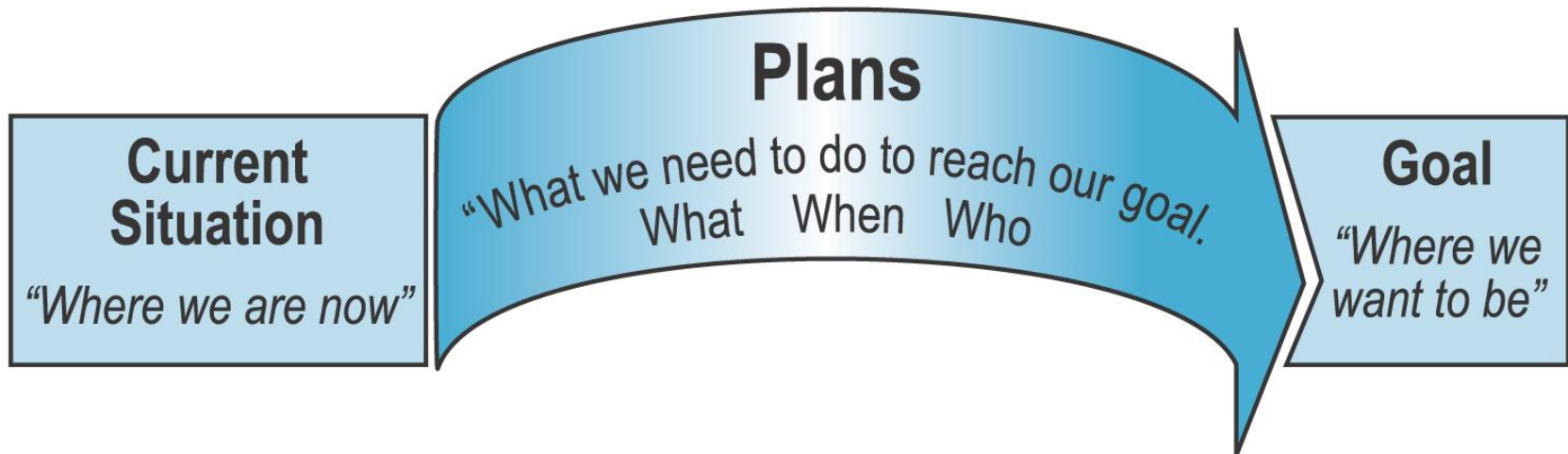


# The Ergonomics of Patient Handling



- Where are you going?

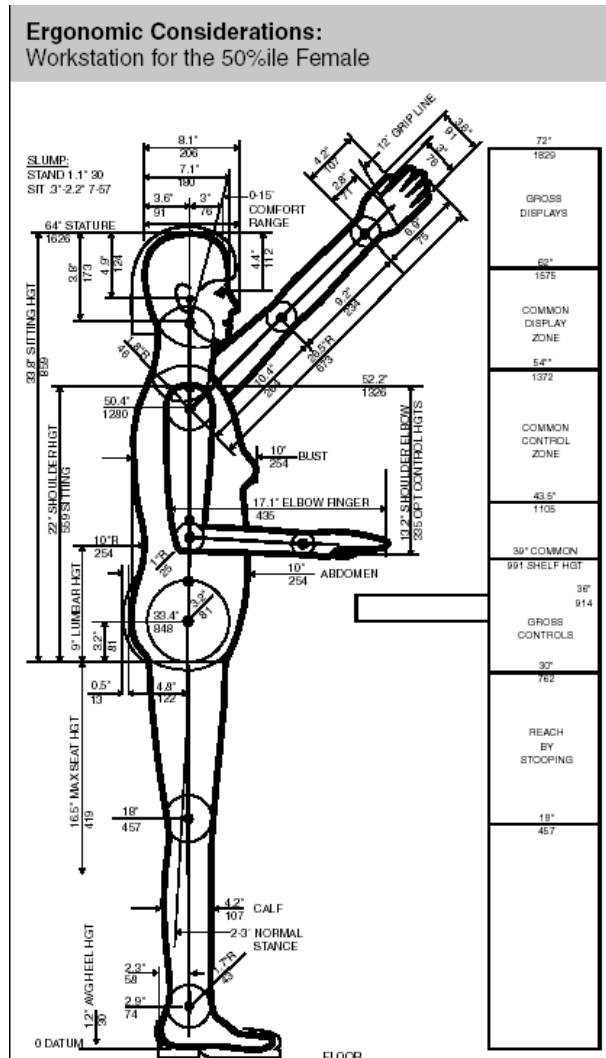


## Fitting the job to the worker

- Science
  - Study/design of the human-work environment / interaction
  - Design the work environment according to the capabilities of the human
- Objectives
  - Improve safety and health
    - Eliminate/reduce risk factors for injury through the design of the work environment
  - Increase efficiency, productivity
    - Design optimizes human capabilities and compensates for limitations
  - Enhance quality and user satisfaction



# Ergonomics



## Reach Locations

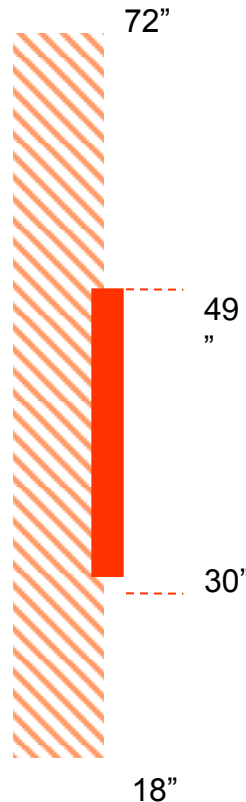
Minimize repetitive back bending and/or excessive reaching by correct placement of controls, connections and devices

- Frequently accessed controls and connections:

- No higher than 49\"/>

• Other controls and connections:

- No higher than 72\"/>

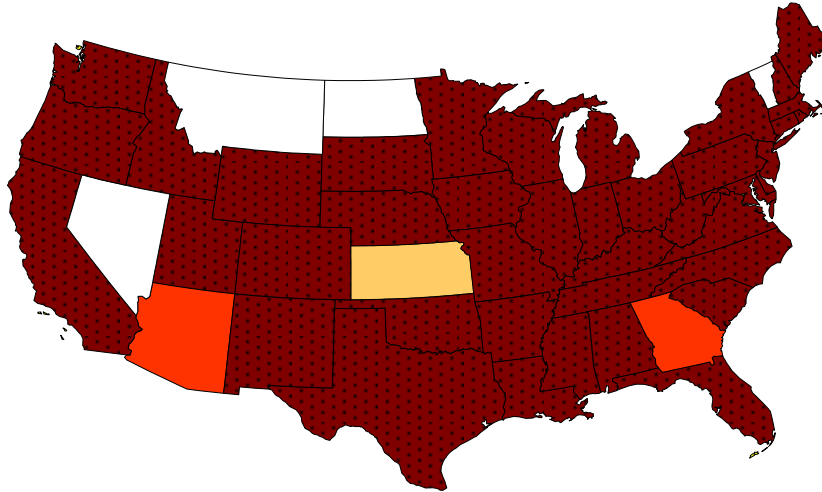


# Influencers that Drive Interest

- High Caregiver Injuries
  - Nursing shortages
  - Average age of Nurses
- Changing Patients
  - Acuity
  - Size
- Hospital Efficiency & Care Quality
  - Costs
  - Improve Patient Outcomes & Satisfaction

