Resources: Hazard Control Options

- Equipment
- Work Heights
- Space Requirements
- Gripping
- Contact Stress
- Dynamic Movement & Stress Reversals
- Proper Body Mechanics

According to Part 2 of the WSH Regulation, employers must, if reasonably practicable, eliminate risk to the safety or health of workers through design of the workplace or work process or use of engineering controls. Any remaining risks must be controlled by implementing safe work procedures and use of personal protective equipment to address any uncontrolled risks that the worker may be exposed to. *Please note that for all tasks involving safe patient handling, safe work procedures are required as outlined in Part 39 of the WSH Regulation. This also applies where elimination or engineering controls have been implemented.*

Hazard control options for patient handling must therefore be considered in order of the **Hierarchy of Controls:**

- **Elimination**
- **Engineering Controls**
- **Administrative Controls**
- **Personal Protective Equipment (PPE)**

When evaluating potential controls of risk, it is generally accepted that the closer the control is placed to the source of the hazard the greater the degree of risk reduction for the worker. Where risks cannot be eliminated, a combination of control methods can also be employed to optimize injury reduction.

Elimination is the most effective way to control a risk and must always be considered first and used whenever possible. Elimination is the process of removing the hazard from the workplace. Eliminating the source of the hazard in patient handling (i.e., the patient) is often not reasonably possible, however, some examples of elimination in patient handling include but are not limited to:

- Not performing a hazardous task when it is not required (e.g., utilizing a patient's capabilities in situations where patient is able to perform the task independently)
- Patient equipment that promotes independence with transfers and eliminates reliance on HCWs to manually assist them (e.g., floor to ceiling poles, stand assist chairs, triangle trapeze bars, etc.)
- Repositioning slings that eliminate the manual repositioning and rolling of patients

Engineering controls are generally considered to be the next closest control to the risk and must be considered when elimination is not possible. Engineering controls involve a change in the physical nature of the work or workplace that minimizes the hazard. Engineering

controls are a very reliable way to control worker exposures as long as the controls are designed, used and maintained properly. Examples include but are not limited to:

- Changes in the design of the workplace
- Equipment/mechanical devices that reduce the force required to move a patient (e.g., mechanical lifts, friction-reducing devices)
- Adjustable work surface heights to reduce bending/stooping (e.g., height-adjustable electric hospital beds)
- Rearranging, modifying, and/or redesigning processes or work flow that reduces the source of exposure to the hazard

Most hazards can be eliminated or reduced through engineering controls although there are instances where cost or required change to the process make the control unattainable.

Administrative Controls are considered less effective than engineering controls in that they do not eliminate or change the source of the physical hazard itself. They lessen the duration and frequency of exposure to the hazard or alter the manner in which a task is performed (i.e., work practices controls) to minimize risk of exposure (e.g., by reducing body sprain and strain potential). Administrative controls are applied when the cost or practicalities of engineering controls are prohibitive. Examples include but are not limited to:

- Workplace policies
- Developing, implementing and training on safe work procedures (e.g., safe patient handling training, proper body mechanics training, housekeeping and/or service schedules for equipment and work areas, etc.)
- Rest breaks
- Additional employees performing a lifting task
- Job rotation or job enlargement such as added task variety or sharing tasks among groups to eliminate or reduce repetition and overuse of the same muscle group.

Personal protective equipment (PPE) is the least effective method of controlling injury risk and is commonly used as a last resort and in conjunction with administrative and some engineering controls. PPE is equipment worn by individuals to reduce exposure such as contact with chemicals or exposure to noise. Examples include but are not limited to:

- Knee pads to reduce contact stress during kneeling
- Respirators
- Protective clothing such as gloves, face shields, eye protection, and footwear that serve to provide a barrier between the wearer and the chemical or material.

Determining Controls for the hazards identified begins with a clear understanding of the work process and work flow through:

- Documentation in the form of a detailed list of the steps required to complete the task (completed by the worker who performs it).
- Observation of the task being performed from start to finish. A flow chart or photos of the process is suggested.
- Assessment of the flow of the task
  - Steps that can be eliminated—are there unnecessary movements? Can steps be combined to reduce movement of patients?
  - Preventive measures where hazards are identified
- Assessment of the physical demands of the work tasks.
- Assessment of the method by which the task is performed.
  - If physical demands cannot be reduced through reduction/substitution, can mechanized lifting/ movement of equipment be introduced to reduce physical demands?

Once the controls are proposed, test the modifications, if possible. Ensure that worker input and support is obtained before proceeding. Ensure that the modifications will 'fit the process' and do not introduce other hazards.

Once changes have been implemented, follow-up to ensure the modifications meet the intended goal. It is common for workers to find further improvements once a change has been made. Always consider any engineering change to be evolutionary, that is, subject to change and improvement as better methods are developed and equipment continues to evolve through design improvements.

