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PATIENT HANDLING:
Mitigating Risk in Healthcare Facility Design

A Module on a Safety Risk Assessment Component

THIS SAFETY MODULE INCLUDES:

- Backgrounder
- Design Strategies
- Issue Brief

This module was created as a supplement to the Safety Risk Assessment (SRA) toolkit and other SRA-related Issue Briefs, Backgrounders, and Top Design Strategies. This toolkit is not intended to be a guarantee of a safe environment; the environment is one part of a safety solution that includes operational policies, procedures and behavior of people. It is intended for use with collaborative input of project- and facility-based expertise.

The Safety toolbox is made available through a partnership with

GRAINGER

This document will be updated in 2018 to be a stand-alone reference under the Grainger sponsorship.
Understanding Patient Handling and Movement

Patient handling and movement (PHAM) refers to a set of important patient care activities (e.g., lifting and moving an immobile patient from bed to bathroom; moving a trauma patient from the ED to an inpatient bed) that impact not only patient safety (e.g., pressure ulcers) and care quality (e.g., depression), but also staff safety (e.g., staff back injuries) (Alamgir et al., 2009; Health Guidelines Revisions Committee Specialty Subcommittee on Patient Movement, 2010).

Typical PHAM tasks include:

- **Transferring**: Moving patients from one place to another in close vicinity, including lifting patients from the floor after falls or from surgical tables, moving patients from vehicles, and moving patients from bed to wheelchair;

- **Positioning/Repositioning**: Making adjustments to a patient’s physical position to prevent bedsores or pressure ulcers, perform patient care (e.g., moving limbs, toileting), optimize a patient’s position for comfort, treatment, or healing, or facilitate communication between a patient and staff members; and

- **Transportation**: Moving patients long distances between units (e.g., ED to OR) in wheelchairs, beds, stretchers, etc.

The manual performance of PHAM tasks by nurses and other healthcare workers may cause high physical stresses on the musculoskeletal system and increase the risk of injuries and musculoskeletal disorders (MSDs) (Koppelaar, Knibbe, Miedema, & Burdorf, 2009). In recent years, the high-risk nature of manual patient handling has been increasingly recognized in the industry. At the same time, the practice of safe patient handling with assistive mechanical equipment and devices has been promoted, gradually becoming the industry standard. National organizations such as the U.S. Occupational Safety and Health Administration (OSHA) and American Nurses Association (ANA) have been promoting safe patient handling through the implementation of special programs and standards (Occupational Safety and Health Administration, n.d.). Patient handling technology (i.e., assistive equipment and...
devices such as ceiling lifts and portable lifts) is an essential component of safe patient handling programs and standards.

Research evidence clearly indicates that the use of mechanical equipment and devices is effective in making patient handling safer, reducing staff injuries, and improving staff quality of life (Yassi et al., 2001). Recent research also found that safe patient handling with assistive equipment may lead to improved patient outcomes, including lower depression levels, better urinary continence, higher social engagement, reduced risk of falls, and higher levels of cognitive alertness (Nelson et al., 2004).

References


TOP DESIGN STRATEGIES

OVERVIEW

The physical environment plays an essential role in mitigating the risks associated with patient handling and movement. Environmental efforts should focus on spatial, structural, lighting, electrical, and interior finish design that supports the use of assistive equipment and devices.

Safety Risk Assessment: Patient Handling and Movement Design Strategies

The following design solutions form a brief summary of the content found in the SRA Issue Brief “Patient Handling: Mitigating Risk in Healthcare Facility Design.” They are organized by building design category.

Building Layout

- Locate departments and units that patients are frequently transported from/to as close to each other as possible (e.g., ED and imaging if these departments represent a frequent patient transport route).

- Minimize the time, physical effort, and risks associated with transporting patients between departments and units through building design (e.g., ample corridor width, minimal turns, wide doorways without thresholds, open layout, elevators with ample space to accommodate bariatric beds).

- Provide patient elevators to accommodate patient beds/stretchers for the transport of special patients (such as bariatric patients).

Unit and Room Layout

- Consider flexibility and adaptability of patient room design (e.g., bariatric patient room, universal room, spaces for portable CT scanners) in order to reduce the need for patient transport.

- Provide adequate clearance in both width and ceiling height in unit corridors and patient rooms to accommodate the use of patient handling and movement assistive equipment.

- Design room and bathroom layouts to facilitate safe and effective use of patient handling and movement equipment (e.g., patient rooms as well as diagnostic/operating/holding area/rehabilitation rooms).
In each area where patient handling occurs (including patient care rooms), designate enough conveniently located storage spaces for patient handling equipment and accessory supplies (e.g., slings, lateral transfer devices, slide boards).

