A GUIDE TO DESIGNING WORKPLACES FOR SAFER HANDLING OF PEOPLE

FOR HEALTH, AGED CARE, REHABILITATION AND DISABILITY FACILITIES

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PUBLIC SECTOR AND COMMUNITY SERVICES

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WorkSafe Victoria is a trading name of the Victorian WorkCover Authority.

INTRODUCTION

ABOUT THIS GUIDE

There is significant correlation between the layout and design of a workplace and the risk of injury. This Guide has been developed by industry for industry to improve knowledge about reducing risks to staff safety through good design practices. Undertaking renovations or building new facilities is an ideal time to incorporate occupational health and safety (OHS) considerations into the planning process and eliminate hazards at the source.

This practical Guide is specific to the health, aged care, rehabilitation and disability sectors and focuses on reducing patient handling risks through good design. It is based on the 1999 edition of *Designing Workplaces for the Safer Handling of Patients/Residents*. The recommendations regarding the allocation of space are based on what is needed to perform the patient handling activities safely.

An important feature of this Guide is the inclusion of an effective consultation process with employees and health and safety representatives (HSRs) during the planning phase.

BACKGROUND INFORMATION

Injuries in health, aged care, rehabilitation and disability services due to the handling of people remain a major OHS issue in Victoria. WorkSafe Victoria statistics indicate that in 2006/07 in Victoria, the health sector has accounted for approximately 8.5% of all claims within the WorkCover Scheme.

For workers, this can mean personal pain and discomfort which sometimes lasts for years, affecting not only their work but everyday lives, families and relationships. For employers, this type of workplace injury may lead to WorkCover claims, increased premiums and other indirect costs that may also affect morale. Furthermore, employers face the risk of possible legal action for workplace injuries.

	HEALTH SECTOR*	INDUSTRIES OTHER THAN HEALTH
Musculoskeletal disorder	71.2%	54.8%
Back injuries	31.8%	22%
Manual handling related	58.9%	43.9%

Table: Injury statistics in the Victorian health sector – proportion of claims (Source: WorkSafe Victoria claims data 2005/06)

**The health sector includes hospitals (private and public), psychiatric hospitals and aged care facilities.*

INTRODUCTION

The implementation of back injury prevention programs based on 'No Lifting' principles[1] has systematically occurred across the health sector in Victoria, resulting in a significant reduction in musculoskeletal disorders associated with people handling. Poor workplace design has been identified as a major obstacle to the implementation of such programs in some workplaces. Hence, there is a clear opportunity to achieve further benefits by getting the design right.

Research has shown that workplace design is a major contributing factor to:

- employee health and safety;
- efficiency and functionality of the workplace; and
- quality of care for patients.

In relation to workplace design and people handling risks, research concludes that key areas of concern are:

- bedrooms;
- bathrooms and ensuites;
- corridors; and
- living areas.

These are the areas where most people handling related tasks occur. Getting the workplace design right will help to reduce risks for staff and optimise quality of care for patients.

Below are some examples of how workplace design can influence staff safety:

- Restricted space in the ensuite may lead to constrained and awkward postures to assist a patient during toileting, or problems with manoeuvring hoists.
- Carpet in the corridor, bedroom or other areas where patient handling or transfers occur may lead to higher forces when moving wheeled equipment.
- Inadequate storage space may make it difficult to access equipment and lead to corridors being cluttered with excess equipment.

While there is considerable guidance available for the design of health facilities, information specifically relating to the design requirements for safe people handling remains limited. For example, the *Building Code of Australia* addresses questions of access for independent disabled persons, but does not consider the additional needs of access for dependant disabled persons and their carers.

This Guide provides information on how good workplace design can reduce people handling risks in health, aged care, rehabilitation and disability services. It complements a number of related WorkSafe Victoria publications, including:

- *Transferring People Safely;*
- *Designing Safer Buildings and Structures;*
- *Working Safely in Visiting Health Services;*
- *Working Safely in Community Services; and*
- *Design 4 Health.*

This Guide also supports a number of design standards and codes developed by other Government agencies associated with workplace design (refer to Appendix B, References).

1. *The occupation most likely to suffer injury within the health sector is nursing. Nurses accounted for 43.3% of all claims and 49.3% of all back claims in the health sector during 2005/06. In 1998, the Australian Nursing Federation (Victoria Branch) implemented a No Lifting policy. No Lifting principles now represent a state of knowledge which has achieved a change in manual handling practices throughout the health sector. No Lifting programs have been supported by the Government and extended across all disciplines where patient handling occurs, including allied health.*

SCOPE AND TERMINOLOGY

This Guide **does** provide information relating to:

REDUCING PEOPLE HANDLING RISKS IN HEALTH, AGED CARE, REHABILITATION AND DISABILITY FACILITIES USING GOOD WORKPLACE DESIGN

This Guide **does not**:

- replace building design standards and codes;
- comprehensively cover other OHS risks associated with design, e.g. materials handling, aggression, emergency response, hazardous substances;
- address design issues in non-people handling areas, e.g. kitchens, stores, laboratories; or
- address design issues in the community.

This Guide is targeted at four main groups:

- designers of health, aged care, rehabilitation and disability facilities (this may include planners, architects, project managers, builders and user groups);
- managers and owners of these facilities;
- HSRs; and
- employees who handle patients, residents and clients.

The aim is to assist service providers, their employees and designers to develop new facilities and/or redevelop existing facilities in a manner that will reduce risks to staff who handle patients. The objective is to reduce the incidence of musculoskeletal disorders arising from people handling tasks.

A further aim is to provide compliance guidance to employers and designers under the *Occupational Health and Safety Act 2004* (the OHS Act), with regard to the design of structures and the requirement to consult widely on the design process.

Terminology

Throughout this Guide, the following terminology is used:

- **Bariatric** – an internationally accepted term applied to patients whose weight far exceeds recommended guidelines, and where body size restricts their mobility, health, or access to available services. Such patients carry weight that increases morbidity and mortality, and causes numerous care challenges.[2]
- **Building designer** – builder, architect, building design consultant.
- **Employee or staff** – direct care workers.
- **Employer** – owner, manager, person in control of a workplace.
- **Health care industry** – health, aged care, rehabilitation and disability sectors.
- **HSRs** – Health and Safety Representatives.
- **Materials handling** – handling of materials or equipment.
- **Manual handling** – people and materials handling combined.
- **OHS** – occupational health and safety.
- **Patients** – any person receiving healthcare, including clients and residents.
- **People or patient handling** – handling of people.
- **Transfer** – the activity of moving a patient.
- **The OHS Act** – the *Occupational Health and Safety Act 2004.*
- **The OHS Regulations** – the *Occupational Health and Safety Regulations 2007.*
- **AS 1428.1** – *Australian Standard 1428.1-2001 – Design for access and mobility: Part 1; General requirements for access – new building work.*

2. *Adapted from: Hahler, B. (2002)* Morbid Obesity: A Nursing Care Challenge, Medsurg Nursing *Vol 11/No. 2 pp.85-90.*

1 WHY MANAGE OHS?

Health care employers have a responsibility to comply with Victoria's health and safety laws. This includes duties to ensure the highest level of protection to employees, patients and others in the workplace.

Work practices that put employees at risk may also place patients at risk. For example, employees using unsafe patient lifting methods may sustain an injury as well as possibly injuring the client.

Management of OHS risks can ensure effective delivery of service as well as protecting employees and others. Under the OHS Act, employers are required to consult with employees and their HSRs as far as is reasonably practicable. Employees and HSRs are a valuable resource in planning an effective and safe workplace design because they know the work practices and workplace more intimately than anyone else. They can provide important information, useful knowledge and insights to ensure the design is both functional and safe, avoiding the need for costly alterations to newly occupied facilities. Consideration may also be given to consulting patients, but the importance of staff health and safety needs to be given high priority in design decisions.

Maintaining a safe and healthy workplace is also good for business. Effective health and safety systems help improve productivity, efficiency and service delivery. Those who work in a safe, healthy and supportive environment are more likely to remain at an organisation and are also better able to cope with work demands.

Recurring safety concerns have detrimental effects on any organisation. Thus health and safety should be part of an organisation's core business, business planning and performance management.

By making workplace health and safety a priority, an organisation demonstrates:

- commitment to the welfare of employees, clients and the public;
- social responsibility in regard to its legal, ethical and moral obligations;
- good management practice by proactively addressing health and safety issues, resulting in improved organisational performance; and
- sound financial management by addressing risks and preventing loss through illness and injury.

Providing and maintaining a workplace that is safe and without risks to health, so far as is reasonably practicable, is a legal requirement under the OHS Act and OHS Regulations.

WHAT THE LAW SAYS

To ensure work environments are safe and free from risks to health and safety, so far as is reasonably practicable, the OHS Act imposes a number of duties on those able to influence health and safety. This includes employers, those who have control of the workplace (i.e. an owner, a director or manager), designers, manufacturers and employees (including contractors).

The duties imposed upon employers, designers and other duty holders are subject to what is reasonably practicable. Under section 20 of the OHS Act, regard must be had to five matters to determine what is reasonably practicable:

- the likelihood of a hazard or risk eventuating;
- the degree of harm that would result if the hazard or risk eventuated;
- what is known, or ought to be known, about the risk and how to eliminate it;
- the availability and suitability of ways to eliminate or reduce the hazard or risk; and
- the cost of eliminating or reducing the hazard or risk.

It should be noted that while cost is an important aspect in building design, all factors must be considered when making decisions about safe workplace design. Many of the issues of practicability related to the design of health facilities and safe manual handling are addressed by this Guide.

Employers

Responsibility for providing a safe workplace rests with employers, as they exercise control over the workplace. Under the OHS Act and associated regulations, employers are expected to **eliminate** risks to health and safety at the source. If it is not reasonably practicable to eliminate the risks at the source, employers must do everything reasonably practicable to **reduce** the risks so far as is practicable.

Employers must also be proactive with regard to OHS in their workplaces. They must so far as is reasonably practicable consult with employees and their elected HSRs. Situations where consultation must take place are outlined on page 6 of this publication.

Employers also have obligations to persons other than employees (including clients, relatives, volunteers, members of the public) under the OHS Act. Persons other than employees cannot be expected to know the hazards or risk control measures in place at a workplace. As such, employers must ensure that persons other than employees are not exposed to health and safety risks arising from the conduct of their undertaking.

It is also the responsibility of the employer to ensure managers, co-ordinators and supervisors are capable of undertaking assigned health and safety responsibilities. These responsibilities may include making sure that:

- identified hazards and risks in areas under their control are managed;
- employees and HSRs are consulted on issues that could affect their health and safety;
- employees are properly trained, supervised and informed; and
- health and safety concerns referred to them are addressed without undue delay.

Designers

With the aim of designing safe workplaces, equipment and furniture, the OHS Act places duties on owners, employers and designers. There are also duties on designers, manufacturers, suppliers and installers to provide plant which is safe when used for the purpose for which it was made.

Section 26 of the OHS Act requires a person with management or control (to any extent) to ensure the workplace and the means of entering and leaving it are safe.

Section 27 requires a person who designs plant to be used in a workplace to:

- ensure the plant is designed to be safe and without risks to health;
- undertake testing and examination to ensure safety; and
- give adequate information to the users, including the purpose for which the plant was designed, the results of any testing and any conditions necessary to ensure plant is safe.

Section 28 requires people who design a building or structure (including builders, architects, building designers and architectural drafters) intended or likely to be used as a workplace to ensure that it is designed to be safe and without risk when the building or structure is used.

Sections 29, **30**, and **31** assign similar duties to manufacturers, suppliers and people who install, erect or commission plant.

Designers may also include those making decisions during the process of designing, preparing construction documentation or tendering, and may include engineers, interior or industrial designers and contractors.

Consultation

Under the OHS Act, employers must consult with employees and HSRs. This consultation process includes the design of buildings and decisions about the structure, plant, equipment and work practices to be undertaken.

Employers must consult, so far as is reasonably practicable, where employees are likely to be directly affected, in:

- identifying or assessing hazards or risks;
- making decisions about:
  - measures to control risk
  - adequacy of facilities for employee welfare
  - resolving health and safety issues
  - monitoring employee health and workplace conditions
  - providing information and training to employees
- determining membership of any health and safety committee; and
- proposing changes that may affect the health or safety of employees to any of the following:
  - the workplace under the employer's control
  - plant, substances or other things used at the workplace
  - conduct of work performed at the workplace.

The consultation process must give employees a reasonable opportunity to express their views and employers need to take their opinions into account, including when making decisions. If employees are represented by a HSR, the consultation must involve that representative.

Managing risks from manual handling

Manual handling covers a wide range of activities including lifting, lowering, pushing, pulling, holding, throwing, carrying and repetitive tasks such as typing, sorting, assembling and operating equipment. In health care, patient handling makes up a large proportion of manual handling and causes many musculoskeletal disorders. Health care staff can be exposed to high force while lifting, holding, restraining or assisting clients, or pushing, pulling and lifting equipment and furniture. Awkward postures and movements can be involved, such as bending and twisting the back or repetitive and sustained poor postures of the shoulders, arms and hands to treat patients and assist them to move and walk.

Under the OHS Regulations, hazardous manual handling refers to the handling of people, or tasks requiring force, awkward and repeated postures and movements and handling unstable, unbalanced or difficult to hold loads. They require all hazardous handling to be identified, in consultation with the HSRs and employees performing the task, and controlled as far as is reasonably practicable. Some tasks are known to be hazardous, such as lifting patients and transferring patients who are unable to assist from bed to a chair, and controls are widely known in the industry.

CASE STUDY

An investigation into the pulling forces required to slide a patient from bed to trolley was undertaken.[3] Researchers found that forces were reduced by almost a third when a combination of a full length slide board and a slide sheet were used (rather than pulling across a slide board on a cotton sheet). The study also concluded that transfers of adult patients from beds to trolleys should be performed by a team of at least two people standing side by side to ensure pulling forces are within recommended limits.

The OHS Act also requires designers, manufacturers and suppliers of buildings and equipment to provide a safe environment for manual handling. There is a strong state of knowledge about good design of environments such as hospitals, and equipment for patient handling and transport. This means the health, aged care, rehabilitation and disability sectors should have knowledge of and be able to comply with, good design principles, so far as is reasonably practicable, as required by the OHS Act.

3. *McFarlane, D. (2003)* Measurements of the forces needed to transfer patients from beds to hospital trolleys. *WorkCover NSW.*

2 GETTING IT RIGHT IN THE PLANNING STAGE

THE LINK BETWEEN OHS AND DESIGN

There is a strong link between the layout and design of a workplace and the risk of staff injury. Research commissioned by the former National Occupational Health and Safety Commission (NOHSC) – now the Australian Safety Compensation Council (ASCC)[4] – examined the contribution that the design of machinery and equipment has on the incidence of fatalities and injuries in Australia. The study indicated that:

- 37% of workplace fatalities definitely or probably had design-related issues involved; and
- design contributes to at least 30% of serious non-fatal workplace injuries.

The study concluded that inferior design is a significant contributor to work related death and serious injury in Australia.

More relevant to the health industry, a recent Canadian study on the economic benefits of overhead ceiling hoists[5] compared a three-year pre-intervention period with a three-year post intervention period and reported reductions in claims numbers and costs. The overhead ceiling hoist had the most impact on lifting and transferring patients, with a 67% reduction in these types of claims. A cost-benefit analysis indicated that it would take two-and-a-half years to pay back the initial investment in the equipment and then continue to generate benefits based on reduced injuries.

A study conducted by WorkCover South Australia[6] demonstrated the relationship between factors such as the availability of mechanical aids and the impact of awkward postures with claims rates. With regard to mechanical aids, the study reported:

- other things being equal, claim rates for employees at workplaces with high levels of aids availability are less than those for employees at workplaces with low levels of aids availability.

The study also found an almost direct relationship between an increase in awkward postures and an increase in claims rates. The report states that, on average:

- as the working space available increases, the level of awkward moves decreases;
- as the availability of suitable well-maintained aids improves, the level of awkward moves decreases; and
- as the proportion of time on slippery/wet floors tasks increases, the level of awkward moves increases.

4. *NOHSC (July 2004)* The role of design issues in work related injuries in Australia 1997–2002.
5. *Chokar R, et al. (2005)* The three year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries, *Applied Ergonomics 36*.
6. *WorkCover Corporation South Australia (2003)* Workplace Environment Study, Industries: Aged Care and Hospitals.

GETTING IT RIGHT IN THE PLANNING STAGE

A common theme in the research about reducing injuries in the health sector is the role that safe design plays. It is reasonable to conclude that design is critical to reducing lifting/transferring injuries and that it accounts for a significant part of the benefits realised.

In the health industry, the layout and design of the physical environment may impact on a range of OHS issues such as:

- **manual handling**, e.g. if the bedroom door is too narrow for a bed to move through, risks arise from dismantling the bed or turning it on its side to get it into the room;
- **slips, trips and falls**, e.g. if the join at the change in floor surface has a lip, trips and falls may occur;
- **striking and collisions**, e.g. if the corridor linking the operating theatre with radiology is too narrow, two beds may not pass easily resulting in potential collisions and inefficiency;
- **emergency response**, e.g. if the corridors are cluttered with excess equipment due to a lack of storage space, this may impede safe evacuation in the case of an emergency;
- **aggression**, e.g. if the counselling room for persons with a behavioural disorder has only one exit, a staff member may be at risk of physical abuse; and/or
- **hazardous substances**, e.g. if the ventilation systems in a laboratory are not properly designed, this may place staff at risk of exposure to hazardous substances.

This Guide will focus primarily on people handling risks and design. However, many of the generic processes discussed are transferable to other OHS hazards during the design process.

THE BENEFITS OF SAFE DESIGN

The opportunities to create safer workplaces are most cost-effective when captured in the earliest phases of the design process. The most effective risk control – eliminating the hazard – is often cheaper and more practical to achieve at the planning stage, rather than making changes later in the lifecycle when the hazards become real to staff or patients. The direct costs associated with unsafe design can be significant, for example:

- retrofitting;
- workers' compensation claims and premiums; and/or
- negligence claims.

Since these costs have greater impact on parties further 'down-stream' in the design process (i.e. they impact the health care service provider and staff more than the designer), the incentive for these parties to influence and benefit from safe design is also greater. This is not always understood or appreciated, especially when there is time pressure to get a building project completed.

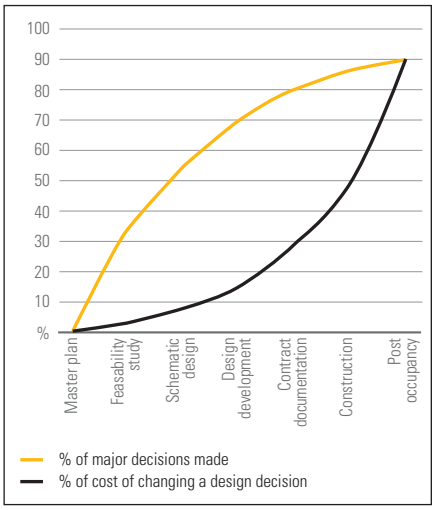
A safe design approach always results in many benefits, including:

- prevention of injury and disease;
- improved functionality of the work area;
- increased productivity and efficiency;
- compliance with OHS legislation;
- reduced costs; and
- innovation, as safe design demands new thinking.

For OHS to be taken seriously during the design process, designers and decision-makers should understand the link between OHS and design and the potential positive outcomes that may be delivered.

"It's a lot simpler to change a line on a plan than to alter a finished building."