Links

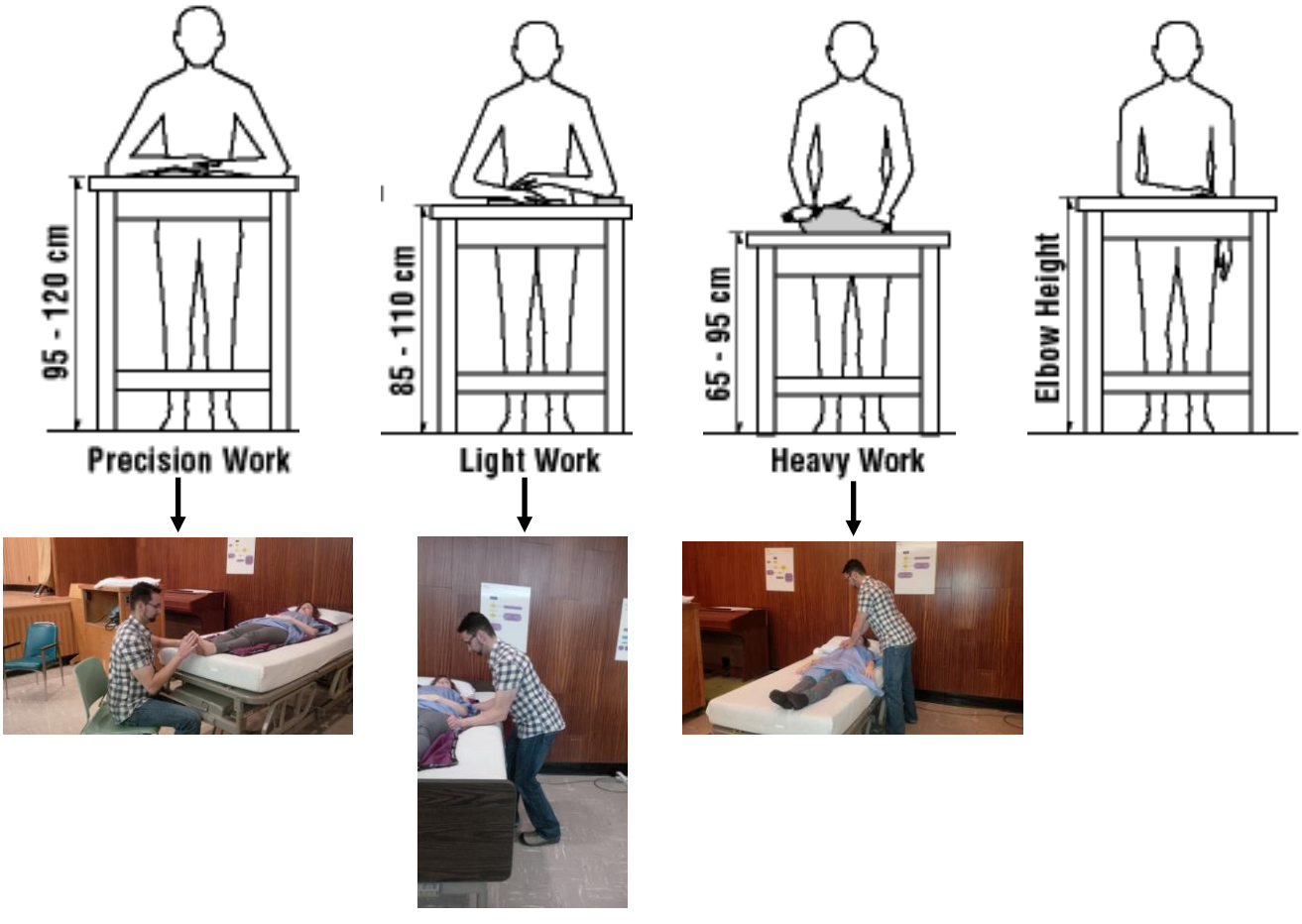
- Choosing The Right Equipment
  - Transfer Belts
  - Sit-Stand Lifts
  - Total Lifts
  - Sling types
  - WorkSafe BC Bulletin: Ceiling Lifts vs Floor Lifts - What's The Difference?
  - WorkSafe BC Bulletin: Ceiling Lifts - They're Not Just For Transfers
  - Choosing the Right Friction Reducing Device
  - WRHA Bariatric Equipment Pool

Work Heights

Work heights should be adjusted to match the HCW's body dimensions (e.g., height) and task requirements to minimize awkward postures of the neck, back, and shoulders and to optimize force generation.

