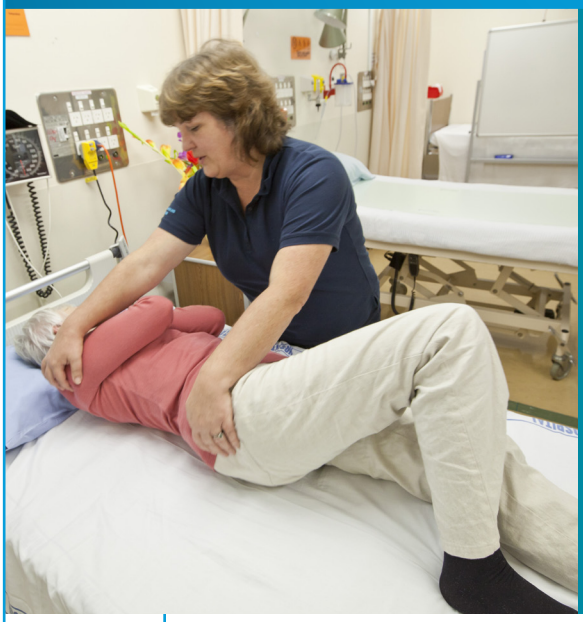
SECTION 9

# Facility design and upgrading



## Contents

## 9.1 Overview of health and residential care facility design

This section provides practical recommendations to help managers, architects, planners and designers involved in designing and redeveloping healthcare facilities. It can also be used by managers and moving and handling advisers as a guide when reviewing their facilities; for example, when completing a workplace profile or an annual moving and handling programme audit. The initial parts of the section cover information about the building design spaces and features needed for effective moving and handling. Later parts in this section provide more detail about upgrading existing facilities.

The aim of facility design is to provide spaces that allow carers to work in safe environments. Facilities for healthcare, aged care and disability care should be planned, designed and built with moving and handling space requirements as standard, not as an afterthought or as a special consideration. Facility design should be based on information from workplace profiles, discussions with end users and the information in this section. It is most cost effective to include moving and handling features during the planning stage; it is much more expensive to add such features later.

As noted in earlier sections, building or facility design is a crucial component in an overall programme to reduce the risks associated with moving and handling people. The information in this section incorporates current best practice in building design for moving and handling people. Designers and people involved with moving and handling need to adopt or adapt the information for new building designs. It is important to conduct a preliminary assessment of the proposed design for a new facility to ensure renovations meet the moving and handling needs of both the people being cared for and their carers.

A common belief is that adding the recommended design spaces and features for moving and handling people will add considerably to the cost of a new facility or the renovation of an existing facility. There are two points to take into account about additional costs:

- **First**, several research reports have noted that the return on investment from adding moving and handling features is around three years (estimates are between 2.5 and four years).[1] The additional costs of including the recommended features for moving and handling people will generally be covered in about three years by cost savings resulting from reduced injuries and lower staff absenteeism and turnover. After three years there are likely to be continuing cost savings in facility operating costs
- **Second**, the cost of changing facility design features after a facility has been built or renovated is considerably higher than when these design features

1. See, for example, Chhokar et al, 2005.

are included at the design stage for a new facility or during renovations. For example, it costs 10 times as much to widen a doorway in an existing facility as it does to include a wider doorway in the design phase.[2]

In 2011, the state of health facility design in New Zealand in relation to moving and handling people was generally poor, in spite of The New Zealand Patient Handling Guidelines being available since 2003. Numerous examples of poor building design features were observed or brought to the attention of the revision panel at the time of writing in 2010-2011 (see Box 9.1).

**BOX 9.1**

**Examples of poor facility design in New Zealand**

- Newly installed ceiling tracking in hospital patient rooms not extended into adjacent bathrooms
- Poorly designed storage spaces where mobile hoists are stored in front of shelves, blocking access to slings
- Toilets in newly built facilities placed in the corners of bathrooms, not allowing carer access to both sides of toilets
- A new surgical theatre for gastric banding operations with operating tables and doorways too small for obese patients
- Wall-hung toilets that are not designed to take heavy patients, but are easy to clean.

Source: Observations made by revision panel members, 2010

Opportunities to incorporate best practice for moving and handling people in facility design include planning a new facility and undertaking minor renovations or a major upgrade of an existing facility. Some examples of design features that might be included during these opportunities are shown in Table 9.1. More detailed information about planning for facility upgrading is provided later in this section.

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

**TABLE 9.1 OPPORTUNITIES FOR IMPROVING FACILITY DESIGN AND FUNCTION**

| Example of facility development | Examples of design features to consider for moving and handling people |
|---|---|
| New building design | Ceiling track specified<br>Minimum width specified for doors and corridors<br>Client rooms<br>Bathroom design<br>Equipment storage<br>Areas for bariatric clients |
| Renovating or upgrading an existing facility – may range from specific and relatively minor modifications to major changes, possibly including structural changes | Doorways widened<br>Bathroom redesigned<br>Ceiling tracking installed or retrofitted<br>Equipment storage added<br>Access for mobile hoists<br>Ramps to doorways<br>Grab rails |

The guidelines in this section are based on ergonomic principles that focus on matching the design and layout features with the needs of both the people being moved and their carers. Moving a client in a confined space makes it difficult to manoeuvre equipment and puts staff and the client at risk. The aim is to provide an environment where people can be moved in an efficient manner that reduces risks for both the carers and the people being moved. In practical terms, this means ensuring that facilities are suitable for the techniques and equipment required for effective moving and handling (see Box 9.2). It is also important to design facilities in a way that encourages client independence and reduces the need for handling.

The recommendations included in this section are based on consultation with moving and handling coordinators and assessments of the literature on healthcare facility design in Australia, Canada and the United Kingdom. All new designs should be assessed using industry standards[3] and the development process should involve manual handling advisers and relevant clinicians early in the design stages.

3. The WorkSafe Victoria (Australia) 2007 publication, *A Guide to Designing Workplaces for Safer Handling of People* is particularly recommended for designers and facility project managers involved in facility planning and renovation.

**BOX 9.2**

### The main facility design considerations for moving and handling people

There are five key areas of facility design for ensuring reduced risks in moving and handling people. These are:

1. **Access**: Corridors and doors should be sufficiently wide to allow the client, the carer and equipment to pass through and for two beds or wheelchairs to pass each other
2. **Space requirements**: There should be enough space around furniture, beds, toilets, showers and baths to allow the use of appropriate moving and handling techniques and equipment
3. **Handrails and grab rails**: These help people who are partially mobile to move. They require careful placement so that they do not obstruct handling operations or the movement of equipment
4. **Floor surfaces and friction**: Floors should be designed to enhance the safety of clients (from falls) and staff who push or pull wheeled equipment
5. **Equipment storage**: There needs to be suitable storage for equipment close to handling areas, so that equipment is readily accessible for use and easy to put away after use.

## 9.2 Health facility design standards relevant to New Zealand

The primary New Zealand standards for building design and construction (collectively known as 'building controls') are the *Building Regulations (1992)* (within the *Building Act (2004)*) and the Building Code, which is the First Schedule to the Building Regulations.[4] The purposes of these laws are to provide controls and to ensure buildings are safe and sanitary and have adequate fire escapes. The sections covering fire safety, access and the interior environments of buildings are particularly relevant to moving and handling people.

The New Zealand Standard 4121:2001 *Design for access and mobility: Buildings and associated facilities* (NZS 4121 Design for Access) provides guidelines for design and sets out access and facility requirements for people with disabilities living independently. Some aspects of the NZS 4121 *Design for Access* recommendations are not suitable for dependent disabled people who require assistance from one or two carers. For example, the bathroom recommendations are too small to allow sufficient space for carers and moving and handling equipment.

There are several items of legislation that employers and designers must take into account. *The Health and Safety in Employment Act (1992)* (including the 2002 amendments) requires all practicable steps to be taken to ensure there is a safe and healthy workplace.[5] Designers and managers have specific duties set out under the *Health and Safety in Employment Regulations (1995)*.

The New Zealand Ministry of Health generally requires use of the *Australasian Health Facility Guidelines* (Australian Health Infrastructure Alliance, 2009) for buildings and facilities for District Health Boards (DHBs). The *Australasian Health Facility Guidelines* are generally appropriate for New Zealand. However, where there are differences between the Australasian guidelines and this section on facility design, we recommend that the specifications described in these Guidelines be used. Note that some of the bathroom recommendations in the *Australasian Health Facility Guidelines* are too small and may not allow sufficient space for moving and handling and using equipment. All toilets and bathrooms in healthcare facilities should allow sufficient space for two carers to assist.

4. Source: www.dbh.govt.nz/building-law-and-compliance, retrieved 19 December 2010.
5. See pamphlet on 'Taking all practicable steps' at www.osh.dol.govt.nz/order/catalogue/hse-factsheets.shtml.

## 9.3 Facility design process

With any facility development, it is important to use a systematic approach so that physical spaces needed for moving and handling people are given adequate consideration. Two specific stages should take place:

- A moving and handling assessment document is developed by a moving and handling coordinator or health and safety staff. This document identifies design specifications for spaces, outlining the manual handling tasks, including moving and handling people, that will take place in those spaces
- Set up a specific project for facility development.

For the first stage, a document is prepared (with a title such as *Moving and Handling Assessment for Facility Design*). This document will provide an evolving plan for the development of facilities that eliminates the need for manual lifting of dependent clients (see Box 9.3). Once developed, this document can be used to assess current facilities and plan changes to buildings whenever opportunities for facility upgrading occur. This document should be used in the initial budget calculations for the strategic planning in the next stage.

**BOX 9.3**

**Example: Moving and Handling Assessment for Facility Design**

The purpose of a *Moving and Handling Assessment for Facility Design* (MAHA) is to develop facilities progressively to eliminate the need for manually lifting or handling dependent clients, patients or residents. The plan will usually be developed by facility staff as a briefing for an external design team. The purpose of the plan is to ensure that physical changes made to buildings and fixtures incorporate best practice for moving and handling people whenever opportunities for new facilities or upgrading occur. Preparing an MAHA takes several steps.