GETTING IT RIGHT IN THE PLANNING STAGE



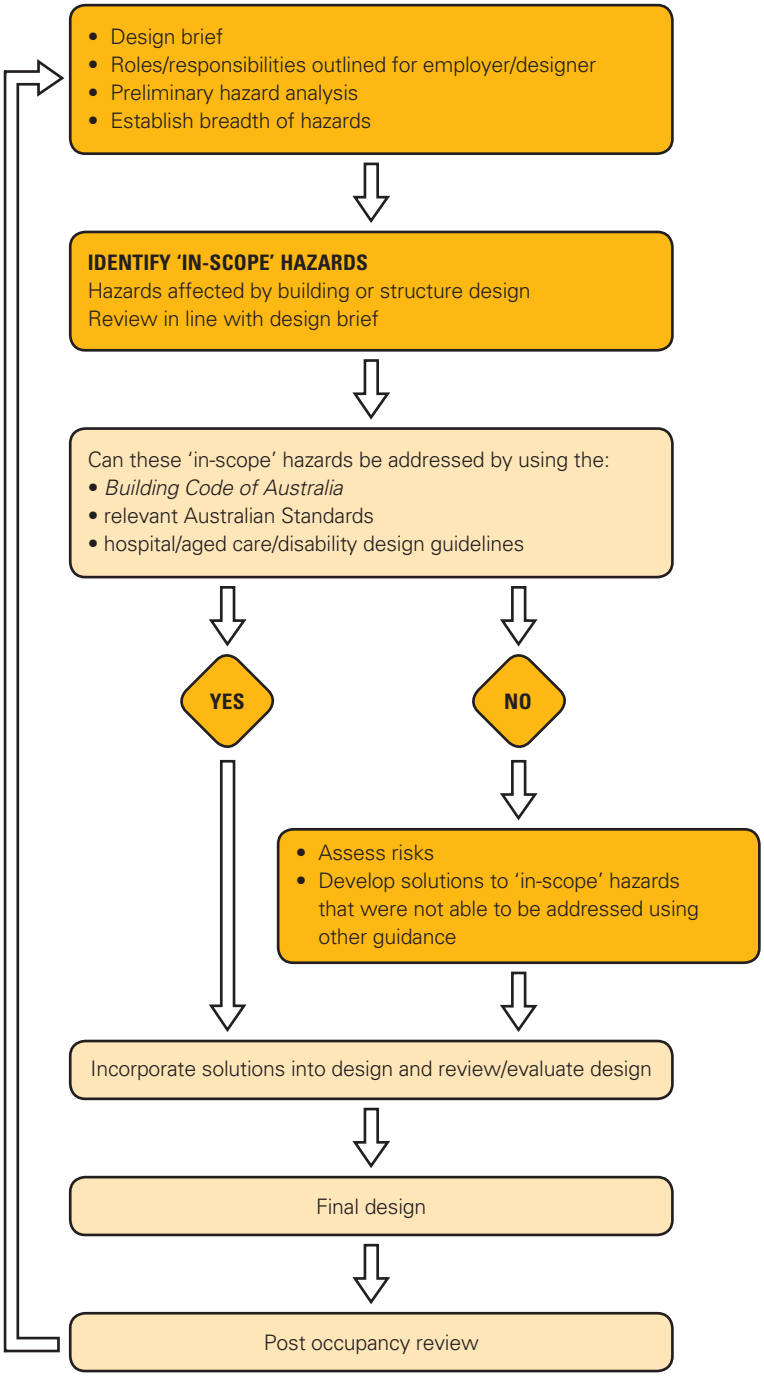
INCORPORATING OHS INTO THE DESIGN PROCESS

Eliminating hazards by good design involves incorporating OHS into the design process right from the beginning. Important decisions are made early in the design process and as the project proceeds it becomes more difficult and more costly to make changes.

For example, during master planning, the decision to build a single storey or multi-storey hospital will have a major impact on the transport of people and equipment throughout the building.

The WorkSafe publication *Designing Safer Buildings and Structures* provides guidance and tools to be used in the design process. These tools can be used to assist in following the recommended process to address OHS issues.

OHS risk management in the overall design process



To identify 'in scope' hazards for each proposed work area, six key questions should be asked:

- **Who is in the work area?**
- **What tasks are undertaken?**
- **What equipment is used?**
- **What internal interactions does this work area have with other parts of the organisation?**
- **What external interactions does this work area have (e.g. suppliers)?**
- **What future needs are likely?**

GETTING EFFECTIVE USER CONSULTATION

Why consult?

Consultation with employees on the design of new and refurbished environments is crucial to functional and safe outcomes. In addition, it is a requirement under the OHS Act that employees and HSRs are consulted where they will be affected by the design. In some circumstances, clients or their representatives may also be part of the consultation process.

Employees and users are a valuable source of information because they know the work practices and the workplace more intimately than anyone else. This means that they can help get the design right in the first place, avoiding the need for costly alterations to newly occupied facilities. If properly consulted, employees are likely to have a greater sense of ownership of the end result, regardless of any shortcomings.

When and how to consult?

Right at the beginning of the process, staff may have a very useful input into decisions. For example, they may be aware that pushing trolleys from the main block to the Imaging department involves high forces to push the trolleys up the ramp and control them going back down again. Thus if the site is to be redesigned, particular emphasis will have to be placed on designing flat walkways and using lifts to change levels.

Where a facility is to be built or rebuilt and staff members already exist or have been recruited, consultation should begin as early as reasonably practicable, from pre-planning and design, through to building and post-occupancy. Staff are not expert builders or designers, but they have the experience of working in the industry, they know what the clients' needs are and what does and doesn't work in a design. Staff may not, however, have any experience in reading plans or interpreting designs, nor will they be up-to-date in the latest design developments.

Hence, it is essential to find ways to consult that are meaningful which can get a positive outcome in relation to hazards and risks. If the process is not done effectively, it can in fact lead to negative design outcomes and low staff morale.

Some strategies to improve the effectiveness of user consultation are summarised below.

Get the right people around the table

An effective user group will include a mix of managers, employees, HSRs and designers who have the following attributes:

- good communication skills and a willingness to put forward ideas and ask questions;
- support of fellow workers;
- availability to spend the time required;
- experience in the work area to be designed; and
- interest in staff safety.

It is preferable that a consistent group is maintained. Changes to personnel can result in confusion and lack of understanding of past decisions.

Train them in design awareness

To provide effective feedback, the user group needs to have the following skills and knowledge in relation to the design process, including:

- an understanding of the stages of the design process;
- skills in reading and interpreting architectural plans – this includes understanding how to use a scale ruler; and
- a knowledge of technical terms and jargon used during the design process.

Establish a transparent consultation process

A user group Terms of Reference should be agreed by all parties, including the purpose, scope, timelines, names and roles of participants. It is essential that adequate time is allowed for consultation at each stage of the process. This consultation time allowance should be built into the project budget and scheduled at the beginning of the process, otherwise it is at risk of being ineffective.

The consultation process should be:

- clearly documented with minutes distributed to all participants; and
- conducted in a language and style suited to all participants.

Provide relevant information

This may include:

- giving access to any generic industry guidelines, such as hospital, aged care or disability accommodation guidelines, which show a general picture of how a particular unit or building might look. This information might be communicated via a notice board, the organisation's intranet or the internet
- publicising the objectives in designing the new environment, e.g. a 10-year plan for services.

Help them to visualise the design

Most health care staff find it difficult to look at an architectural plan and imagine what it will be like to work in the area, but this is what we need them to be able to do. Some strategies to bring the two dimensional plan to life include:

- bring a tape measure to every meeting to help illustrate simple dimensions;
- use scaled cut-outs of equipment and furniture and move these around on the plans;
- in the early stages of planning, use tape or chalk on the floor to do a simple mock-up of an area;
- view a 'virtual image' of the proposed area;
- build a prototype of a proposed design for staff to evaluate with relevant furniture and equipment in situ; and
- visit other similar environments to see a similar project completion and discuss the design with people working in that environment.

Establish feedback loops

The users are generally representatives of larger groups of staff. Effective feedback loops to relevant groups should be established to ensure that all valuable information is captured. Strategies may include:

- having the design project as a standing agenda item at the health and safety committee meetings;
- having the design project as a standing agenda item at the relevant work group staff meetings;
- posting proposed plans in meeting areas for staff to view; and
- having a feedback process via the project office to the project managers and building designers.

At each stage of the project, reviews should be conducted. These reviews should be conducted with project members upstream and downstream of the current stage of the project to ensure alignment with the scope, design and implementation needs of the building. An effective user consultation process during planning will build teamwork and morale within the work environment and lead to a quality design outcome.

Specialist ergonomics input

Many organisations engage specialist ergonomists to assist the design process. Workplace ergonomists seek to optimise the working environment to best suit people's capabilities and limitations. In regard to the design of health facilities, specialist ergonomist input can:

- help staff participate more effectively in the consultation process and provide design awareness education for user groups;
- provide quantitative information about the sizes, space requirements and capabilities of people (e.g. force assessments) and the implications of this information for the design; and
- review architectural plans and provide advice about potential health and safety risks or functionality problems, in consultation with staff.

It is preferable to use an ergonomist with the following attributes:

- specialist experience in the design of health facilities;
- specialist knowledge of the No Lifting approach to patient handling; and
- a specialist qualification in ergonomics and/or a professional member of the Human Factors and Ergonomics Society of Australia (Certified Professional Ergonomist).

GETTING IT RIGHT IN THE PLANNING STAGE

Sample agenda for consultation throughout the design process

STAGE OF DESIGN PROCESS	AGENDA FOR STAFF CONSULTATION – CONSIDERATION OF PEOPLE HANDLING ISSUES
Master plan	Consider types of patients likely to occupy the work area – both in the short and long term. Consider external interactions with outside services (e.g. ambulance, funeral directors). Consider internal interactions between departments (e.g. those departments that need to be co-located). Consider site planning issues (e.g. transport, entry/exit, parking, single versus multiple levels and between buildings). Understand relevant OHS policies and legislative responsibilities.
Feasibility study	Establish formal consultative process for the project, budgeting for staff time. Review patient handling policies and procedures – ensure planning for design sits within stated No Lifting policy for safe patient handling. Review relevant risk assessments and incident reports. Undertake work area analysis – who, what equipment, what tasks/work practices. Review work flow and relationships between work areas. Benchmark with similar facilities. Feedback and approval.
Schematic design	Finalise room functions. Confirm patient handling equipment and work practices likely to be used. Review schematic design plans with respect to: • work space required for equipment; and • work space required to safely undertake tasks. Prepare simple mock ups of high risk areas (e.g. bathrooms and bedrooms). Users inspect other good examples of similar existing facilities. Specialist ergonomist review if required. Feedback and approval.
Design development	Build prototype of high risk areas with furniture and equipment in situ. Assess suitability and location of furniture, fixtures, finishes and services. Specialist ergonomist review if required. Feedback and approval.
Contract documentation	Involvement in selection of materials – review available information, view samples. Benchmark with similar facilities. Feedback and approval.
Construction	Review services that may be interrupted during construction. Logistics of relocation and occupancy. Regular site inspections as building proceeds.
Post occupancy	Keep a running list of issues, encouraging all staff to contribute. Conduct a formal post occupancy assessment with the user group and designer, noting positive and negative aspects of the design. Transfer knowledge to other user group participants and design projects.

3

INFLUENCES ON THE DESIGN FOR SAFE HANDLING OF PEOPLE

Under the OHS Regulations, the manual handling of people is defined as hazardous. People handling tasks have been a major cause of injury to staff working in hospitals, aged care, rehabilitation and disability facilities.

Patient handling work practices in all health care environments should be based on a No Lifting system, where manual lifting of patients is eliminated in all but emergency situations. This system includes:

- a No Lifting policy;
- provision of patient handling equipment, such as hoists and trolleys, which are appropriate and sufficient in number;
- provision of training to staff in the system of work, including assessing patients' needs, specific handling techniques and the use of patient handling equipment; and
- monitoring of the No Lifting system.

The WorkSafe publication *Transferring People Safely* provides comprehensive guidance about recommended patient handling methods to reduce risk as far as practicable. The implementation of a No Lifting system will be easier and more successful with good workplace design. There are a number of influences on the design of a workplace to facilitate the safe handling of patients, including:

- the type of facility;
- functional capacity of patients;
- organisational culture; and
- work practices.

INFLUENCES ON THE DESIGN FOR SAFE HANDLING OF PEOPLE

THE TYPE OF FACILITY

Patient handling tasks occur across a variety of health care settings. The type of facility will have an influence on the design and safe handling requirements for these patients.

EXAMPLES

- In accordance with government policy, aged care facilities need to be as home-like as possible, whilst providing a safe environment for both residents and staff. Design and layout of facilities should cater for the safe handling and transfer needs of residents, taking into account current as well as future needs. For example, 'ageing in place' requires a flexible design, catering for residents from semi dependent stages through to increased dependency in later years. A clear statement of likely future uses of the facility should be included in the master planning and facility design documents.
- Acute hospitals provide a very broad range of services and their patients vary from highly dependent, acutely ill or traumatised patients through to those having surgical procedures or investigations such as imaging. As well as in-patient treatment units, there may be assessment units, emergency and out-patient areas. The range of services is matched by a variety of patient dependencies and behaviours and requirements for manual handling. The setting is more clinical without the need for accommodating home-like furniture, but there may be a considerable amount of fixed or mobile medical equipment.
- Rehabilitation facilities accommodate patients who are being rehabilitated prior to returning home. Patients may have a medium term stay following a medical condition, surgery (such as amputation) or an accident. Manual handling is complex due to the wide variety of patients and the focus on the patient achieving functional independence.
- Community residential units are usually smaller group homes which support either community living or treatment for people with a range of disabilities – physical, psychological or intellectual. They aim to provide a home-like environment while sometimes providing for the needs of physically dependent people. In some cases, they are caring for people with conditions causing challenging or aggressive behaviours where the design needs to provide a safe environment for all aspects of their care.

No matter what type of facility is involved, the underlying principles with respect to patient handling and the design of the environment are:

- health and safety for staff; and
- quality of care and safety for patients.

FUNCTIONAL CAPACITY OF PATIENTS

The level of dependency and type of patient will influence the workplace design required to enable safe handling.

Despite the differences between patients in health, aged and disability sectors, the space requirements and design demands are remarkably similar. Two factors are critical in design for health, aged and disability services:

- capacity of patients to move around; and
- the level of staff assistance required.

Patients can be grouped by their levels of dependency and mobility to guide what design features will be required, to optimise their handling and maximise their independence.

Functional capacity

Independent patients

To be assessed as independent, the patient should be physically able to complete a task or transfer with or without the assistance of mobility equipment, e.g. 'wheelie' frames.

Patients who can transfer themselves from place to place, such as independent people with spinal injuries, and those who can walk with or without a walking aid, may need little or no assistance from staff or carers. In any care situation, however, these people may need staff assistance for short periods of time (e.g. if unwell or recovering from treatment) or in emergencies. In many cases, independent patients are only independent with the use of support aids in bedrooms, bathrooms, corridors and access ways. For example, a frail elderly person may not be independent without the aid of a grab rail in the corridor or a walking aid.

Patients in hospital who have had surgery or an illness may return to independent movement and self care in a few days, although there may be some handling assistance required while their condition is acute. Relevant aids to assist their mobility include bed sticks, grab rails and furniture that adjust to aid independence, such as electrically adjustable bed heads, toilet seats or chair raisers.

It is essential to get the design right to cater for the independent patient's mobility equipment. For example, patients who walk with wheelie frames require appropriate space, gradients, doorways and floor surfaces to safely use their equipment. Good workplace design will in fact enhance independence, thereby eliminating many patient handling tasks.

Patients able to assist

To be assessed as 'able to assist', the patient should satisfy two criteria:

- they should be physically able to assist in the transfer or task; and
- they should be co-operative and able to understand instructions.

Many patients can walk with or without walking aids, yet require assistance from one or two staff to get dressed, get in and out of bed, on and off toilets and in and out of showers. They may also require assistance from various mobility or patient handling aids. In these circumstances the need for adequate space and access to facilities becomes almost the same as for more dependent patients.

Design for sufficient room for staff to assist patients and to manage emergencies is important, so as to maximise the patient's ability and to minimise the risk of injury to the carer.

Lifting devices may be required to transfer dependent patients

Dependent patients

To be assessed as dependent, the patient would be dependent on staff for assistance to undertake transfers or tasks due to physical and/or mental incapacities.

Fully dependent patients who are wheelchair-dependent or bed-bound require staff assistance for all tasks. These patients may be those with a high level of functional or cognitive incapacity and there is a need for support aids and lifting equipment. These patients are commonly in high-level aged care facilities and disability accommodation and have a considerable degree of paralysis or immobility. The equipment in these cases may include ceiling tracking hoists, bath/shower trolleys, mobile chairs and equipment for moving the patient in bed, such as slide sheets/boards. Design features to allow space for carers to assist patients and for access to rooms by large equipment is most important. Access to beds, toilets, showers and furniture such as dining room tables should be considered in the design.

Designing for flexibility

It is reasonable to expect that many health care facilities will need to cater for all types of functional capacity levels, from independent to fully dependent patients, at some stage in the life cycle of the building.

This is very obvious and predictable for some organisations, for example:

- Aged care facilities should consider the needs, including future needs, of their client population and incorporate 'ageing in place' considerations into their designs, to cater for their residents as they become more dependent (this will avoid the need for costly changes to retrofit facilities to cater for changing needs).
- Residential care for people with disabilities should consider the increasing issues of physical dependency in their ageing residents.
- Hospitals and rehabilitation units will have a range of patients, including those with disabilities and older patients.

In other organisations this is less predictable, for example:

- Hostel or low care aged care facilities may aim to cater for the independent or partially dependent resident; however, even independent persons may become ill for an interim period, leading to their functional capacity approaching higher dependency levels.

Hence, to provide optimal flexibility many organisations should aim to design for the most dependent patient likely to use the service.

A clear statement of the likely future uses of, and demands on, a facility, should be included in the master planning and facility design documents of new facilities. This should take into account the potential functional capacities of patients.

CASE STUDY

An acute hospital is planning a new surgical ward. Patients are generally independent, though may require some staff assistance following surgery. The organisation wants maximum flexibility for each bed so that it can accommodate all types of patients. The decision is made to install overhead tracking over each bed and design bedrooms and ensuites to allow for the fully dependent patient. While this may not be used in every surgical case, over the 20-year lifecycle of the ward, it is likely that dependent patients will occupy all of the beds at some stage.
Not long after the surgical ward is built, the needs of the organisation change. The surgical ward becomes a medical ward and the patient demographic changes towards older patients. The decision to design for maximum flexibility pays off immediately and the organisation and its staff can meet the new patient handling demands.

INFLUENCES ON THE DESIGN FOR SAFE HANDLING OF PEOPLE

ORGANISATIONAL CULTURE

The culture of an organisation or type of service should be considered when designing new facilities or refurbishing existing facilities. Where specific philosophies underlie a service provision, these should be taken into account, while attempting to provide a design which gives functionality and flexibility for future possible use.

SOME EXAMPLES INCLUDE:

- the desire to make aged care and disability units as home-like as possible while at the same time agreeing that safety of patients and staff is the major requirement
- the desire to make a maternity or children's wing appealing and safe for children.

A health care facility is a workplace. It therefore should be functional and safe for all who use the facility, including staff, patients, visitors and contractors. Of course there is no reason that a functional facility cannot also be aesthetically pleasing, aligning with the underlying cultural philosophies of an organisation.

WORK PRACTICES

When planning for a new building, it is imperative that designers and user groups have an understanding of the patient handling work practices likely to occur in the proposed building. This involves undertaking risk assessments of the hazards associated with each task and determining what methods and equipment will be used to reduce risk, so far as is reasonably practicable.

The design of the building and patient handling work practices needs to take into account the way work is organised. Where there are peaks of work at specific times of the day, the design of the building should accommodate these varying numbers of staff, patients and equipment.

EXAMPLES

- In an aged care facility, the use of the dining room peaks at lunch time, when most residents attend to eat meals. The design should not only accommodate all patients and support staff, but also the mobility aids that accompany them.
- In a radiology department of an acute hospital, the out-patients attend in the morning, making the waiting area crowded with patients and their carers. The design should cater for the likely numbers of people waiting, as well as allowing movement of trolleys for in-patients that may need to attend for an X-ray.

Work practices may also include decisions about patient and equipment flow, which will in turn impact on the workplace design.

EXAMPLE

- Transporting patients to the operating theatre may involve transferring them from bed to trolley and then to the theatre table. Alternatively, a system of moving the patient to theatre on the bed can be used to decrease the number of transfers. Designing for these work practices includes appropriate corridor and doorway widths, floor surfaces and turning circles to accommodate the type of equipment being moved around.

Hence, an understanding of work practices is essential when planning for design.

4 GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

SITE DEVELOPMENT

Whether an existing or a greenfield site, there are many site-related factors that should be taken into account when planning for functionality and safe patient handling.

Size and topography

- The size of the site will influence whether a single storey or multi-storey facility is required to accommodate the needs of the service. This has implications for the movement of people and materials around the facility.

CASE STUDY

A large single storey acute facility ran into problems with staff pushing equipment for long distances when moving patients from one area to another. An opportunity for redevelopment arose and the decision was made to build a two-storey building. The feedback from staff indicated that with sensible planning for the location of services and the inclusion of an adequate number of lifts, it was quicker and easier to move patients around.

- The topography of a site is also an important consideration with the movement of patients and materials. Ramps and gradients should be avoided as these increase patient handling risks for staff due to an increase in force needed to manoeuvre equipment. Ramps also make it more difficult for patients to move themselves around
- If a ramp is unavoidable, it should meet requirements under *Australian Standard 1428.1-2001 – Design for access and mobility: Part one: General requirements for access – new building work* (to be referred to as AS1428.1) and the organisation should plan for the use of motorised mechanical handling aids where the movement of wheeled equipment is involved.

Access

Consideration needs to be given to access and exit points for people and vehicles to reduce patient handling risks.

Pedestrian access

- Staff, patients and visitors need easy access from the car park and from public transport.
- Patient handling issues will be minimised if the entrance is compatible with all types of mobility equipment including wheelchairs, walking frames and electric scooters
- Automatic opening doors will facilitate access
- A covered entrance with level ground will facilitate easy access.

Vehicular access

- The variety of vehicles that will need access should be taken into consideration, for example, suppliers of goods, people moving vehicles (such as ambulances and funeral cars), emergency vehicles and patient and staff vehicles
- The potential numbers of vehicles that may seek access at different times of the day or night should be considered
- Planning for appropriate space is imperative for vehicle turning circles, safe transport of goods and people, and to reduce patient handling risks.

CASE STUDY

An aged care facility had vehicular access near its main entrance. This meant that all emergency vehicles needed to pick up patients in a central area, in full view of many staff and residents. Ambulance trolleys needed to be pushed from near the main entrance, through carpeted corridors.