Different tasks require different work heights:

- Precision work and/or tasks with high visual demands (e.g., wound care) - 5 cm above elbow height; elbow support is needed.
- Light work (e.g., ***most patient handling activities***) - about 5-10 cm below elbow height (i.e., hip/iliac crest height)
- Heavy work with demanding downward forces (e.g., CPR) - 20-40 cm below elbow height.



Patient beds/stretchers should be adequately height adjustable to match the needs of various HCW's and tasks. Using the recommended work height range for light work, a height adjustable range between 33-43" would accommodate the majority of workers. If the work surface cannot be adjusted (e.g., some beds/exam tables, wheelchairs, bath tubs, etc.), efforts should be made by the HCW to adjust their body position to achieve the best possible work height for delivery of care (e.g., lowering one's body by bending knees/hips, sit instead of stand, ½ kneel).

Space Requirements

Sufficient space and organization is essential to minimizing awkward body postures and forceful exertions while performing patient handling tasks in a safe and efficient manner. There should be enough room to:

- Move, turn, position and store floor-based equipment (e.g., mechanical lifts, wheelchairs, beds, stretchers, etc.) in a manner that limits turns and twisting, particularly when occupied.
- Move around and change positions as required by the task (e.g., move to the foot or opposite side of bed, change body positions to improve visual demands, etc.)
- Practice proper body mechanics (e.g., stand in a wide based walking stance at the bedside)

Space recommendations have been developed for some patient handling equipment, some of which are reproduced below. Various equipment brands or products may differ slightly in their dimensions and design, which may alter the amount of space required. Larger equipment will require more space to move (e.g., bariatric equipment).

Links

- Bariatric Space Requirements
- Space Requirements for Total Lifts

Gripping

Patient handling equipment should be used to promote the use of power grips when manually assisting patients to move (e.g., transfer belts, sliders with handles, mechanical lifts). Neutral wrist and forearm positions should be maintained while gripping.

If gloves are required, there should be a good selection of sizes/types available; large, thick or ill-fitting gloves can increase grip strength required to hold or manipulate objects/tools.

Contact Stress

- Avoid leaning against or on something for extended periods of time
- Rather than kneeling on both knees simultaneously, alternate between right/left half kneeling positions
- Distribute pressure over a larger surface area wherever possible (e.g., forearm versus wrist)
- Use personal protective equipment (e.g., knee pads, pillow, etc.)

Dynamic Movement & Stress Reversals

Changing body positions results in less strain on individual muscles and joints, improved blood supply to the working muscles and reduction of overall fatigue.

Working positions should be changed as frequently as possible so that any particular position is of reasonably short duration (e.g., from standing to sitting when the work process allows for rest). Even minor changes in body position can have a significant effect. For example, if prolonged standing is required while providing care:

- Portable footrests can be used so that HCW's can shift their body weight from one leg to the other

- Sit-stand stools can be used to allow HCW's to alternate between standing and perching (semi-sitting)
- Short movement breaks can be taken between patients
- Perform intermittent selective isometric muscle contractions

Proper Body Mechanics

Within the exertion limits that most people can safely manage, a person's body mechanics will have a significant effect on the risk of injury when handling patients. "Proper body mechanics" means positioning and moving the body in a way that eliminates awkward postures, maintains body balance and control, enhances physical capabilities and reduces fatigue and the overall stress placed on the body. It is the most efficient and safest way to use the body to minimize injury. For example, lifting with the back straight (i.e., neutral) reduces the risk of injury as compared to lifting with the back bent forward (flexion). Similarly, lifting 35 lbs close to the body at waist height would be considered safe for most workers. However, lifting that same 35 lbs away from the body with the arms outstretched would require the muscles of the back and upper body to work harder and increase compressive forces, thus increasing the risk of injury.

"Power Position"

When moving or handling weight, it is best to assume a "power" position, which takes advantage of the strength of the legs while maintaining a neutral spine position. The power position can be summarized as follows:

- Hips and knees bent – to keep the work in the large and strong muscles of the legs, instead of the back
- Buttocks back, head & chest up – to maintain the natural curve of the spine (neutral)
- Shoulders low & relaxed; elbows tucked in close to body -
- Feet positioned in a wide staggered (walk) or parallel stance – broad base of support, balanced stance, and ability to weight shift
- Active abdominals

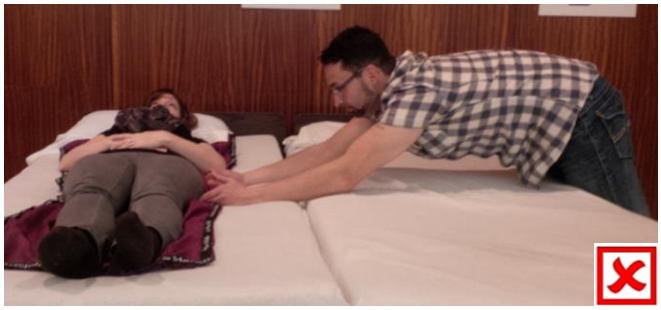
This is the same body position or movement pattern we use when we go to sit down in a chair.