**Equipment**

- Select patient handling and movement devices based on the following factors:
  - Patient dependency,
  - Patient weight and size,
  - Projected patient populations,
  - Patient handling tasks,
  - Transfer time,
  - Risk of injury,
  - Ease of use, and
  - Space/structural/other requirements.

**Structural Design**

- Structural design should support the current and anticipated requirements for using ceiling- and/or wall-mounted overhead patient lifts.

**Lighting**

- Provide enough illumination in ambient and task lighting for patient handling and movement tasks.
- Position lighting fixtures appropriately to accommodate clinical needs, as well as patient handling and movement tasks.

**Interior Design/Finishes**

- Design the ceiling and floor (including ceiling track systems, ceiling height, flooring materials, thresholds, and ramps) to support the use of ceiling-mounted or floor-based patient handling and movement equipment as needed.

**Electrical Design**

- Optimize the locations of the electrical supply for charging and/or using patient handling equipment so they are easily accessible to the users.
Additional Resources


CDC/NOISH Safe Patient Handling: http://www.cdc.gov/niosh/topics/safepatient/

OSHA Safe Patient Handling: https://www.osha.gov/dsg/hospitals/patient_handling.html

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PATIENT HANDLING:
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An Issue Brief on a Safety Risk Assessment Component

INSIDE YOU WILL LEARN ABOUT:

How patient handling and movement are essential aspects of patient care.

Patient and staff safety risks involved in patient handling.

Key environmental considerations for mitigating risks related to patient handling.

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Safety Risk Assessment for Healthcare Facility Design: Mitigating Risk Associated With Patient Handling and Movement

January 2017

Executive Summary

Patient handling and movement (PHAM) activities, including lifting, transferring, positioning, and sliding patients without assistive technology, are an essential component of healthcare. However, manual patient handling and movement often introduce safety risks to both staff (e.g., musculoskeletal injuries) and patients (e.g., pressure ulcers, skin tears, depression). These safety risks can result in financial consequences for the organization (e.g., lost time, replacing injured staff, workers’ compensation) (Alamgir, Li, Gorman, et al., 2009a; Health Guidelines Revisions Committee Specialty Subcommittee on Patient Movement, 2010). To mitigate the risks associated with patient handling and movement, many healthcare organizations have engaged in safe patient handling programs including policy changes, ergonomic assessments, education, and environmental interventions.

Research shows that the built environment may play a significant role in facilitating (e.g., wider bathroom doors) or impeding (e.g., limited storage space for assistive devices) PHAM tasks, even though research evidence is limited on some of the building design elements. Based on research evidence and best practices, key design considerations for PHAM include:

- Short patient transport routes with features that facilitate patient movement (e.g., design of corridors, ramps, and doorways);
- Flexible and adaptable room design that reduces the need for patient transfer;
- Selection of PHAM equipment depending on patient characteristics and ease of use;
- Spaces for using and storing PHAM equipment;
- Structural, electrical, and lighting design that supports the use of PHAM equipment (e.g., conveniently accessible electrical outlets); and
Ceiling and flooring design that facilitates the use of ceiling-mounted and floor-based movable PHAM equipment (e.g., removal of thresholds, ramps).

Mitigating Risks Associated With Patient Handling and Movement Through Environmental Design

Building Layout

Patient transport and movement between hospital departments and units are frequently associated with complications that can have a harmful effect on patients. Research has found that longer transport times are linked to more frequent and serious complications (Ulrich & Zhu, 2007). Physical proximity of destination points on frequent patient transport routes may facilitate patient movement and reduce transport duration, thereby improving safety by reducing the risk of patient complications and staff injuries during transportation. It may also improve efficiency by reducing staff time spent on patient transport. Other building elements (e.g., design of corridors, ramps, and doorways) may facilitate or hinder patient movement between units and departments within a hospital, thus impacting the time, physical effort, and risks associated with transporting patients.

The increasing number of bariatric patients seen in hospitals also presents a challenge to healthcare. The availability of elevators has been found to significantly impact the movement of patients, especially bariatric patients. It is important to consider the weight and size limits of patient elevators so that special patients and equipment can be accommodated (Muir & Archer-Heese, 2009).

Unit and Room Layout

Research shows that certain room designs that are more flexible and adaptable (e.g., acuity-adaptable or universal rooms) can reduce the need for patient transport and movement within a hospital, thereby reducing the risk of complications associated with patient transport (Hendrich, 2003).