This was also the case for moving deceased residents to funeral directors' vehicles which caused much distress for some residents and staff, therefore, a refurbishment was planned.
A second vehicle entrance was developed at the rear of the building where discreet movement of residents and materials could occur. The new rear entrance was closer to the residents' rooms, reducing the distance of travel. The rear entrance corridor was covered in a vinyl floor covering to reduce pushing forces for wheeled equipment.

LOCATION OF SERVICES

During the master planning phase, the relationships between services provided by the organisation need to be mapped out with a view to optimising work flow and safety.

Consideration needs to be given to the movement of:

- patients and visitors;
- materials and goods; and
- staff and contractors.

Services with strong connections need to be located within close proximity to optimise work flow and reduce patient handling risks.

CASE STUDY

An acute hospital facility was planning the redevelopment of its Radiology department.
The existing department had been located near the rear of a large facility, on the first floor. While it was close to the car park and the main ward block for easy access, it was a long way from theatre, emergency and the intensive care unit (ICU) that were located near the main entrance at the front of the building. Staff reported that transporting the patients between Radiology and Theatre/Emergency/ICU was time consuming and difficult.

A mapping exercise took place to assess the movement patterns of patients and materials. The Radiology department was relocated to a central point between Theatre/Emergency/ICU and the main ward block. Patients were able to access the department either through the front or rear entrance. Additional navigation aids were required for patients and visitors so that they could find the new Radiology department from the car park.

GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

Electrically operated adjustable bed

FURNITURE

Planning and selection of furniture plays an important role in reducing risks from manual handling. The most common furniture items in health and disability services can be designed to minimise risks. The overall design of the facility then needs to provide appropriate space and environment for these pieces of furniture, which in some cases can double as mobility aids. Beds and chairs are particularly important items for safe patient handling.

Beds

Dependent and semi dependent patients should be provided with electrically operated, fully adjustable beds. The beds should be on large wheels or castors with brakes and provide adjustability in height, bed head tilt and foot tilt. In some acute and high care environments, they may also rotate or provide full bed tilt. These beds can be heavy and may also have pressure mattresses which increase the weight.

When planning for a new area, it is important to determine the types of beds likely to be used. Some beds are longer or wider than others and this may have an impact on the space requirements.

CASE STUDIES

- In aged care, many organisations use high/low beds that adjust right to the floor. This feature assists with management of residents that may try to get out of bed during the night. These beds generally have the height adjustment mechanism at either end of the bed, thereby making them longer than the standard electric bed by up to 400mm. This additional bed length needs to be taken into account to ensure that the space at the foot end of the bed is sufficient and the turning circle into the room is adequate.

- In acute care, there has been an increase in bariatric patient admissions. Bariatric beds are often longer and wider than the standard bed and this should be considered during planning to ensure sufficient workspace around the bed and access to the room is provided.

Beds are used to move clients around in many hospital situations, so the bed design, floor surfaces, door widths, space available and work practices are important to risk reduction. It is particularly important that doors are wide enough to allow beds to be wheeled through easily. Space is important to allow access for carers to both sides of the bed. The risks from changing and making beds should be minimised by providing adequate space, appropriate bedding and work practices, and sometimes lifting aids.

The clearances underneath beds need to be compatible with all equipment that will be used, including hoists, lifting machines and over-bed tables.

In aged care and disability facilities, a difficulty may arise when patients or families want to provide a bed which does not meet these criteria and may be too low, immobile or have a mattress which is heavy to move, such as a water bed. Such beds present risks to carers and to those who clean and make beds. In all situations where people are being handled and cared for, beds should be adjustable in height and mobile.

Chairs

Patient chairs are often large, requiring more space than an ordinary chair. For example, a patient armchair may need to be reclined and/or the legs extended, and be adjustable in height and tilt, requiring a larger than normal base or 'footprint'. For design purposes, the following issues should be kept in mind

- Patient armchairs should generally have a higher seat which is not too deep, with chair arms to assist independence. Where practicable, features should include height adjustability, removable arms and castors with locks/wheel brakes. Adequate space around the chair is essential to facilitate independent or assisted transfers and to allow the staff members to provide care for the patient
- In the dining room, dining chairs may be on castors or patients may dine in a wheelchair. Thus tables need to be high enough to accommodate wheeled chairs and adequate space in the dining room is needed to facilitate transfers and store mobility equipment.
- Older and frailer patients may be positioned in a large wheeled chair that can be semi-reclined. These chairs are often heavy and large and care needs to be taken with the design of the castors and the interface with the floor surfaces, to reduce the force required to move clients in these chairs. Adequate space needs to be planned to cater for their larger size in bedrooms and recreation areas
- Wheelchairs, either manually or electrically driven, are a common form of transport, both inside and outside. Ground and floor surfaces should be even and smooth. Wheelchairs that are electrically driven or motorised will reduce push/pull forces.
- Mobile commode/shower chairs for toilet/shower transfers should have rubber wheels, brakes, removable arms and foot plates and a seat with a front or central space to allow toileting and washing. Some can be padded or specifically designed with support for a patient who has limited sitting balance; while others may be fully reclining. Design for safe use of the commode chair should take into account the floor surface and the available workspace.

CASE STUDY

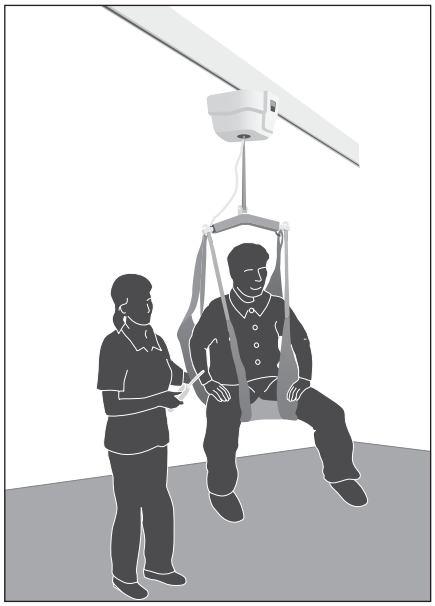
A low care aged care facility allowed residents to bring in some items of their own furniture to help make their room more home-like. One ambulant resident with dementia, who had been in the facility for some time, had her favourite armchair. As her physical condition deteriorated, the resident was unable to get out of the chair herself, as it was fairly low. A risk assessment indicated that the task of assisting her out of the chair posed risks to staff.

Hence her chair needed to be replaced with a more appropriately designed height adjustable chair with a gas operated assist seat to help the patient move from the sit to stand position. This facilitated her independence without risk to staff, but caused some distress to the resident who had to live without her favourite chair. After this experience, the facility decided to introduce a 'furniture policy' for future residents. On admission, residents were able to bring some of their own furniture as long as it met strict requirements. The furniture needed to be assessed initially and when the resident's condition changed, with respect to:

- staff needs – related to moving and cleaning furniture, transferring residents and adequate workspace; and
- resident needs – comfort, support and transfers.

GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

Fixed overhead ceiling hoist for walking a patient in rehabilitation



Fixed overhead ceiling hoist with person in sling

PATIENT HANDLING EQUIPMENT

Workplace design and the selection and use of patient handling equipment are inextricably linked. In the early stages of the design process, patient handling work practices and the equipment to be used should be determined to ensure the design will be functional. The choice of patient handling equipment may have a bearing on:

- workspace required;
- floor surfaces chosen;
- equipment storage requirements;
- roof and floor strength and capacity;
- furniture and fittings; and
- wall protection.

Patient lifting hoists

Overhead ceiling hoists

Overhead ceiling hoists are used where dependent or semi dependent people need assistance with transfers or movements. In many cases, they offer a superior alternative to traditional mobile hoists. Overhead ceiling hoists are easily adapted for a variety of situations, including:

- over the bed – for on bed movements and bed to chair/trolley transfers;
- in the bathroom – on/off the toilet, in/out of the bath;
- in therapy settings – for assisted walking and standing; and
- in specialist treatment or diagnostic settings, such as radiology.

Overhead ceiling hoists are suitable in acute hospitals, aged care facilities, community settings and private homes. Where patients are fully dependant, for example, in high care aged care facilities, overhead ceiling tracking should be installed over every bed.

It is recommended that all new or refurbished health facilities have structural supports incorporated into the ceilings in relevant areas to support overhead tracking for future needs.

The key components include a ceiling track, an electric motor, a suspended sling or frame and a handset control. There are a number of different models, including:

- portable systems – where the motor can be detached from the tracking and used across a variety of rooms; and/or
- fixed systems – where the motor is attached to the tracking and dedicated to a specific location.

The ceiling track is also available in a variety of forms including:

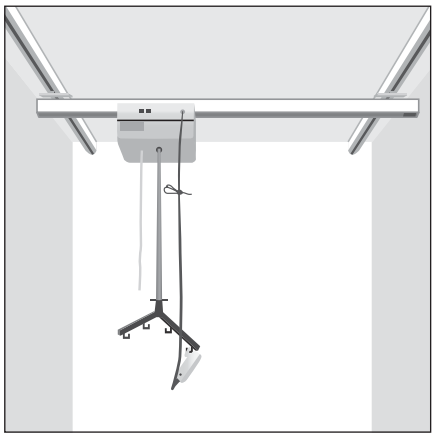
- straight or curved in various lengths, or with turntable junctions that allow for changes in direction;
- a transverse system that allows for two-way movement (up/down and across);
- fixed to the ceiling, suspended from the ceiling or recessed into the ceiling; and/or
- stand alone/semi permanent tracking (portable gantry).

Overhead tracking systems are available in various weight capacities up to 450kg.

Choosing an overhead ceiling hoist system

The type and level of complexity of the required system will depend on:

- the patient mix and their weight and functional capacity;
- the chosen No Lifting technique;
- other patient handling equipment and furniture used; and/or
- the design of the facility.



Fixed overhead ceiling tracking and hoist system

Portable overhead gantry and hoist system

Some factors to consider when analysing alternative systems include:

- ensuring compliance with *AS/ISO 10535-2002: Hoists for the transfer of disabled persons – requirements and test methods;*
- consulting a building surveyor to ensure that fire safety requirements will not be compromised (e.g. location of sprinklers, overhead ceiling fans);
- the weight and noise of the motor;
- the ease of use of the system, including the remote control;
- the comfort and dignity of the patient;
- the battery charging requirements; and
- the ability of the hoist to be able to pick a patient up from the floor.

Installing an overhead ceiling hoist system

Ceiling-mounted patient-lifting hoist systems must have adequate structural support for the potential loads. To reduce the risks from manual handling, the tracking systems should be located so that they: match the manual handling task requirements; are easy to access and attach the hoists; and are easy to operate. Inadequate structural supports pose a risk to patients and staff from potential overloading of the structure, resulting in serious falls or being struck by the hoist, failed tracking or the beam itself.

The areas where such tracking systems are to be installed should be initially inspected for suitability to erect beams that can be safely supported and easily accessed. The beams should be designed for the appropriate loading. Consideration should be given to: the number of persons that may be supported at any one time off one beam; the persons' locations; the length of travel; and the stability and weight of the person. The support of the beams, which might be part of the existing building structure, should be verified by a qualified engineer for its support suitability and ability to transfer loads. Very often trusses, roof or ceiling frameworks require reinforcing to support potential loads, e.g. heavy patients plus equipment. Reinforcements should also be checked by a structural engineer. All design calculations should be documented.

The designer and builder should consult with the employer, employees and HSRs to ensure the positioning of the lifting system matches the requirements for patient handling and does not introduce any other risks from manual handling.

CASE STUDY

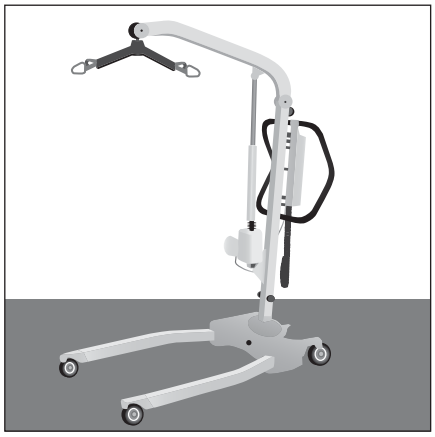
An aged care facility made the decision to install overhead tracking over all beds in their high care wing. The employer consulted staff about the types of tasks that the tracking would be used for. The staff indicated that mobile hoists were currently used to get patients out of bed and to transfer them to various forms of wheeled equipment including commode chairs, wheelchairs and large recliner wheeled chairs. They also used the mobile hoists after showers to transfer the patients from commode chair to wheelchair/recliner within the room. To ensure that the overhead ceiling tracking would accommodate all of these tasks, the organisation installed a long three metre track to provide flexibility for transfers within the room. They also installed overhead tracking in the separate toilets near the dining room area and the lounge area. This reduced time for staff in needing to transport patients back to their own room for toileting.

Costs and benefits

Many organisations find that the costs of installing overhead ceiling hoists are comparable to using traditional mobile lifting equipment when the productivity and space advantages are considered.

Even if the decision is made not to install the tracking immediately, the provision for adequate structural supports does not add a great deal to the cost of the building project and will allow for future flexibility.

GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING



Mobile lifting hoist

Mobile standing lifter hoist

Mobile lifting and standing hoists

Mobile electric hoists may be used for tasks such as lifting dependent patients from bed to chair, chair to toilet, bed to trolley and up from the floor, and for assisting semi dependent patients' standing and walking.

Mobile lifting and standing hoists should be selected to provide:

- adequate height adjustment, usually from floor to above bed;
- adjustable leg width for movement around fittings and furniture;
- easy to attach hooks for slings;
- wheel foot brakes;
- finger touch controls for raising and lowering, opening and closing hoist legs and moving the hoist;
- slings of various sizes and types to fit the client needs;
- back-up system for mechanical failure and back-up battery;
- a match to the furniture, with hoist legs to fit under beds and chairs; and
- a match to the floor coverings to be used so that push forces are within safe limits.

Section 5 of this publication provides guidance on workspace required to manoeuvre mobile hoists.

Comparison of overhead ceiling hoists and mobile hoists

	OVERHEAD CEILING HOISTS	MOBILE HOISTS
Manual handling	• Minimal physical exertion demands (even with the heaviest patients) • Easy to use, regardless of floor surfaces.	• Push, pull and twist forces • Soft floor coverings such as carpet can increase handling forces.
Productivity	• More accessible, increasing the likelihood of use • Reduced time spent finding and retrieving the equipment.	• Increased time required to find and transport equipment • Increased time required to manoeuvre and set up hoist.
Transfer space	• Requires less space to use • Construction savings and more room for equipment and furniture • Bed to chair transfer clear space 900mm required.	• Bulky and awkward to manoeuvre, especially in small spaces, e.g. around beds, in bathrooms • Bed to chair transfer clear space of 1100mm required.
Storage space	• Compact and lightweight, little dedicated storage space required.	• Bulky and awkward to manoeuvre, large amount of dedicated storage space required.
Compatibility with equipment and patient feedback	• Compatible with all beds and equipment as long as installed in the correct location • Patients report that they feel more comfortable and safer with the smooth ride.	• Not all mobile hoists fit under beds or can raise the patient high enough to return the patient to bed (especially with specialised pressure mattresses on top of a normal mattress). • Patients report less comfort and more anxiety.
Room layout and flexibility	• Room layout needs to be set around the position of the tracking • Less flexible use of hoist, e.g. tracking could not be used in a bedroom if the bed is moved to a different position.	• Flexible use in multiple environments.
Falls	• Even if installed for every bedroom and bathroom, overhead tracking does not cover patient falls in an area not served by the overhead system.	• Mobile hoist flexible as backup for falls in different locations.
Ceiling supports	• Adequate structural ceiling supports are required for installation.	• No structural requirements.

GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

CHECKLIST
Selecting patient handling equipment in relation to building design
Do the purchasing procedures include a requirement for health and safety assessment and approval of all items prior to purchase?
Do the purchasing procedures include provision for consultation with direct care staff and HSRs in the selection and trial of patient/resident handling equipment?
Is there sufficient information available about the proposed design of the building to ensure that the equipment and furniture will be compatible with the design of the building and the new work practices?
What is the footprint (i.e. floor area) covered by the equipment?
What additional space is required for the client (e.g. arms and legs)?
What space is required by the person operating the equipment?
Is there adequate space for safe use, access to and storage of equipment close to the point of use?
Will the equipment fit into or through all the spaces in which it needs to go? For example: • adjacent to beds (three sides), toilets and baths; • through doorways (e.g. to bedroom, bathroom, toilet, ensuite, therapy and treatment room); • along the corridors and around the corners; and • under height-adjustable beds.
Is the plinth under the bath narrow enough to allow the base of a mobile patient lifter to be manoeuvred into the correct position in relation to the bath or is overhead tracking to be installed?
Are the floor surfaces on the routes over which the equipment will be transported compatible with the design of the equipment (consider ramps, carpets, steps, lift doorways, size of wheels and steering characteristics)?
Will the equipment itself constrain staff movement, and therefore contribute to a risk of strain injury?
Does the equipment have any special anchorages and supports, and do the ceilings, floors and walls require reinforcement or any special protection from damage by equipment?
Is the equipment suited to a range of sizes of staff and patients?
Is the position of fixed equipment for handling patients correctly determined before it is installed?
How manoeuvrable is equipment, including force required to push/pull and steer around corners?

Bath/shower trolley

FIXTURES

The design and location of certain fixtures can have a major impact on patient handling risk.

Bathrooms and ensuites

Showers

Floor level shower bases without fixed doors or walls are preferred in all situations. Design of this area requires a floor slope for effective drainage (refer *Building Code of Australia*), space for a commode chair and surrounding space to allow access for staff to assist showering. There should be provision for grab rails to be fixed to the wall and a fold-up shower seat (refer AS1428.1). The shower rose should accommodate a hand-held system with flexible tubing that enables both independent patients and staff to use. Tap positions should be designed to avoid having to reach through the water to turn them on or off. Location and design of soap and other shelves should be within easy reach of both the independent seated patient and the standing employee and not introduce a striking hazard.

Baths

Low baths are not acceptable in health care, nor are spa baths with wide sides and deep seating. Assisting patients in and out of these baths poses significant risks to staff due to awkward bending and reaching postures required.

A raised height or adjustable height bath is a better option. The method of transferring patients in and out should be established when designing for the bath. The preferred option is to use ceiling mounted overhead tracking hoists with immersible slings to move clients into and out of a bath and to other facilities in the bathroom. If a mobile hoist is to be used, there needs to be adequate space under the bath for the hoist legs.

Grab rails for bath use can be fixed to the wall, attached to the bath, floor or other fixed surface for clients who can assist and for staff to lean on while helping to wash a patient. Hand-held showers should be provided to assist washing patients.

Bath/shower trolleys

Adjustable height bath/shower trolleys are a useful aid to reduce risks from handling people. The bath/shower trolley can be used to transport a patient from the bedroom to the ensuite to wash the patient, be drained and then used as a drying and change surface. For dependent patients, the use of overhead tracking hoists where the transfer will take place (e.g. the bedroom and/or bathroom) reduces risks to transfer them on and off the trolley.

A bath/shower trolley is fitted with castors and brakes and is easy to wheel, but there should be adequate space for it to be wheeled in and out of rooms and across or along corridors. The design of entry to bedrooms and bathrooms requires adequate turning space and preferably a configuration where there is a fairly straight path from bedroom to bathroom.

Toilets

To reduce patient handling risks as far as practicable, the design of toilets should take into consideration the:

- location of toilet within the bathroom – where possible, toilets should be located directly opposite the door to reduce unnecessary manoeuvring of wheeled equipment;
- height of toilet – should allow for the use of over-toilet or commode chairs and be appropriate for people with disabilities (AS1428.1 recommends 460–480mm to top of toilet seat);
- need for space on both sides of the toilet for access by carers where there may be people requiring assistance with toileting – this reduces awkward postures when stabilising the patient or assisting with clothing;
- need for space on one or both sides for independent wheelchair users to do a sideways transfer;
- space available to allow access for equipment in emergencies, i.e. if the patient has fallen onto the floor, a mobile hoist may be required;
- space available for patient handling equipment, e.g. standing hoists may be used to transfer patients onto the toilet and require up to 1500mm in front of the toilet;
- positioning of toilet roll holders accessible to patients and carers; and
- positioning and flexibility of grab rails, e.g. for centrally located toilets, drop down grab rails either side of the toilet can provide maximum flexibility.

Bedrooms

Wardrobes and drawers

The design and location of the storage units requires careful planning with respect to:

- size – it should be adequate to suit the patients' and staff needs;
- access – it should be easily accessible by patients and staff;
- layout – it should be suitable for patients (possibly wheelchair-dependant) and staff; and
- workspace – it should not impede safe access to the bed or chair.

For example, the ability to move bedside drawers on castors will aid access to the bed during transfers.

Medical services

The design and location of gases, suction, intravenous and blood pressure machines requires careful planning to ensure:

- staff can easily reach the service and where practicable, leads are long enough so that equipment can be used in multiple locations;
- staff can easily view and monitor the service; and
- they do not obstruct access to other equipment or pose a striking risk to pedestrian traffic.