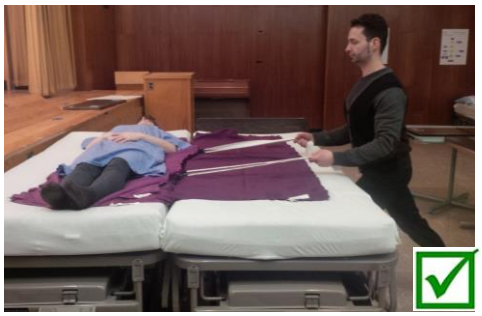
Movement Principles

1. Position body close to patient so that your elbows are as close to your body as possible.

Assisting Patient
Sit → Stand

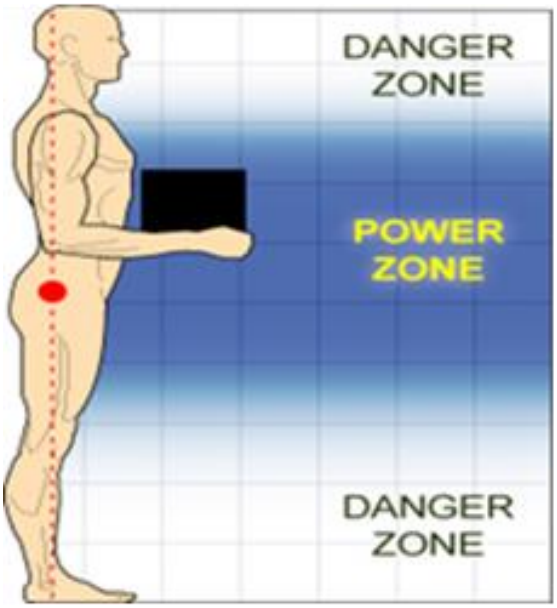
Lateral Transfer





Rolling Patient

2. Keep hands between knee and shoulder height (closest to hip height where possible).



3. Use legs by bending and straightening knees and hips to lift.

4. Face in the same direction as feet and move feet and hips together with upper body when turning to avoid twisting back.

5. Move smoothly in a slow, controlled manner to minimize acceleration.

6. Shift bodyweight from one leg to the other, in the same directon the patient is being moved, when pushing/pulling (e.g., repositioning patient). Avoid using primarily the arms and shoulders to exert force.

Repositioning patient up in bed (boosting)

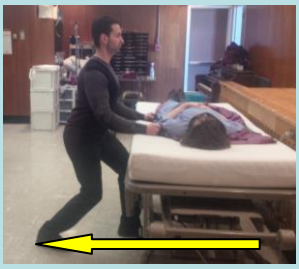
Stand with feet in a wide parallel stance and body weight shifted onto leg that is furthest away from the final destination (i.e., bend hip & knee of leg furthest away from patient's head if boosting patient up in bed); elbows should be tucked close to body to stabilize arms

To move patient, start shifting body weight towards leg closest to destination (e.g., towards patient's head)

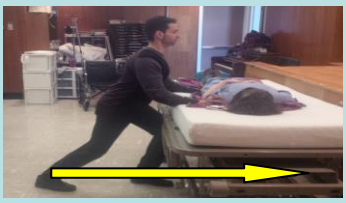
Shift body weight onto leg that is closest to destination (i.e., bend hip & knee of leg closest to patient's head)

Repositioning patient side↔side in bed

Stand with feet in a staggered (walking) stance; elbows tucked close to body to stabilize arms



If **PULLING** patient towards you, move patient by shifting body weight from front leg to onto back leg



If **PUSHING** patient away from you, move patient by shifting body weight onto front leg

7. When kneeling is required, a ½ kneeling position will be more stable and facilitate weight shifting to the side or forward/back onto one foot (e.g., when leaning forward or further lowering your body onto the back foot). The knee in contact with the ground can also readily be alternated, minimizing the effects of prolonged contact stress. In a high ½ kneeling position:

    - the foot & knee should be about hip width apart
    - the down knee should be under the same hip & shoulder
    - the foot that is planted should be in line with the same knee (i.e., front shin vertical)
    - the hips and shoulders should be square facing ahead (i.e., no rotation)
    - the back should be straight

    If required, a low half kneeling position may also be adopted to lower the body further. If able, place a pillow under the kneeling thigh to avoid extreme end range knee flexion and to add some cushioning between the buttock and the foot.

High Half Kneeling

Low Half Kneeling

When raising or lowering in and out of a ½ kneeling position, you can use an external support in front of you or your thigh for additional support. Do not twist.