

Soteria Strains

Safe Patient Handling and Mobility Program Guide

Section 3 - Controls

Section 3.5 – Key Design and Installation Specifications

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A provincial strategy for healthcare workplace musculoskeletal injury prevention.

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Section 3.5 Supplement – Key Design and Installation Specifications

Ceiling Tracking and Lifts

One of the most important design features to include in building projects and renovations is the installation of ceiling tracks that allow the use of ceiling-mounted lifts. Ceiling lifts facilitate patient handling and mobilization and save space. Ceiling tracks can also be retrofitted to existing facilities. As a minimum for new buildings, ensure that the ceiling structure is sufficiently strong enough to allow ceiling tracking and lifts to be fitted later when funds are available.

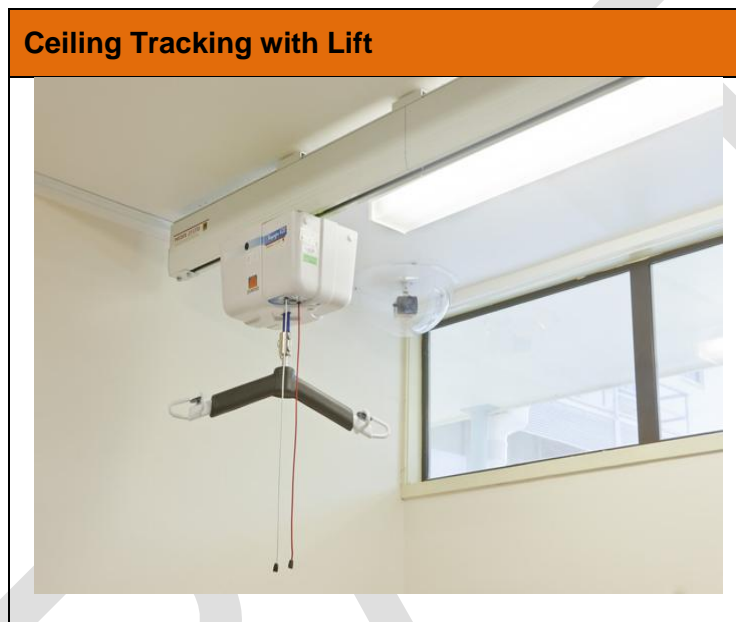


Figure 3.5.1 – Ceiling Tracking with Lift

Ceiling lifts support repositioning, transfers with minimal manual effort by health care workers. The lifts are usually battery operated and mounted on tracks in the ceiling. They allow the lifting and transferring of people in slings within areas covered by the track.

Research has shown that the installation of ceiling lifts leads to significant reductions in musculoskeletal injuries and physical stress to health care workers.¹ It also increases safety for patients. Payback periods (based on returns on investment through reduced injuries and absenteeism) for ceiling lifts vary from less than a year to three years depending on the equipment purchased and the extent of training provided. Injury-reduction rates of 58% to 72% have been achieved within one to three years.²

¹ Jung & Bridge, 2009

² Ceiling Hoists, Workplace Health and Safety, Queensland (Australia). Retrieved 7 January 2011 from www.deir.qld.gov.au/workplace/subjects/ceilinghoists/index.htm.

Ceiling Lift Features

- Ceiling lifts require fewer health care workers to carry out transfer tasks and take less time to use than mobile lifts.
- Ceiling lifts can be effective for environments that are problematic for mobile lifts, such as restricted spaces and difficult to manoeuvre areas.
- They can reduce the need for other structural changes required in a patient's home, such as widening doorways and bathrooms
- The initial costs of ceiling lifts are typically more than those of other transfer methods – they are most cost effective when installed in new buildings. Whenever they are installed the case can be made for return on investment.
- Transfers by ceiling lift can only be provided in the areas with tracks installed.

Layout Options for Ceiling Tracking

There are multiple designs for ceiling track systems: single- and multiple-track systems, and straight, angled, curved, and multidirectional track systems. The type of ceiling-track system selected will depend on the intended use. For single rooms, straight tracking may be the easiest to install. However, it only allows lifting and moving patients in a straight line. Adding curved sections of tracking enables increased coverage and repositioning flexibility, especially in bathrooms (see Figure 1.4.2). In new designs where the bed and toilet locations are known, it may be possible to install a straight track from near the head of the bed to the toilet by appropriate positioning of the doorway. This can result in significant cost savings.

Example of Curved Ceiling Tracking in Bathroom



Figure 3.5.2 – Curved Ceiling Tracking in Bathroom

More complex track systems are available for health care facilities where transfers between rooms, such as bedroom to toilet, are required. For example, gates (for transit between two adjacent track systems) and turntables (which allow moving from one track to another at track junctions) can also be fitted to increase the versatility of ceiling-tracking systems.