1. Assess the physical dependency needs of the clients or resident population by determining the degree of assistance they characteristically require in each care area. Do this first for specific wards or units being upgraded. For each area, identify and list the equipment needed, as well as any storage and service requirements for the equipment. It is important to consult staff working in these areas and seek the input of the manual handling coordinator or equivalent person.
2. The MAHA details should be collated and provided to the team preparing the design plan. The MAHA can be used to inform project space and design requirements, addressing all architectural, structural and utility planning and coordination issues.
3. A mock-up of the proposed changes should be constructed. This can be as simple as using tape on a floor to mock-up the area and where furniture and equipment will be placed. This will provide useful information about how practical the plan is. Ask staff for their input at the mock-up stage.
4. Modify the plan with the information gathered from the mock-up. The modified plan should then be sent to the external design team so that the facility design can be developed further prior to construction.
5. Following completion of the facility construction or renovation, managers should ensure that carers and other facility staff are familiarised with the new facility, and know how to use, service and maintain all equipment in the facility.
6. The preparation of aMAHA is only required for each area in which client or resident handling will take place. It can be an indispensable tool for increasing staff and client safety, and assisting client mobilisation and rehabilitation.

Adapted from: Leib & Cohen, 2010.

A second stage is to set up a specific project for a facility development. The steps involved for a specific facility design project are summarised in Table 9.2 and are described in more detail below. Where there is an external design team, these steps are intended for an internal facility project team that is liaising with the external design team. The steps are most relevant for designing new buildings and for major renovations to existing facilities. A briefer version can be used for smaller-scale facilities upgrades.

**TABLE 9.2 STEPS IN THE FACILITY DESIGN OR RENOVATION PROCESS**

| Step | Main activity |
|---|---|
| **Step 1** Strategic planning | Identify needs and set goals, develop a plan |
| **Step 2** Initial consultation and action plan | Gain commitment from decision-makers, set up project working group. Develop action plan and timetable. Assign responsibilities |
| **Step 3** Facility review and development of design brief | Review existing facility and future needs. Collect specific information for decision-making. Collate and prepare a facility report. Prepare a design brief |
| **Step 4** Facility design | Consult staff and key people. Finalise design |
| **Step 5** Implementation of facility building or upgrade | Approvals and budget confirmed, work commenced |
| **Step 6** Commission report and ongoing review | Closing report that records the progress of the project. Regularly inspect and review facilities |

## Step 1 Strategic planning

The first step is to develop a strategic plan that sets out the project goals and strategies. The plan should:

- Identify the healthcare services needed now and for the next five years
- Describe the model of care that will underpin service delivery. For example, if it is to assist elderly people to live as independently as possible and maintain maximum control over their lives, this model of care will have design implications
- Define the scope of the project. For instance, is this building a new centre or redesigning an existing one?
- Set out the project goals and your strategies for reaching them
- Set out how you will communicate with and consult staff to gain their commitment
- Define how the client handling facility design process fits into the overall redesign or build project
- Ensure that the facility is 'future proofed' by allowing for service or client demographic changes.

## Step 2 Initial consultation and action plan

The project should gain the commitment of people throughout the organisation, especially those who can influence the outcome of the project, such as those who make the decisions, control the resources and understand the work processes and issues. Set up a working group of key people, including:

- Management, finance representatives
- Key clinical staff
- The designer or architect
- Health and safety unit representatives
- The moving and handling coordinator
- An employee or union representative.

Involving clinical staff and employee representatives is important because they are likely to be familiar with the practical issues involved in moving and handling people and can provide valuable ideas related to their work activities and client needs.

The action plan includes setting timelines and specific project tasks so that key people are clear about their roles and responsibilities, and there is a clear path to follow to achieve the project objectives. This will include the following tasks:

- Identify and prioritise the project objectives
- Assign responsibilities within the project group
- Decide what information is needed and how to gather it (see Step 5)
- Develop an initial plan and timeline for the project
- Identify what the communication strategy will be between the design team and the organisation's building committee or management team (e.g. meeting schedules, key stakeholders and contacts, agendas and distribution of minutes)
- Ensure the project plan is incorporated into the overall development plan for the facility.

## Step 3 Facility review and development of design brief

Before making any changes, a review of the existing facilities should be carried out so that issues related to the facility design and layout can be identified. There are several potential sources of specific information that can be used to help the development of the design brief. These include the use of existing records, the facility profile and simulations.

- **Existing records**: Most healthcare organisations have operational records of client populations, handling tasks performed and equipment used. Accident

and injury data should also be available. There may be information from sources such as client and workplace profiles, staff questionnaires and workplace audits. Archived documents from previous projects should be read for 'lessons learned'.

- **Current facility profile**: Compile a profile of the current state of the facility using methods such as walkthrough audits (see Section 13 on conducting audits), group discussions and staff self-report questionnaires. Topics to be reviewed include moving and handling policies, staff and client needs, equipment use, workflow analysis (including any time-and-motion studies and staffing and resident profiles) and the state of current facilities such as workspaces, room layout, access ways and storage.
- **Simulations**: It is **strongly recommended** that mock-ups of physical layouts be used to assess whether planned spaces are adequate. One way of doing this is to use a taped layout on an empty floor space so that all staff working in that area can trial the work tasks that will be happening.

Once the information has been gathered and collated, prepare a facility report so that the project group can review the findings and decide if more information is needed. Once the review is complete, senior management should appoint key people from the working group to develop the design brief, preferably including or consulting a moving and handling coordinator. The brief sets specifications for workspaces, layouts, access ways, fixtures, fittings and other features. The project plan may need updating at this point.

## Step 4 Facility design

There will usually be several design stages, from initial concepts to finished plans. It is important that key people are consulted at each stage. The moving and handling coordinator will ensure that the design is 'user friendly' and promotes low-risk client handling practices. Staff should be asked for feedback, as they will provide practical views based on their experience of moving and handling operations.

## Step 5 Implementation of facility building or upgrade

This step involves gaining approvals and budgets, obtaining prices or tenders, commissioning the work, and monitoring progress to ensure the work is carried out to specifications.

## Step 6 Commission report and ongoing review

Once the project has been completed and prior to facility use, there should be a closing report that records the progress of the project, listing any problems, deviations from plan and resolutions. Once this has been archived it can be used

as a guide for future projects as a 'lessons learned' document. Ongoing and regular reviews of facilities are needed. Information to assist this process can be obtained from resources such as the audit tool, staff questionnaire and workplace profile – see Sections 12 and 13 in these Guidelines for more details. Regular reviews of facilities and identifying safety issues are critical parts of the risk assessment process and should be done at least once a year. Addressing issues and upgrading facilities should be part of the process of continuing quality improvement.

## 9.4 Ceiling tracking and hoists

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

Ceiling hoists support vertical and lateral transfers with minimal manual effort by carers. The hoists operate from ceiling-mounted tracking and most are battery operated. They allow the lifting and transfer of people in slings within areas covered by the track.

**FIGURE 9.1**

**Ceiling tracking with hoist**

Research has shown that the installation of ceiling hoists leads to significant reductions in musculoskeletal injuries and physical stress to carers.[6] It also increases safety for clients. Payback periods (based on returns on investment through reduced injuries and absenteeism) for ceiling hoists 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.[7]

- Specific advantages and features of ceiling hoists are:
- Ceiling hoists require fewer carers to carry out transfer tasks and take less time to use than mobile hoists
- Ceiling hoists can be effective for environments that are problematic for mobile hoists, such as restricted spaces and spaces with carpeted floors
- They can reduce the need for other structural changes required in a client's home, such as doorways and bathrooms
- The initial costs of ceiling hoists are typically more than those of other transfer methods – they are most cost effective when installed in new buildings
- Transfers by ceiling hoist 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 types of use intended. For single

6. Jung & Bridge, 2009.
7. Ceiling Hoists, Workplace Health and Safety, Queensland (Australia). Retrieved 7 January 2011 from www.deir.qld.gov.au/workplace/subjects/ceilinghoists/index.htm.

rooms, straight tracking may be the easiest to install. However, its major limitation is that it only allows the lifting and movement of clients in a straight line. Adding curved sections of tracking allows increased coverage and repositioning flexibility, especially in bathrooms (see Figure 9.2). In new designs where the bed and toilet locations are known, it may be possible to organise a straight track from near the head end of the bed to the toilet by appropriate positioning of the doorway. This can result in significant cost savings.

**FIGURE 9.2**

**Example of curved ceiling tracking in bathroom**

The most versatile tracking system is a parallel tracking pattern called the 'XY' system, which provides full room coverage. With this system a client can be moved anywhere in the room. The XY system has two straight sections of track on each side of the room, parallel to each other, with another track joining the two. The joining track can slide along the two parallel tracks.

More complex track systems are available for healthcare 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. More information about the types of ceiling hoist used with ceiling tracking is provided in Section 7 Equipment for moving and handling people.

### Designing for ceiling tracking and hoists

**Ceiling support structures**: A primary design feature is to ensure that the ceiling support structure is adequate for the additional loads imposed by a ceiling tracking system and hoist (see Box 9.4). Many ceiling tracking systems with hoists have a safe working load (SWL – weight of person lifted) of 200 kilograms and 270kg. Additional systems are available that have SWL capacities of 363kg and 454kg. The following design specifications are recommended:

1. For new installations, the recommended minimum SWL for the hoist should be 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 hoist tracks could be subject to more than one hoist loading at a time, engineering approval must be obtained
4. During installation, all ceiling tracking must be clearly labelled with the SWL at regular intervals along the tracking
5. If the initial design does not provide for hoists, every attempt should be made to provide a design that maximises the opportunity for future hoist and track

installation (e.g. avoid the installation of false ceilings or services above where tracks may go in the future).