# 2006 BMI Comparison

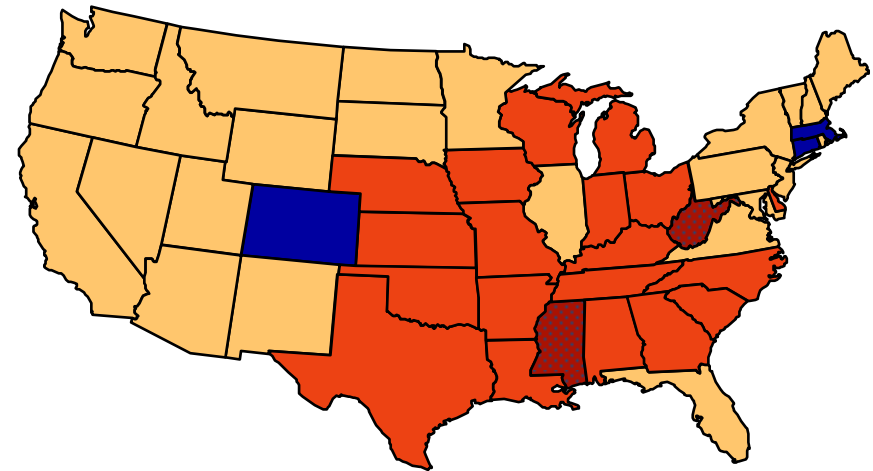
## Patient Volumes



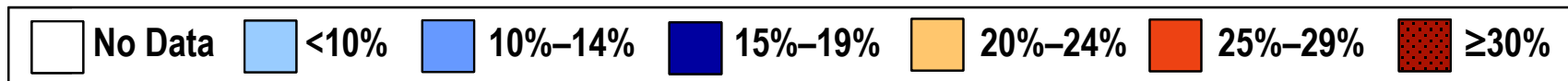
Source: 68,479 Patients; 2006 Hill-Rom IPUP Survey  
731 Hospital Represented

% of Obese Patients  
(BMI of 30 or Greater)

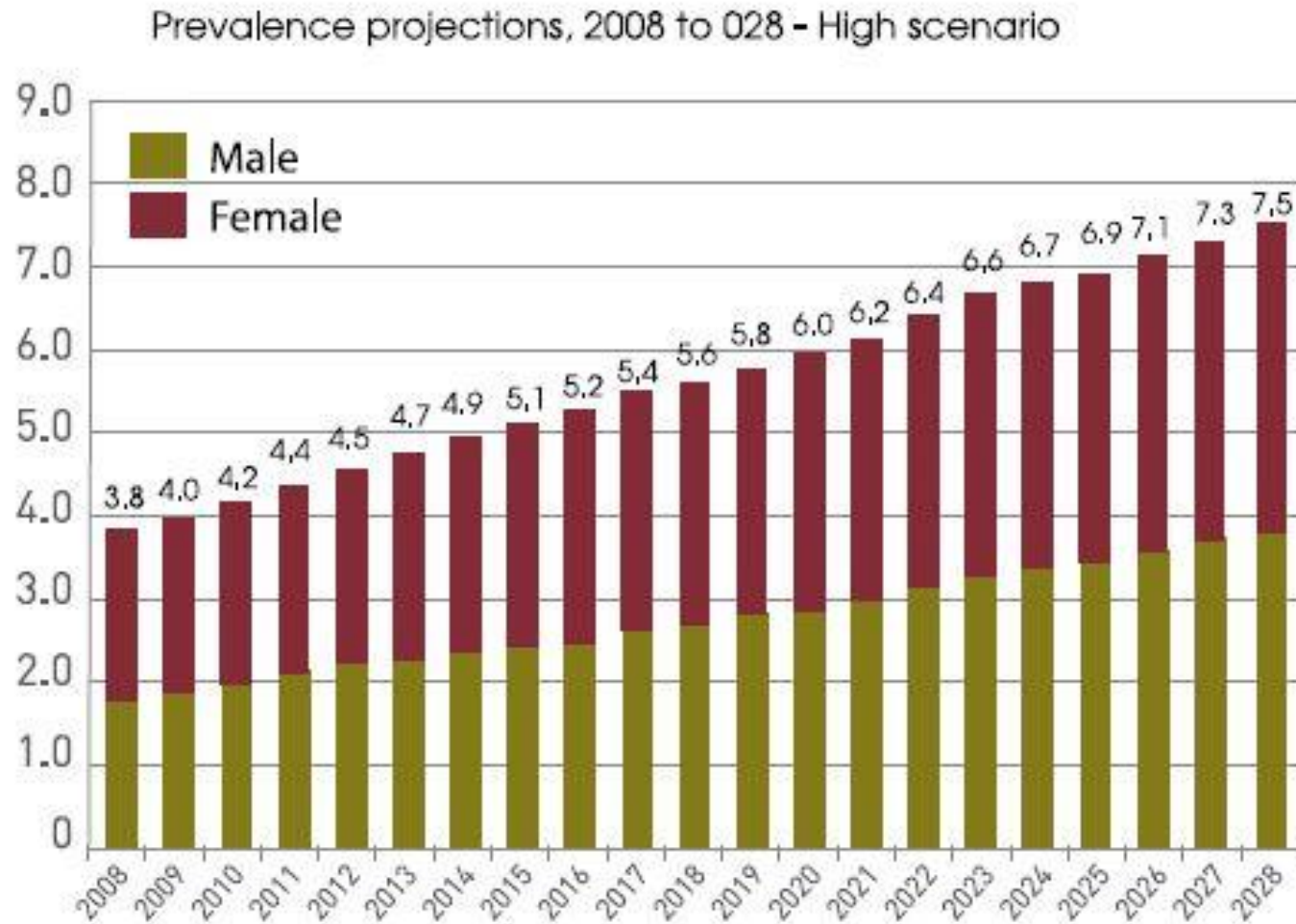
## Total Population



Source: Behavioral Risk Factor Surveillance System, CDC.



# Obesity Trends in Australia



**Figure 3:** Population obesity prevalence projections, Australia, 2008-2028 (assuming current trends continue)

**Source:** Access Economics 2008(13)

Millions of obese people.



# I'll win 400kg battle of bulge

**EXCLUSIVE**

**BEN PIKE  
JANE HANSEN**

A SYDNEY man who once weighed about 400kg and needed to have part of his house removed so he could be taken to hospital has lost more



The partly demolished house,

than 100kg and is now planning to study nutrition.

Andre Nasr's family said the 35-year-old was "feeling great" after getting his weight down to under 300kg and he could walk for the first time in many years.

"He has come a long way," said Mr Nasr's stepson Vince Tassone. "He's about to study an advanced diploma of nutrition. He just wants to help people who are in similar situations to what he has been in."

Mr Tassone, 21, said his stepfather had made major progress after some intense physiotherapy and changes to his diet. He said the family had had its struggles since Mr Nasr was taken to Concord Hospital in July last year.

"He has got a lot of support from the family," Mr Tassone said. "They had their ups and downs, but other than that everyone's strong behind him."

Plastic surgeon Dr Peter Haertsch said Mr Nasr's weight loss would save his life.

"He was bed-bound and covered in bed sores, but he's

mobile now," Dr Haertsch said.

"The fact he is losing weight will save his life and he will become much more mobile."

"When he gets to 250kg the anaesthetists say it will be safe for me to operate and remove all the fat from his legs that hamper his mobility."