Designing for Ceiling Tracking and Lifts

Ceiling support structures:

1. For new installations, the recommended minimum safe weight limit (SWL) for the lift is 270kg.
2. Both the tracking and the ceiling support structures should be able to support 1.5 times the SWL for a period of 20 minutes.
3. Where ceiling lift tracks could be subject to more than one lift loading at a time, clinical engineering needs to be consulted.
4. During installation, all ceiling tracking must be clearly labeled with the SWL at regular intervals along the tracking.
5. If the initial design does not provide for lifts, every attempt should be made to provide a design that maximizes the opportunity for future lift and track upgrading and installation (e.g. avoid the installation of false ceilings where tracks may go in the future).

Ceiling heights: For ceiling heights, allowing 3000mm in new buildings provides adequate space for ceiling tracking and screening-curtain tracking. Specifying a doorway height that extends to the ceiling will assist in the placement of ceiling tracking to connect rooms.

Doorways: Typical transfer tasks occur between rooms, so ceiling tracking needs to go across rooms, through doorways, and into adjacent areas such as bathrooms. Usually full-height doorways should be specified when ceiling tracking is to be installed.

Screening curtains: When screening curtains are used in conjunction with ceiling tracking, specific planning is needed during curtain-tracking installation. Curtain tracking is typically installed below ceiling tracking and positioned so that screening curtains can be pulled clear of ceiling tracking and ceiling lifts. However, some ceiling-tracking systems allow curtain tracking to be placed above ceiling tracking. There are several options for curtain tracking that are designed to be compatible with ceiling tracking.

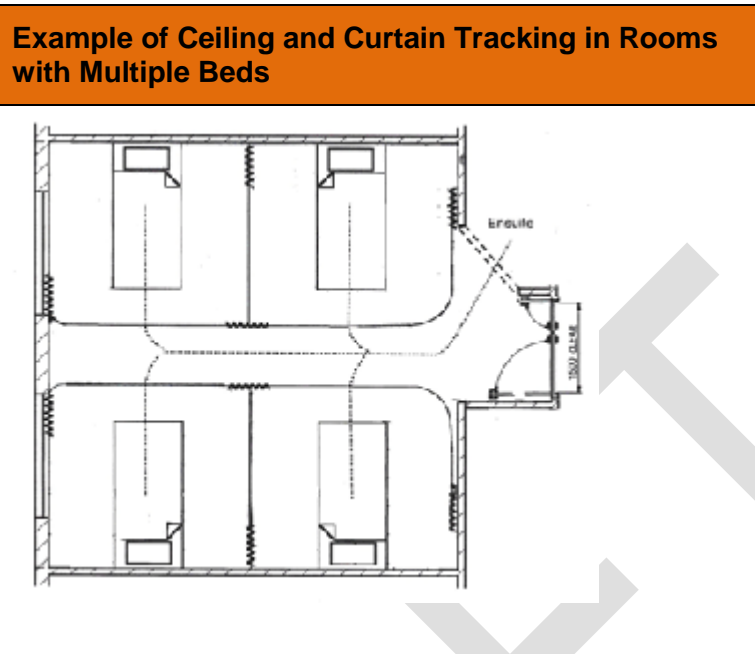


Figure 3.5.3 – Example of Ceiling and Curtain Tracking in Rooms with Multiple Beds

Access Design Features

The movement of patients requires assistance from health care workers who may need to use large pieces of equipment such as beds, stretchers, lifts, and wheelchairs. The width of corridors and doors, flooring, and handrail features affect access for staff and patients between the various functional areas of a health care facility. This section suggests suitable dimensions for access ways, turning space, and passing spaces.

Corridors

Corridors are expensive to build and maintain, so the minimum widths recommended reflect a balance between use and cost. The main considerations include where the corridor is located, frequency of use by staff and patients, and equipment used in the area (such as beds, stretchers, wheelchairs, and lifts).

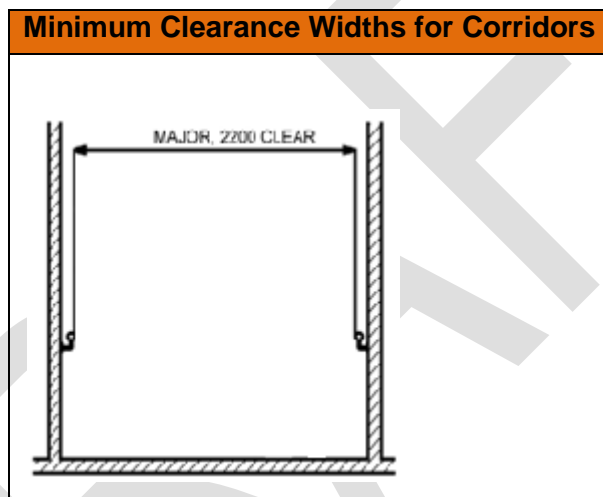


Figure 3.5.4– Minimum Clearance Widths for Corridors



Figure 3.5.5 – Major Corridors Need Adequate Clearance Widths

The recommended minimum widths allow staff to move patients during their normal daily tasks as well as during emergency evacuations. These widths must be clear and unobstructed. Fixed and portable items such as handrails, basins, stretchers, and furniture should not be placed where they reduce the clear width or additional space should be provided for these items. National Building Code (NBC) section 3.3.3.3.3 requires:³

- A width of 2400mm in buildings where the corridors may be used to move patients in beds.
- A width of 1650mm:
 - In buildings where the corridors will not be used to move patients in beds.
 - In buildings with more than 10 patients and where corridors serve the patients.
- A width of 1100mm in buildings with not more than 10 patients.