CASE STUDY

An acute facility designed a smart looking cupboard above the bed for the location of their medical services. It was proposed that this would reduce the clinical nature of the room, making it appear more home-like for the patient. Staff feedback indicated that this would not be practical as they would need to leave the cupboard door open to access and monitor the level of gases. The cupboard was redesigned without a door to allow easy access for staff.

Recreation and communication devices

- Television – the TV location and design should be easy to access, clean, repair and use without any part of it becoming a striking risk or a tripping hazard (e.g. electrical cables)
- Telephone – the telephone location and design should facilitate independence for right and left handed patients.

Hand wash basins

The design and location of the staff hand wash basin should ensure that it:

- is visible and easily accessible so that staff use it frequently;
- does not impede movement of people or materials (recessed);
- is at a suitable height for comfortable use (minimal bending); and
- has non-slip flooring underneath (extending at least 400mm from the inside of the front lip of the basin and 300mm either side).

Privacy curtains

The location and design of the privacy curtain should take into account:

- location of overhead ceiling hoist tracks (where applicable); and
- space required to undertake patient transfers.

Some organisations choose moveable/adjustable location privacy curtains as this provides some flexibility in modifying the space around the bed.

Corridors

Fixtures in corridors, such as hand wash basins, should be designed so that they do not impede movement of people and materials. This can be achieved by designing recessed alcoves to accommodate the required fixtures.

Grab rails to be provided in patient use areas, similar in profile to that of AS1428.1 and be continuous around corners and for the full length of the corridor where practicable.

ELECTRICAL AND MECHANICAL FITTINGS

The appropriate location of electrical and mechanical fittings (e.g. air conditioners, ducted vacuum systems) can also have an impact on staff handling procedures and prevention of staff injuries. Design considerations include:

- type of equipment to be plugged in;
- head clearance;
- ease of use and access;
- restrictions on patient usage; and
- elimination of cords across walkways.

LIFTS

Lifts can have an impact on patient handling procedures. The key elements to be considered include:

- door openings (ensuring width and height accommodates all equipment and people);
- internal dimensions (allowing for staff to stand on either side of bed/trolley and accommodate all required equipment);
- position of lift controls – ensuring they are easy to reach;
- door hold-open times – allowing for movement of equipment and people;
- accuracy of levelling between lift floor and external floor – checking it does not create trip hazard; and
- the horizontal width of the gap between the lift floor and the external floors, relative to the diameter of the wheels of mobile patient handling equipment including lifting machines and beds – allowing for smooth movement.

NURSE CALL SYSTEMS

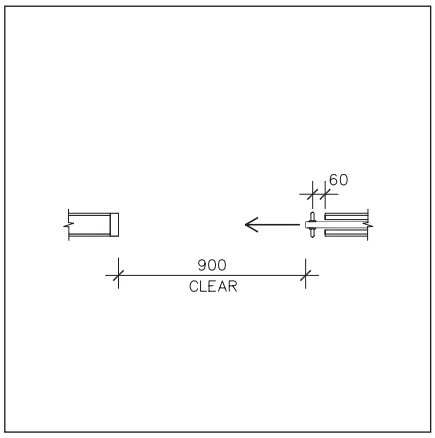
The design and installation of nurse call systems play an important part in staff handling of patients, particularly in emergency situations. If the system is inadequate, staff may not wait for assistance and take shortcuts, leading to risky work practices. The major problems that can occur with a nurse call system include:

- staff not being aware how critical the situation is when the nurse call system is activated;
- staff not being able to relay messages to other staff for back-up; and
- staff not being aware that the nurse call system has been activated (e.g. staff member is in ensuite and does not hear the nurse call system being activated in another room).

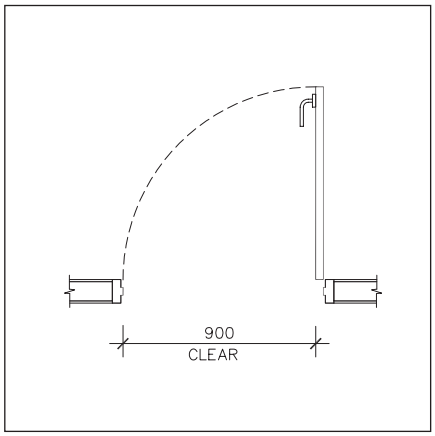
There are a variety of nurse call systems available that address these concerns and they can be integrated with emergency systems, e.g. fire alarms.

The strategic location of nurse call buttons should also be carefully planned to facilitate ease of use and reduce awkward postures, for example:

- In toilets, a nurse call button located on the rear wall will be out of reach of many patients. Where drop down grab rails are installed on both sides of a toilet, a call button and toilet roll may need to be attached to the drop down grab rail. An additional call button could be provided within reach, when the drop down grab rail is folded away.
- In the bedroom, the nurse call should be flexible for use on either side of the bed and the turn off switch should be located with easy access for the staff member.
- In the shower recess, a nurse call button must be located at a height that is accessible by a person who has fallen.
- In the therapy setting, a nurse call button should be strategically located so that it is easily identifiable and accessible by staff and patients.



Minimum clear width of sliding door



Minimum clear width of opened hinged door

'Cat and kitten' door

DOORS AND DOOR OPENINGS

Doors and doorways can either assist or hinder staff when handling patients. The selection and design of doors requires careful consideration of a range of factors which include the following.

Door location

- Door location should facilitate flow of people and materials.
- Where persons may enter the door in a wheelchair, there may be a need to provide adequate wall space on the latch side of the door to facilitate access (refer AS1428.1).
- Door location should take into account the location of adjacent fittings or fixtures.

Door size

- Door width – clear opening space should allow for easy movement of people and equipment. Door openings into bedrooms should be wide enough so that beds can be manoeuvred through easily without being tilted on their sides.

DOOR REQUIREMENT	MINIMUM MEASUREMENTS FOR CLEAR DOOR OPENING SPACE
Movement of ambulant patients and wheelchairs.	900mm
Movement of standard electric beds and trolleys.	1100mm (but preferably 1350mm)
Movement of beds with attachments (e.g. acute hospital beds) or bariatric beds.	1350mm (check width of bariatric bed, as these are adjustable or may vary)

It is important to note that it is a combination of the door width, its location and the turning circle into the door that impact on how easy it is to move an item through a door.

- Door height should take into account materials that may be moved in and out, such as intravenous drip poles and fracture frames. Standard door height is 2040mm. In some circumstances this may need to be increased to 2400mm to accommodate special needs equipment.

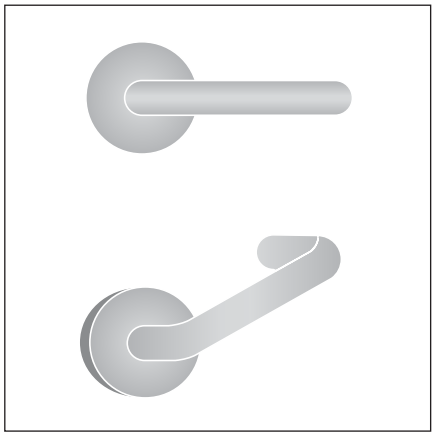
Door design

Different door designs will suit different needs, for example:

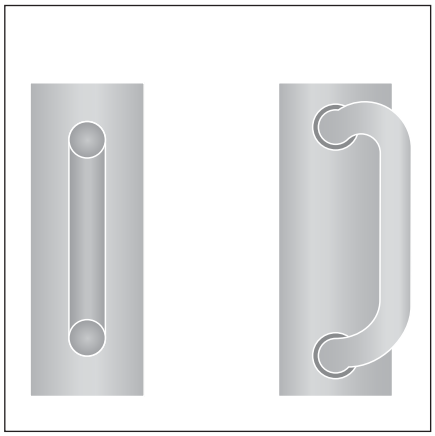
- A single hinge door may open inwards or outwards.
- A 'cat and kitten' door (i.e. a standard 950mm door combined with a 400mm door) will provide flexibility for larger items of equipment.
- A manual sliding door will eliminate the need to take account of the door swing (but may raise issues with maintenance).
- An automatic sliding door will facilitate easy transport of persons and equipment (but may raise issues with maintenance, infection control and poorly timed automatic doors may strike the patient precipitating a fall and consequently a patient handling hazard).

Consideration should also be given to the weight of the door to ensure that it is easy to open and close. Full height doors can be relatively heavy. There are a number of different door types, including solid, semi-solid and hollow core.

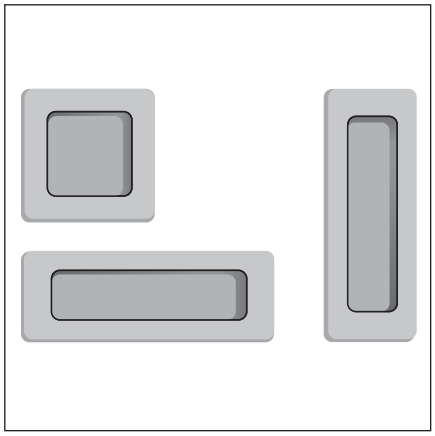
GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING



Lever type handles (hinged doors)



'D' pull door handles (sliding doors)



Recessed door handles (not as common as 'D' pull door handles)

Door swing and door closers

Doors should not open into a zone that impedes movement of patients or equipment, nor swing out into a circulation area.

The door into a fully enclosed toilet or bathroom must:

- open outwards; or
- slide; or
- be readily removable from the outside of the sanitary compartment, unless there is a clear space of at least 1200mm between the closet pan within the compartment and the nearest part of the doorway when the door is in the open position.

Door closers are generally not recommended into bedrooms or bathrooms because:

- the staff member may need to hold the door open against a closing force, while assisting a patient through – it can be very awkward trying to reach the door while supporting the patient, then stepping back to allow space to pull the door open, holding it open while moving through the doorway, and then releasing it without allowing the door to swing back against the patient; and
- many patients struggle to open a door against a force and they may in turn be struck by the closing door.

Door closers with hold-open devices may reduce some of the risk, but they should be used only where there is a specific need. It is recommended that door closers be used only where absolutely necessary and generally not in patient traffic areas.

In some circumstances (e.g. doors into utility rooms), hold-open devices with timed closers may assist staff with the movement of equipment.

Fire doors in corridors linked to hold-open devices controlled by smoke detectors reduce impediments to safe patient handling.

Door handle furniture

On a swing door, lever type handles are generally easier to use than knobs. It is essential that these are designed to prevent clothing from catching on the handle.

On a sliding door, 'D' pulls are easier to use than recessed handles.

The positioning of the handle on the door is important to provide ease of use and reduce injuries.

When selecting door furniture, it is important to consider the special needs of the patient mix, e.g. mental health.

FLOORS AND FLOOR COVERINGS

PROVIDING A SAFE WORKPLACE AND A COMFORTABLE ENVIRONMENT

Choosing floor coverings that meet the needs of staff, patients and managers can be one of the most difficult decisions in designing new health care facilities. Floor coverings should be:

- safe for staff and patients;
- comfortable for living and working with; and
- functional from a cleaning and maintenance perspective.

The most important OHS risks relating to floor coverings in health and aged care workplaces are:

- musculoskeletal disorders caused by manoeuvring wheeled equipment;
- injuries from slips, trips and falls; and/or
- musculoskeletal disorders arising from cleaning the floors.

Due to the significance of floor coverings in the design of health facilities and the difficulty many organisations face in reaching a decision, this section provides detailed guidance in choosing safe floor coverings.

Legislative obligations

State of knowledge

In making decisions about floor coverings, organisations should consider relevant standards and guidance material which constitute state of knowledge for that sector.

In Victoria, most health and aged care facilities use No Lifting systems where the manual lifting of patients should be eliminated in all but exceptional or life-threatening situations. Mechanical lifting aids or other equipment should be used whenever it can reduce risk associated with patient handling. No Lifting systems represent current state of knowledge and assist organisations to comply with the OHS Regulations for manual handling.

Consultation

Under the OHS Act and the manual handling regulations, employers are required to consult as far as practicable with HSRs and employees when conducting manual handling risk assessments and developing and implementing risk controls. Consultation should therefore occur in relation to floor surfaces if the surfaces are likely to impact on the risk of musculoskeletal disorders. Where practicable, mock-ups and trialling of actual equipment and work practices on the proposed floor surface is strongly recommended to assist staff to identify any potential hazards in a simulated environment.

What the Building Code says

The *Building Code of Australia* requires floor surfaces to have good performance in the event of a fire, including low flammability and low levels of harmful emissions during combustion.

Pushing or pulling wheeled equipment

Using wheeled equipment

With regard to pushing or pulling wheeled equipment, the main risk factor is the magnitude of the forces that have to be exerted. Reducing the risk means decreasing the forces to the lowest level as practicable. Key factors impacting on push and pull forces include:

- type of floor covering and the way it has been installed (e.g. cushioned, direct stick);
- floor gradients (e.g. ramps) and uneven surfaces (e.g. joins between different floor coverings);
- type and condition of the wheels;
- total weight of wheeled equipment being moved (e.g. beds, mobile hoists);
- workspace – limited space (e.g. in bedrooms and bathrooms) impacts on manoeuvring equipment; and
- work practices – e.g. how many people are doing the pushing.

Wheeled equipment should be purchased with large, easy to use wheels that are regularly maintained and compatible with other equipment, e.g. hoists that can fit under beds.

How much push force is acceptable for wheeled equipment?

High forces when manoeuvring wheeled equipment increase the risks of musculoskeletal disorders. Our best state of knowledge on pushing and pulling is based on the work of Snook and Ciriello.[7] Snook investigated a large number of tasks in which workers had been injured in order to establish the relationship between perceived risk and actual injury occurrence.

To make work safe, Snook recommended that the forces should be kept below the level at which 75% of the workforce felt was safe. Since health sector workplaces employ both men and women in jobs involving pushing equipment, then the forces should be below the level at which 75% of women are capable. If the forces are reduced further below this level, Snook suggests that it is unlikely that further gains in risk reduction will be made.

Snook's maximum acceptable forces are set out in tables which allow the analyst to select different combinations of variables such as distance and frequency of push, initial versus sustained push and handle height to determine acceptable maximum force. Some examples are provided in the table following.

Measuring actual forces exerted to push equipment

The actual forces experienced in the workplace cannot be predicted theoretically. Forces need to be measured with the particular floor covering, laid in the same manner and with similar wheeled equipment that is in good condition. This can be done using a force gauge, such as a spring balance. Note that for wheeled equipment, pull forces can be measured to approximate push forces. This is not the case with non-wheeled loads that are dragged or slid across the floor.

7. Snook, S and Ciriello, V. (1991) The design of manual handling tasks; revised tables of maximum acceptable weights and forces, Ergonomics *34.9:1197–1213.*

ACCEPTABLE FREQUENCIES FOR SUSTAINED STRAIGHT LINE PUSHING OF WHEELED EQUIPMENT OVER VARIOUS DISTANCES, HANDLE HEIGHT 890MM (ACCORDING TO SNOOK AND CIRIELLO 1991)						
Distance	**2.1m**	**7.6m**	**15.2m**	**30.5m**	**45.7m**	**61.0m**
Sustained Force* kg	Frequency: 75% of female workforce may push wheeled equipment over stated distance once every:					
6kg or less	6 sec	15 sec	25 sec	1 min	1 min	2 min
7kg	6 sec	15 sec	25 sec	1 min	1 min	30 min
8kg	6 sec	15 sec	35 sec	1 min	2 min	8 hours
9kg	12 sec	15 sec	1 min	2 min	30 min	8 hours
10kg	12 sec	22 sec	2 min	30 min	8 hours	Not acceptable
11kg	12 sec	1 min	5 min	8 hours	8 hours	Not acceptable
12kg	1 min	5 min	8 hours	8 hours	8 hours	Not acceptable

**Sustained force will depend on the type of equipment, its weight and the floor surface.*

To interpret this table: this means that, for example, a person pushing a force of 10kg over a 30.5m distance can safely undertake this task throughout an eight-hour shift as long as it is not more frequent than once every 30 minutes.

Limitations of Snook

It should be noted that the Snook data is limited in relation to real life situations frequently encountered by staff when caring for patients. While the Snook data provides information on maximum forces for initial force and sustained force for straight line pushing tasks, the layout of a patient's room and furniture may mean that the equipment has to be manoeuvred around the bed and other furniture in other than a straight line. Turning forces are very difficult to measure and not within the scope of the Snook data.

Also, staff may participate in a wide variety of physical tasks throughout the day (in addition to pushing wheeled equipment) and the Snook force data deals only with the specific tasks being analysed. Additional manual handling tasks will increase the risk of injury. Risk assessments should therefore include factors such as other environmental constraints, e.g. clutter, furniture, lack of space to manoeuvre or turn equipment, and the potential impact of other manual handling tasks performed.

Gradients and slopes

The force required to manually push wheeled equipment up a slope will increase as the gradient of the slope increases. The total force is equal to that required to push the equipment on a horizontal surface, plus a force component due to the slope. It is preferable to avoid slopes where wheeled equipment is manually moved. If this is not practicable, control measures to reduce the forces include the use of hard floor coverings, mechanical means to move the equipment or administrative controls* (e.g. additional persons doing the pushing). In all of these circumstances, actual force measurements should be undertaken, with reference to frequency and distance of pushing, to determine safe work practices.

*(*Note: administrative controls are a lower order control that rely on human behaviour and may be used only in conjunction with, or where implementation of higher order controls such as engineering controls or the provision of mechanical equipment, are not reasonably practicable).*

The relationship between floor coverings and patient handling equipment

We know that some soft floor coverings (e.g. carpet) can double the forces required for manoeuvring mobile hoists, compared to hard surfaces such as vinyl. Overhead ceiling hoists are far less physically demanding (even with the heaviest patients), regardless of the floor surface and are strongly recommended in facilities caring for dependent or semi dependent persons. Small lips/joins between different floor coverings can increase the forces required to manoeuvre patient handling equipment between rooms.

CASE STUDY

WorkCover NSW[8] 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.

Evacuating dependent patients

Under the No Lifting philosophy, staff should not manually lift patients where this involves lifting all or most of the patient's body weight. However, where staff need to evacuate patients in an emergency, the use of evacuation blankets which minimise the push/pull forces or physical exertion may be required. Carpet can increase the push/pull forces and resistance of the surface, therefore increasing the risk of musculoskeletal disorders occurring when evacuating patients or conducting evacuation drills. When deciding on practical evacuation procedures, the slip resistance of the flooring and impact on push/pull forces should be taken into account.

8. *McFarland, D. (2006)* Measurements of the forces needed to move patients in mobile hoists and beds. *Human Factors and Ergonomics Society of Australia 42nd Annual Conference 2006.*

Meeting the needs of patients, staff and managers

Patients' needs

The capabilities and needs of different groups of patients should be considered during the floor coverings selection process.

PATIENT CHARACTERISTICS	IMPLICATIONS FOR CHOICE OF FLOOR COVERING
Medical or surgical intervention	Where there is a likelihood of biological spills, the floor covering should: be easily cleaned and impervious to liquids; promote high levels of infection control; be slip resistant; and allow easy bed movement.
Independent wheelchair users	Independent people using manual wheelchairs need a low resistance surface to be able to propel their wheelchairs easily. Those using electric wheelchairs also need low resistance for easy manoeuvrability and less demand on the battery.
Patients at risk of falls	Independent persons with some gait restrictions or at risk of falls need a slip resistant surface that does not cause them to stumble.
Dependent	Patients who are physically dependent may need to be pushed around in beds, hoists, shower trolleys, commodes, etc. The floor surface needs to be slip resistant, but also enable wheeled equipment to move over the surface easily. Generally, carpets are not suitable where: • mobile hoists need to be moved in confined spaces (e.g. around the bed) and in these cases overhead ceiling hoists are preferred; and/or • heavy wheeled equipment (e.g. a loaded bed) is manually pushed over long distances. Some low resistance carpets may be suitable for short distances of straight line pushing of wheeled equipment, and where push pull forces are assessed to be within required limits.
Dementia and/or incontinence sufferers	Where there is a likelihood of biological spills, the floor covering should be easily cleaned, impervious to liquids and slip resistant. Residents with dementia may be hesitant to cross between different floor surfaces or on checked/two tone design – busy designs should be avoided.
Visually impaired people	Visually impaired patients need visual contrast. Glare from shiny surfaces, busy designs, checks and two-toned surfaces should be avoided. Visual contrast at doorways and corridor junctions will assist navigation.
Patients needing low stimulus environments	Hard floor coverings such as vinyl can increase noise levels and may not be conducive for all patients. Increased noise levels may also hamper the ability of patients to sleep during periods of high activity.

Staff and management needs

STAFF NEED A FLOOR COVERING THAT:	MANAGERS NEED A FLOOR COVERING THAT:
• is comfortable for long periods of standing/walking; • is easy to move wheeled equipment on – in small and large spaces; • has a low likelihood of slips/trips; • is safe and easy to clean and maintain; and • looks good and remains odour free.	• suits needs of patients and staff; • looks good and remains odour free; • has a low lifetime cost with regard to: – purchase and installation – replacement – cleaning and maintenance – injuries from working on or cleaning the floor; and • assists the employer to comply with OHS legislation.

What types of flooring are available?