Mr Nasr's case made headlines last July when the NSW Ambulance service called in 20 Fire and Rescue workers to remove him from his house.

Nutritionist Dr Rosemary Stanton said Mr Nasr's case was a stark illustration of Australia's growing battle of the bulge, with more than half of all people overweight or obese.

"The fat are getting fatter," she said. "We've always had a lot of men who are a bit overweight but a lot more who were overweight are becoming obese. That's the category that is increasing the fastest."

Australia's obesity rate increased 19 per cent between 1989 and 2011-12, with figures from the National Health Performance Authority showing 4.7 million people were obese.



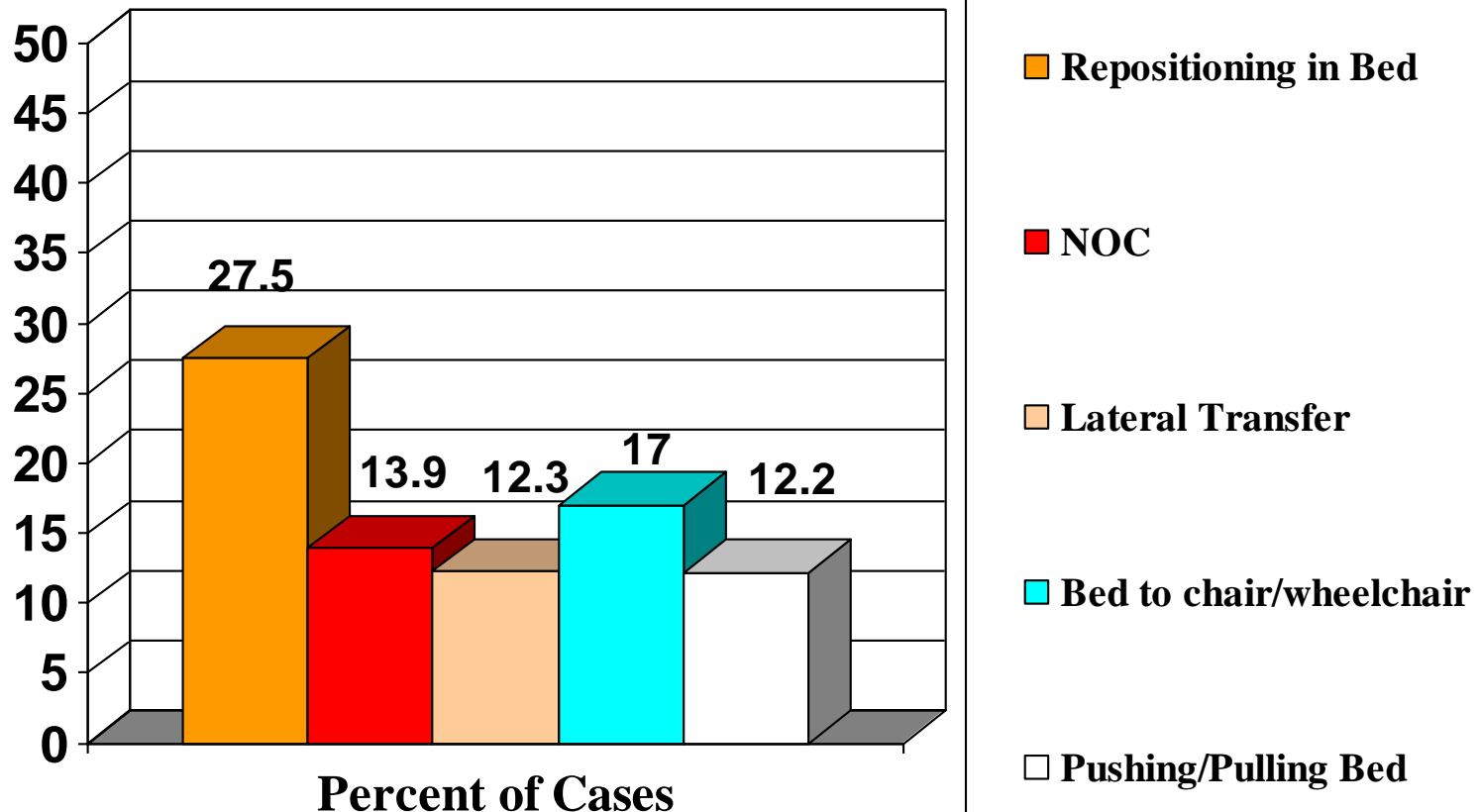
# US National Data

- 19 Acute care Facilities;
  - 68 Med/Surg units, 28 ICU/CCU units
- Average number of licensed beds 302
  - Ranged from 83 to 498 beds
- Average cost of claims per facility for Patient Handling Injuries. (Direct & Indirect) \$1,294,034/yr.
- Average costs for Patient Handling Injuries per bed \$4,275/yr.
- Number of recordable claims per year
  - Averaging 32 per Facility
  - Averaging 447 Lost Days & 718 Restricted Days per Facility

# US National Data

## Facility Analysis: 19 Acute Care Hospitals

Percent of Injuries Occurring During Each Task



# Cumulative Risk Factors

- Average age of nursing = 47 yrs.
- Greater risk vs. average occupation
- 10-12 hr. work shift
- Maintains normal family duties



**Stand Assisting Patients**

**Lifting Patients**



**Repositioning Patients**



**Transporting Patients**



**↓Daily Recovery**

*Insufficient time to recover and heal from muscle strains sustained daily - compounding the risk for greater injury.*

## Body Mechanics Training

- Questionable applicability to patient care
  - Reaching and lifting loads far from the body
  - Lifting heavy loads
  - Twisting while lifting
  - Unexpected changes in load demand during the lift
  - Reaching low or high to begin a lift
  - Moving a load a significant distance
- All transfer tasks produce excessive compressive forces on spine (Marras et al., 1999)

## Solicit assistance

- Additional staff--Back stress only reduced by 10% (Marras et al., 1999)
  - **Not effective in reducing injuries among health care workers**

- Our bodies first reaction to stress, either physical or emotional stress, is muscle tension (Fight or Flight Syndrome)
- A tense muscle is a tight muscle. And tight muscles are much more susceptible to strains and sprains



# **PROBLEM IDENTIFICATION AND PRIORITIZATION**

# Why Programs Fail

- Lack Planning
- Lack Leadership
- Poor Communication
- No Policies
- Lack Proper Equipment
- Lack of Follow-up (Auditing)
- Etc.