Doorways

The recommendations provided refer to the dimensions of the clear space in the doorway when the door is fully open, and apply to both swinging and sliding doors.

Doorway Height

The minimum height is 2030mm to enable equipment to pass through.

Doorway Width

For corridors, the minimum door opening width is 1800mm (double-opening swinging doors with an 850mm – 850mm split). Double doors must swing in opposite directions, with the right-hand door swinging in the direction of travel.⁴

For bedrooms and other rooms used by patients, the minimum door opening width is 1500mm.

For toilets, showers and bathrooms, the minimum door opening width is 1200mm.

Sliding and swinging doors are acceptable however doors should not swing into toilets.

³ National Building Code (NBC) section The NBC code for corridors is **3.3.3.3. (3) and doorway width is 3.3.3.4. (1).**

⁴ NBC section 3.3.3.3.4



Figure 3.5.6 – Adequate Doorway Widths

Flooring

Choosing floor coverings that meet the needs of staff, patients, and industry requirements can be challenging for new and renovated facilities. Floor coverings need to be:

- Safe for staff and patients
- Comfortable for patients and staff
- Functional from a cleaning and maintenance perspective

Some common risks relating to floor coverings in health care facilities include strains and injuries caused by maneuvering wheeled equipment and injuries from slips, trips, and falls. Small lips or joints between different floor coverings can increase the force required to maneuver wheeled equipment such as mobile lifts between rooms.

Recommendations for Flooring:

- Floor coverings should be tightly fitted to avoid trip hazards.
- Joints in floor materials must be permanently sealed to avoid gaps and loose edges that could cause tripping or restrict the movement of patient handling equipment. Joints should be level with the main floor to prevent problems for wheeled equipment.
- Where wheeled patient handling equipment is used, select hard floor coverings such as vinyl instead of carpet to make moving equipment easier.
- Ensure edging strips in flooring are beveled and not more than 10mm above the floor.⁵

⁵ See WorkSafe Victoria Correct title? (2007, pp. 3544) for more information on flooring.

For wet areas, make sure the flooring is nonslip when wet. Slope the floor four ways with a minimum gradient of at least 1:50 to stop water pooling. To avoid leaks, ensure flooring goes up shower walls at least 150mm and up the walls of dressing areas at least 75100mm.

Ramps

Ramps are used in many health care and residential-care facilities. As a general rule, ramps present significant hazards to workers and people in manual wheelchairs because of the force required to push wheeled equipment up them. Ramps also present hazards to both health care workers and patients when manoeuvring wheeled equipment down them. It is recommended that ramps be avoided if possible because of the potential hazards they create.

If ramps are in use and cannot be removed, several criteria are relevant to decreasing the hazards they create. Usually the steeper ramps are, the more hazardous they become. Many design standards specify a preferred gradient of 1:14 for people with disabilities and a maximum gradient of 1:10 (5.7°). Ramp flooring should be made of nonslip material. Outside ramps that can get wet require special consideration for flooring.

Patient Handling and Mobility Areas

Health care facilities should be designed to enable patients to move independently and reduce the risk of injury or accident to health care workers and patients. Effective moving and handling places additional design requirements on facilities. Extra space is needed for health care staff to work alongside patients and to allow appropriate equipment to be used. How much extra space is needed depends on the number of health care workers required, the mobility of patients, the equipment being used, and the specific techniques used to move patients.

The main areas where moving and handling tasks take place are bedrooms, bathrooms (including toilets, showers, and baths), corridors, day rooms, dining rooms, and clinical suites. Each one has special requirements. In this section, suggested layouts and fittings for each type of room are provided. A key feature that should be considered early in the design process is the installation of ceiling tracking to allow the use of ceiling lifts.

Bedrooms

Health care workers need sufficient space to carry out handling techniques. They also need sufficient clear space to move and handle equipment including mobile lifts and wheelchairs.

Access space should be provided to allow equipment to move freely between beds and doorways. Furniture should also be kept out of these areas or be easy to move. If sinks or other fixtures are being installed, space should be added to provide sufficient clear space for moving and handling.

Dimensions for Bedrooms

The following clear spaces are required for moving and handling and apply to a typical bed that is 2200mm long by 1000mm wide. These clear spaces reflect the recommendations made in a review of bed spaces for patients receiving care.⁶

- 1200mm clear space on each side of the bed so health care workers can work with equipment such as mobile lifts. Ceiling-track lifts and wheelchairs need less space than this, but allowing 1200mm enables most transfer tasks to be performed effectively.
- 1500mm clear space beside the bed where standing lifts and bed-to-stretcher transfers may be required.⁷
- 1200mm clear space at the foot of the bed so that equipment can be moved from the bed to the door. This allows a lift to be positioned and a patient to be transferred to a chair at the foot of the bed.