Vinyl or linoleum

Vinyl floor coverings generally have a smooth, relatively hard surface and are impervious to liquids or bodily fluids. Some vinyls have improved slip resistance properties and are suitable for wet or dry areas. Slip resistance values for pedestrian surfaces (other than carpet) – indoor and outdoor, wet and dry – are recommended in Standards Australia Handbook HB 197. The methods for testing and classifying slip resistance of new and existing pedestrian surface materials are specified in *AS/NZS 4586-2004 Slip resistance classification of new pedestrian surfaces* and *AS/NZS 4663-2004 Slip resistance measurements of existing pedestrian surfaces*. Vinyls with poor slip resistance become a slip hazard for patients and staff when wet. All wet areas or areas at risk of spills must have a non-slip floor finish.

Vinyl may be directly stuck to the undersurface or cushion backed. Cushion backed vinyl is slightly softer underfoot, but increases the forces when manoeuvring wheeled equipment. For this reason, cushion backed vinyl is generally not recommended where wheeled equipment is manually moved. The forces when manoeuvring wheeled equipment on hard backed vinyl are generally about half those on most carpets.

Depending on the installation, the amount of foot traffic and types of footwear, some vinyls can lead to increased noise levels. Noise levels can be reduced by using soft furnishings and window coverings.

Depending on the distances walked and types of footwear, some staff report increased fatigue levels when working for long periods of time on hard vinyl floors.

Carpet

To reduce the risk of sprains/strains, carpet is generally not recommended where heavy wheeled equipment such as mobile hoists and beds are manually moved in confined spaces or over long distances. If considering carpet, force measurements and trials should be undertaken with the wheeled equipment to be used and a sample of the proposed carpet.

Woven carpet

Woven carpets come in a wide range of profiles and finishes. There appears to be little difference in push forces between carpet tiles and broad loom, or 'roll goods' carpet. High profile, thick pile or cushion backed carpets are generally harder to push equipment on than thinner pile glued carpets. There is a range of low profile, glued carpets that are acceptable for infrequent or short distance straight line pushing of some wheeled equipment.

Some carpets have a directional resistance in relation to the pile of the carpet and if this is not properly installed, wheeled equipment may not travel easily in a straight line. Wheeled equipment is often moved in multiple directions, hence directional resistance may cause problems for users.

Where carpet is used on concrete floors in a health facility, it is recommended that the concrete floor be sealed prior to laying the carpet, or vinyl backed carpet that can be seal welded, is used. This assists in preventing urine and other body fluids penetrating the concrete slab and then generating unpleasant odours through bacterial action. Using appropriate cleaning procedures and equipment is also essential.

Many older people find some carpets difficult to walk on as they provide too much grip to some shoes, causing them to stumble. There is mixed evidence to suggest that either carpets or vinyl are associated with more frequent falls, but the injuries resulting from falls on carpets are generally less severe than those on vinyl.

Vinyl carpet

There is a limited range of vinyl carpets (sometimes referred to as solution dyed nylon carpet). These products are low profile, direct stick, non-slip and impervious to liquids. They generally require a specialised cleaning process. Some vinyl carpets have a directional resistance in relation to the pile. These surfaces should be properly installed to allow wheeled equipment to travel easily in a straight line.

Mix of surfaces

Some facilities opt for a mix of surfaces to suit the uses of different areas in the building. In these situations it is important that joins or lips/ridges between the different floor surfaces are as smooth as possible and do not create resistance or cause uneven surfaces when using wheeled equipment. In some cases, diminishing strips installed to cover the joins have been installed with a high profile. This may lead to high forces when manoeuvring equipment (especially in tight spaces and/or at low speeds) or jolting for patients being transported in the wheeled equipment.

The cleaning process required for the mix of surfaces is also important to consider. Some surfaces require a wet cleaning process and can lead to slip risks for staff when they walk from a wet surface to a dry surface. Some vinyl cleaners have been found to damage other adjacent surfaces if they come into contact.

CASE STUDY

A community residential unit housing five people was a 1970s home with carpeted hall, lounge and bedrooms and non-slip vinyl in the eat-in kitchen and bathrooms. As the residents were becoming older, the levels of dependency were increasing and more wheeled equipment was necessary to assist them. Mobile hoists were being used to transfer the residents from bed to bathroom. In addition, one client's behaviours resulted in difficulties in keeping carpets clean and odour was a problem.

Push/pull force measurements were performed with mobile hoists and wheelchairs and staff were consulted about difficulties with manual handling. Forces were found to be very high manoeuvring a mobile hoist in the carpeted bedrooms, at the entrance into and along the front hall and at the junctions between the lounge and the kitchen. Other issues identified, were the small size and narrow doorways to bedrooms making movement awkward.

Refurbishment was undertaken in consultation with staff. Floor surfaces in the hall, lounge and one bedroom were changed from carpet to vinyl and the correct cleaning equipment purchased to more easily clean these areas. In the other two bedrooms, the carpet was left and overhead tracking was introduced to decrease risks from pushing and pulling mobile hoists. This allowed staff to use mobile commodes rather than mobile hoists to transfer people to the bathroom, requiring less space to go through doors and acceptable push forces. A long term plan was made to widen doors. Low profile joins were ensured where different floor surfaces met.

Staff reported that the resultant balance between carpet and vinyl floor coverings was functional for working and comfortable for living.

GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

RISK ASSESSMENT CHECKLIST – CHOOSING FLOOR COVERINGS FOR NEW BUILDINGS

STEP ONE – ANALYSE YOUR SITUATION		
	Factors to consider (tick or add details)	**Implications for floor coverings**
Patient needs	**Are your patients:**	
Mobility	• fully ambulant? ☐ • independent using walking frames/wheelchairs? ☐ • dependent on staff and patient handling equipment? ☐ • at risk of falls? ☐ • a mix of dependencies? ☐ • ageing in place? ☐ • other? ☐	
Acoustic	• sensitive to noise? ☐ • needing an especially quiet environment? ☐	
Visual	• needing low light/dull environments? ☐ • needing bright environments? ☐ • needing visual contrast, visual navigation aids? ☐	
Other	• suffering from dementia? ☐ • suffering from incontinence? ☐ • needing tactile stimulation of the feet? ☐	
Wheeled equipment characteristics, floor levels, cleaning methods		
Ease of movement	Do the wheels move easily? ☐ Consider: wheel diameter, dual versus single wheels, narrow rather than wide tyres, maintenance, steering characteristics (front wheels lockable/ rear wheels swivel)	
Movement directions	Straight line pushing? ☐ Turning? ☐ Manoeuvring in confined spaces? ☐	
Changes of level	Ramps – internal or external? ☐ Joins, lips, steps, other changes in height? ☐	
Floor cleaning	Method and frequency of cleaning floor coverings? ☐ Cleaning equipment and materials available? ☐ Staffing levels available for cleaning? ☐	
Other factors	What evacuation procedures will be used? ☐ Other? ☐	

GENERIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

STEP TWO – CONSIDER SPECIFIC AREAS				
	Wheeled equipment to be moved (tick)	**Workspace (tick)**	**Risk of spills (tick)**	**Implications for floor coverings (tick)**
Bedroom	Bed ☐ Hoist ☐ Commode ☐ Wheelchair ☐	Restricted ☐ Spacious ☐	Low ☐ Moderate ☐ High ☐	Smooth and even ☐ Slip resistant ☐ Low push/pull forces ☐ Easy manoeuvrability of equipment ☐
Corridor	Bed ☐ Hoist ☐ Wheelchair ☐ Trolley ☐ Wheelie frame ☐	Restricted ☐ Spacious ☐	Low ☐ Moderate ☐ High ☐	Smooth and even ☐ Slip resistant ☐ Low push/pull forces ☐ Easy manoeuvrability of equipment ☐
Lounge room	Hoist ☐ Wheelchair ☐ Wheelie frame ☐	Restricted ☐ Spacious ☐	Low ☐ Moderate ☐ High ☐	Smooth and even ☐ Slip resistant ☐ Low push/pull forces ☐ Easy manoeuvrability of equipment ☐
Activity room	Hoist ☐ Wheelchair ☐ Wheelie frame ☐	Restricted ☐ Spacious ☐	Low ☐ Moderate ☐ High ☐	Smooth and even ☐ Slip resistant ☐ Low push/pull forces ☐ Easy manoeuvrability of equipment ☐
Dining room	Hoist ☐ Wheelchair ☐ Wheelie frame ☐	Restricted ☐ Spacious ☐	Low ☐ Moderate ☐ High ☐	Smooth and even ☐ Slip resistant ☐ Low push/pull forces ☐ Easy manoeuvrability of equipment ☐
Wet areas – ensuite bathroom pan rooms	Various ☐	Restricted ☐ Spacious ☐	High ☐	Slip resistant ☐

STEP THREE – BENCHMARK WITH OTHER FACILITIES

Review the advantages and disadvantages of their floor surfaces for:

- patients; and
- all relevant staff groups, e.g. direct care staff, staff from other departments, cleaning staff.

Seek specific information about preferred floor surfaces, suppliers and brand names.

STEP FOUR – REVIEW TECHNICAL INFORMATION FROM SUPPLIERS

In consultation with employees and HSRs, gather information on potential floor coverings regarding:

- push/pull forces;
- slip resistance; and
- cleaning procedures and equipment.

STEP FIVE – DECIDE WHAT TYPES OF FLOOR COVERINGS ARE BEST SUITED TO YOUR DIFFERENT AREAS	
Bedroom	
Corridor	
Lounge room	
Activity room	
Dining room	
Wet areas – ensuite bathroom pan rooms	Must be slip resistant

5

GENERIC SPATIAL REQUIREMENTS FOR SAFE HANDLING

This section provides guidance on spatial requirements for the main areas related to patient handling. The spatial requirements refer to how much clear space is required to provide for:

- safe use of equipment;
- safe handling techniques; and
- safety for patients.

Prior to designing any area, it is critical to establish work practices and equipment that will be used to handle patients. This should be done with reference to the WorkSafe publication *Transferring People Safely.*

BEDROOMS

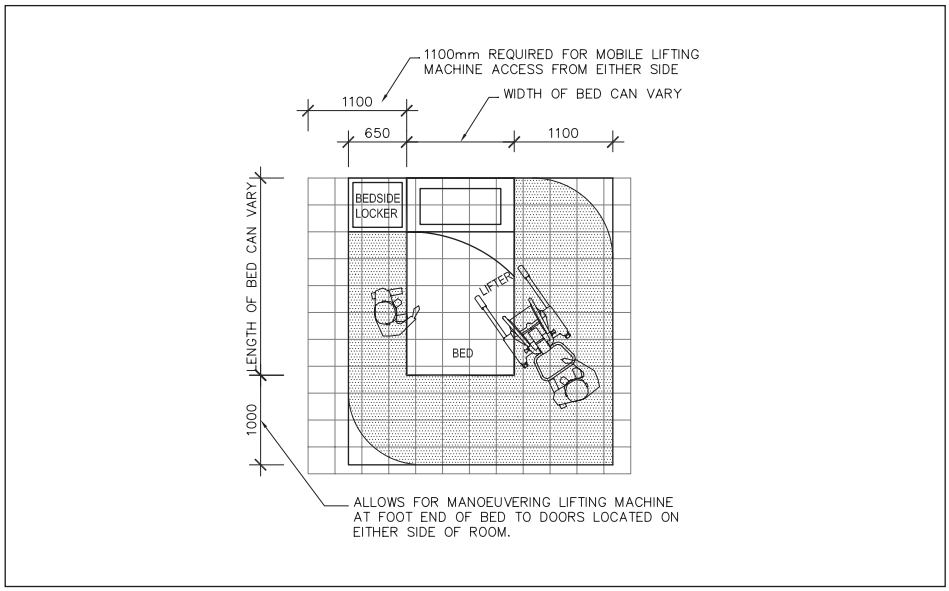
Functional bedroom design should take into account:

- people using the space – patients, staff, visitors;
- equipment and furniture – bed, chair, medical equipment, patient handling equipment (e.g. overhead ceiling hoist versus mobile hoist); and
- tasks to be undertaken in the room – hence an understanding of work practices is essential.

Depending on the type of facility, there are a variety of layouts including single bed, two-bed and four-bed rooms. The recommended spatial requirements for bedrooms are based on height adjustable beds so that staff do not have to bend when attending the patient or making the bed. It is also recommended that staff can undertake patient handling tasks in the bedroom without moving the bed.

GENERIC SPATIAL REQUIREMENTS FOR SAFE HANDLING

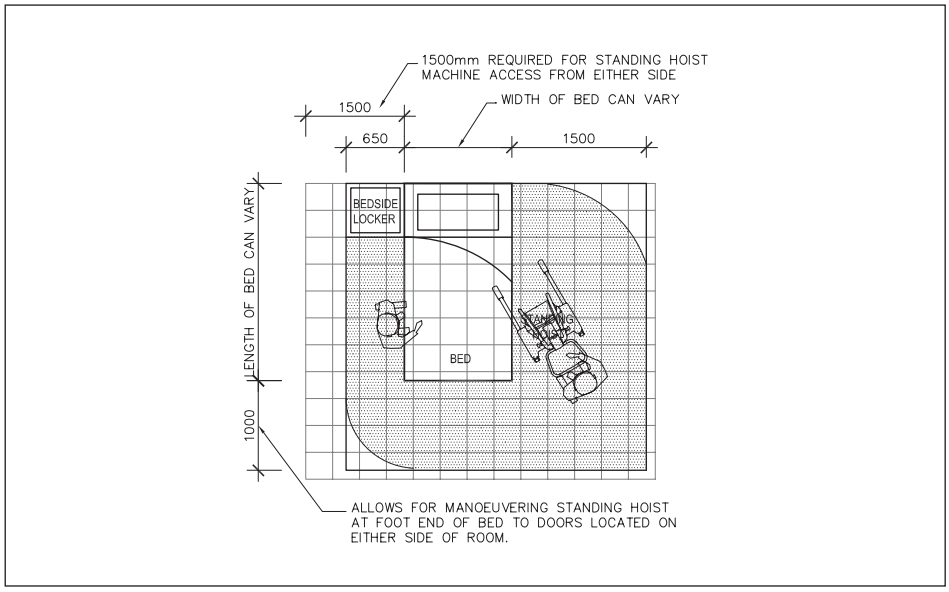
Single bedroom and mobile lifting hoist



Note:

- *A minimum of 650mm needs to be allowed on both sides of the bed to allow adequate space for staff making the beds.*
- *This assumes a mobile hoist not exceeding 1200mm length x 700mm width with adequate clearance underneath the bed for the lifting machine base.*

Single bedroom and standing hoist



Note:

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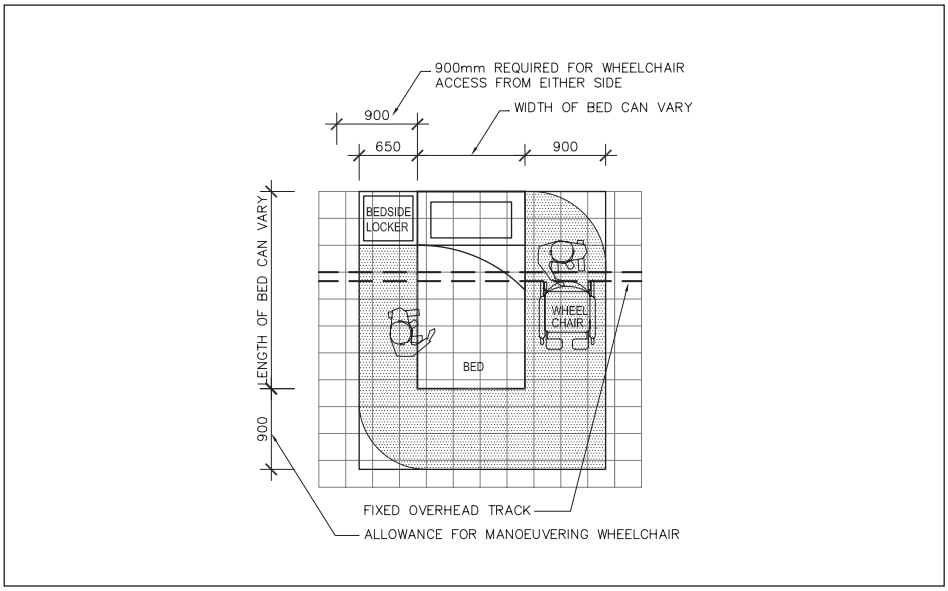
b. The measurements shown are clear space requirements and any furniture/equipment within this zone should be easily moveable (i.e. no fixed or large/heavy furnishings within this zone).

c. If equipment exceeds sizes assumed, spatial dimensions may need to be increased.

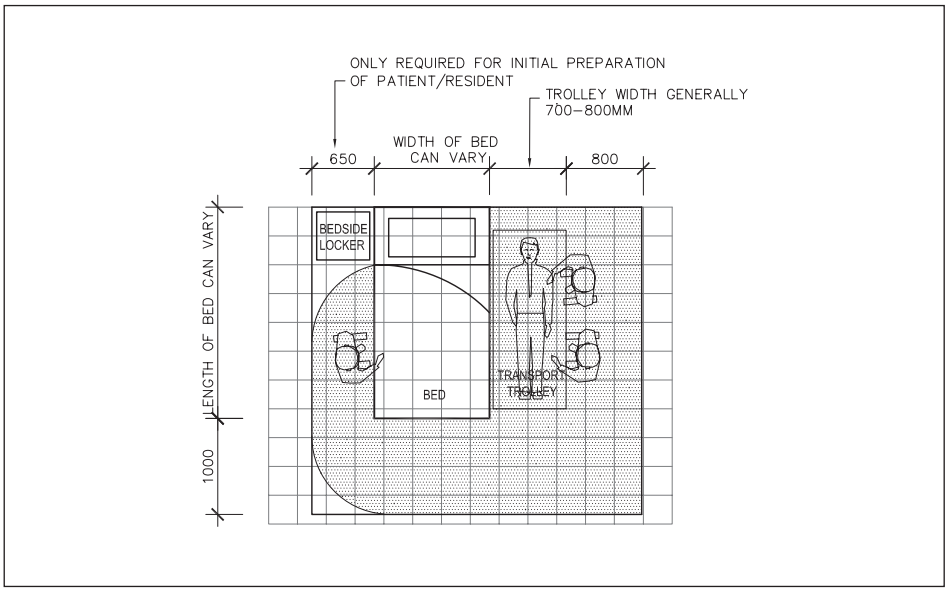
d. Spatial requirements are based on adjustable beds so that staff do not have to bend when attending the patient or making the bed.

Single bedroom and overhead ceiling hoist



Note: This assumes that standard size wheelchair is used (700mm width x 1000mm length) and that the chair is pushed in backwards.

Single bedroom – bed to trolley transfer using slide sheets



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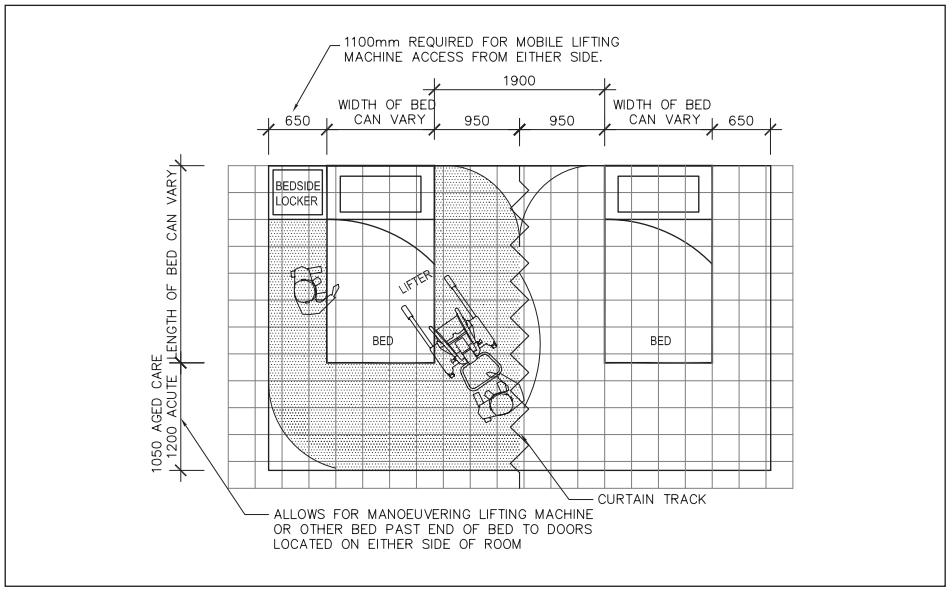
c. If equipment exceeds sizes assumed, spatial dimensions may need to be increased.