# Why Programs Succeed

## Common Elements of Successful Injury Reduction Programs at 13 Fortune 500 Companies

- Strong Leadership and Culture
- Defined Roles and Responsibilities
- Integration with Other Improvement Efforts
- Involvement and Accountability at All Organizational Levels
- Regular Program Review/Audit
- Leading and Trailing Measures of Success

Humantech, 2010

# Ergonomics Improvement Process

Root Cause  
Analysis

Identify  
Solutions

Develop Policy  
& Procedure

Implement  
Solutions

Educate Staff

Internalize Ergonomics Management Skills

# 9 Skill Sets that are Essential for a SPH Manager

- Finance
- Team Leadership
- Policy and Procedure Deployment
- Training Deployment
- Clinical Knowledge and Experience
- Risk Analysis and Control
- Program Promotion
- Program Audit
- Unit Specific Customization





# **FACILITY ANALYSIS**

# Direct / Indirect Costs of Patient Handling Injuries

## Direct Costs: Typically measured

- **Medical**
- **Indemnity**
- **Legal**

## Indirect Costs: More difficult to capture

- **Turnover**
  - Recruiting/replacement costs: \$20,000-\$85,000
- **Absenteeism Due to Unreported Injuries**
  - 15 to 18% of unscheduled absences
- **Staffing to compensate for lost and restricted work days**
  - Additional Staff, shift differential, overtime, agency nursing
- **Lost productivity**
  - Reduced staff
  - Untrained/inexperienced staff
  - Restricted/modified duty of injured staff
- **Quality of Care**
- **Morale**
- **Injury/Claims Administration**
- **Occupational Medicine/Employee Health costs**

# Hidden Cost of Patient Handling-Related Injuries



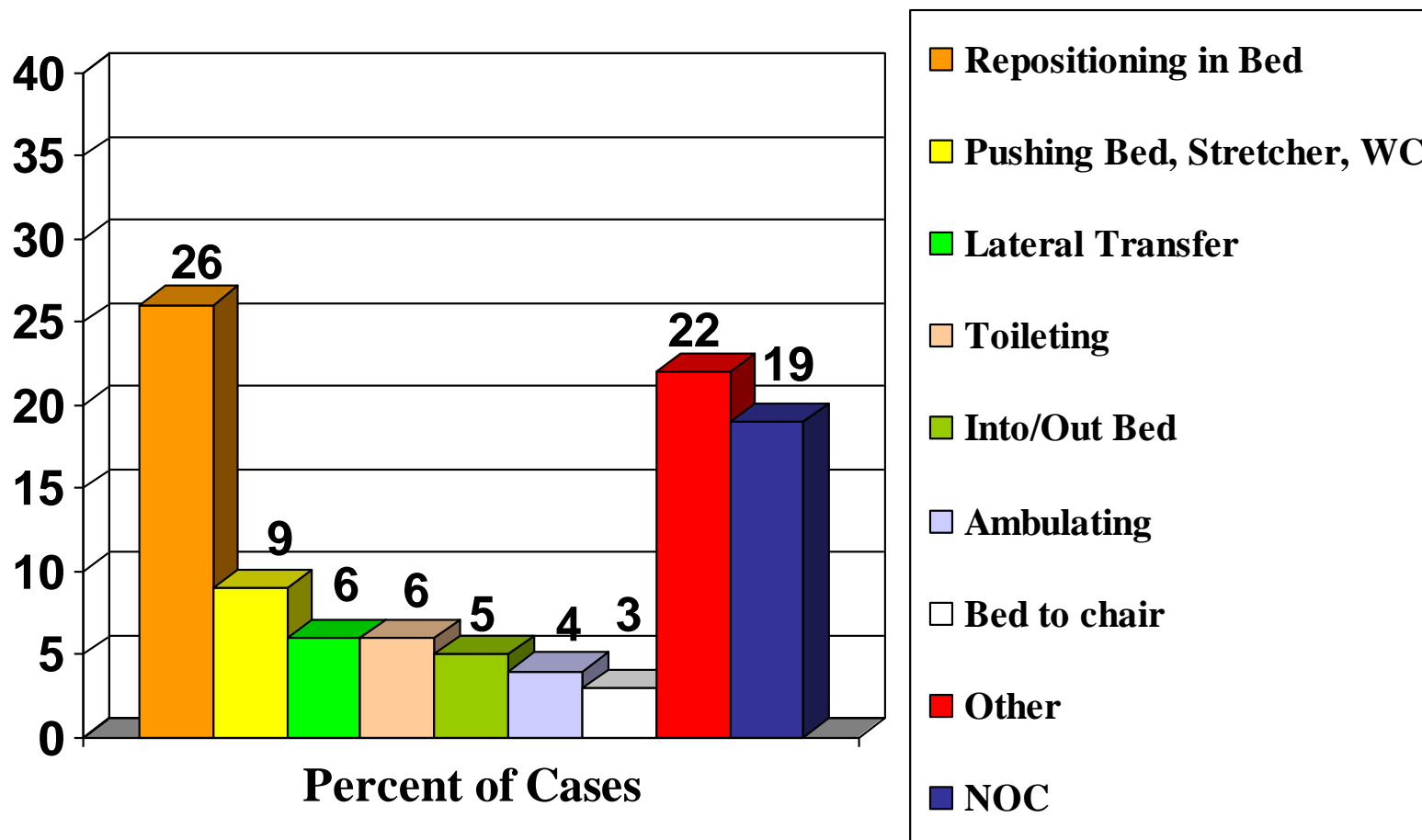
- **Indirect costs** constitute the greatest proportion of patient handling injury costs

- For every **\$1** of direct costs, there are **\$3 – \$10** of indirect costs

- Tulane U. Study: Indirect costs \$4 - \$7
- National Safety Council: \$3 - \$10
- Liberty Mutual \$5

# Facility Analysis: Causes of Patient Handling Injuries

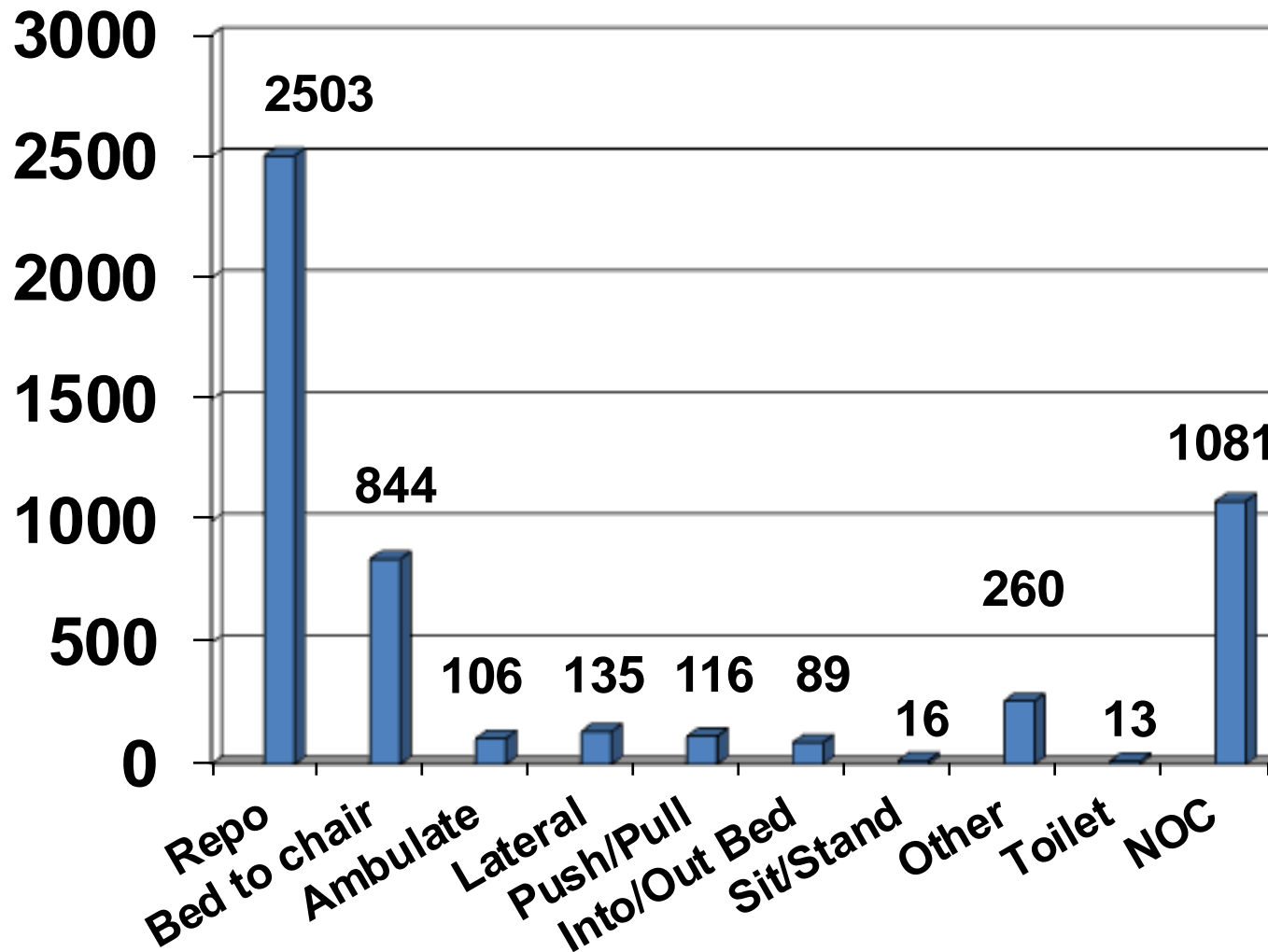
Percent of Injuries Occurring During Each Task