Furniture in Bedrooms

- Beds should be height adjustable so that moving and handling tasks can be carried out at the correct working height.

⁶ See Hignett & Lu, 2010.

⁷ See WorkSafe Victoria, 2007, pp. 46 and 47.

- Beds should have an under-bed clearance of at least 150mm to accommodate mobile lifts.
- Beds should be on castors so that health care workers can move them more easily to create extra space if needed. Castors must have lockable brakes.
- Chairs with armrests are needed to help patients stand up.
- Locking castors are necessary on furniture so health care workers can move furniture easily and to allow space for moving and handling large pieces of equipment.
- If recliner chairs are used, they should be electric and have easy-to-clean surfaces such as vinyl.

General Features for Bedrooms and Other Patient Areas

- Provide a staff calling system in as many locations as possible and within easy reach of patients, so that patients and health care workers can call for help if necessary. The system activation light should operate so that it can only be cancelled at the activation point.
- Have sufficient electrical outlets in patient areas so that power cords do not need to cross access ways. A double, general power outlet should be under each bed and another on a side wall (e.g., under a window) for electric armchairs.
- Install sliding doors to allow for more effective use of space where feasible.

Single Bedrooms

Figure 1.6.1 shows an example of a single room layout. In this example, to provide for 1200mm clear space on each side of the bed, the minimum bedroom dimensions should be 4000mm wide and 3400mm deep to allow for fixed wall fittings and furniture on one side.

For transfers from a bed to a stretcher using a transfer board, there needs to be at least a 1200mm clear area beside the stretcher, so that the health care worker can adopt a safe working posture. Providing for 1200mm on each side of the bed allows larger spaces for bed-to-stretcher transfers if the bed is pushed to one side.

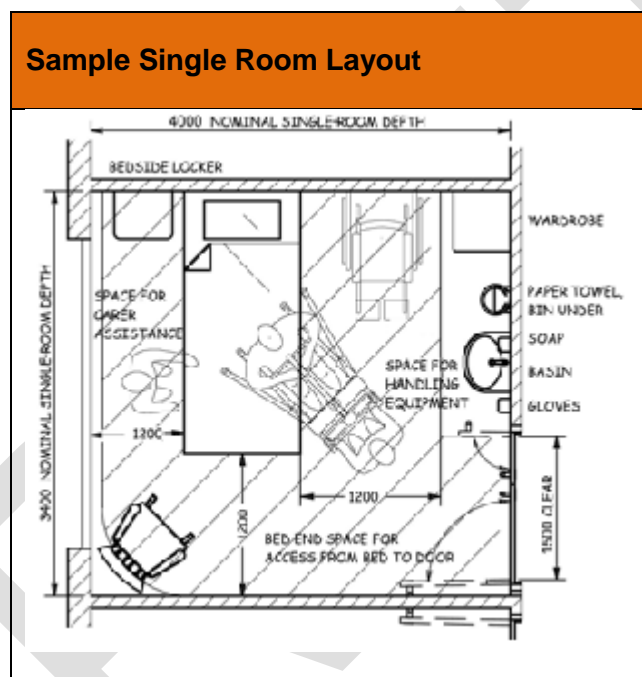


Figure 3.5.7 – Sample Single Room Layout

Rooms with Two or More Beds

The minimum space recommendations for single rooms can be used as a guide for rooms with multiple beds (see Figure 1.6.2). In bedrooms with multiple beds, there should be minimum clear spaces of 2400mm between beds that are side to side and 2400mm between beds that are end to end. It is assumed that the typical bed size is 2200mm long by 1000mm wide. These dimensions may need to be larger for beds with additional equipment and accessories attached.

For beds that are side by side, these dimensions are necessary:

- 3400mm between bed centrelines
- 1200mm between the bed and the screening curtain to allow for use of equipment within the privacy curtain. If ceiling-track lifts are installed, allow 1000mm between the bed and curtain so patient movements can be performed effectively.
- 1200mm clearance between the foot end of the bed and the privacy curtain
- 900mm wide corridor space outside the privacy curtain at the end of the bed for access between the bed and the door

For beds that are end to end, these dimensions are necessary:

- 2400mm clearance between bed foot ends
- 1200mm clearance between the foot of the bed and the privacy curtain
- 900mm wide corridor between privacy curtains for access to door when privacy curtains are used

Bathrooms

Toilet Spaces

There must be adequate space around toilet bowls and sinks plus clear passages to allow health care workers to assist patients and use large equipment. A common design error in health facilities is to place toilets in corners of bathrooms with the backs of the toilets too close to the walls.

The amount of space required depends on how many health care workers are involved and the equipment used. Moving and handling activities and the type of equipment used these tasks include transfers from a wheelchair or commode chair (either side on or front on), walking with frames, and standing lifts.