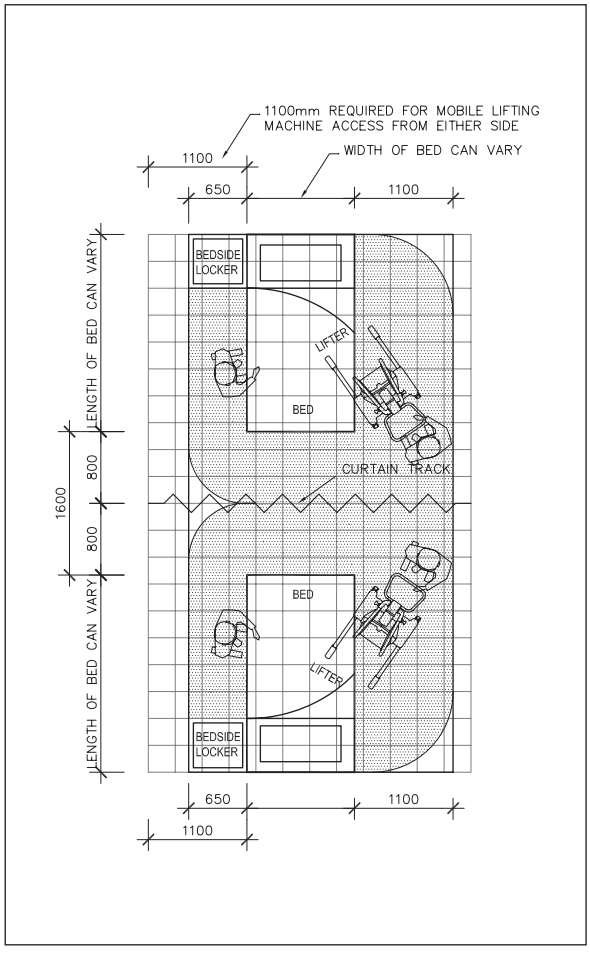
d. Spatial requirements are based on adjustable beds so that staff do not have to bend when attending the patient or making the bed.

GENERIC SPATIAL REQUIREMENTS FOR SAFE HANDLING

Multiple bedrooms and mobile lifting hoist



Note: Drawing shows space requirements for fixed curtain track. Space between beds could be reduced if moveable curtain track used – refer to space requirements for single bedrooms.



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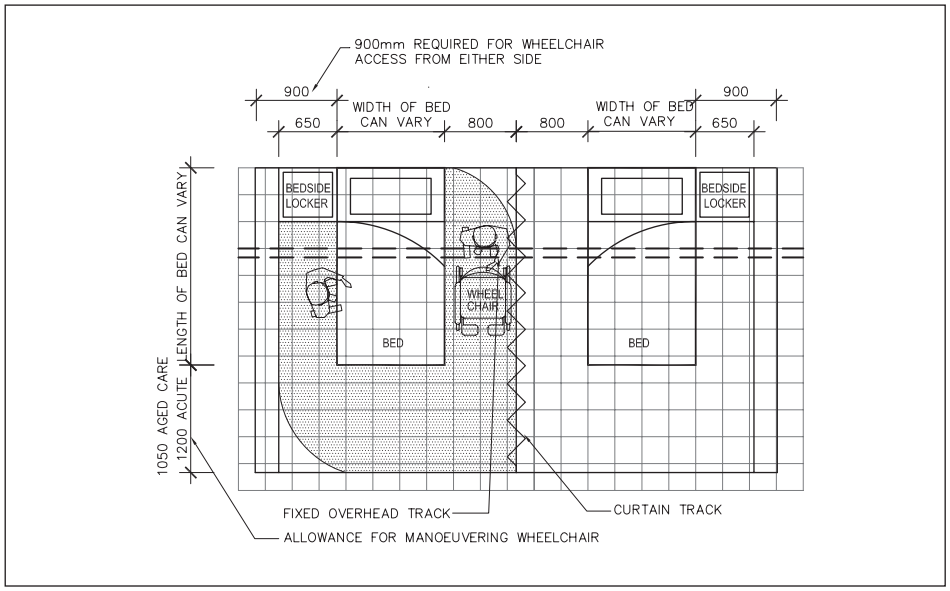
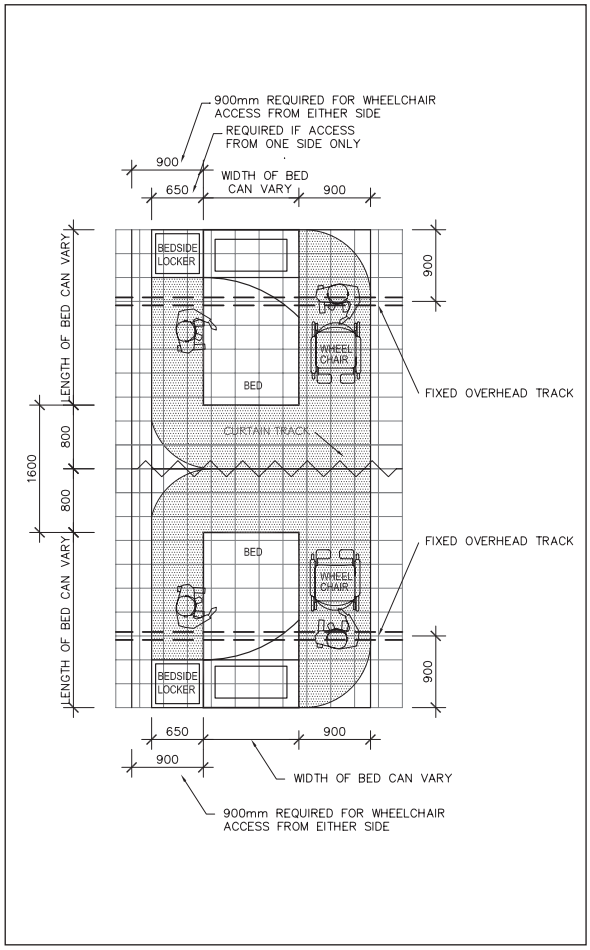
c. If equipment exceeds sizes assumed, spatial dimensions may need to be increased.

d. Spatial requirements are based on adjustable beds so that staff do not have to bend when attending the patient or making the bed.

Multiple bedrooms and overhead ceiling hoist



Note: This assumes that standard size wheelchair is used (700mm width x 1000mm length) and that the chair is pushed in backwards.



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c. If equipment exceeds sizes assumed, spatial dimensions may need to be increased.

d. Spatial requirements are based on adjustable beds so that staff do not have to bend when attending the patient or making the bed.

ENSUITES AND ASSISTED BATHROOMS

Designing for independent disabled persons

AS1428.1–2001: Design for access and mobility: Part 1: General requirements for access – new building work provides detailed guidance regarding the design of bathrooms for the independent disabled person, i.e. those independent with the use of mobility aids such as wheelchairs or walking frames. This Standard includes recommendations with regard to the space and layout of:

- toilets;
- hand wash basins;
- showers; and
- bathroom fixtures and fittings, e.g. mirrors, soap dispensers, grab-rails.

This information and guidance is highly relevant for all independent patients and those that may be cared for in a wheelchair or commode chair when in the bathroom.

Designing for dependent disabled persons

This section of the Guide aims to provide solutions for ensuite design that meet the needs of assisted persons and their carers. These solutions provide flexibilities for a range of disabilities, from independent to dependent and provide for needs beyond that catered for by AS1428.1. Thus it is not intended to replace AS1428.1, but rather provide solutions for disability needs not addressed by the Standard.

Prior to designing the ensuite or assisted bathroom, it is critical to establish the work practices and equipment that will be used to transfer patients. The following patient handling equipment may be used:

- mobile lifting hoist;
- overhead ceiling hoist;
- shower chair;
- walking/wheelie frame;
- standing lifter;
- commode chair;
- wheelchair;
- mobile shower trolley; and/or
- transfer trolley/ambulance stretcher.

Space around the toilet

A great deal of patient handling occurs during toileting. Designing for space around the toilet can reduce manual handling risks by allowing adequate space for patient handling equipment and adequate space for staff to assist. This space is not provided for by AS1428.1 as it addresses the needs of independent disabled persons.

CLEAR SPACE AROUND THE TOILET	WHAT THIS ALLOWS FOR
300mm adjacent to toilet	Recommended by AS1428.1 – independent persons only.
550mm adjacent to toilet	Staff assistance – to stabilise or adjust clothing.
950mm adjacent to toilet	Sideways wheelchair transfer (recommended by AS1428.1) and/or staff assistance.
1500mm in front of toilet	Wheelchair, lifting machine or standing hoist transfer.
1200mm in front of toilet	Recommended by AS1428.1 – independent persons only; wheelchair or wheelie frame.

GENERIC SPATIAL REQUIREMENTS FOR SAFE HANDLING

Note:

a. *The dimensions shown in the diagrams do not provide guidance on total room sizes or layouts (i.e. the perimeter walls of the rooms are not shown).*
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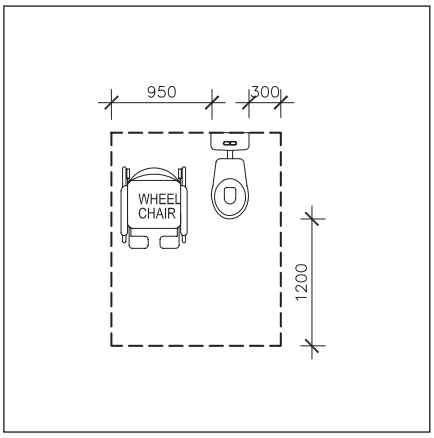
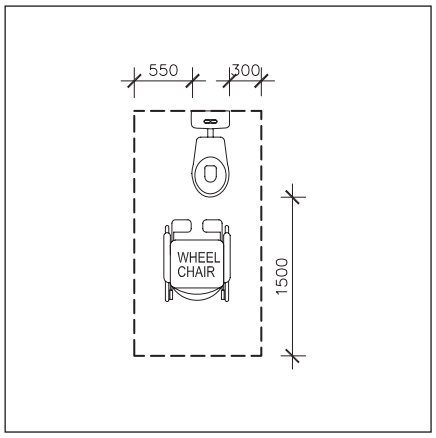
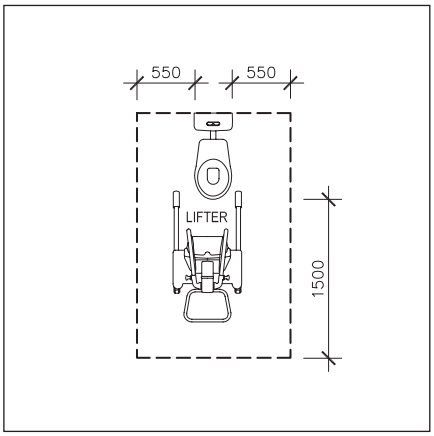
c. *If equipment exceeds sizes assumed, spatial dimensions may need to be increased.*



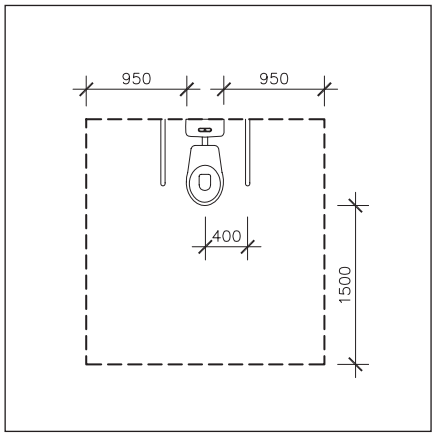
The functional area needed by an independent wheelchair person, side transfer



The functional area needed by an independent wheelchair person, front transfer



The functional area needed for a patient in a lifting machine and with assistance of one or two staff on either side. The transfer to the lifting machine has been done outside this area



Drop down grab rails either side of toilet. This allows for the option of full staff assistance, sideways transfer from either side or use of a standing lifting machine

Drop down grab rails on both sides of toilet – generally positioned 200–300mm above toilet seat and 400mm from centreline of pan.

Drop down grab rails

Where more than 300mm clear space is provided adjacent to the toilet, it should be fitted with drop down grab rails. Drop down grab rails provide flexibility, and can be positioned in the up or down positions

- In the up position, there is clear space for staff/equipment access or sideways wheelchair transfer.
- In the down position, grab rails provide support for a patient to get themselves on or off the toilet.
- The toilet roll holder can be built in to the grab rail and should be positioned on the rail furthest from the shower.
- The nurse call button can be built into the grab rail – if this is the case, it is essential that this rail is always left in the down position unless staff/equipment access is required.
- The grab rails need to be sufficiently strong and well mounted to withstand a force of 110kg applied at any point in both downwards and sideways directions.
- The grab rails need to have a design feature that enables them to be securely mounted in the up position, in case a patient inadvertently uses them as a grab rail.
- The location of the grab rails in relation to the toilet pan needs careful planning to optimise independent patient transfers on/off the toilet. Height adjustable drop down grab rails are preferred to provide flexibility for a range of patients. Fixed drop down grab rails should be located 300mm above the height of the toilet seat and 400mm from the centreline of the pan (for bariatric patients, additional space adjacent to the pan may be required). Note: the pan size and design may vary.

Determining ratios of toilet locations

A mix of toilet locations may be needed to cater for patient needs and mobility. An analysis of the ratios of dependent versus independent patients likely to use the facility should occur during planning so that correct decisions can be made. Further information can be sourced from guidance material relevant to the type of facility.

Example: Residential aged care

The following table indicates the recommended quantities of different toilet locations and the required minimum distance of the pan from the wall (Reference – Department of Human Services *Residential Aged Care Services Generic Brief [2007]):*

RESIDENTIAL AGED CARE – TOILET LOCATION AND MINIMUM RECOMMENDED QUANTITY DIMENSIONS INDICATE CLEAR SPACE EITHER SIDE OF THE 400MM PAN				
Facility size	Total ensuites	950/400/950 mm	950/400/550 mm	950/400/300 mm
30-bed	20	2	12	6
45-bed	30	3	18	9
60-bed	40	4	24	12
90-bed	60	6	36	18

Note:
- *The table indicates the minimum distance of the pan from the wall, where 400mm indicates the pan width and figures either side indicate clear space.*
- *The 950mm on one side of the toilet may incorporate the shower.*
- *There should be a mix of right and left sided designs to provide the flexibility to cater for a range of patient needs.*
- *Consideration must also be given to the number of accessible ensuites and bathrooms as per* Building Code of Australia *requirements.*

Space in the shower

When showering dependent patients, open space in the shower reduces awkward postures for staff.

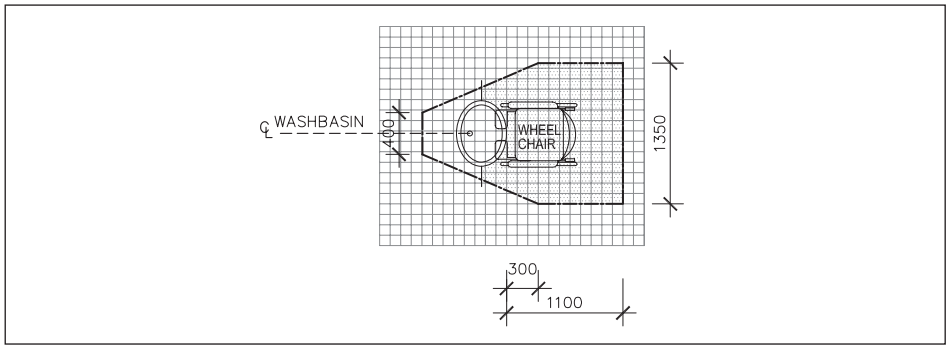
For example, AS1428.1 recommends a clear minimum space of 1160mm x 1100mm in the shower, plus an adjacent circulation space sufficient for the use of a wheelchair or commode chair.

Note: When designing for bariatric patients, additional space will improve functionality.

Space around the hand wash basin

When caring for dependent patients, circulation space around the hand wash basin should allow for a wheelchair/commode chair plus the staff member assisting.

AS1428.1 recommends clear space of 1100mm depth x 800mm width in front of the basin for independent wheelchair users. Additional width to this space would be required to allow for staff assisting a dependant person. An additional 550mm is recommended to allow for the standing staff member.



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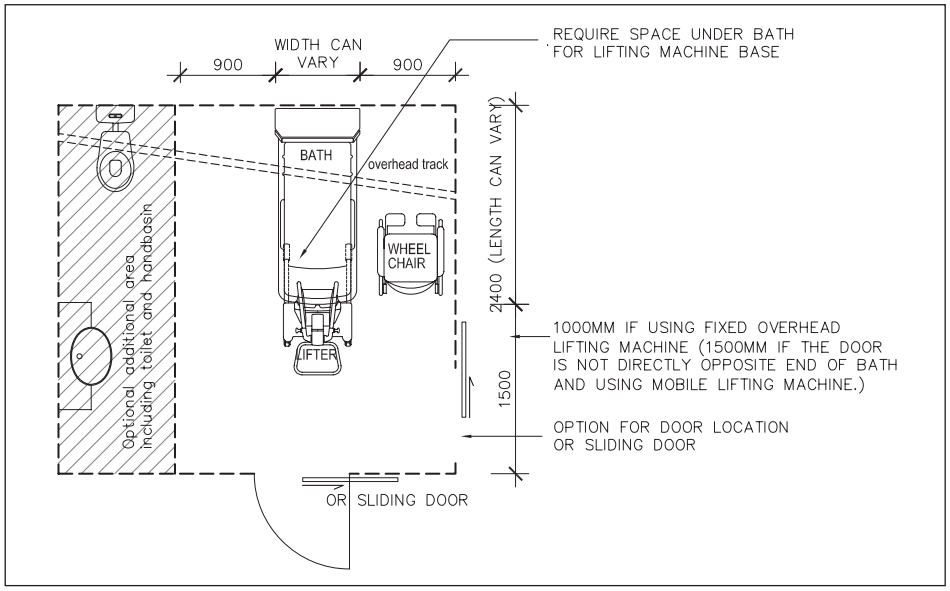
b. The measurements shown are clear space requirements and any furniture/equipment within this zone should be easily moveable (i.e. no fixed or large/heavy furnishings within this zone).

c. If equipment exceeds sizes assumed, spatial dimensions may need to be increased.

Space around the bath

Height adjustable, island baths are required to reduce risks for staff washing dependent patients. The space required around the bath is directly linked to the method chosen to transfer the patient in or out of the bath, e.g. transfer from wheelchair using overhead tracking versus mobile hoist.

In designing an assisted bathroom, space should also be provided for staff to assist in drying of the patient and possibly partial dressing.



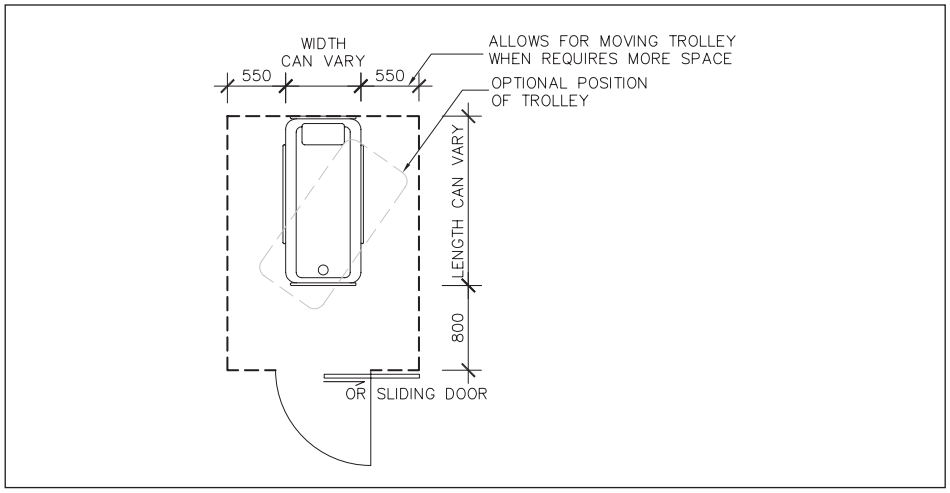
Note: If a mobile lifting hoist is used, it is essential that there is adequate space to manoeuvre the legs of the hoist under the bath.

Space around a mobile bath/shower trolley

Mobile bath/shower trolleys are often used to provide a relaxing bath experience for dependent patients.

In many cases, patients are transferred onto the bath/shower trolley outside the bathroom/ensuite and then wheeled into the bathroom. In this situation, the minimum space required inside the bathroom/ensuite for two persons assisting (one either side of the trolley) is 550mm clear space on either side of the trolley for the standing staff members.

Where patients are transferred onto the mobile bath/shower trolley by a lifting machine inside the bathroom/ensuite, the clear space required is the same as that around a bath – refer to the previous section for details.