**BOX 9.4**

**Australasian Health Facility Guidelines: Ceiling tracking**

The *Australasian Health Facility Guidelines* (AUSHFG 2009) note the following design specifications for ceiling tracking:

501441 Rooms with ceiling mounted equipment, such as X-Ray Rooms and Operating Rooms or other rooms where ceiling-mounted patient lifting devices are fitted may require increased ceiling heights. Heights should comply with equipment manufacturers' recommendations. The most common ceiling height in such areas is 3000 mm. (AUSHFG 2009 pp. 851-852)

501444 Reinforcement of the ceiling support structure should be provided for overhead patient hoists where installed. This should be noted in the project brief. In addition, information provided by equipment manufacturers should be reviewed in terms of the needs of particular items of equipment for passage through full height door openings e.g. to ensuite bathrooms; or that may affect the positioning of bed screen tracks or other such fixtures in multiple-bedrooms.

**Ceiling heights**: For ceiling heights, allowing 3,000mm in new buildings provides dequate 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.

**FIGURE 9.3**

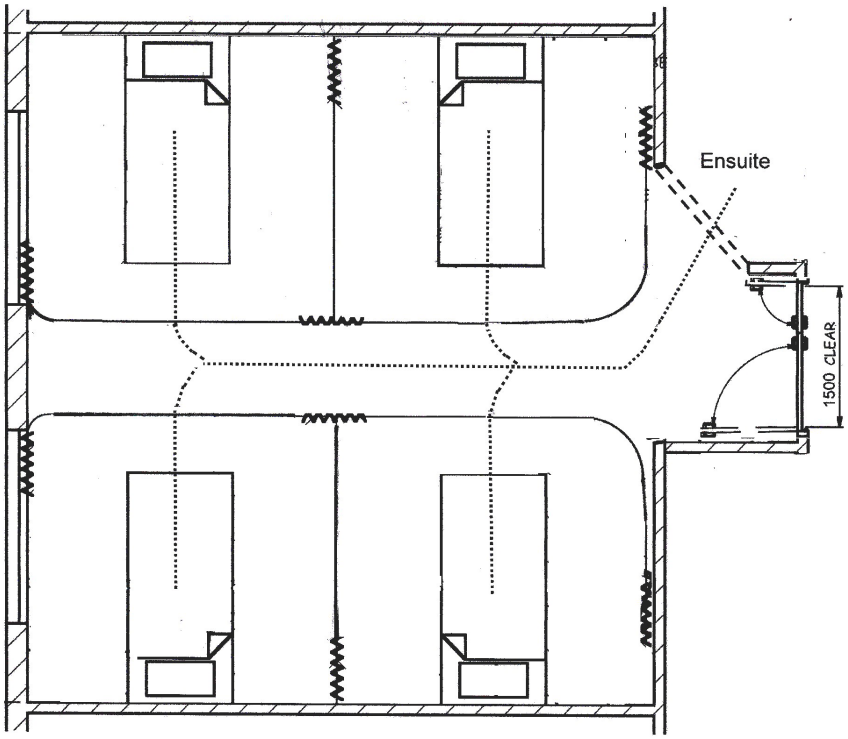
**Example of curved ceiling tracking in bathroom**

**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 located so that screening curtains can be pulled clear of the ceiling tracking and ceiling hoists. 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 9.4 shows a suggested configuration for ceiling tracking and curtain tracks for a room with multiple beds and adjacent ensuite bathroom. Ceiling tracking and hoists should reach within 1000mm of the heads of beds.

**FIGURE 9.4**

## Example of ceiling and curtain tracking in rooms with multiple beds



# 9.5 Access design features

Corridor widths, door widths, flooring and handrail features affect access for staff and clients between the various functional areas of a healthcare facility. This section recommends suitable dimensions for access ways and turning and passing spaces, with drawings showing suggested design details. The movement of clients requires assistance from carers, who may need to use large equipment such as beds, trolleys, hoists and wheelchairs to transfer clients. The use of handrails, grab rails and lighting is also covered.

## Corridors

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

- **Major corridors** are high-use corridors where the unrestricted movement of clients is important. They are usually emergency evacuation routes and high-frequency-use corridors.

**FIGURE 9.5**

**Minimum clearance widths for corridors**

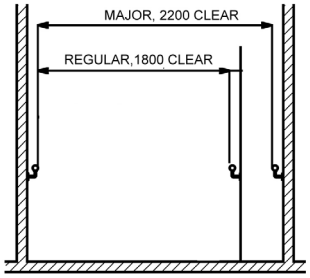



**FIGURE 9.6**

**Major corridors need adequate clearance widths**

- **Regular corridors** need clear passages for assisted client movements and may be lower-frequency-use corridors.

The recommended minimum widths described below allow staff to move clients 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, trolleys and furniture should not be placed where they reduce the clear width – or additional space should be provided for these items.

- 2,200mm clear width for major corridors such as interdepartmental and public routes.
- 1,800mm clear width for regular corridors where clients may be moved in large equipment (such as beds) and where passing is required, and corridors within

wards where clients are moved with large equipment items and are often assisted by carers.

Corridors need to comply with the relevant building codes.[8]

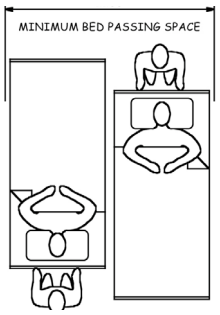
## Floor spaces for passing and turning

The widths for corridors also apply to spaces where passing or turning clients in wheelchairs is likely, or when using other large equipment. The widths specified refer to clear spaces between handrails and any other fixtures. Widths for these spaces are listed below.

For client beds, the minimum passing spaces are:

**FIGURE 9.7**

**Bed passing space**




- 2,200mm minimum clear width for bed passing
- 1,800mm minimum clear width for other passing – this includes passing spaces for clients assisted by carers and for large client handling equipment, including mobile hoists, mobile sit to stand hoists, wheelchairs, commode chairs and trolleys.

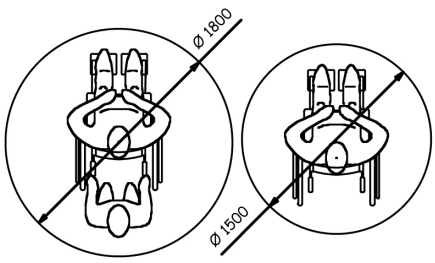
## Minimum turning spaces

For turning wheelchairs, commode chairs and walking frames:

- 1,800mm minimum turning circle diameter space for carers to rotate chairs with clients
- 1,500mm minimum turning circle diameter space for people using self-propelled chairs and walking frames.

**FIGURE 9.8**

**Turning circle for assisted and unassisted wheelchairs**




For a carer to turn a bed, wheelchair or hoist through 90° when entering or leaving a room:

- 1,800mm minimum width for turning beds
- 1,500mm minimum width for turning wheelchairs or hoists.

8. These include the *Building Act (2004)*, the Fire Safety and Access Route provisions of the *Building Regulations (1992)* and NZS 4121 *Design for Access*).

## 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 2,030mm to enable equipment to pass through the doorway.

**Doorway width**: For corridors, the minimum door opening width is 1,800mm (double opening swinging doors with a 900-900mm split).

For **bedrooms** and other rooms used by clients, the minimum door opening width is 1500mm (double opening swinging doors, for example with a 1,050–1,450mm split; see Figure 9.10) where large equipment may pass through.

For **toilets, showers and bathrooms**, the minimum door opening width is 1,200mm. Sliding and swinging doors are acceptable. Doors should not swing into toilets.

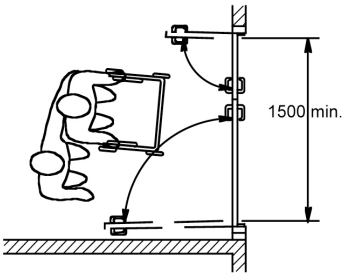
In other aspects, door openings need to comply with NZS 4121 *Design for Access*.

**FIGURE 9.9**

**Ensure adequate doorway widths**

**FIGURE 9.10**

**Door opening 1500mm width with 1,050–1,450mm split**




## Flooring

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

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

Some common risks relating to floor coverings in health workplaces include strains and injuries caused by manoeuvring wheeled equipment and injuries from slips, trips and falls. Some soft floor coverings (e.g. carpet) can double the forces required for manoeuvring mobile hoists compared with hard surfaces such as vinyl. Small lips or joins between different floor coverings can increase the forces required to manoeuvre wheeled equipment such as mobile hoists between rooms.

Where carers are moving and handling clients, some recommendations for flooring are:

- 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 client handling equipment. Joints should be level with the main floor to avoid being obstacles for wheeled equipment
- Where wheeled client 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 bevelled and not more than 10mm above the floor.[9]

For wet areas, make sure the flooring is non-slip when wet. Slope the floor four ways with a minimum fall of at least 1:50 to stop water pooling. Lap the flooring up shower walls at least 150mm, and up the walls of dressing areas at least 75-100mm to avoid leaks.

Floors should comply with fire safety requirements and the relevant Australian and New Zealand standards for slip resistance.[10]

## Ramps

Ramps are used in many healthcare and residential care facilities as well as in private homes. As a general rule, ramps present significant hazards to carers and people in manual wheelchairs because of the forces required to push wheeled equipment up them. Ramps also present hazards to both carers and clients when manoeuvring wheeled equipment down them. A current design view is to avoid ramps if possible because of the potential hazards they create. However, avoiding ramps may not be feasible in some private homes.

If ramps are in use and cannot be removed, several criteria are relevant to decreasing the hazards ramps create. As a general rule, 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°). Ramps with gradients greater than 1:8 (7.12°) are difficult to use by elderly and disabled people. Even with gradients that are not too physically demanding, landings are necessary as resting places. Most standards limit the distance of ramps between landings to around 9,000mm.[11]

Ramp flooring should be of non-slip material. Outside ramps that can get wet require special consideration for flooring.