Figure 1.6.3 highlights the typical space requirements that are adequate for a toilet in a health care facility. For rooms with a single toilet, the minimum recommended dimensions required for health care workers and equipment are:

- Door opening: minimum 1200mm clear width
- Depth of room: minimum 2200mm from door opening
1500mm clear space

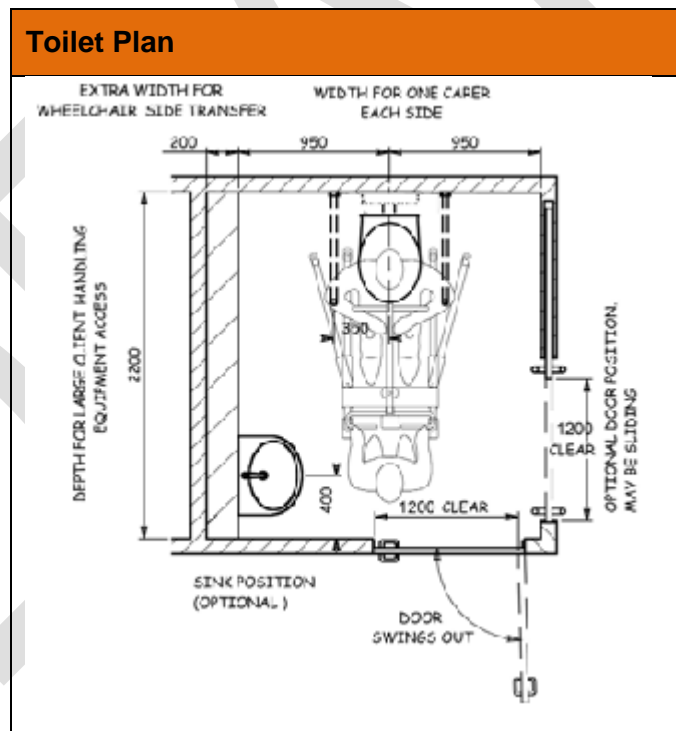


Figure 3.5.9 – Toilet Plan

For space between the toilet bowl and wall:

- The front of the toilet seat needs to be 700–750mm from the back wall.
- For two health care workers, there needs to be at least 950mm on each side from the toilet bowl centre, plus 200mm on one side for independent, disabled side transfers.
- In facilities with mostly mobile residents, it may be adequate to provide for one health care worker with at least 950mm on one side and 450mm on the other side from the toilet bowl centre, plus 200mm for independent, disabled side transfers.

Toilet with Space for Health care Workers and Equipment



Figure 3.5.10 – Toilet with Space for Health care Workers and Equipment

Toilet fittings: To transfer people easily, a stable and secure toilet seat is important. The toilet bowl height also needs to allow for equipment that may be used. For example, a commode chair may be used over the bowl. In a unit that provides care for bariatric patients, large toilet seats may be needed. In facilities caring for people with dementia, toilet seats should be different colours from the pedestals.

Handrails: Handrails or grab rails extending from the wall on each side of the toilet can help people to move on and off toilets, limiting the role of the health care worker. Horizontal dropdown grab rails 700mm from the floor that can be folded away are most suitable.

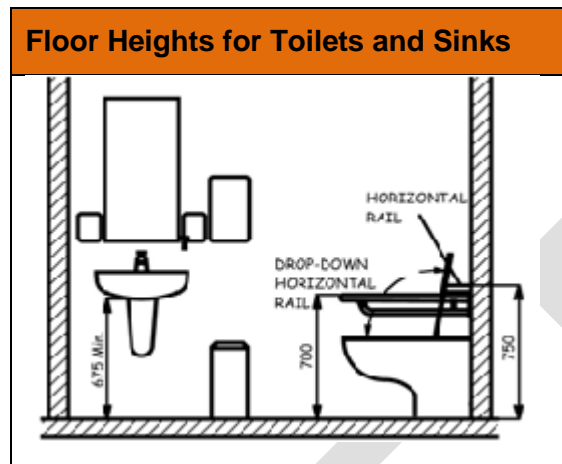


Figure 3.5.11 – Floor Heights for Toilets and Sinks

Sinks: When positioning basins, the centre of each basin should be at least 400mm from any adjacent wall so that it can be used by a patient in a chair. Allow a clear space of at least 800mm wide by 1200mm deep in front of the basin for wheelchair and equipment access. There should be a clearance of 5060mm between the taps and any obstruction or wall. Allow at least 675mm clear space under the basin for use by a seated patient (Figure 1.6.5). Ensure pipes and waste outlets do not obstruct the space under the basin.

Shower Rooms

Adequate space should be designed for shower rooms so that health care workers can assist patients to shower, dry, move, and transfer, and to allow access for large patient-handling equipment such as wheelchairs and commode chairs. There should be no plinth, raised edges, or other obstacles in a shower unit that may limit wheelchair access. All floors need to be designed with falls to stop water from pooling, with an increased number of falls in curtained-off shower cubicles. All floors should have nonslip material.

Shower rooms need enough space for health care workers and equipment in both wet and drying areas.

- Wet shower areas: 1800mm by 1000mm
- Drying space: 1800mm by 1800mm generally or 2200mm by 2200mm if large mobile shower stretchers are used and for bariatric patients.

Mobile shower stretchers vary in size, but are usually 600–750mm wide and 1500–2200mm long. The drying space needs to be at least 2200mm by 2200mm to move most shower stretchers into position. Less space may be required when using smaller shower stretchers.