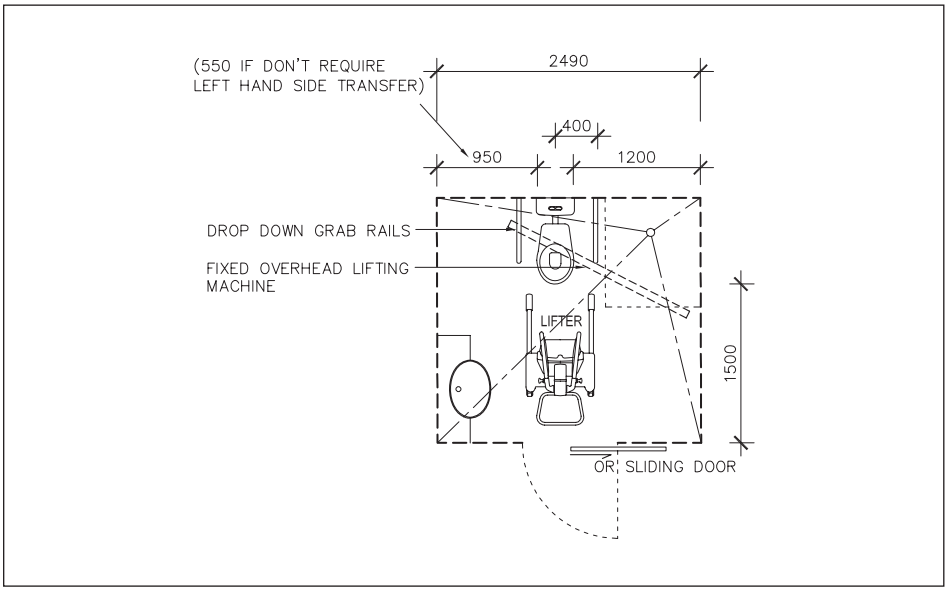


Related spatial issues

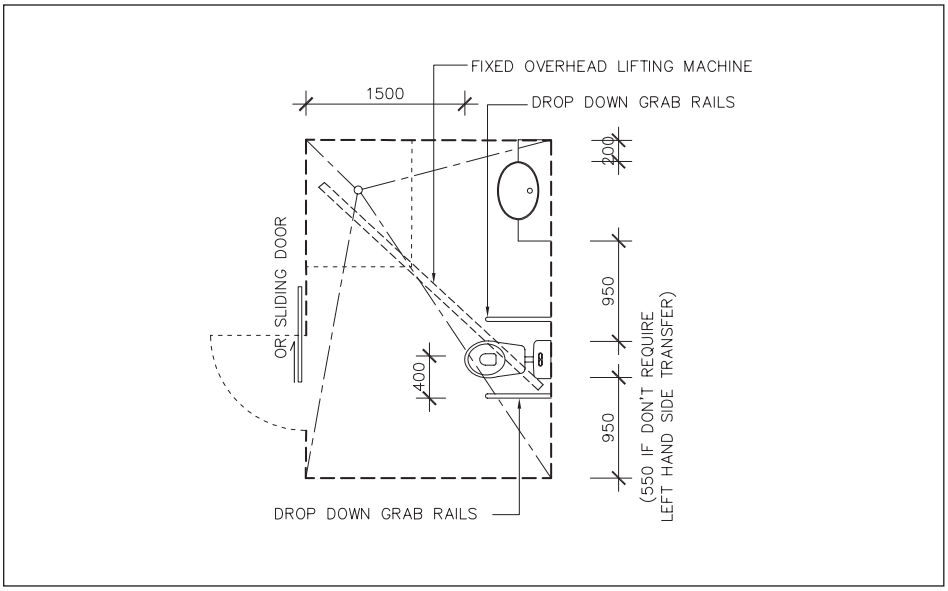
When considering the layout of an ensuite or bathroom, it is essential to consider the location and type of door as this may have an impact on circulation space:

- Hinge doors – in general, should swing outwards – minimal impact on circulation space inside the ensuite/bathroom, but may be dangerous if opening onto a walkway.
- Inwards opening hinge doors or sliding doors should be capable of either being opened outwards or removed from the outside – may impact circulation space inside the ensuite/bathroom.
- Doors located directly opposite the toilet minimise risks for staff associated with manoeuvring wheelchairs, commode chairs and lifting machines.

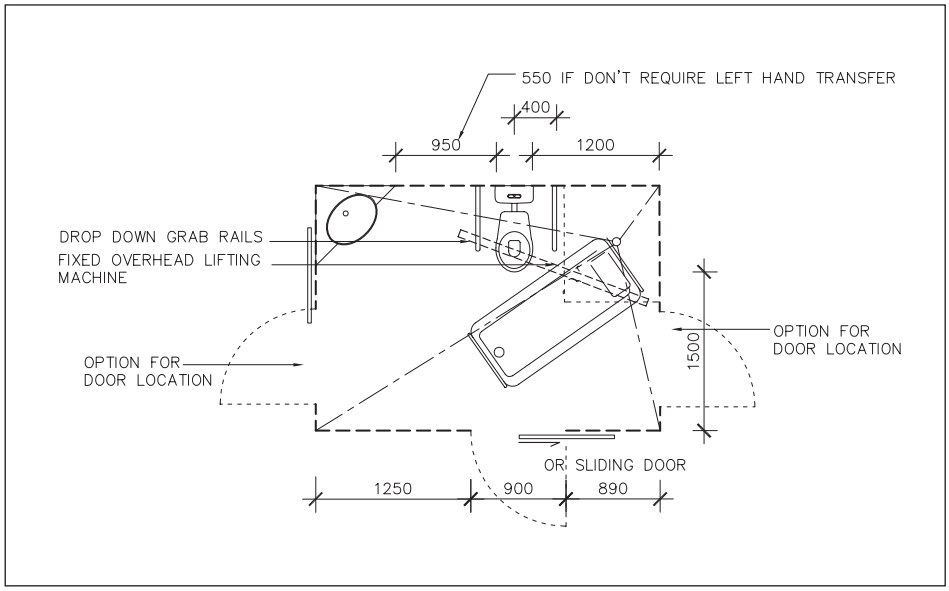
Examples of ensuite layouts for dependent patients



Note: These designs show minimum space requirements to allow toileting and showering using mobile lifting equipment (such as standing lifter or commode chair) and/or overhead tracking. They may not provide adequate workspace for use of a bath/shower trolley.



The following ensuite design would be suitable for most bath/shower trolleys (sizes can vary so check your bath/shower trolley dimensions for suitability).



CORRIDORS

The minimum requirements for corridor widths in health and aged care facilities are specified in the *Building Code of Australia* and related guidance material. In relation to patient handling issues, the important factors to achieve are:

- clear space for the movement of wheeled equipment and people up and down the corridors; and
- adequate turning circle space for wheeled equipment in and out of doorways.

A summary of minimum recommended clear corridor widths (i.e. clear space between handrails and unencumbered by other fixtures) is as follows:

- Health facility (where patients transported on trolleys) – 2100mm standard width and 2350mm is optimal.
- Health facility (main access corridors where two beds may need to pass) – 2350mm.
- Aged care corridors (where patients are transported in beds) – 1800mm.
- Aged care corridors (where patients are not transported in beds) – 1500mm clear width with 1800mm clear width at doorways to bedrooms and communal bathrooms.

Straight corridors are recommended to minimise risks related to the manoeuvring of wheeled equipment.

It is essential that the clear width of corridors is not used for the storage of equipment or for the location of protruding fixtures, e.g. hand wash basins. Where this is required, recesses should be provided in the corridor for the fixtures or storage bays.

STORAGE

Planning for equipment storage is a critical and complex aspect of safe and functional design. It is essential that total storage requirements are ascertained during the design process to avoid the problem of excess equipment being left in corridors, bedrooms or bathrooms, creating trip hazards and safety problems for staff and patients.

How much storage is required?

There is no easy way to estimate storage requirements as it depends on the specific equipment used by a facility and the storage philosophy of an organisation. For example, some facilities will aim to store all patient handling equipment used by a patient within the bedroom/ensuite, but others will utilise a central store for some items of equipment.

During the planning phase, the user group should itemise all storage requirements in terms of:

- type of equipment being stored, e.g. wheelchairs, lifting hoists, medical equipment, patient walking aids;
- number of items to be stored;
- special needs in relation to items being stored, for example:
  - strategic location;
  - power points needed for charging.

It is essential to consider future storage needs and maximum possible future demands.

Storage layout

There are many options for storage layout, whether it be a specific room or a recessed bay in a corridor. The main requirement in relation to staff safety is that the storage layout facilitates easy access for the equipment being stored.

Some storage design solutions for consideration include:

- rectangular or long narrow storerooms with an aisle down the middle and space on the walls for storage are generally better than square storerooms (in the latter, it is often hard to retrieve items near the walls as the middle of the room can become cluttered with equipment);
- storage bays accessible from the corridor (e.g. wheelchairs/equipment underneath and cupboards above) can be an effective means of maximising storage space, instead of building a room; and
- adjustable height shelving allows for flexibility of items to be stored.

Storage of patient handling equipment

Patient lifting machines

Research has shown that the strategic location of lifting equipment is important to aid compliance with No Lifting policies. If lifting machines are stored too far away, staff may be reluctant to use them and staff travel is increased, which may put patients/residents at risk due to the delay in time. It is recommended that lifting machines be available to staff within 20 metres. Their actual storage should allow for easy access. A preferred option is directly off a main corridor and in a recessed alcove with power supply. They should not be stored in circulation areas where they inhibit movement.

Wheelchairs

The storage of wheelchairs often presents a dilemma: are they stored in one central location or is space provided within the actual bedrooms? This will depend on the usage. In acute facilities, where the patients' stay is often short and their individual requirements can vary significantly from patient to patient, the storage of wheelchairs may be better in strategically located storerooms which may also accommodate other equipment. In aged care, long term residents may require a wheelchair to be close at hand. Provision of a specific storage area within the bedroom is preferred. Suitable parking places need to be provided for charging of battery wheelchairs.

Commodes and shower chairs

Commodes and shower chairs can be stored in the shower area of the ensuite, as they are used whenever patients use the ensuite. Shared ensuites may need to be large enough to contain a number of shower chairs/stools to accommodate varied patient functional capacities.

LOUNGE/DINING ROOMS

The size and layout of these shared areas relate to the following factors:

- People using the area – patients, staff, visitors (consider peak use time such as meal time and activity time).
- Equipment used in the room, e.g. wheelchairs, dining and lounge chairs, tables, television units.
- Equipment stored in the room, e.g. wheelie frames and wheelchairs parked temporarily while patient is seated on lounge/dining chairs.
- Tasks undertaken, e.g. chair-to-chair transfers and lifting machine transfers.

To reduce patient handling risks, designers should consider the layout of furniture and fixtures in relation to the assessment of factors listed above, with particular consideration of circulation space and transfer space.

Circulation space

Adequate circulation space within the room is needed for patients and staff to move between items of furniture. Space recommended depends on tasks undertaken, for example:

- 900mm clear space between objects will allow for the manoeuvring of wheelie frames and wheelchairs.
- If a staff member is likely to walk side by side with a resident, then a clear space of 1200mm between objects is recommended.
- If a space is needed for two wheelchairs to pass, then 1600mm clear space between objects is recommended.

Transfer space

When using patient handling equipment to transfer patients into chairs, space needs to be provided for the safe use of equipment.

- It is recommended that 1500mm of space be allowed in front of chair for standing hoist or mobile lifting hoist.

Estimating total room sizes

Information on recommended total room size can be found in guidance material specific to the type of facility.

Example A

The Victorian Department of Human Services' *Residential Aged Care Services Generic Brief (2007)* recommends:

- two square metres per resident for dining areas; and
- three square metres per resident for lounge areas.

Example B

The Victorian Department of Human Services' *Disability Accommodation Guidelines (2005)* recommends the following.

ACCOMMODATION MODEL	LIVING AND MEALS AREA COMBINED	SECOND LIVING AREA
Four-bed house and sleepover room	28 square metres	16 square metres
Five-bed house and sleepover room	34 square metres	17 square metres
Six-bed house and sleepover room	36 square metres	18 square metres

**For houses accommodating more than three residents who use a wheelchair, an additional area of up to three square metres may be added to the living area allowance to ensure sufficient circulation space for manoeuvrability of wheelchairs.*

6 AREA-SPECIFIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

INTRODUCTION

This section provides additional information about people handling risks and design solutions in specific work areas. It is not intended to be prescriptive or exhaustive, but to provide some guidance for consideration.

Each section will describe:

- hazard identification – people, equipment and environment, tasks; and
- design solutions.

BARIATRIC PATIENTS

Hazard identification

People

Bariatric patients (previously referred to as obese or morbidly obese) are a small, but increasing number of patients. The term bariatric applies to patients whose weight far exceeds recommended guidelines, and where body size restricts their mobility, health, or access to available services. Their weight increases morbidity and mortality, and causes numerous care challenges. The size and shape of bariatric patients will vary greatly and weights may range from 100–400kg. Handling bariatric patients is defined as hazardous under the OHS Regulations due to use of high force, handling of live people and loads that are unstable, unbalanced and difficult to grasp or hold.

Bariatric patients with excessive weight or girth often present with a severe disease status, such as heart or renal failure or diabetes, or with compromised skin condition, leading to the need for extensive and very careful handling. They may also exceed the weight and size limits for standard furniture or patient handling equipment.

Equipment and environment

Bariatric patients can be found in all sectors where patient handling occurs, from children through to the elderly and from acute care and surgery through to aged care rehabilitation. Handling bariatric patients is also an issue for transporting patients to and from care and for nursing homes, mortuary attendants and undertakers.

Large heavy capacity equipment is required for all aspects of the bariatric patients care, including:

- large beds with adjustments to support very heavy patients; some have the ability to adjust into a chair;
- mobile or overhead tracking hoists to support weights up to 300-400kg (ceiling tracks may require reinforced structural supports) with appropriate attachments such as extra wide lifting frames/large slings;
- extra large chairs and wheelchairs;
- heavy capacity toilets, commode chairs and over toilet frames;
- powered chairs and trolleys to eliminate pushing or pulling large weights;
- heavy duty walking machines and frames;
- weigh scales built into beds or hoists, or built into the floor; and
- heavy capacity theatre tables or treatment tables.

Organisations may purchase or hire bariatric equipment on a needs basis. Given the increased size of bariatric equipment, it is essential that it is factored into the planning process to ensure the workspace accommodates the equipment and space required to use and store it.

Tasks

The hazards occur in both on and off bed tasks. Due to the size and weight of bariatric patients, even tasks not generally presenting people handling hazards, for example, assisting a patient to wash their limbs, can become hazardous.

Designing for safer people handling

Determining organisational needs

The design solutions will depend on the predicted number and frequency of bariatric patients likely to occupy the facility, for example:

- Large acute hospitals may require one or more specially designed bariatric room/ ensuite, as well as provisions for these patients in specific areas such as ICU, Emergency, Theatre and Maternity.
- Small hospitals or aged care facilities with infrequent need may remove one bed from a two-bed room and use the room for one bariatric patient with hired furniture and equipment; or refer bariatric patients to an alternative facility.

Design for bariatric patients may consider the following general guidance

Bedroom

- Wide entrance door (e.g. 1300mm or greater) to accommodate manoeuvring of large equipment.
- Extra space around the bed for equipment and transfers (at least 1500mm – 2000mm recommended on both sides and at the foot of the bed).
- Heavy capacity overhead tracking – may provide for in/out of bed transfers only or may run directly into adjacent ensuite; may include in built weigh scale.

Ensuite

- Wide entrance door (e.g. 1300mm or greater) to accommodate large equipment and carers.
- Centrally located heavy capacity toilet with extra space either side and in front (e.g. 1200mm on either side and 1500mm in front) and heavy capacity drop down grab-rails.
- Large shower area (e.g. 1800mm x 1800mm) for easy access and use of large shower chairs.
- Heavy capacity overhead tracking.

Imaging and Operating Theatres

- Heavy capacity, height adjustable imaging and operating tables and table accessories, e.g. stirrups and armrests.
- Heavy capacity overhead ceiling tracking or portable overhead gantry frames.
- Wide entrance doors.
- Step stools for staff plus appropriate transfer equipment, e.g. inflatable transfer devices.

Emergency

- Weigh scale either built into a trolley/bed or in the floor.
- Special needs cubicle with additional space for equipment/handling of bariatric patients.
- Heavy capacity wheeled equipment, e.g. adjustable trolley and wheelchair.

Storage

- Additional space to store bariatric equipment when not in use.

Mortuary

- Heavy capacity trolley and patient transfer equipment.
- Larger size body storage areas/equipment.

Corridors, doorways, turning circles/corners need to accommodate access, egress and turning for large and wide beds and trolleys.

Lifts need to have the size and weight capacity to cater for bariatric beds, patients and staff.

REHABILITATION

Hazard identification

People

Rehabilitation units address both in- and out-patient needs for a wide range of conditions and levels of dependency.

Equipment and environment

An in-patient rehabilitation unit includes bedrooms, bathrooms, recreational and therapy areas, e.g. metalwork/woodwork workshops, kitchens, gardens, gymnasiums, swimming pools.

Rehabilitation units may use a wider range of equipment than other areas, including:

- mobility aids such as wheelchairs, walking frames, crutches;
- patient handling equipment such as hoists and standing/walking aids;
- therapy equipment such as parallel walking bars, treatment tables; and
- workshop equipment such as woodwork or metal work tools and benches.

During the planning process it is essential that all items of equipment likely to be used are determined so that proper space and weight capacity can be allocated.

Tasks

The hazards occur in tasks such as:

- manually assisting patients to walk;
- exercising patients with very little active movement, i.e. moving limbs;
- assisting patients learning to roll, sit up, transfer and stand;
- dressing, undressing and bathing patients;
- transferring patients in and out of hydrotherapy pools;
- managing uncontrolled patient movements; and
- assisting with activities of daily living.

Designing for safer people handling

The proximity of the residential services to therapeutic services should be considered, to minimise the handling and transport of patients.

Rehabilitation units should be designed to maximise patient function and independence and minimise the hazardous manual handling required by employees. This could include:

- additional workspace to allow for use of mobility aids such as electric and manual wheelchairs, scooters, wheelie frames;
- adjustable treatment tables with height and back rest finger control adjustment;
- adjustable beds and pressure care equipment to minimise turning;
- overhead tracking to support standing and walking frames;
- mobile or overhead hoists with both stretcher and chair support attachments for lifting patients into pools;
- adjustable height mobile change tables in change rooms;
- use of aids to increase patient independence, such as transfer boards, slide sheets, overhead and bedside pull bars and frames;
- motorised wheelchairs;
- adjustable height parallel walking bars;
- additional storage space for rehabilitation equipment such as wheelchairs, walking frames; and/or
- specially designed therapy areas to facilitate independence, e.g. workshops, kitchens and gardens.

Specific units

Patients with specific conditions, such as spinal cord injuries, acquired brain damage, or psychiatric illness may need specific designs or fixtures to allow for management of these conditions, for example:

- Extra space for large or motorised wheelchairs/scooters to move around beds and other furniture.
- Separated areas (with visual access for staff) for patients who may be agitated or aggressive.
- Maximum support, such as overhead tracking, for movement around bathroom and toilet areas.
- Fall prevention devices such as laser alert pressure mats.

IMAGING

Hazard identification

People

Patients may be in- or out-patients, ranging from the fully independent to the very frail or sick. Imaging staff may need to wear lead aprons for sustained periods, which may contribute to fatigue and the risk of musculoskeletal disorder.

Equipment and environment

Treatments or examinations are usually performed in the Imaging department, but may be undertaken in hospital wards, such as the ICU.

Equipment may pose major risks in Imaging departments. Large and non-adjustable or immovable pieces of equipment, such as scanners, may require exact positioning of patients in narrow or confined spaces. Sonography often requires the employee to input data with one hand and maintain contact with the ultrasound head to a large or difficult to access part of the patient's body. Many imaging departments are moving towards implementation of filmless picture archiving and communication systems (PACS) where there is increased emphasis on the design and use of computer imaging equipment.

Tasks

Hazardous tasks include:

- transferring patients on and off imaging trolleys for procedures such as scans or X-rays – these transfers can be from beds, trolleys or wheelchairs, or assisting patients to climb onto/off the imaging trolley or structure;
- pushing patients in wheelchairs or on hospital trolleys to and from the imaging department;
- helping position patients torso and/or limbs on imaging surfaces by lifting, pushing and pulling;
- raising or lifting dependent patients to insert X-ray plates and perform X-rays taken within hospital wards;
- sustained awkward reaching, holding and moving for administering ultrasound examinations;
- working with arms raised to position the X-ray tube head; and
- sustained use of the computer and mouse with PACS.

Designing for safer people handling

Consideration should be given to:

- space to allow large trolleys to be placed next to imaging tables for slide sheet transfers (see page 47, section 5 for guidance on space);
- overhead tracking or mobile hoist with a stretcher frame attachment;
- adjustable height equipment, trolleys and tables;
- adequate space and wide corridors for trolleys;
- trolleys with electric tugs or motors for transporting to and from imaging;
- use of slide sheets and slide boards to transfer patient from trolley to table;
- power driven mobile X-ray machines;
- positioning and support of computers on adjustable height tables/trolleys;
- adjustable height forward tilting mobile stools or chairs for sonographers and other technicians where awkward postures have to be sustained;
- selection of x-ray equipment that enables positioning of X-ray tube head with electric hand control, rather than manual positioning;
- elimination of need to work with X-ray plates by using direct radiography equipment/system of work; and
- purchase of trolleys/beds with an X-ray tray underneath to eliminate need to position X-ray plate behind patient.

AREA-SPECIFIC DESIGN CONSIDERATIONS FOR SAFE HANDLING

OPERATING THEATRES

Hazard identification

There are many OHS and patient safety issues within the operating theatre environment. Whilst emphasis should be put on the maintenance of life and control of infection, there are many aspects of theatre work requiring hazardous manual handling tasks. In the past these have been weighed up against the controls required for sustaining life and positive outcomes of surgery and many of the known risk controls for manual handling available in health care have not been widely used in theatres.