9. See WorkSafe Victoria (2007, pp. 35-44) for more information on flooring.
10. These standards include AS/NZS 4586-2004 and AS/NZS 4663-2004 – see Australian/New Zealand Standards, 2004a and 2004b in the reference list.
11. See Templer (1992, p. 44) for a detailed discussion of ramp design.

## Handrails

Handrails or grab rails should be provided in multiple locations, such as bathrooms and other spaces, for semi-mobile clients. A handrail is used for general support and may occasionally take a client's full weight if they trip or fall. An example is handrails along the sides of corridors. All handrails and grab rails should have known SWLs and these should be visible where appropriate, such as on grab rails beside toilets.

**FIGURE 9.11**

**Fit handrails and grab rails where needed**

A grab rail provides stronger support than a handrail. It can take a client's full weight during handling operations; for instance, a combined horizontal/vertical grab rail fitted adjacent to a toilet can help a client to stand.[12] Grab rails in areas used by bariatric clients may need walls with additional load-bearing capacity.

12. Standards for handrail and grab rail designs are in NZS 4121 *Design for Access* – see New Zealand Standards, 2001.

## 9.6 Client handling areas

The design of all healthcare facilities should enable independent mobility by clients and allow carers to work with clients in ways that reduce risks to clients and carers. Effective moving and handling places additional design requirements on facilities. Extra space is needed for carers to work alongside clients and to allow suitable equipment to be used. How much extra space is needed depends on the number of carers required, the level of mobility of clients, the equipment being used and the specific techniques used to move clients, and possible changes in the profiles of clients in the facility or unit.

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 design feature that should be considered early in the design process is the installation of ceiling tracking to allow the use of ceiling hoists.

### Bedrooms

The areas adjacent to beds need to allow carers to use effective working postures to carry out handling techniques. There should also be sufficient clear space to allow moving and handling equipment, such as mobile hoists and wheelchairs, to be used.

Access space should be provided so that equipment such as mobile hoists can be moved freely between beds and doorways. Keep furniture out of these areas, or ensure that it is easy to move. If hand basins or other fixtures are to be installed, space should be added to allow 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 2,200mm long by 1,000mm wide. These clear spaces are consistent with the recommendations made in a review of bed spaces for clients receiving healthcare.[13]

- 1,200mm clear space on each side of the bed so that carers can work with equipment items such as mobile hoists. Ceiling track hoists and wheelchairs need less space than this, but allowing 1200mm enables most transfer tasks to be performed effectively
- 1,500mm clear space beside the bed where standing hoists and bed to trolley transfers may be required[14]
- 1,200mm clear space at the foot of the bed so that equipment can be moved from the bed to the door. This allows a hoist to be positioned and a client to be transferred to a chair at the foot of the bed.

13. See Hignett & Lu, 2010.
14. See WorkSafe Victoria, 2007, pp. 46 and 47.

### Furniture in bedrooms

- Beds should be height adjustable so that moving and handling tasks can be carried out at the correct working height
- Beds should have an under-bed clearance of at least 150mm to accommodate mobile hoists
- Beds should be on castors so that carers can move the beds to create extra space if needed
- Provide chairs with armrests to help clients stand up
- Provide furniture on castors so that it is easy for carers to move it to allow space for large moving and handling 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 client areas

- Provide a staff calling system in as many locations as possible and within easy reach of clients, so that clients and carers 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 client areas so that power cords do not need to cross access ways. It is recommended that there be a double general power outlet under each bed and another on a side wall (e.g. under a window) for electric armchairs
- Where feasible to install, sliding doors allow more effective use of space.

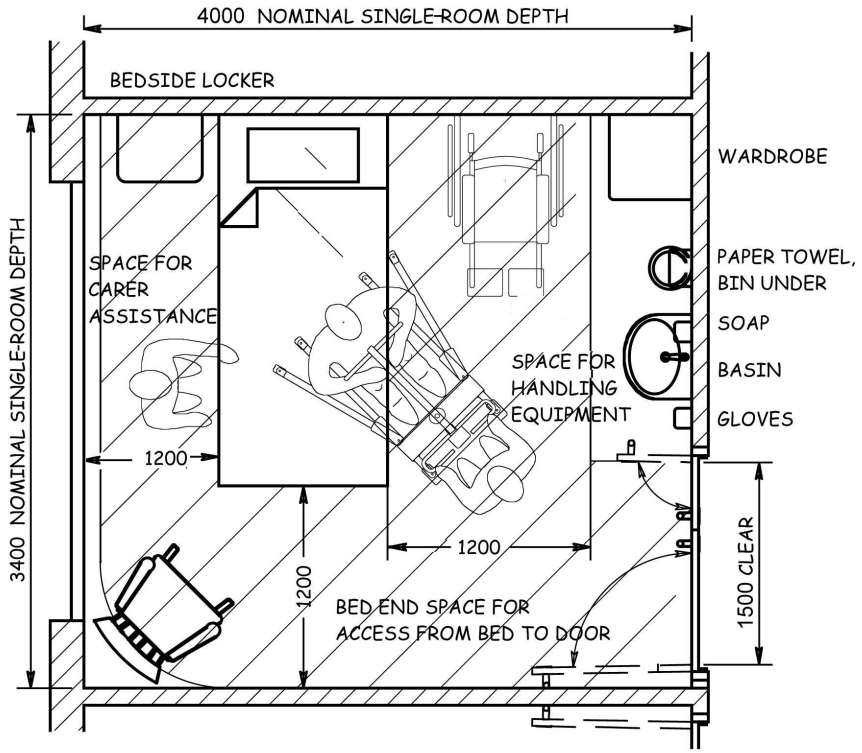
### Single bedrooms

Figure 9.12 shows an example of a single-room layout. In this example, to provide for 1,200mm clear space on each side of the bed, the minimum bedroom dimensions should be 4000mm wide to allow for fixed wall fittings and furniture on one side, and 3,400mm deep.

For transfers from a bed to a trolley using a transfer board, there needs to be at least a 1,200mm clear area beside the trolley, so that the carer can adopt a safe working posture. Providing for 1,200mm on each side of the bed allows larger spaces for bed to trolley transfers if the bed is pushed to one side.

**FIGURE 9.12**

**Example of a 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 9.13). In bedrooms with multiple beds, there should be minimum clear spaces of 2,400mm between beds that are side to side and 2,400mm between beds that are end to end. It is assumed that the typical bed size is 2,200mm 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**

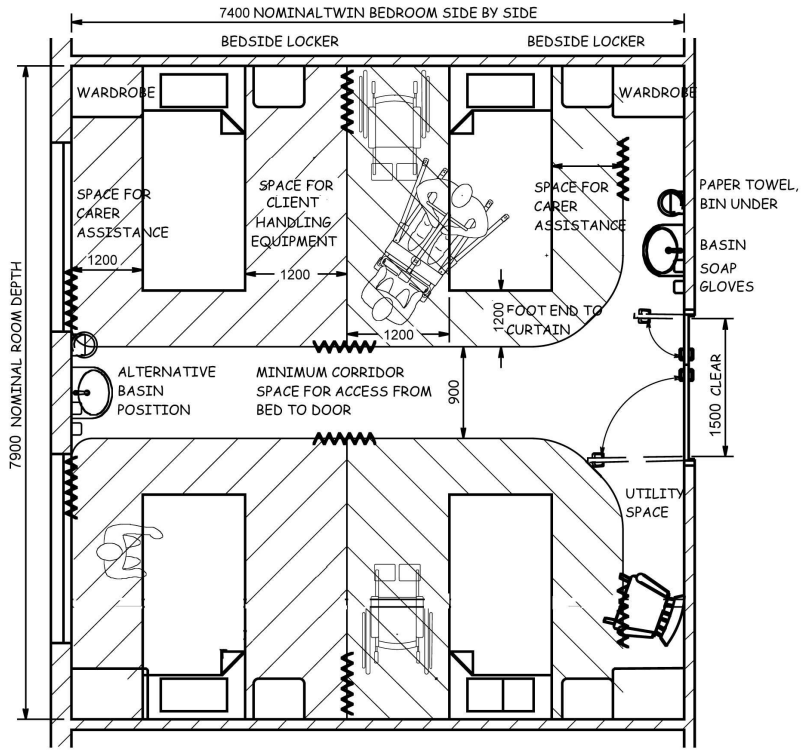
- 3,400mm between bed centrelines
- Allow at least 1,200mm between the bed and the screening curtain for use of equipment within the privacy curtain. If ceiling track hoists are installed, allowing 1,000mm between the bed and curtain enables client movements to be performed effectively
- 1,200mm clearance 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

- 2,400mm clearance between bed foot ends
- 1,200mm 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.

**FIGURE 9.13**

**Example of a room layout with four beds**




## Bathrooms, toilets and showers

The layouts for bathrooms will depend on the specific needs of the facility. The text below describes layouts for both separate facilities, in which toilets, showers and baths are in separate rooms, and combined facilities such as ensuite bathrooms, where toilets and showers are provided in the same room. The general layout principles for separate toilets and showers can be adapted where these facilities are located in a single room.

## Toilet spaces

Toilets need adequate space around toilet bowls and sinks, plus clear passages to allow carers to assist clients and use large equipment if needed. For multiple-bed facilities, at least one all-gender accessible toilet should be provided in each ward

or unit. A common design error in New Zealand health facilities is to place toilets in corners of bathrooms, with the backs of the toilets too close to the walls.