The use of PHAM equipment is key to the success of safe patient handling programs (see the Equipment section below). Spatial requirements for using PHAM equipment vary significantly (Hignett & Evans, 2006). Unit corridor width and height should accommodate the use of assistive devices for patient handling or movement. For example,ambulating a tall patient (>5’6”) on a ceiling lift is nearly impossible in a corridor with an 8-foot ceiling. In addition, there should be enough clearance between the placement of a lift and the edge of the corridor to allow a person of wider girth to ambulate freely. Often, staff
must move patients through room doors when using PHAM equipment to support or assist patients (for example, moving a patient on a bed/wheelchair/lift). The door clearances should allow for safe and efficient passage of both patients and staff, in addition to the equipment. Extra space may be needed for the safe and efficient maneuvering/use of PHAM equipment. Various PHAM devices’ spatial requirements should be considered in determining the layout of patient care spaces, including patient rooms and any other spaces where patient care activities occur. PHAM assistive devices and equipment should be stored out of the way when not in use to avoid clutter that can increase the risk of falls.

Staff members perform many patient handling tasks in bathrooms. Bathrooms are typically tight spaces that can hinder the use of certain PHAM equipment. As with ADA bathroom design, which considers maneuvering clearances, the use of patient handling devices should be taken into consideration in planning patient bathroom layouts (Hignett & Evans, 2006).

**Equipment**

Mounting evidence shows that the use of PHAM equipment may provide essential support to staff and help improve patient and staff outcomes (Alamgir et al., 2009a; Chhokar et al., 2005). Different PHAM devices are suitable under different conditions (e.g., different patient groups require different handling tasks), and each device demonstrates specific advantages and disadvantages (Alamgir, Li, Yu, et al., 2009b; Nelson et al., 2004). The selection of a particular PHAM device should be based on the consideration of factors such as:

- Patient dependency;
- Patient weight and size;
- Projected patient populations;
- Patient handling tasks;
- Transfer time;
- Risk of injury;
- Ease of use; and
- Space/structural/other requirements.

Different PHAM devices are suitable under different conditions, and each device demonstrates specific advantages and disadvantages.
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**STRUCTURAL DESIGN**

Consider special requirements of structural load on walls, ceilings, and floors, especially when the needs of bariatric patients are in question.

**Lighting**

Proper lighting levels are needed to allow for the safe operation of PHAM devices, and to prevent injuries (e.g., slips, falls) for both staff and patients during patient handling and movement. In certain circumstances, the positioning of light fixtures may need to meet the needs of clinical procedures as well as operating patient handling assistive devices/equipment. Conflicts between light fixtures and patient handling equipment could cause operational issues (e.g., inconvenient ceiling lift track locations, suboptimal lighting angles).

**Electrical Design**

An electrical supply is necessary for charging and using many types of PHAM equipment. Electrical outlets positioned in inconvenient, hard-to-reach locations may impede use.

**Interior Design/Finishes**

Select suitable flooring materials and reduce thresholds, ramps, and other potential barriers. Consider ceiling track systems and ceiling height for the use of certain PHAM equipment.

**Structural Design**

The installation of particular PHAM equipment may have special requirements in terms of structural load on walls, ceilings, and/or floors. Insufficient structural support may make the use of PHAM equipment unsafe. These considerations become even more important when the needs of bariatric patients are in question.

**Lighting**

Lighting location is an important consideration for safe patient handling, as conflicts can exist with suspended fixtures.

**Interior Design/Finishes**

Many types of PHAM equipment, including ceiling lifts, need adequate ceiling clearance to function. These device-specific requirements for ceiling design (such as ceiling track systems and ceiling height) should be considered early in the design stage to avoid the need for costly changes during the construction stage.

Like many other types of healthcare equipment, certain PHAM equipment, including floor lifts, wheelchairs, and patient beds, are floor-based and move on wheels. Rolling resistance differs significantly on different flooring materials. An inappropriate flooring material may require staff to exert excessive force when moving wheeled equipment uphill, across a slippery surface, or in other circumstances, and increases the risk of staff members sustaining physical
injuries. Thresholds, ramps, and other obstacles on flooring may hinder the use of certain floor-based patient handling devices and increase the risk of injury from slips, bumps, and falls.

**Conclusion**

Environmental design plays a significant role in promoting safe patient handling and movement. Several design principles from research and best practices can be summarized as follows:

- Design major patient transport routes to be short and easy to navigate;
- Select patient handling equipment based on the following considerations:
  - Patient dependency
  - Patient weight and size
  - Projected patient populations
  - Patient handling tasks
  - Transfer time
  - Risk of injury
  - Ease of use
  - Space/structural/other requirements
- Provide enough space for easy use, storage, and transportation of the selected patient handling equipment and devices in patient rooms/units as well as other areas;
- Facilitate the maneuvering of wheeled PHAM devices by selecting suitable flooring materials and reducing thresholds, ramps, and other potential barriers; and
- Ensure lighting and structural design support the current and anticipated requirements for using ceiling- and/or wall-mounted overhead patient lifts.

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References