For shower-room fittings the following features are desirable:

- A hinged dropdown seat in the shower cubicle that is at least 600mm wide can help patients who are partially mobile. The seat can be hinged out of the way for patients who are walking or using commode chairs. One disadvantage to hinged seats is that they require regular cleaning and may impede mobile shower stretchers.
- A fixed grab rail with horizontal and vertical arms near the shower seat can help patients to stand.
- The shower should have a detachable, height-adjustable showerhead and a hose at least 1500mm long that is close to the shower seat. If a shower stretcher is used, the hose needs to be at least 2000mm long.

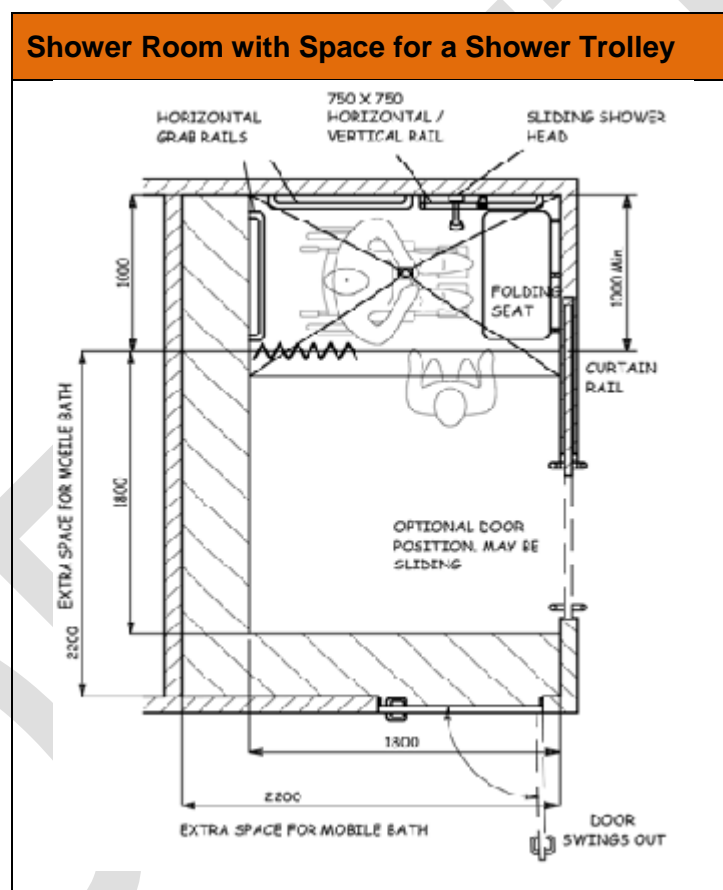


Figure 3.5.12 – Shower Room with Space for a Shower Trolley

Combined Shower and Toilet Rooms

Combined shower and toilet rooms can be useful to health care workers, because they provide immediate access to a toilet if a patient needs one while showering. A ceiling-track lift with a curved section around the bathroom helps health care workers more easily move patients between the shower and toilet. While there are numerous options for laying out a combined shower and toilet room, it is essential to allow adequate space in showering and drying areas so that health care workers can use large equipment if required.

Figure 1.6.7 shows the minimum space required for the single-doorway option. If a combined shower and toilet room is shared between rooms, extra space will be needed for another door. This can be done by extending the room length from 2700 to 3350mm.

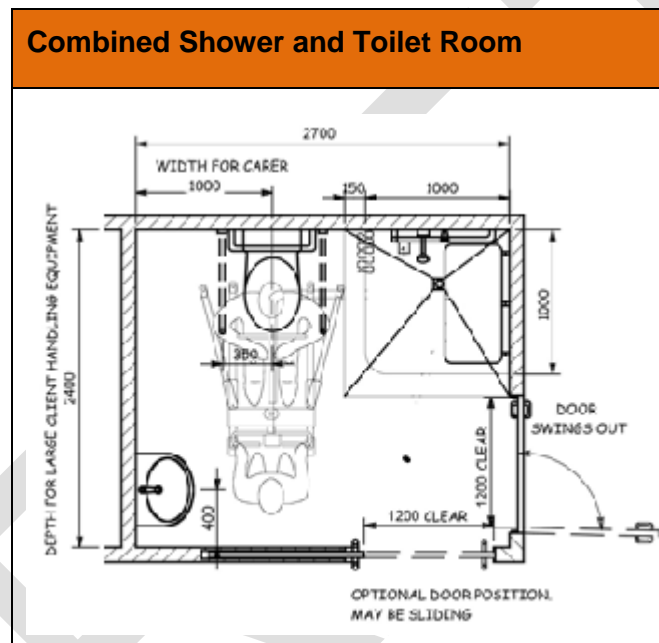


Figure 3.5.13 – Combined Shower and Toilet Room

Rooms with Baths

As baths have been largely replaced by showers, few baths are installed in new and renovated health care facilities. If a bath is installed, where feasible, ensure there is ceiling tracking. If ceiling tracking is not available, allow 1200mm on both sides of the bath to move a person from a wheelchair to the bath using a mobile lift. Consider mounting the bath on a plinth (300mm high); otherwise bending over the bath can be stressful on health care workers' lumbar spines. Have at least 150mm clear space underneath so that a mobile lift can be positioned over the bath. Birthing pools also need ceiling tracking above for handling and emergency evacuations.