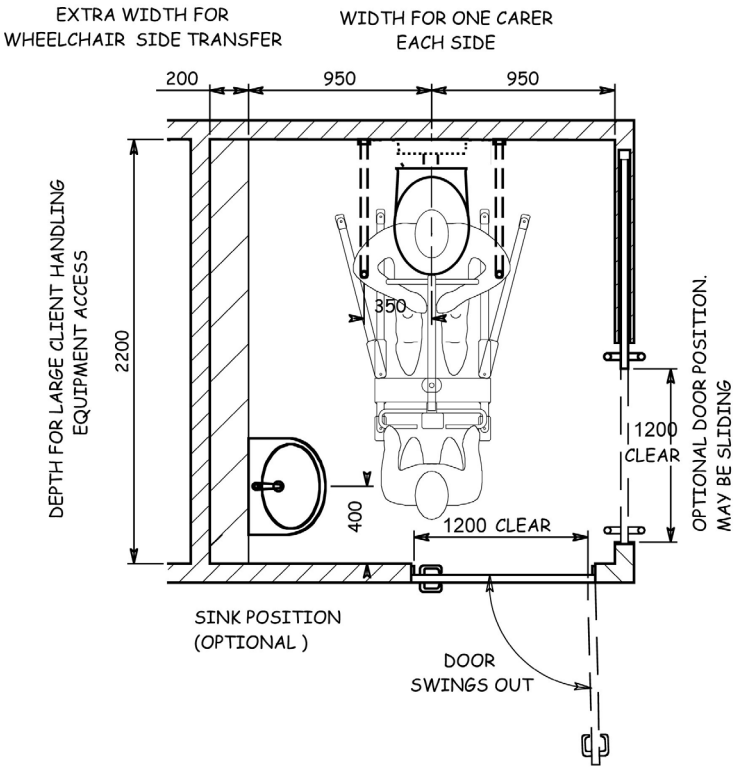
The amount of space required depends on how many carers are involved and the equipment used. Moving and handling activities and equipment in toilets include transfers from a wheelchair or commode chair (either side on or front on), clients walking with frames, and standing hoists.

Figure 9.14 gives the typical spaces that would be adequate for a toilet in a healthcare facility. For rooms with a single toilet and for ensuite bathrooms, the minimum recommended dimensions required for carers and equipment are:

- Door opening: minimum 1,200mm clear width
- Depth of room: minimum 2,200mm from door opening
- 1,500mm clear space in front of toilet to allow for equipment for toilet transfers.

**FIGURE 9.14**

**Toilet plan allowing space for carers and equipment**




For doors into ensuite and other bathrooms, consideration could be given to having corners with two sliding doors so that the entire corners can be opened for access.

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 carers, 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 carer 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.

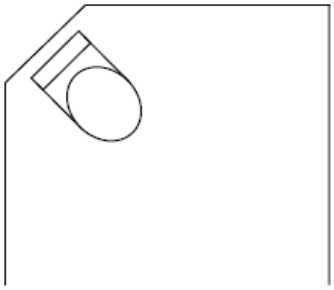
**FIGURE 9.15**

**Toilet with space for carers and equipment**

Another design alternative for toilet space is to angle the wall and the toilet pedestal to provide space on each side of the toilet (see Figure 9.16). This can be a cost-effective option for small toilet areas.

**FIGURE 9.16**

**Angled toilet pedestal**

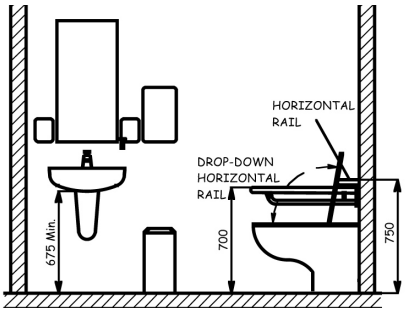


**Toilet fittings**: A stable and secure toilet seat is important as it makes it easy to transfer people. The toilet bowl height needs to allow for equipment that may be used. For example, allow for a commode chair being used over the bowl. In a unit that provides care for bariatric clients, large toilet 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. Horizontal drop-down grab rails 700mm from the floor, that can be folded away, are most suitable (see Figures 9.15 and 9.17).

**FIGURE 9.17**

**Floor heights for toilets and basins**




**Basins**: When positioning basins, the centre of each basin should be at least 400mm from any adjacent wall, so that the basin can be used by a client in a chair. Allow a clear space of at least 800mm wide by 1,200mm deep in front of the basin for wheelchair and equipment access. There should be a clearance of 50-60mm between the taps and any obstruction or wall.

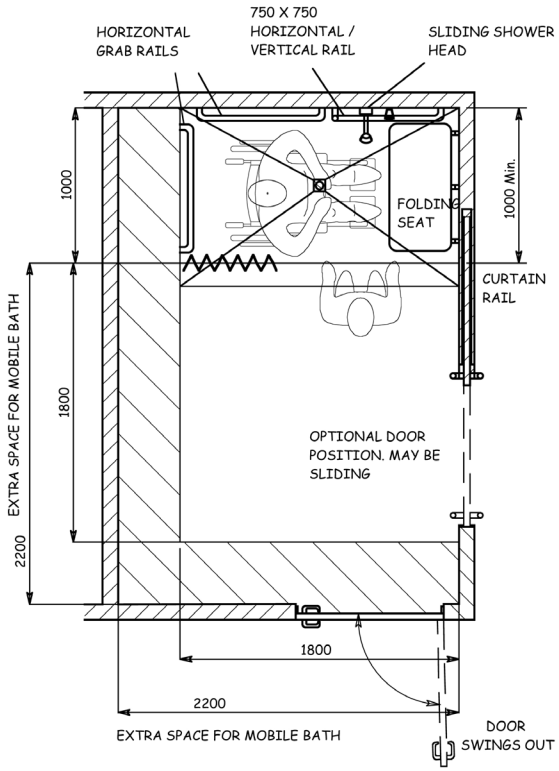
Allow at least 675mm clear space under the basin for use by a seated client (Figure 9.17). Ensure pipes and waste outlets do not obstruct the space under the basin.

## Shower rooms

Adequate space should be designed for shower rooms so that carers can assist clients to shower, dry, move and transfer, and to allow access for large client 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 increased falls in curtained-off shower cubicles. The floors should have non-slip floor material.

**FIGURE 9.18**

**Shower room with space for a shower trolley**



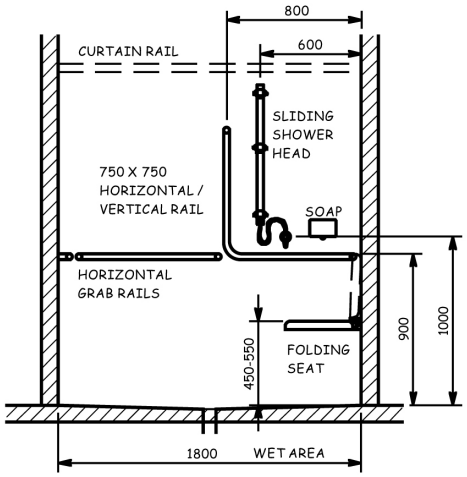

Shower rooms need enough space for carers and equipment in both wet and drying areas (see Figure 9.18).

- Wet shower areas: 1,800mm by 1,000mm
- Drying space: 1,800mm by 1,800mm or 2,200mm by 2,200mm if large mobile shower trolleys are used and for bariatric clients.

Mobile shower trolleys vary in size, but are usually 600-750mm wide and 1,500-2,200mm long. The drying space needs to be at least 2,200mm by 2,200mm

**FIGURE 9.19**

**Shower room fittings**



to move most shower trolleys into position. Less space may be needed when using smaller shower trolleys.

For shower room fittings the following features are desirable (see Figures 9.18 and 9.19):

- A hinged drop-down seat in the shower cubicle that is at least 600mm wide can help clients who are partially mobile. The seat can be hinged out of the way for clients who are walking or using commode chairs. A disadvantage is that hinged seats require regular cleaning and may impede mobile shower trolleys
- A fixed grab rail with horizontal and vertical arms near the shower seat can help clients to stand
- The shower should have a detachable, height-adjustable shower head and a hose at least 1,500mm long close to the shower seat. If a shower trolley is used, the hose needs to be at least 2,000mm long.

## Combined shower and toilet rooms

Combined shower and toilet rooms can be useful to carers, because they provide immediate access to a toilet if a client needs one while showering. A ceiling track hoist with a curved section around the bathroom will help carers to move clients between the shower and toilet more easily (see Figure 9.20). There are multiple options for laying out a combined shower and toilet room. It is most important to allow adequate space in showering and drying areas so that carers can use large equipment if required.

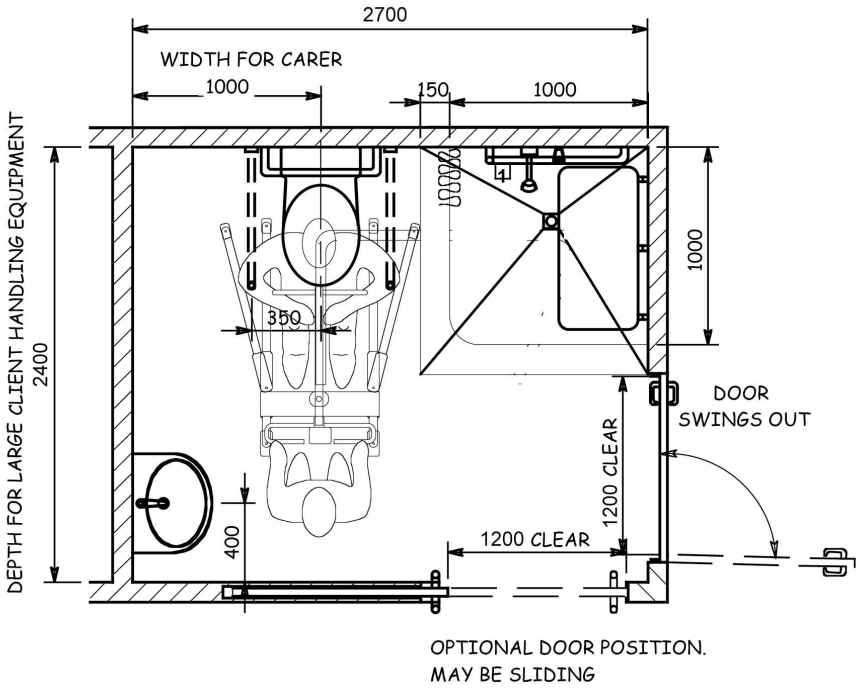
**FIGURE 9.20**

**Example of ceiling tracking through into bathroom**

Figure 9.21 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 2,700mm to 3,350 mm.