Data Analysis and Summary from XXX Hospital

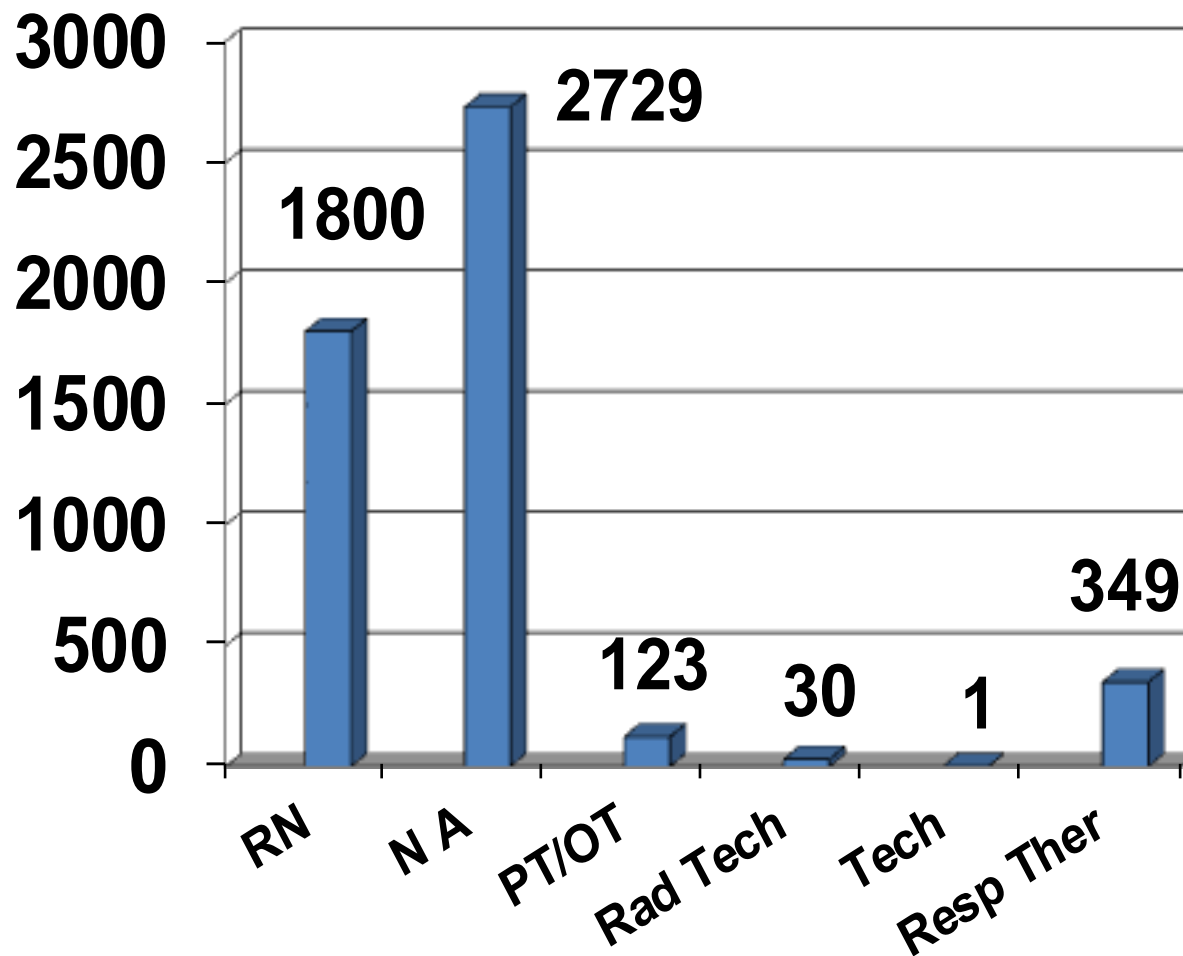
# Facility Analysis: Cause of Injury

## Lost Work Days by Cause of Injury





## Facility Analysis: Lost Days by job classification for 2013 & 2014

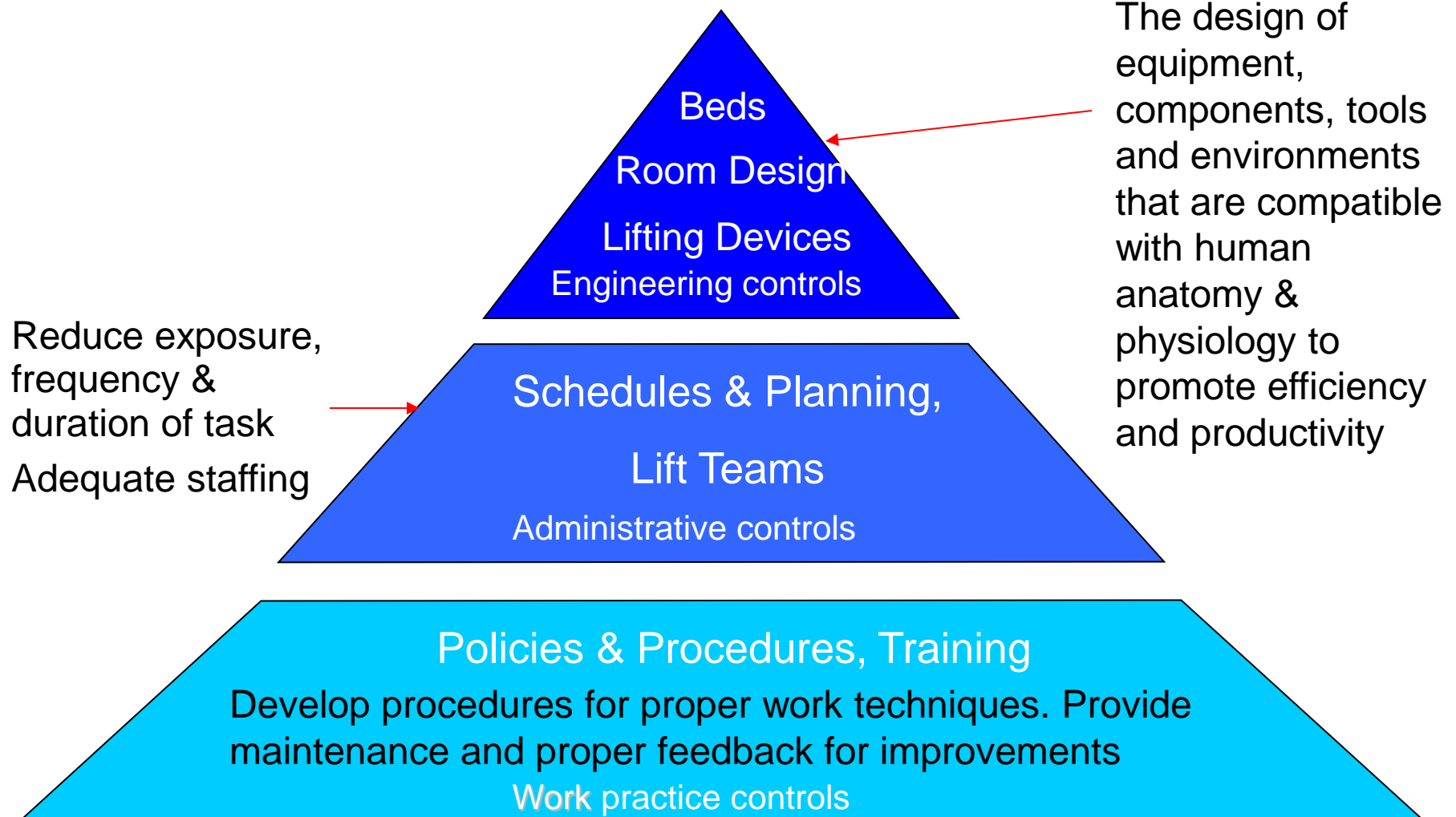


# Task Analysis: Additional Information Required

- Frequency of Task
- Dependency of Patients
- Availability of Equipment
- Effectiveness of Equipment
- Utilization of Equipment

# **PRIORITY RECOMMENDATIONS**

# Hierarchy of Controls



# Hierarchy of Controls: Engineering Controls



Engineering controls are the most effective means of reducing injury risk. These controls may be further classified based on their availability and efficiency.

## •**Built-in Capabilities**

•Because the control is built into the room or equipment that is continually present it can increase utilization and efficiency. Some drawbacks may include non-portability. Examples include:

