moving limbs, toileting), optimization of patient body position for treatment or healing, patient comfort, communication between patient and staff
Transportation	Moving patient long distance between units (e.g. ED-OR) by wheelchairs, beds, stretchers and so on.

WHAT DO "PATIENT CARE" ERGONOMIC HAZARDS RESULT FROM?

Ergonomic hazards for caregivers include…

- pushing, pulling
- lifting heavy loads
- horizontal & vertical lifting
- lifting light loads for long periods of time
- twisting, bending, reaching
- standing for long periods of time
- awkward postures
- repetitive motions
- others….



ERGONOMIC HAZARDS

Architecture and design that take into account factors that impact patient handling and the use of patient handling equipment will foster…

- **improved patient care and outcomes**
- **safer and more professionally satisfying work environments for staff**

This includes:

- Provision of adequate space
- Structural requirements
- Other environmental factors

PATIENT HANDLING AND MOVEMENT ASSESSMENT: A WHITE PAPER

2010 HGRC Specialty Subcommittee on Patient Movement

Contents

- Rationale
- PHAMA – Chapter 2
- Business case
- PHAM Program implementation strategies
- Future Trends
- Resources

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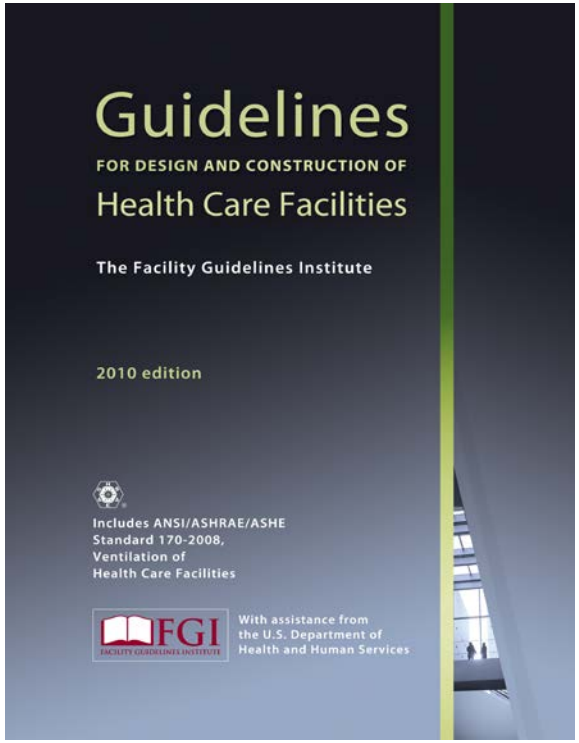

PHAMA

General Information – responsibility, team composition, schedule for completion, areas for inclusion etc.

Process for conducting PHAMA

Phase 1: Patient Handling and Movement Needs Assessment

Unit/Area Equipment Needs are based on

1. Patient population characteristics
2. High Risk patient handling tasks
3. Knowledge of appropriate Equipment Solutions

Phase 2: Design Considerations

Define

- Space requirements
- Structural requirements
- Other design considerations

EQUIPMENT SELECTION – MULTIPLE OPTIONS

Patient Room

Dialysis

Physical therapy

Into Toilet Room

THE EVIDENCE – PORTABLE FLOOR LIFTS VS. CEILING LIFTS

- **Biomechanical stress on caregiver is greater when pushing/pulling portable lift & patient.**

  (Nelson, et al, 2003; Santaguida et al, 2005; Marras, 2007; Marras et al, 2009; Waters et al, 2009)

- **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.

  (Garg, 1991; Garg, 1991; Daynard, 2001)

CEILING LIFTS – STAFF AND PATIENT OUTCOMES

- **Significant reduction in nursing back injuries, lost workdays and associated costs**
  (Brophy, et al 2001; Chhokar, et al, 2005; Li, Wolf &Evanoff, 2004, Ronald, et al, 2002)
- **Ceiling lift accessibility results in greater use**
  (OHSAH, 2006; Garg, 1991; Garg, 1991; Daynard, 2001; Nelson et al, 2006)
- **Improves staff efficiency** - Time for preparation, actual transfer time, and total time were longer for those transfers with floor lifts than those with ceiling lifts (Alamgir, 2009)
- **Staff prefer ceiling lifts.**
  (Alamgir et al, 2009; Nelson, et al, 2003; Santaguida et al, 2005; OHSAH, 2006; Garg, 1991; Garg, 1991; Daynard, 2001; Nelson et al; 2006; Miller 2006)
- Higher use of ceiling lifts associated with **lower incidence of pressure ulcers** among patients. (Alamgir, 2009)
- **Patients preferred** ceiling lifts over floor lifts (Alamgir, 2009)

COST IMPACT OF CEILING LIFTS

Projected costs of patient handling injuries based on cost per injury prior to ceiling lifts.

Unit	Direct Cost *	# Injuries	Avg direct cost per injury*	Avg indirect cost (2x) **	Total Cost one injury	Avg # injuries per year	Total Annual Cost
Neuro	$222,646.	15 (3 yrs)	$14,843.	$29,686	$44,529	5	$222,645
ICU	$ 95,003	10 (2 yrs)	$9,500.	$19,000	$28,500	5	$142,500
subtotal							$365,145

Projected costs of patient handling injuries based on cost per injury after installing ceiling lifts.