**FIGURE 9.21**

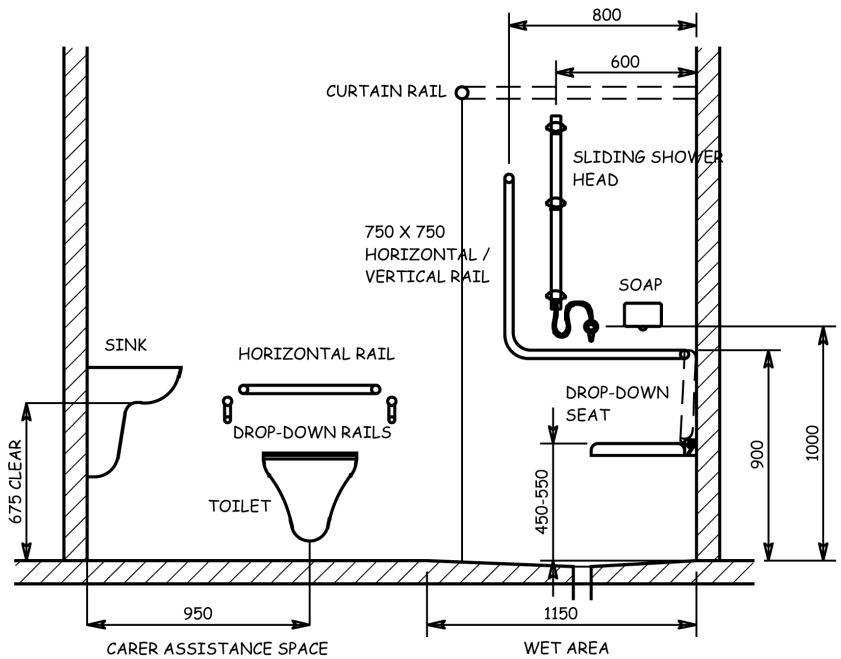
## Combined shower and toilet room




The recommended requirements for combined shower and toilet room fittings are shown in Figure 9.22. NZS 4121 *Design for Access* has further information on designing showers and combined shower and toilet areas for disabled people.

**FIGURE 9.22**

## Fittings for combined shower and toilet room

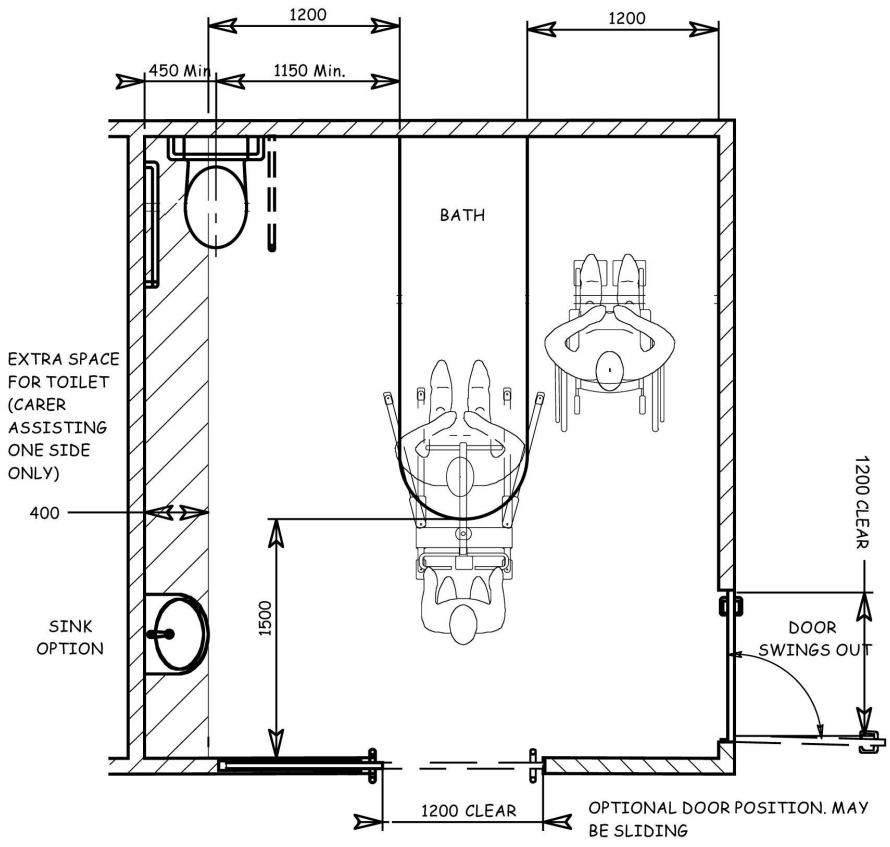


## Rooms with baths

As baths have been largely replaced by showers, few baths are installed in new and renovated healthcare facilities. If a bath is installed, the recommended dimensions for space are shown in Figure 9.23. Where feasible, install ceiling tracking. If ceiling tracking is not available, allow 1,200mm on both sides of the bath to move a person from a wheelchair to the bath using a mobile hoist. Consider mounting the bath on a plinth (300mm high), otherwise carers can find bending over the bath stressful on their lumbar spines. Have at least 150mm clear space underneath so that a mobile hoist can be positioned over the bath. Birthing pools need ceiling tracking above for handling and emergency evacuations.

**FIGURE 9.23**

**Layout for a room with a bath**



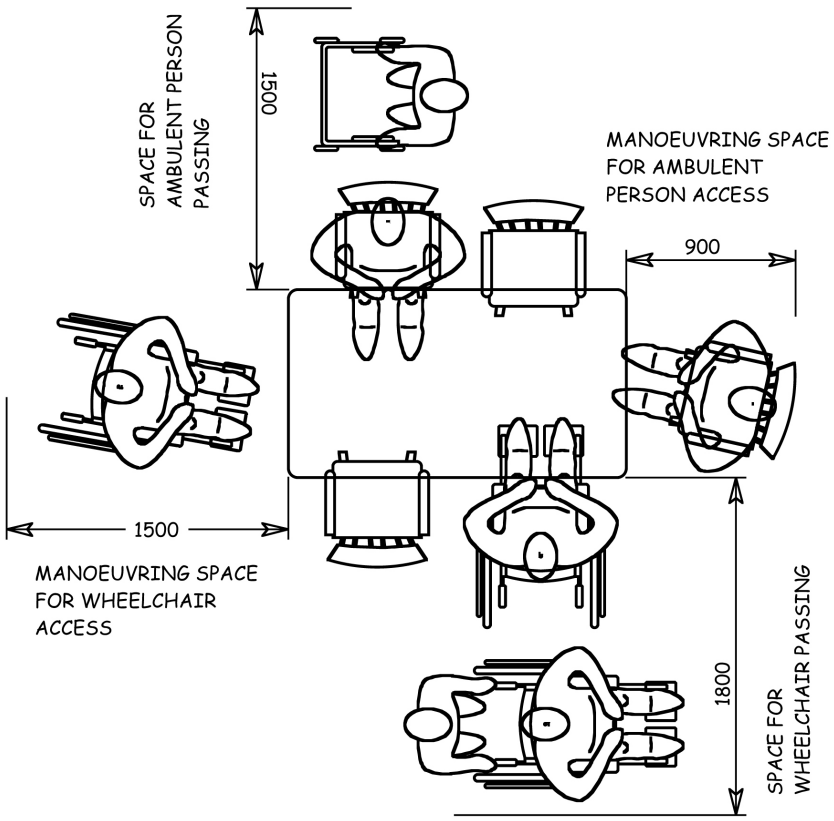
## Day and dining rooms

For day rooms and dining rooms, Figure 9.24 shows the typical spaces needed. Some key points are:

- Allow adequate space around chairs and dining tables so that clients 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 1,500mm wide so that clients and their carers 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.

**FIGURE 9.24**

**Spaces needed around furniture in day rooms**



## Clinical suites

Clinical suites are taken to include medical imaging suites, obstetric delivery suites, operating suites and mortuary and autopsy suites. The layout of clinical suites needs special consideration, as 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 1,200mm space on both sides of the bed to accommodate client handling equipment and transfer trolleys. If this is not practical, 700mm on one side of the bed and 1,200mm on the other may be sufficient – facilities for bariatric clients should allow 1,500mm on both sides of the bed
- Clinical suites should have double-opening doors. Doorways need to be at least 1,500mm wide to allow for equipment items
- The pathway from the door to the main care area should be at least 1,500mm wide
- Allow at least 1,200mm clear space at the foot of the bed
- Keep all equipment away from clear spaces, or put equipment on castors to allow it to be moved easily.

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

## Other client handling areas

There are several other areas that may need to be included in the design of client handling spaces. These include lifts in multi-storey buildings, external access to buildings and outdoor areas such as gardens.

**Lifts**: Key elements to be considered for lift design include:

- 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 levelling between lift floor and external floor – it should not create a trip hazard

- The horizontal width of the gap between the lift floor and the external floors, relative to the diameter of the wheels of mobile client handling equipment, including lifting machines and beds – allow for smooth movement.[15]

**External access to buildings**: Consider building access and exit points for people and vehicles to reduce client handling and other risks. For pedestrian access, staff, clients and visitors need easy access from car parks and from public transport. Main entrance doors should be useable by all types of mobility equipment, including wheelchairs, walking frames and electric scooters. Two specific features to assist access are automatic opening doors and covered entrances at ground level. Enquiry or reception areas should be located at main entrances to assist people in wheelchairs and using other mobility equipment.