Day and Dining Rooms

For day rooms and dining rooms, some key requirements are:

- Allow adequate space around chairs and dining tables so that patients using mobility aids and wheelchairs can access the furniture easily.
- Make sure the access area between the entrance doorway and seating areas is at least 1500mm wide so that patients and their health care workers have space to move and pass.
- Provide extra space for the temporary storage of equipment, such as walking aids and wheelchairs, while it is not being used.

Clinical Suites

The layout of clinical suites, which include medical imaging suites, obstetric delivery suites, operating suites and mortuary and autopsy suites, requires special consideration; beds may be surrounded by equipment and cannot easily be moved if more space is needed for handling tasks.

The following are recommendations for clear areas and spaces required for clinical suites:

- Allow a 1200mm space on both sides of the bed to accommodate patient-handling equipment and transfer trolleys. If this is not practical, 700mm on one side of the bed and 1200mm on both sides of the bed.
- Clinical suites should have double-opening doors. Doorways need to be at least 1500mm wide to allow for equipment.
- The pathway from the door to the main care area should be at least 1500mm wide.
- Allow at least 1200mm clear space at the foot of the bed.
- Keep all equipment away from clear spaces or put equipment on castors so it can be moved easily.

The spaces needed around beds in pre- and post-medical rooms are similar to those required typical units and patient bedrooms.

Other Patient Handling and Mobility Areas

There are several other areas that may need to be considered when designing patient-handling spaces. These include lifts in multi-storey buildings, external access to buildings, and outdoor areas such as gardens.

Other Patient Handling and Mobility Areas
Lifts:
<ul style="list-style-type: none">• Door openings – ensure the width and height accommodate large equipment and people• Internal dimensions – allow for staff to stand on either side of a bed or trolley• Position of lift controls – ensure they are easy to reach• Door hold-open times – allow time for the positioning of equipment and people• Accuracy of leveling between lift floor and external floor – make sure it does not create a trip hazard• The horizontal width of the gap between the lift floor and the external floors relative to the diameter of equipment wheels – allow for smooth movement.⁸
External Access to Buildings:
<ul style="list-style-type: none">• Consider building access and exit points for people and vehicles to reduce patient handling and other risks.• Main entrance doors should be useable by all types of mobility equipment, including wheelchairs, walkers, and electric scooters. Two specific features to assist access are automatic-opening doors and covered entrances at ground level.• When planning for vehicular access, identify the types of vehicles that need access. These might include ambulances and other emergency vehicles, patient and staff vehicles, funeral cars, and vehicles used by suppliers of goods and services. Vehicle-access areas should provide sufficient space for the use of large equipment such as wheelchairs, stretchers, and trolleys.
Outdoor Areas:
<p>Health care workers may be involved in the following tasks in an outdoor setting:</p> <ul style="list-style-type: none">• Pushing wheelchairs and other equipment• Assisting with transfers to and from seating• Assisting with walking• Assisting patients involved in activities such as gardening. <p>Check outdoor environments for the following hazards:</p> <ul style="list-style-type: none">• Access doors that present barriers, for example, because they have raised steps• Paths or doors that are too narrow to provide space for patients, their mobility equipment and health care workers• Steep slopes, ramps, and stairs, particularly for mobility aids and wheeled equipment• Uneven or rough ground surfaces that pose trip hazards and obstacles for wheeled equipment• Outdoor furniture that is too low and difficult for patients to get on and out of easily

⁸ Adapted from WorkSafe Victoria, 2007, p. 32.

Equipment Storage

The number of storage areas and their location depend on the layout of the main facility rooms and on the types of moving and handling equipment used. When planning storage areas:

- There needs to be sufficient space for both large and small pieces of equipment.
- Storage areas need to be located in the ward or unit within 2000mm of handling areas and within 1000mm of a supervisor station.
- Storage areas should not block or reduce access ways.
- Doorways should be at least 1200mm wide for large equipment items such as mobile lifts.

For mobile lifts, standing lifts and other battery-operated equipment, ensure such equipment is stored close to where it will be used. If stored too far away, health care workers may be reluctant to use it because of the increased access time. Such equipment should be available within 2000mm of its primary area of use. A preferred option is to store the equipment directly off a main corridor in a recessed alcove with a power supply. Any equipment accessories, such as slings for lifts, must be housed in the same place to reduce access time.

The amount of space needed for storing equipment depends on what equipment is needed and how many items there are. Each ward or unit in a large facility may have somewhat different equipment items; standardize storage areas as much as possible across units or wards so that when staff rotates to different units they can find equipment easily. Designers and planners should refer to equipment manuals for specific size details. Avoid using storage rooms for housing damaged equipment.