Unit	Direct Cost	# Injuries	Avg direct cost per injury *	Avg indirect cost (2x)**	Total Cost one injury	Avg # injuries per year	Total Annual Cost
Neuro	$ 43,728	6 (2 yrs)	$ 7288	$ 14,576	$ 21,864	3	$ 54,660
ICU	$	1 (3 yrs)	$ 0.	$ 0	$ 0	.3	$ 0
subtotal	$ 43,728	7	$ 6,247	$ 12,494	$ 18,741	2.8	$ 61,845

83% reduction in total annual costs

*Direct costs of just patient handling injuries

** Indirect costs include light duty salaries, replacement salaries, and training costs

PHAMA PHASE 2: DESIGN CONSIDERATIONS

- Structural (1.2-5.2.2.1)
- Electrical & Mechanical (1.2-5.2.2.2)
- Provision of adequate space (1.2-5.2.2.3)
- Destination Points (1.2-5.2.2.4)
- Door Openings – sizes & types (1.2-5.2.2.5)
- Floor Finishes, Surfaces, Transitions (1.2-5.2.2.6)

PHAMA PHASE 2: DESIGN CONSIDERATIONS

- Installation Coordination (1.2-5.2.2.7)
- Storage Space (1.2-5.2.2.8)
- Impact on Environment of Care (1.2-5.2.2.9)
- Impact of Aesthetics (1.2-5.2.2.10)
- Infection Control Risk Mitigation (1.2-5.2.2.11)

SPACE REQUIREMENTS

- Provision of adequate space for movement of people and equipment
- Provision of space for storage of equipment
- Patient room configuration to facilitate transfers – from room, bed to bathroom etc.

Space restrictions around patient beds contribute to increased risk of back injury in staff

Hignett S. (2001) Embedding ergonomics in hospital culture: top-down and bottom-up strategies. *Applied Ergonomics* 32:61-69.

PHAMA PHASE 2 – PROVISION OF ADEQUATE \SPACE

Must accommodate expanded width of …

- portable/floor-based lifts
- standard, motorized, (& bariatric) beds/gurneys/stretchers
- other equipment

- In all maneuvering areas
  - Patient & Other Rooms
  - Toilet/Bathing Rooms
  - Hallways (width to pass & turning radius)
  - Doorways
  - Elevators

Special consideration for bariatric patient rooms and toilets to accommodate equipment, beds and three or more staff

BATHROOM STUDY

Laboratory mock-up of two lifts – mobile hoist and overhead ceiling lift.

Video recording of simulations to measure space needed, time taken and postural risk scores

Findings:

- Mobile hoist needed significantly more space
- Took significantly longer time
- Exposed patient handlers to more postural risk

(Hignett & Evans, 2006)

1.2-5.2.2 PHAMA PHASE 2: FLOOR SURFACES, TRANSITION

- Growing concern about staff injuries associated with movement of patients and equipment on carpeted or padded tile surfaces.
- Pushing and pulling may result in excessive shear forces on the spine
- These forces become particularly problematic when
  - performing turning maneuvers
  - performed in small spaces such as bathrooms

(Marras et al., Lumbar spine forces.)

Design considerations:

- **Thresholds** should be flush with the floor surface
- **Transitions** between different adjacent floor surfaces should eliminate tripping, bumps, and strain on staff pushing or guiding manual or powered equipment.
- Pushing patients up and down **inclines** in beds or wheelchairs has the potential for causing serious injury to both the patient and the caregiver.

DESIGN CONSIDERATIONS: AESTHETICS

Especially important In long-term care/nursing home settings

***Designers* can:**

- Minimize visual impact of tracks, slings, hanger bars, & motors.
- Curve tracks away from center of room
- Enclose lifts in decorative cabinets
- Conceal with crown molding or indirect ceiling lift coves.

HEADWALL SYSTEM W/ CEILING LIFT/SLING STORAGE

Credits: Mary Matz

INSTALLATION CONSIDERATIONS - EXISTING

1. Structural integrity of mounting surface
2. Location of structural supports (doorways)
3. Ceiling fixtures - lights, TV's, sprinkler heads, AC vents...
4. Ceiling Height
5. Ceiling configuration/drop ceiling
6. Equipment, pipes, ductwork, above ceiling
7. ICU Power Columns
8. Presence of asbestos
9. Privacy Curtains
10. Others

RESEARCH GAPS

Strong body of research on positive impact of using ceiling lifts for patient handling

Research gaps:

- Space requirements for different types of patient handling activities in different clinical areas (med/surg, long term care, rehabilitation, etc.)
- Space requirements and usability of tracks that cover patient bedrooms and bathrooms
- Bariatric design considerations
  - structural considerations,
  - design of equipment and furniture and
  - Room configuration and space needs
- Ideal patient room configuration to support typical PHAM activities
- Impact of ceiling lift use on patient perceptions of care and patient outcomes in different settings

THANK YOU!

Thank you Mary Matz!!

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Questions?

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