- » Ceiling mounted hoists
- » Bathroom design
- » Certain bed features

## •**Remote Accessory Equipment**

•At times, it may be more cost-effective to have equipment available that is moved from one patient to another as the need arises. Needs to be readily available and stored in convenient locations. Examples of this type of equipment include:

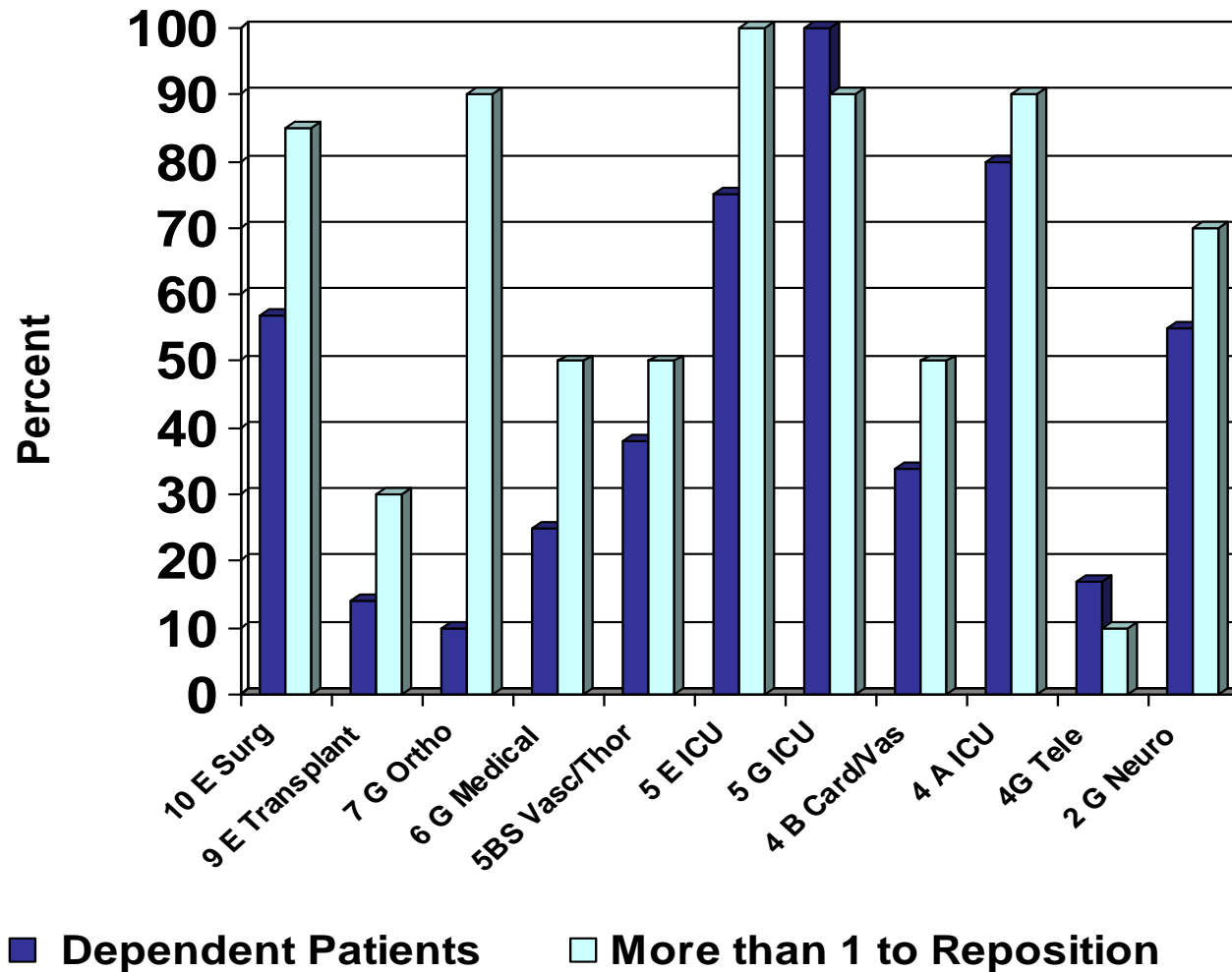
- » Air assisted transfer devices
- » Sling lifts
- » Stretcher chairs
- » Bed side commodes/High Johns



# Task Analysis: Interpreting The Data

- Which units have the highest dependency patients?
- What tasks do these units perform the most frequently?
- What equipment do they have available?
- How well does that equipment minimize injury risks?
- How routinely is the equipment utilized?
- Identify the gaps, investigate the cause for these gaps, and determine suggestions for improvement.