Storage Layout

There are several options for configuring storage areas, a storage room or recessed bay in a corridor, for example, but the layout should provide easy access to equipment and not obstruct clear spaces in corridors. Storage design options include:

- Long, narrow storerooms with aisles down the middle and storage space on the walls are generally better than square storerooms, where it is often hard to retrieve items near walls because the middle of the room becomes cluttered.
- Storage bays accessible from the corridor can be an effective option for storage instead of building a room.
- Shelving that is height adjustable enables more types and sizes of items to be stored.

Facility Design for Bariatric Patients

Health care and other facilities providing care for bariatric patients need to provide adequate room for these patients (for more information, please reference Section 4.2 –Bariatric Patients). Any facility design should take into account both the current demographic profile of patients and changes that may occur in the future. Planning for a bariatric patient's entry to a facility starts with ramps and handrails at entrances to facilitate access to the building. Ensure that bariatric wheelchairs are available and that the facility's main entrance has sufficient clearance. Lifts should have adequate door clearance and weight capacity.⁹

Increased door clearances and storage spaces are also necessary to accommodate oversized wheelchairs, stretchers, trolleys, beds, and mobile lifts. Although 1500mm has been recommended as the design standard for doorway widths, larger doorway widths may be needed for diagnostic and treatment rooms, inpatient rooms, surgical suites, and other areas where bariatric patients are treated.

For bariatric patient rooms, approximately 10 square metres more space than a standard room will be needed and 1750mm clearance around beds is required. This additional space is necessary for specialized equipment, such as wheelchairs and mobile lifts, as well as for additional nursing staff required to care for bariatric patients. If ceiling tracking is used, additional steel reinforcement is needed.

In bathrooms, bigger shower stalls should feature heavy-duty hand bars. Other options for showers include multiple handrails, large seats, and handheld showerheads. Large toilet seats are also important. Toilet fixtures and sinks should be floor mounted, although care should be taken that floor-mounted sinks do not interfere with wheelchairs. Bathrooms should be designed to allow for staff assistance on both sides of patients using the toilet and shower and for cases where large people will be transferred and large equipment is needed.

⁹ Parts of this section were adapted from Wignall, 2008. See also Collignon, 2008.

Facility Design References and Resources

Australasian Health Infrastructure Alliance. (2009). *Australasian Health Facility Guidelines*. Sydney: Centre for Health Assets Australasia, University of New South Wales. Retrieved 5 November 2010 from www.healthfacilityguidelines.com.au.

Australian/New Zealand Standards. (2004a). AS/NZS 4586: 2004 *Slip Resistance Classification of New Pedestrian Surface Materials*. www.standards.co.nz.

Australian/New Zealand Standards. (2004b). AS/NZS 4663: 2004 *Slip Resistance Measurement of Existing Pedestrian Surfaces*. www.standards.co.nz.

Canadian Standards Association, 2011. CSA Z8000 – Canadian Health Care Facilities – Planning, Design, and Construction. <http://www.csagroup.org/ca/en/home>

Chhokar, R., Engst, C., Miller, A., Robinson, D., Tate, R. B., & Yassi, A. (2005). The three year economic benefits of a ceiling lift intervention aimed to reduce health care worker injuries. *Applied Ergonomics*, 36(2), 223239.

Cohen, M. H., Nelson, G. G., Green, D. A., Leib, R., Matz, M. W., & Thomas, P. A. (2010). *Patient Handling and mobility Assessments: A White Paper*. Dallas, Texas: The Facility Guidelines Institute. Retrieved 16 June 2010 from www.fgiguideines.org.

Collignon, A. (2008). *Strategies for Accommodating Obese Patients in an Acute Care Setting*. The American Institute of Architects. Retrieved 12 September 2011 from www.aia.org.

Hignett, S., & Lu, J. (2010). Space to care and treat safely in acute hospitals: Recommendations from 1866 to 2008. *Applied Ergonomics*, 41(5), 666673. doi: 10.1016/j.apergo.2009.12.010.

Jung, Y. M., & Bridge, C. (2009). *The Effectiveness of Ceiling Hoists in Transferring People with Disabilities*. Retrieved 26 October 2010 from www.deir.qld.gov.au/workplace/subjects/ceilinghoists/index.htm.

Leib, R., & Cohen, M. (2010). Easy does it: The FGI Guidelines' patient handling requirements. *Health Facilities Management*, 23(9), 5354, 56, 58.

National Building Code of Canada, 2010. <http://www.nationalcodes.nrc.gc.ca/>

New Zealand Association of Occupational Therapists. (2006). *Submission on Review of the Building Code*. p. 5.

Standards New Zealand (2001). NZS 4121:2001 *Design for access and mobility: Buildings and associated facilities*. <http://standards.co.nz>

Wignall, D. (2008). Design as a critical tool in bariatric patient care. *Journal of Diabetes Science and Technology*, 2(2), 263267.

Worksafe Victoria. (2007). *A Guide to Designing Workplaces for Safer Handling of People: For health, aged care, rehabilitation and disability facilities*. Melbourne: Victorian WorkCover Authority.