When planning for vehicular access, identify the types of vehicle that need access. These might include ambulances and other emergency vehicles, client and staff vehicles, funeral cars and vehicles used by suppliers of goods and services. Planning for appropriate vehicle access needs to take into account vehicle turning circles. Vehicle access points to buildings should be separate from the main pedestrian access points to buildings. Vehicle access areas should provide sufficient space for the use of large equipment such as wheelchairs, stretchers and trolleys.

**Outdoor areas**: Some facilities provide clients and staff with access to outdoor areas such as gardens and courtyards. These should function effectively from staff safety and quality of care perspectives. In aged-care and community settings, outdoor areas are important for the wellbeing and mobility of clients. A safe environment for clients increases their mobility and reduces the potential risks to employees. If adequately designed, such areas have high therapeutic value, providing opportunities for walking, recreation and sitting space, particularly for people with dementia and those in disability housing.

Carers may be involved in the following tasks in an outdoor setting:

- Pushing wheelchairs and other equipment
- Assisting with transfers to and from seating
- Assisting walking
- Assisting clients involved in activities such as gardening.

Check outdoor environments for the following hazards that may create risks:

- Access doors that present barriers such as raised steps
- Paths or doors that are too narrow, not providing space for clients and their mobility equipment and carers
- Steep slopes, ramps and stairs, particularly for mobility aids and wheeled equipment

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

- Uneven or rough ground surfaces causing trip hazards and obstacles for wheeled equipment
- Courtyards that are too small for the number of people likely to use them
- Outdoor furniture that is too low and difficult for clients to get into and out of
- Sharp foliage, poisonous plants and water displays, which may present risks to people with dementia.

## Staff and client call systems

Providing staff and client call systems can play an important role in the handling of clients, particularly in emergencies. During the planning of new buildings, ensure that adequate call systems are installed. During renovations, consider upgrading call systems. Plan the locations of call buttons to facilitate ease of use and reduce awkward postures.

In toilets, where drop-down grab rails are installed on both sides of a toilet, the call button should be accessible whether the grab rail is down or folded away. Two call buttons may be needed.

In bedrooms, call buttons should be accessible for use on either side of the beds and turn-off switches should be located with easy access for staff.

In showers, call buttons must be located at a height that is accessible by a person who has fallen.

In clinical and treatment rooms, call buttons should be located so that they are easily identifiable and accessible by staff and clients.

## 9.7 Equipment storage

The number of storage areas, and where they are located, depend on the layout of the main facility rooms and on the types of moving and handling equipment used. Some things to consider when planning storage areas are:

- Allow space for both large and small items of equipment
- Storage areas need to be located in the ward or unit, within 2,000mm of handling areas and within 1,000mm of a supervisor station
- Storage areas should not block or reduce access ways
- Doorways should be at least 1,200mm wide for storage areas for large equipment items such as mobile hoists.

For mobile and standing hoists and other battery-operated equipment, it is important to ensure that such equipment is stored close to where it will be used. If it is stored too far away, carers may be reluctant to use the equipment because of the increased time to access it. Such equipment should be available within 2,000mm of its primary area of use. A preferred option is directly off a main corridor in a recessed alcove with a power supply. Any equipment accessories, such as slings for hoists, must be in the same place to reduce the time needed to access the equipment.

The amount of space needed for storing equipment depends on what equipment is needed and how many items there are. Workplace profiles can help to identify storage needs.[16] Although each ward or unit in a large facility may have somewhat different equipment items, standardise storage areas as much as possible across units or wards so that when staff rotate 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 storing damaged equipment. Moving and handling equipment should be well maintained, and repaired or replaced when damaged.

### Storage layout

There are several options for configuring storage areas such as a storage room or recessed bay in a corridor. Storage layout should provide easy access to the equipment being stored. Ensure that equipment storage does not obstruct clear spaces in corridors. Storage design options include:

Long, narrow storerooms with aisles down the middle and space on the walls for storage are generally better than square storerooms, where it is often hard to retrieve items near the walls as the middle of the rooms can become cluttered with equipment

Storage bays accessible from the corridor can be an effective option for storage, instead of building a room

Shelving that is height adjustable allows for flexibility in the items to be stored.



16. For residential care, a reasonable benchmark for equipment storage is to allow one square metre per resident.

## 9.8 Maintaining working spaces for client handling

A key maintenance task for staff is to ensure that areas used for moving and handling remain free of stored furniture and other items that reduce the working space. Ongoing routines should involve the removal of items that impede clear space. Suggested procedures are noted below.

**Bedrooms**

- Keep client bedrooms tidy and free of clutter
- Create a permanent clear passage from the foot of the bed to the door, so there is always clear access to move equipment from the door to the bed
- In small rooms where space is at a premium, attach castors to the furniture so that it can be easily moved out of the way during moving and handling tasks. For chairs or beds with wheels, brakes should also be fitted
- Make sure that beds are height adjustable
- Make sure that chairs have armrests to help client transfers
- Try to locate clients who need to use wheelchairs close to day and dining rooms to minimise the distance they have to travel
- Provide plenty of electrical sockets, to prevent trailing leads.

**Toilets, showers and bathrooms**

- If toilets are small, inaccessible and difficult places in which to perform client handling tasks safely, consider using other toileting methods such as commodes, pans and bottles.
- If the shower or bathroom is too small and inaccessible for large moving and handling equipment, consider bed bathing until an alternative is found, or using a shower chair that can be pushed into the shower or bathroom
- Install grab rails in toilets, showers and bathrooms to encourage clients to stand and sit independently.

**Corridors and doors**

- Check that corridors and access routes are free of items that restrict minimum recommended widths
- Ensure that items are not stored behind doors that can prevent them fully opening
- Install continuous handrails along corridors and stairs
- If thresholds or stairs impede wheeled equipment, fit temporary ramps to eliminate the risks associated with lifting equipment over thresholds.

## 9.9 Facility design for bariatric clients

Healthcare and other facilities providing care for bariatric clients need to provide adequate spaces for these clients. Any facility design should take into account both the current demographic profile of clients and changes that may occur in the future. Such planning should take into account SWLs and requirements for large people. Planning for a bariatric client'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.[17]

Increased door clearances and storage spaces are also necessary to accommodate oversized wheelchairs, stretchers, trolleys and beds, as well as mobile hoists. Although 1,500mm has been recommended as the design standard for doorway widths, larger doorway widths may be needed for diagnostic and treatment rooms, inpatient rooms and surgical suites in areas where bariatric clients are treated.

For client rooms, increase the space for each room by approximately 10 square metres above the size of a standard room, and provide for a 1,750mm clearance around beds. This additional room space is necessary for specialised equipment such as wheelchairs and mobile hoists, as well as for additional nursing staff required to care for bariatric clients. If ceiling tracking is fitted into areas for bariatric care, ceilings require additional steel reinforcement to be designed into the structure.

In bathrooms, bigger shower stalls should feature heavy-duty hand bars. Other options for showers are multiple handrails, large seats and hand-held showerheads. Large toilet seats are also needed. 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 sized to allow for staff assistance on two sides of clients at the toilets and showers, for cases where both large people will be transferred and large equipment is needed.

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

## 9.10 Overview of upgrading facilities

For facilities with limited resources, and for home-based care, upgrading existing facilities is often the most feasible option to make existing workspaces safer for both clients and carers. This part provides an overview of facility upgrading, describes the assessments of existing spaces as part of planning upgrades, and outlines some strategies for upgrading facilities.

In many cases it may be feasible to modify existing buildings and spaces to allow more effective moving and handling of clients. For large organisations, such as facilities operated by DHBs and private hospitals where extensive renovations or new buildings are being planned, the design features covered earlier in this section may prove to be most relevant.

Where existing facilities pose difficulties for moving and handling people, the upgrading of facilities and spaces leads to improvements in client care and carer efficiency. Design improvements are likely to decrease client care costs substantially, despite the initial set-up costs for modifications and equipment. For home care clients, it may mean that the clients can remain at home rather than move into managed care facilities. It may also reduce the number of home visits, or the time requirements of carers making home visits. Estimates of the payback time from the costs of facility upgrading and moving and handling equipment range from two to four years.

**BOX 9.5**

**Example of building modifications reducing injury risks**

The case described below illustrates how a simple redesign of flooring reduced risks to staff at a facility in Australia.

'WorkCover NSW undertook a study to investigate serious shoulder injuries associated with moving a loaded mobile lifting hoist between a bedroom and an ensuite. The study found that injuries were caused by the high forces involved in pushing the hoist over a ridge in the floor (an edging strip between the carpet of the bedroom and the vinyl of the ensuite). Due to the narrow doorway into the ensuite (740mm) the staff member needed to stop the hoist at the entrance and carefully pull it through the door to avoid a striking risk. The resultant pull force measured 44kg, which exceeded maximum limits for initial force recommended by Snook. Redesign of the floor coverings to ensure flat joins between different floor types, combined with a wider doorway, would reduce risks for staff moving a loaded hoist from bedroom to ensuite.'

Source: WorkSafe Victoria, 2007, p. 38

There are also likely to be other benefits, such as improvements in the quality of care, increased carer morale and decreased associated costs. There are also potential benefits for clients. Cost savings have been estimated to be as high as five times the upgrading and equipment costs, but more commonly are around two times.[18]

18. Cohen et al, 2010, p. 43.

Examples of design features that may be included when upgrading facilities are shown in Table 9.3.