# Unit Analysis: Patient Repositioning Demands



## Unit Priorities:

5 E

5G

4 A

7 G

10 E

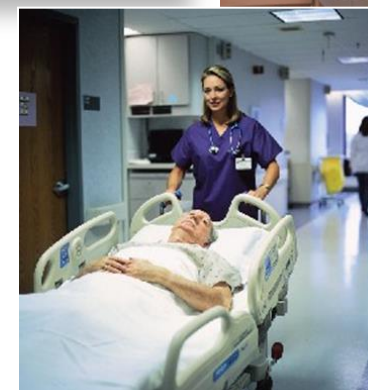
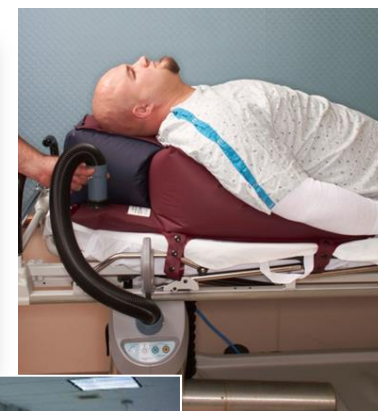
2 G

# **IMPLEMENTING WORKPLACE IMPROVEMENTS**

## The right tool for the right job

### Task

- Transport
- Intubation
- Prone
- Toileting
- Ambulation
- Therapeutic
- Etc.



# Priority Recommendations:

## Repositioning Patients: Pulling Patients up in Bed

- Devices used for reducing the forces of lateral transfers may also be used for repositioning patients.
- Air powered surfaces can provide a significant assist feature that allow patients to be repositioned by sliding the patient on a cushion of air. When multiple positioning tasks are required, these devices can be left under the patient for extended periods of time.



## Priority Recommendations:

### Toileting and Ambulation: Stand Assist Lift

Stand assists are most useful in areas where the patients have some weight bearing capabilities but may need assistance with toileting or movement to a chair, wheelchair or other treatment surfaces.



## **Priority Recommendations: Pushing Beds or Stretchers**

- Maintenance of Casters
  - As the casters on beds and stretchers age, the force required to push increases. Regular preventative maintenance, inspection, and replacement of casters can reduce the likelihood of injuries.
- Flooring Selection
  - Carpets increase push forces. The more padding under the carpet, the more the forces are increased. The use of carpeting should be carefully evaluated in areas where beds and stretchers are frequently moved.
- Powered Assist
  - Built into bed, such as the Intellidrive, can also greatly reduce the need for stretchers and lateral transfers between bed and stretcher.
  - External bed pushers such as the ErgoTug



# General Facility Recommendations



- Room Design: Provide sufficient space for lift/equipment usage
  - Minimum of 5 feet of clearance needed from the side of a bed to operate a floor lift
  - Minimum of 4 feet clearance needed from end of bed to wall to utilize TotalCare foot egress with support of a walker.
  - Consider patient size, bariatric patients require significantly more clearance space.



## Toileting and Ambulation: Room Design Considerations

### Door Widths

- The width of the bathroom doors varied from 20" to 33". The smaller doors will restrict the use of some mechanical assists when patients need assistance in the bathroom.
- Room doors are adequate at 43"-56". Recommendation is 48". 60" for Bariatric rooms.
- Avoid open door as an obstacle either inside or outside the bathroom.

## Toileting and Ambulation: Room Design Considerations

### Toilets

- Keep toilet height above (17” to 19”)
- Toilet heights varied from 14”- 16”

Lower toilets make it difficult for patients to lift their body weight.

- Provide sufficient clearance around toilet to allow for the patient, caregiver and toilet/shower chair.
- Avoid wall mounted toilets that may limit the weight of the patients they can support.

## Toileting and Ambulation: Room Design Considerations

### Handrails

- Place rails to maximize patient ability to assist self/caregiver and caregiver to assist patient
- Ideally, rails should be placed on both sides of commode in both horizontal and vertical orientations
- Placement behind and in front of commode is beneficial
- Horizontal rails placed to the sides of the commode extending 6-8 inches above seat height facilitate patient mobility
- Consider placing rails at various heights, some located lower than sitting shoulder height
- Vertical rails to the front of the commode near shoulder height have been found to be beneficial

## Toileting and Ambulation: Room Design Considerations

### Bathroom/shower door design

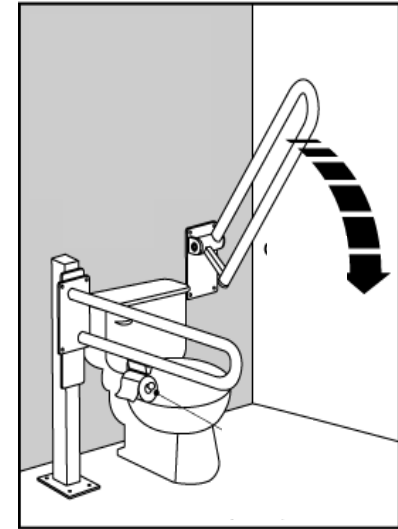
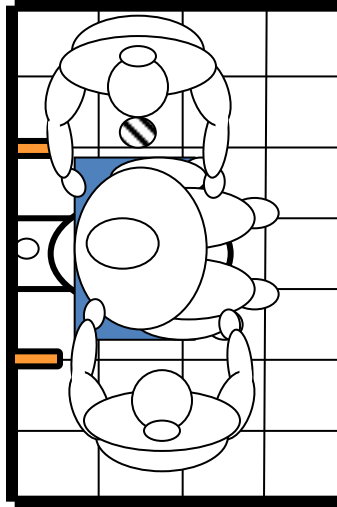
- Width of bathroom and shower entrance should allow for the patient, caregiver and assist devices. Shower entrance is 31”.  
Very narrow.
- Entrance to shower should be flush with bathroom floor to allow ease of use for assist equipment and to avoid presenting an obstacle for patients and caregivers. The current threshold is 5.5”. This is a significant obstacle.
- Avoid placing towel racks where they may be confused for hand rails.

# Bariatric Bathroom

## Bariatric Toileting Assists

### Pivoting Support Bars

- Providing space for two nurses to assist patients with toileting, positions the toilet away from adjoining walls and grab bar supports.
- Pivoting arms on wall or floor mounts provide patient support and staff access.



### Angled Grab Bars

- Angled grab bars provide additional ergonomic leverage for getting to a standing position.



- \* Specify support bars with a 500lbs. weight capacity

## Bariatric Bathroom Toilets

Specify floor mounted toilets with 800-1000 lbs. capacity based on anticipated patient weight.

Wall mounted toilets are not recommended for bariatric patient environments (250 lbs. capacity). Wall mounted toilets increases the risk of hardware failure and patient injury.



Floor Mounted Toilet  
-800 – 1000 lbs. capacity



Stainless Steel Toilet  
- 3,000 - 5000 lbs capacity

- **Maintenance of equipment & flooring**
  - Routine maintenance of all carts wheels/casters
  - Brakes
  - Handles
  - Floors, elevators

# General Facility Recommendations



- Establish a process that ensures a review by the Ergonomics Committee of any planned renovation or design project
- Avoid ramps in high traffic areas
- Doors and frames that show damage due to equipment movement are great indicators that the door frame is too small or restrictive for the type of transports that are passing through.
- Door may be wide enough, but the angle of approach for the stretcher or other equipment is restricted because of the width of the hallway.



- Reduce/eliminate hallway and room clutter where possible. Difficult to maneuver equipment with patients in crowded areas.

# General Facility Recommendations

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- High visibility placement and ease of accessibility of lifting equipment will promote consistent use.
- Do not block access.

# **Process Recommendations**

## Develop and Promote a Written Patient Handling Policy

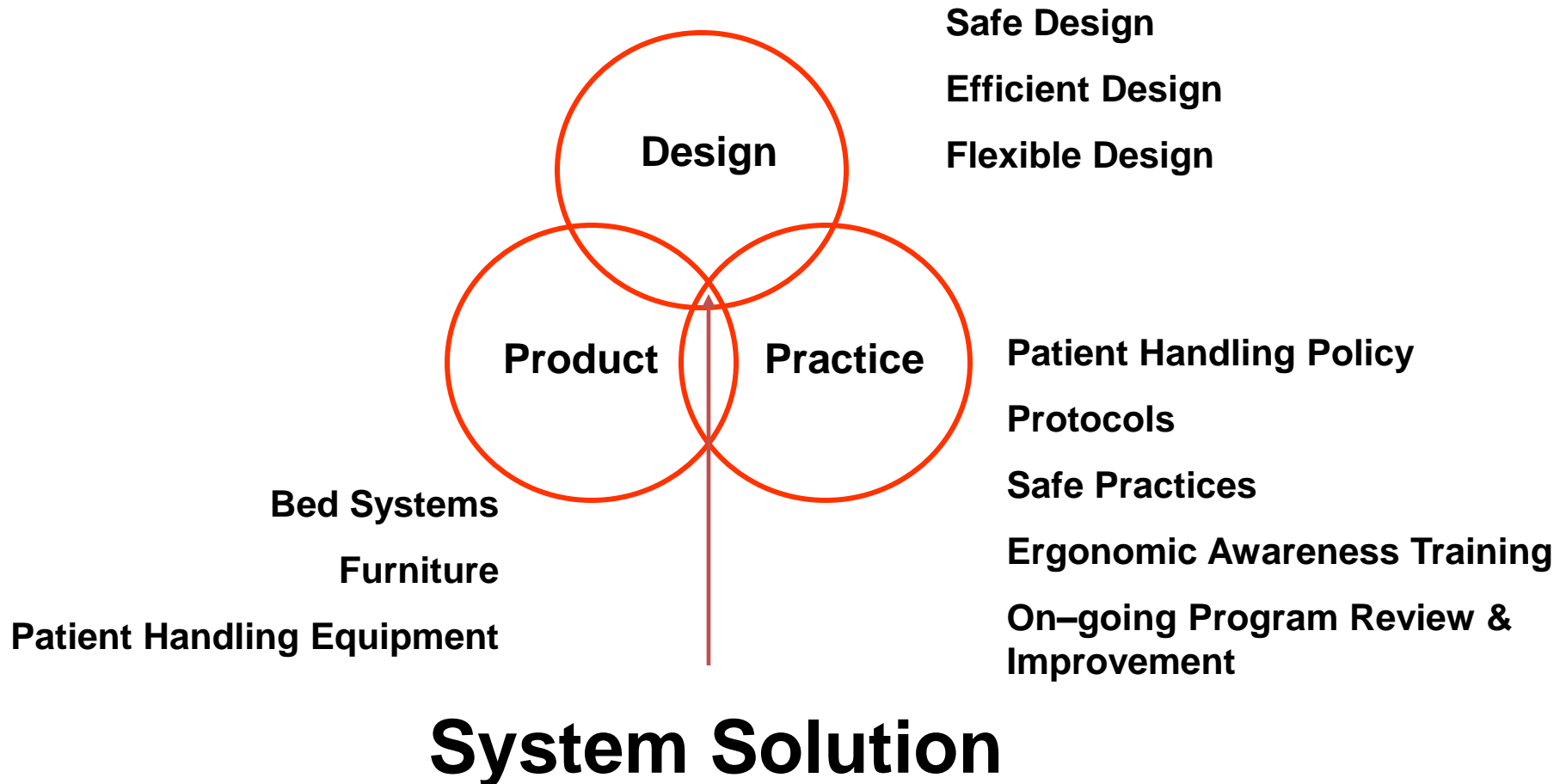
- If each individual caregiver is responsible for determining if the lift or transfer is within their limitations based on available resources, they will often choose quickness over safety. (This approach often creates a conflict and is a formula for potential injuries.)
  - Include clear goals, objectives, and responsibilities.
  - Identify the specific responsibilities of senior management and unit management that are necessary for program success, so that in approving the policy senior management is clear about the implications and requirements for success.

# Process Recommendations:

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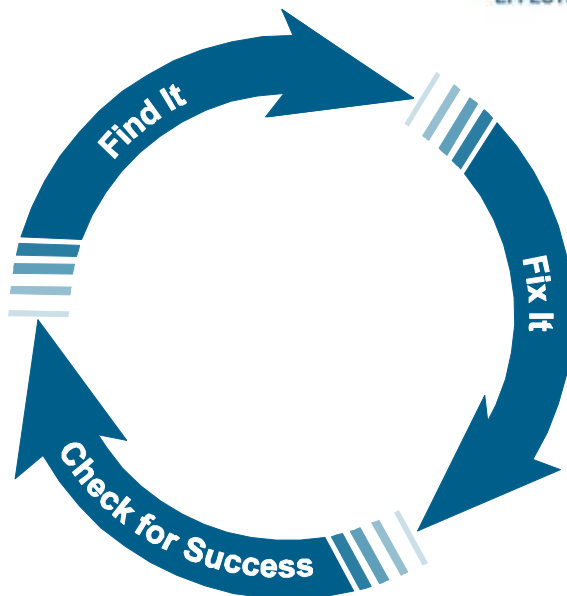
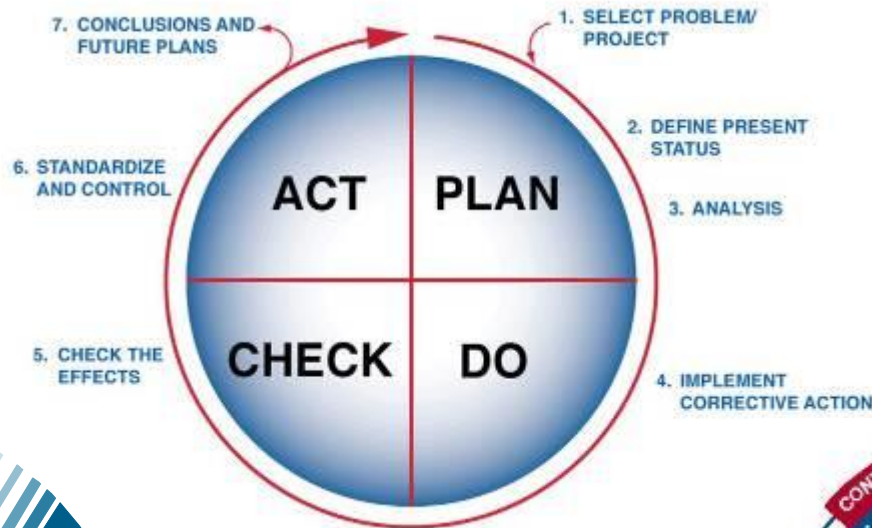
- Policy is different than the implementation plan. The policy reflects commitment to reducing injuries through improvements in equipment, processes, training, and work practices. It also reflects who is responsible and accountable for achieving improvement and how that improvement will be measured. The policy may be hospital-wide or even system-wide.
- The implementation plan may be unit specific and describes how the goals will be achieved. The implementation plan is generally developed by the unit with direction and assistance from the ergonomics committee or patient handling committee.

# Patient and Caregiver Safety



# Process Recommendations:

*“Life is a journey, not a destination”*



# Questions?



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