**TABLE 9.3 IMPROVING FACILITY DESIGN AND FUNCTION IN EXISTING FACILITIES**

| Type of facility development | Examples of design features for moving and handling people |
|---|---|
| Upgrading an existing facility | Ceiling tracking installed<br>Providing access for mobile hoists<br>Installing handrails<br>Doorways widened<br>Bathrooms re-designed<br>Equipment storage areas added |
| Specific modifications to small units and homes | Ceiling tracking installed<br>Increasing space to accommodate equipment in toilet and shower areas<br>Providing access for mobile hoists<br>Providing ramps to bypass stairs<br>Installing handrails |

Opportunities for modifications to buildings and facilities may also arise where a hazard or other problem for moving and handling is identified. When building renovations are planned for other purposes, there can also be opportunities to include changes to improve moving and handling and reduce hazards and injury risks.

## 9.11 Assessing existing spaces for upgrading

A key phase in building and facility renovations is to carry out a review and assessment of the existing spaces in terms of their suitability for moving and handling. The main features relevant to assessing existing spaces for building renovations are likely to include:

- The current mobility profile of clients
- An inventory of existing moving and handling equipment
- What additional equipment is required for improving client mobility and carer safety
- Spaces required for moving and handling
- Modifications needed to existing spaces
- Future-proofing the facility for changes in types of client or facility use.

### Client profile and renovations

Information about assessing client mobility is included in Section 3 Risk assessment. If the renovation is for a single client living at home, the assessment will include:

- The current mobility of the client
- Any changes in client mobility or profile
- The extent to which carers will be required to assist the client, and what equipment will be needed for that.

It is also useful to look at the number and costs of carers needed compared with the potential costs of equipment or renovations. Sometimes it will cost less to upgrade facilities and procure suitable moving and handling equipment.

For small and medium facilities, such as those catering for 10-20 clients, a client profile will be needed. The client profile should include:

- An assessment of the mobility status and cognitive status of clients
- An inventory of existing moving and handling equipment
- Possible future purchases or acquisitions of new equipment based on the mobility profile of clients.

Descriptions of moving and handling equipment are included in Section 7 of these Guidelines.

## Client destination assessment

One approach recommended for planning spaces for moving and handling is described as a 'client destination assessment'.[19] This involves identifying the destination points for clients to which they need to be moved. There are two types of client destination points:

1. Those used by carers to provide client care
2. Those used by clients for involvement in activities and relationships that are important to them.

Information on the reasons for client movements and the destinations to which clients are moved can then be used to:

- Identify any changes needed to spaces to ensure they are suitable for the types of equipment needed for moving and handling
- Develop a facility upgrade design that supports the equipment needed and encourages self-mobilisation of clients to maintain and improve client functioning
- Plan the types of space that assist carer efficiency by reducing turns and travel distances along the routes to the most frequent destinations
- Identify floor coverings, handrail locations and rest areas that encourage both the assisted movement of clients and client self-mobilisation.

For specific medical and residential care facilities it may be useful to distinguish short-stay, acute-care rooms and spaces from long-stay residents' rooms and spaces, bearing in mind that these may change. One practical way to carry out the assessment is to walk the route with the equipment and client, noting all the risks and difficulties encountered along the way. Identify redesign solutions for each of the hazards and risks encountered. In large facilities, the functions of rooms and spaces may change considerably, so future proofing should be considered.

**Short-stay, acute-care rooms and spaces**

In short-stay care facilities, such as acute-care hospitals and rehabilitation facilities, movements to specific destinations usually start from clients' rooms. Client movements between locations may be by wheelchair, stretcher or hoist. The following destinations may be relevant for the assessment process:

- Toilets
- Bathing and showering areas
- Changes in clients' rooms owing to changes in acuity or preparing for client discharge
- Diagnostic and testing areas for examination

19. This section has been adapted from Cohen et al, 2010, p. 35.

- Surgical suites
- Therapy areas for group support and therapy
- Lobby, cafeteria, vending machines and outdoors for visiting, exercise, food and a change of scenery.

**Long-term-care resident rooms and spaces**

In long-stay client facilities, such as chronic care hospitals and residential care facilities, the following activities may require transport by wheelchair or hoist to particular destinations:

- Toilet in a private or shared bathroom
- Bathing and showering in an adjacent room or a shared facility
- Dining in a shared dining area
- Meeting places for residents and groups such as family, friends and organisations
- Exercise spaces that may be outdoors, exercise rooms or group exercise spaces
- Examination and treatment rooms and spaces
- Special interest activities, such as craft rooms, kitchen and chapel
- Socialising, such as tearoom, lounge, outdoors and corridors (by walking or assisted movement)
- Therapy, such as physical, occupational and speech therapy areas.

## Modifications needed to existing spaces

As part of the assessment process, it is useful to consider the specific types of modification and feature that may be needed to reduce hazards for moving and handling. Table 9.4 lists some of the common types of modification that are likely to improve moving and handling operations.

**TABLE 9.4 EXAMPLES OF SPECIFIC MODIFICATIONS TO FACILITATE MOVING AND HANDLING**

| Type of modification | Purpose of modification |
|---|---|
| Doorways widened | Improve access for wheelchairs, mobile hoists and electric beds |
| Door sills and steps removed or bypassed | Improve access for wheelchairs, mobile hoists and walking frames |
| Handrails fitted | Improve safety in bathrooms, showers and toilets |
| Floor coverings or separators changed | Improve mobility for wheelchairs and mobile hoists or improve infection control |
| Electrical wall plugs installed | Access for charging batteries on mobile hoists and wheelchairs or installing electric beds |
| Room layout changed | Improve access for wheelchairs, mobile hoists and electric beds<br>Space requirements for manoeuvring equipment<br>Provide storage space for equipment |

Following a moving and handling needs assessment, specific modifications are planned, which include details of the changes needed in the building and client spaces to use the equipment required for moving and handling.

## 9.12 Strategies for upgrading facilities

There is a series of steps needed in the process for planning and implementing renovations in healthcare facilities (see Box 9.6). These steps can be adapted to suit the scope and budget available for a specific renovation project.

For housing modifications, the Ministry of Health provides details about application procedures through the website 'accessable' (www.accessable.co.nz). It also provides a process document for complex housing modifications.[20]

**BOX 9.6**

**Example of steps for renovation of health facilities**

1. Perceiving the problems and determining that they are solvable
2. Appointing a medical facilities consultant and a building designer (such as an architect)
3. Assessing the facilities to identify precisely the renovation needs
4. Prioritising the facilities and the work to be done in them
5. Establishing a budget not only to cover the costs for the proposed renovations but also for unanticipated work that arises during the renovations
6. Agreeing with the stakeholders in each facility on the renovations needed
7. Developing designs and technical specifications with cost estimates
8. Contracting the construction work to private agencies or a government department
9. Supervising the construction and responding to unforeseen changes
10. Confirming that the construction has been carried out as was designed and specified
11. Installing equipment and commissioning (starting to use) the renovated space
12. Formal inauguration of the facility.

Source: Mavalankar & Abreu, 2002, p. 26

As well as the technical features for new building design and building renovations, some key steps to include when planning building renovations are:

- The formation of a project planning group to steer the project and solicit input from key staff and user groups. This group should include a moving and handling specialist and the health and safety manager. For a client living in their own home, the client, family members, primary carers and the builder may need to meet to put a plan together
- Discussions with managers and staff regarding features needed for effective moving and handling, given the client profile of the facility or unit

20. See Ministry of Health, 2008.

- The identification of spaces and design features in the existing facility that need improvement
- The development of the draft plan for the new facility, or a list of changes needed
- Communication of the construction schedule or timetable to key user groups prior to and during the construction phase
- The development of a plan for maintaining services during renovations
- Planning a post-occupancy review report after the renovations have been completed and the area is fully operational. This report should be archived and used for future projects as a guide or reference.

## Maintaining services during renovations

Undertaking a major building construction or renovation project at a health facility is a challenge that can be fraught with unanticipated events that can disrupt services and have major impacts on staff and clients. For a facility and its associated services to continue functioning adequately during a building or renovation project, a detailed transition plan is needed to allow staff to continue to deliver quality care in an efficient manner.

Many project managers spend a great deal of time on architectural and construction planning. The transitional planning for service delivery that is essential to a project's success can easily be overlooked, especially in terms of impacts on clients, staff and others. Failure to plan for transitional operations during a renovation project can result in substantial increases in staff workloads, delays in scheduled service delivery and delays in the renovation timetable, all of which can compromise client quality of care.

Before completing a renovation plan that involves building modifications, consider the interim moves and adjustments that may be required for the continued operation of units and services. Once the construction timetable has been prepared, develop a detailed plan of how the facility's services will function during each step of the construction process. Which rooms will be functional during each phase? What equipment will be out of service during each phase? What contingency plans (such as equipment loans and rentals) are needed to maintain functionality? What is the project's impact on client admissions, care and discharges? If the client is living in their own home, do they need to be moved into suitable accommodation while renovations are in progress to enable them to use the toilet and shower?

Communication is a key aspect of transition arrangements. Renovation projects involving multiple units require detailed planning to ensure effective communication with all affected groups. Disseminate a detailed move sequence for all units that require relocation prior to construction starting. Update the sequence during

construction as needed. This will enable support services that work with the affected units to plan for the move as well.

Some key issues to consider for a services' transition plan are:

- What aspects of the shift from the existing system to the completed renovations will be conducted by outside movers, equipment suppliers and internal staff or units?
- How, when and where will new equipment, furniture, fittings and signage be installed, inspected and inventoried?
- How will carers be trained in the use and maintenance of the new equipment?
- How will you brief staff about the new space, equipment and operational systems?
- How will you notify clients, staff and families of the changes?

## Post-occupancy review

Once the building modifications have been completed and the new premises occupied, it is useful to carry out a post-occupancy review. Most new facilities have teething problems, such as lack of signs, fittings located in the wrong positions, and features that have not been finished properly.

When carrying out a post-occupancy review, develop a running list of issues, encouraging all staff to contribute. Conduct a formal post-occupancy assessment involving both user groups and the designers. Note positive and negative aspects of the new facility, and note which features need post-occupancy modifications. Transfer knowledge gained to other user groups and design projects. Key stakeholders should formally contribute to the review and archive the report for future reference.

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