People

Patients in a theatre environment are generally anaesthetised, and therefore fully dependent. There are often considerable numbers of staff needed during surgery. The need to wear personal protective equipment (PPE) such as lead aprons, theatre gowns and double gloves can increase the degree of difficulty for some manual handling tasks.

Equipment and environment

Work practices in theatres often require employees to operate together in a confined space and for long periods of time. Larger theatres are required where complex and awkward equipment, such as frames, are in use.

More than most other working environments, the design of theatres needs to be based on detailed analysis of work practices and work flow to minimise hazardous manual handling. Equipment design and placement, (not just surgical instruments, but also tables, support frames, trolleys, storage racks and other ancillary fittings), needs to optimise efficiency and minimise handling.

Tasks

Hazardous tasks include:

- continuously working in an awkward and forward bent posture to perform surgery or support functions;
- holding and stabilising limbs or other body parts for long periods while surgery is performed or while prepping limbs;
- transferring and moving patients on and off operating tables and trolleys/beds;
- controlled rolling or moving patients on narrow operating tables to allow closer access for surgery;
- performing repeated small movements of the hands and fingers, holding instruments or equipment; and
- delivery, storage, preparation, sorting, washing, sterilising and wrapping instrument sets for surgery*.

Designing for safer people handling**

Consideration should be given to the following:

- wide doorways and access corridors;
- adjustable height tables;
- tables which turn to allow access to various aspects of the patient;
- trolleys or beds which can adjust to the table height;
- provision of overhead tracking and stretchers to transfer patients;
- provision of inflatable transfer devices and slide sheets;
- frames which can support limbs during surgery;
- adjustable height stools for anaesthetists and operating staff;
- mobile instrument trolleys; and
- overhead gantry to support electrical leads for equipment.

* *Solutions to hazardous manual handling of instrument sets can be found in the WorkSafe publication* Orthopaedic Surgical Instrument Sets – Reducing Risks of Musculoskeletal Disorders.

** *These recommendations are also relevant to mental health treatment rooms providing electro convulsive therapy (ECT).*

INTENSIVE CARE UNITS (ICUs)

Hazard identification

People

ICU patients may be comatose or very ill, requiring 24-hour interventions and almost completely dependent on staff to perform all tasks. Staff working in ICUs need to be able to respond to multiple signals from monitoring devices, address immediate emergency issues and manage patients who may be difficult to handle due to their conditions and their attachment to numerous pieces of equipment. In an emergency response situation, there may be up to 10 staff members around the bed providing care.

Equipment and environment

The bed is almost the entire work station for ICU staff and a fully adjustable bed with adequate workspace around the bed is of major importance. Other considerations include:

- large and small pieces of patient support equipment, both mobile and fixed, which may reduce access to the patient;
- imaging or patient handling equipment brought to and from the patient; and
- adjustable chairs and trolleys.

Tasks

Hazardous manual handling tasks may include:

- bending and twisting to insert lines or drips or to use suction;
- exerting force to undertake emergency resuscitation or defibrillation;
- exerting force turning, raising, moving patients on the bed or transferring patients from bed to chair or trolley;
- awkward postures for washing or changing patients in bed;
- awkward postures and force moving patients attached to life support systems or multiple lines to equipment; and
- holding or restraining patients with challenging behaviours.

Designing for safer people handling

Space

- The bed should be positioned centrally with larger than usual space around all aspects – the foot, the head and the sides of the bed.
- Extra space for wider separation between beds allows for positioning of equipment, access for wheeled equipment and easy access to the patient by several staff, visitor chairs.
- Privacy curtains on adjustable tracks allow the space around a bed to be maximised in an emergency response where additional staff members are needed.
- Maximum width passageways and doorways allow for easy movement of large items of equipment.
- Beds should be located in easy view of the staff station to facilitate monitoring of the patient's condition and equipment.

Furniture

- Beds should be mobile with large wheels, removable head and foot, electrically operated and adjustable for raising and lowering, raising the bed head, tilt and turn.
- Pressure care equipment/mattresses to minimise turning.
- Chairs, such as flotation chairs, should be mobile with holding handles, brakes, fully height adjustable and have removable sides.

Equipment

- Overhead tracking with hoists and lifting frames should be available for all beds for use in both on-bed and off-bed tasks.
- Slide sheets combined with slide boards should be available at every bed.
- Wherever possible, equipment should be on braked castors and with handles or other easy holds for pushing/pulling.
- Electrical leads should be suspended to reduce trip hazards and improve access.

EMERGENCY DEPARTMENT

Hazard identification

People

The Emergency department should consider the needs of injured/ill patients as well as their accompanying carers. Crowding is very common as their families/friends surround patients in cubicles and fill corridors and waiting rooms. The tension of waiting and worrying in this environment can sometimes lead to aggression and may impede the work of the employees. Teams of medical and nursing staff working under pressure need to be accommodated.

Equipment and environment

The Emergency department environment may include:

- triage and reception area;
- waiting areas;
- multiple cubicles or rooms off corridors;
- treatment rooms and possibly an on-site imaging area;
- ambulance or vehicle entrance bay; and
- staff administrative area.

Equipment to be considered during the planning process includes many mobile patient trolleys and chairs, medical equipment in each cubicle and often mobile treatment or imaging equipment. Patients and families may also have their own mobility equipment or personal items.

Tasks

People handling hazards in Emergency departments may include these tasks:

- Lifting or supporting patients who have collapsed on the floor or fallen from equipment or furniture.
- Transferring injured or possibly unconscious patients from private cars.
- Transfers of patients from ambulance to trolley.
- Patient transfers to and from beds, trolleys and chairs.
- Restraining patients with violent or disturbed behaviours or relatives and friends who may be substance affected, aggressive or emotional.
- Intensive repetitive physical treatments, such as resuscitation.
- Pushing and pulling trolleys, wheelchairs and equipment.

Designing for safer people handling

Consideration should be given to:

- separate ambulance entry with wide doorways and automatic doors and direct access to treatment areas;
- automatic doors for patient entry;
- overhead tracking on a gantry in an undercover area adjacent to the entrance, combined with a slide board and wheelchair/trolley to assist in transfers in/out of private cars;
- wide corridors and adequate turning circles to allow for safe manoeuvring of a patient on a trolley/bed while being attended to by medical and nursing staff;
- parabolic mirror systems on corners to allow viewing of patient areas and corridors for oncoming wheeled traffic;
- cubicles with space on all sides of the trolley/bed and adequate space for treating staff, visitors, imaging or other equipment and to transfer patients on and off trolleys;
- adjustable privacy curtains may provide for some flexibility in the size of cubicles;
- adjustable height trolleys, both mobile and those fixed in cubicles;
- at least one cubicle with extra space and heavy equipment for special needs patients such as bariatric patients, including an overhead tracking supported hoist;
- provision of mobile hoist or inflatable devices, slide sheets and adjustable trolleys for picking patients up from the floor;
- easily accessible emergency communication in each area, for employees and patients and in public areas such as toilets;
- a separated medical office area which allows visual access to the general treatment area and an escape route where there is violence towards staff*; and
- comfortable waiting rooms with entertainment to minimise tension for those waiting long periods under stress.

**Further information on aggression can be found in the WorkSafe Victoria publication Violence and Bullying (2005) and the Information Pack for WorkSafe Victoria's Intervention on Occupational Violence in Hospitals (2005).*

DAY PROCEDURE UNITS

In day procedure units, patients are admitted, procedures such as surgery or dialysis are undertaken, recovery time is allowed on either a chair or a bed/trolley and the patient is discharged the same day.

Design and patient handing issues in the theatre environment will not be discussed in this section as this has already been addressed on page 64. There are, however, several specific tasks undertaken in day procedure centres where hazardous manual handling may occur if the design is not considered.

Hazard identification

People

As day procedure patients are admitted and discharged as independent patients, theoretically there should be little patient handling undertaken except during procedures. People using a day procedure unit will include the patient and in some circumstances (e.g. dialysis, oncology units) their carer/s.

Equipment and environment

- The design of recovery or treatment chairs has an impact on postures required by staff members to assist and monitor patients.
- Workspace may be crowded if additional carers or equipment is not taken into account.
- The design of the day procedure centre should allow for equipment and staff needed in an emergency response.

Tasks

Hazardous tasks may include:

- undertaking procedures (supporting limbs, controlling patient movement, inserting a line or needle, performing minor surgery) with the patient seated on a large support chair, where the employee has to bend and assume awkward postures;
- transferring patients from the bed/trolley to the chair for recovery;
- assisting patients to stand and walk from a trolley or chair; and
- managing possible falls due to varying recovery times for patients following procedures and anaesthetics, and pain.

Designing for safer people handling

Consideration should be given to:

- adjustable height trolleys and treatment chairs;
- adequate workspace to accommodate patient treatment chairs and trolleys with space all around for the staff members to assist;
- adequate space to enable a slide sheet transfer onto the treatment trolley;
- adequate space to enable a wheelchair transfer onto the treatment chair;
- adequate space for visitors and carers' chairs adjacent to the patient recovery/treatment chairs;
- adequate space for the storage of mobility equipment, e.g. wheelchairs and walking frames and crutches; and
- adequate space for equipment and staff needed in an emergency response.

MORTUARY

Hazard identification

People

Mortuary employees have responsibility for the transport and management of the deceased. They work with the nursing staff to bring the deceased from the ward to the mortuary. They in turn work with the funeral director to transfer the deceased from the mortuary to the funeral director's vehicle. Medical staff work within the mortuary during autopsies.

Equipment and environment

The Mortuary environment includes:

- mortuary trolleys;
- autopsy trolley;
- dissection bench;
- funeral director's vehicle; and
- refrigerated body storage area.

Tasks

- Transferring the body from hospital bed/trolley to mortuary trolley.
- Storage of the deceased in the refrigerated storage area.
- Conducting autopsies.
- Storage and investigation of dissected body organs.
- Transfer of the body from mortuary trolley to the funeral director's folding trolley and then into the funeral director's vehicle.

Designing for safer people handling

Consideration should be given to:

- wide access doors and corridors with turning space for beds/trolleys;
- space for slide sheet transfer from hospital trolley/bed to mortuary trolley;
- adjustable height mortuary trolley;
- autopsy theatres should have: adjustable height tables/trolleys; working bays with sufficient space for staff to be able to work in an uncrowded environment; adequate space for easy access to instruments/containers; and readily accessible facilities for weighing and measuring organs;
- flat floor surfaces with low resistance, easy to clean floor surfaces and suitable drainage;
- overhead tracking may be considered for transferring bodies to and from trolleys;
- slide sheets and patslides for trolley to trolley transfer of bodies;
- provision for large, heavy duty trolleys, working surfaces, refrigerated storage areas and lifting hoists for bariatric patients;
- easy, private, undercover access from mortuary to the funeral director's vehicle; and
- adjustable folding trolley for transfer into the funeral director's vehicle – consideration for the transport of bariatric patients.

ALLIED HEALTH

Hazard identification

People

Allied health departments provide a range of health services to in-patients, out-patients, rehabilitation patients and community centre and home based services. These services are performed by allied health groups such as occupational therapists, physiotherapists, podiatrists and prosthetics and orthotics professionals.

Patients present with a wide range of disabilities and mobility. They are sometimes accompanied by a carer.

Equipment and environment

The design will need to take into consideration a wide array of equipment including:

- personal mobility equipment such as walking frames, wheelchairs and crutches;
- rehabilitation equipment such as exercise machines and walking race; and
- treatment equipment such as treatment tables and ultrasound machines.

Tasks

Hazardous handling can include:

- awkward postures and high force supporting and assisting a patient to learn to stand and walk;
- awkward bending and twisting to perform hands-on mobilising treatments (exercises), making and fitting orthoses and artificial limbs, and treating patients' feet/hands;
- awkward postures and high force working in confined spaces to assist toileting and showering;
- bending and twisting, pushing and pulling to use treatment equipment in small cubicles; and
- assisting patients practise independence and outside skills in an outdoor environment.

Designing for safer people handling

Space

In the gymnasium or equipment usage area:

- Space around equipment needs to allow for a person on each side of the patient.
- A walking race (parallel bars) should have space at each side to allow two carers to supervise and assist.
- Space for wheelchair turning circle at each end of walking races to prevent the need to lift and manoeuvre wheelchairs into place.

Equipment

Consideration should be given to:

- provision of enough equipment to prevent the need to constantly reposition it;
- equipment on trolleys with castor wheels, brakes and controls which are accessible to the employee without bending and twisting;
- treatment tables, benches and treatment chairs that are easily adjustable with electric controls, for height and tilt where necessary;
- adjustable patient equipment such as tilting tables with electric control;
- ceiling mounted hoist with extra long track and walking sling to assist with ambulation;
- reinforced ceilings in the gymnasium for bariatric patients requiring rehabilitation; and
- gas assist chairs with height adjustable seats/inflatable cushion to assist patients to move from sit to stand.

MATERNITY AND NEONATAL

Hazard identification

People

Maternity and neonatal units generally look after mothers who are able to assist or manage their own care and also small babies. Given the nature of the environment, there are often visiting family members and children in the unit and sometimes large groups of visitors.

Equipment and environment

Birthing rooms which allow for family involvement in the birthing process often contain low or fixed height double beds. These beds contribute to the risks for employees assisting with the birth or collecting foetal blood, due to the need for sustained bent and awkward postures. The rooms may also be crowded due to the additional equipment required when caring for a baby, such as cots and bathing surfaces.

Tasks

Alternative positions for birthing (e.g. on the floor or under water) can lead to extreme postures for assisting employees. These risks can be reduced by changing work practices and improving the design of equipment, furniture and workspace.

Following caesarean section births, patients can require similar assistance to those who have had abdominal surgery and the requirements for bed and bedroom design are very similar.

Assisting mothers with breastfeeding is a task that requires the attending nurse to support the baby for extended periods in sustained, awkward postures. If there is no appropriate stool available, the employee cannot get close to the mother and may be standing or propping on the seat of the chair or bed while forward reaching.

Neonatal care involves some manual handling that can become hazardous, including:

- non-adjustable baby cots and baths require employees to bend and lift babies; and
- extended and repetitive holding of babies while feeding them, particularly in more intensive neonatal units.

Work practices are important in this type of work. For example, mothers should wherever possible be encouraged to perform feeding using the 'hands-off' technique where staff provide them with verbal guidance and instruction. However, design issues also need consideration.

Designing for safer people handling

Bedroom

Consideration should be given to:

- space at the end and sides of the beds for equipment and staff assistance – equipment needs may include cot, bathing surface, chairs (for patient, staff member and visitor);
- space for a feeding chair and an adjacent adjustable height mobile stool for the staff member to assist mothers with breastfeeding;
- electronic remote control adjustable height and back rest beds for birthing units;
- adjustable beds provided with an overhead bar or rope on the foot of the bed for the patient to assist their movement;
- adjustable height cots with slide down sides for babies and height adjustable surfaces for bathing; and
- supportive high back chairs with arms for staff who are feeding babies.

Bathroom

- Ensuites should be designed for the independent disabled person, as per AS1428.1.
- Where an assisted bathroom is provided with a bath for relaxation or pain relief (pre or post birth), the room and equipment should be designed to ensure a mobile hoist or overhead tracking can be used to assist a dependent patient out of the bath. In some circumstances, a birthing mother's condition may suddenly change whilst in the bath, hence a safe means for getting them out is required.
- Where a water birth policy is supported, the design of the bath and bathroom is critical for the safety of the staff members, the patient and the baby. A centrally located, raised/adjustable height bath with space for staff assistance and emergency equipment is recommended. A safe means of removing the patient from the bath is also required, such as overhead ceiling hoist or mobile hoist.

(Note: where bathing for relaxation or water births are permitted, organisations should also develop suitable administrative risk controls, including:

- *a formal risk assessment process for selecting suitable patients to use the bath; and*
- *a procedure for monitoring the patient's status while in the bath to ensure that they are removed at a suitable time when they are independent/still able to assist.)*

COMMUNITY RESIDENTIAL ACCOMMODATION

Community based residences provide a home environment for a group of people with disabilities. Accommodation is designed to provide for a range of disabilities: sensory, physical, neurological or acquired brain injury and intellectual.

Hazard identification

People

Many patients in community residential accommodation have severe physical disabilities and are dependent on carers to provide for all their physical needs, including:

- personal care;
- recreation;
- mobilising; and
- transport.

Some of the handling can be hazardous due to challenging behaviours, awkward postures and involuntary movements. With ageing patients, risks can be related to handling people who are frail and may have dementia.

Equipment and environment

Commonly the environment is a house in a suburb or town, sometimes designed specifically for the needs of the residents, or in other cases resembling the range of homes in the community. Environmental issues arise from:

- residences which are on uneven or sloped land presenting hazards from pushing and pulling equipment and assisting people to walk and access transport;
- lack of space for storage and use of equipment, for example, walking frames, hoists, wheelchairs, commode chairs or bath/shower trolleys;
- door widths, corridor widths and corners which do not accommodate wheeled equipment;
- floor surfaces which do not allow easy mobility or pushing and pulling equipment;
- furniture that is not designed to prevent risks to carers from manual handling, for example fixed height water beds; and
- inappropriate transport options.

Tasks

The tasks involving potentially hazardous manual handling can include:

- bathing or showering;
- transferring people, such as from bed to chair or chair to toilet;
- assisting on bed movement such as turning, during dressing or changing urinary aids;
- pushing and pulling equipment, including wheelchairs, hoists, commode chairs, flotation chairs, bath/shower trolleys and other wheeled equipment;
- assisting mobilisation – exercising limbs, ambulation or transferring; and
- assisting people into transport, such as cars or up bus steps.

Designing for safer people handling

Designing the environment of a home for people with disabilities entails most of the principles spelt out in the general design sections of this Guide. An assessment of the types of persons likely to be accommodated within the home should be undertaken during the planning phase, with particular emphasis on mobility.

Good design features to cater for physically disabled persons include:

- a flat block of land with outside surfaces supporting wheeled equipment and access to transport;
- space to store equipment both in rooms and in dedicated storage;
- corridor and door widths to accommodate wheeled equipment and assisted walking;
- floor surfaces which encourage independence and do not provide any impediments to walking or the pushing of equipment;
- bathroom design for the dependent disabled person, incorporating:
  - direct access from door to toilet and direct access for a trolley bath if required
  - space for carers around the toilet and drop down rails
  - adjustable height island bath or trolley bath if a bath is required
  - open access to shower with seating and portable shower rose
  - overhead tracking to support hoist transfers to and from toilet/shower/bath and change table; and
- handrails in circulation areas, both inside and outside.

Designing furniture and fittings

Important factors include:

- beds that are adjustable in height and back rest, with easy to use bed rails (however, it is acknowledged that in some circumstances where challenging behaviours are a problem, purpose-built furniture may be needed which is adapted to prevent danger to the person or the carer);
- furniture on castors which allow for flexibility of the room layout (e.g. bedroom drawers);
- flotation or support chairs that have adequate size wheels to push easily;
- specifically designed wheelchairs may be motorised as they may present a hazard due to weight and awkward size; and
- lounge and dining chairs high enough to encourage the ability to stand up, and be wheeled where appropriate (with lockable brakes).

Further detailed information about the design of community residential accommodation can be found in the Department of Human Services Victoria publication, *Disability Services – Accommodation Standards for the Provision of Shared Supported Accommodation (general).*

GARDENS AND OUTDOOR AREAS

Hazard identification

Courtyards and outside areas should function effectively from a staff safety and quality of care perspective. In aged and community settings, these areas are important to patients' wellbeing and mobility. A safe environment for patients increases their independence and reduces the potential risks to employees.

People

Patients, visitors and employees use outdoor areas. An enclosed area provides walking, recreation and sitting space particularly for people with dementia and those in disability housing. It includes people using mobility aids and their carers.

Outdoor areas are often used for therapy purposes, patient rehabilitation and patients contributing to the maintenance of the garden.

Equipment and environment

The environment may pose risks from:

- rough or changing ground surfaces causing trip hazards;
- steep slopes or ramps or stairs, particularly with mobility aids or wheeled equipment;
- prominent changes in terrain, patterns or colour can confuse some patients and cause behavioural changes, which may injure patients or employees;
- sharp or rough foliage, poisonous plants or water displays, which may present risks to people with dementia or challenging behaviours;
- access doors which present barriers such as raised door steps;
- paths or doors that are too narrow, not providing space for the patient, their mobility equipment and their carer;
- courtyards that are too small for the number of people likely to use them; and
- outdoor furniture that is too low or difficult for patients to get themselves in and out of.

Tasks

Staff may undertake the following people handling tasks in an outdoor setting:

- pushing wheelchairs;
- assisting with transfers onto/off seating;
- assisted walking;
- assisting with therapy using the environment, e.g. gardening, using steps; and
- in some cases, fully dependent immobilised patients can be taken into the garden in their beds.

Designing for safer people handling

The following issues should be considered during the planning for outdoor areas to reduce people handling risks.

- Adequate workspace is required to accommodate the number of people likely to use the area as well as the likely outdoor furniture and mobility equipment, e.g. wheelchairs, walking frames and beds.
- The patient walking paths and courtyards should be on flat terrain to aid independent mobility.
- The surface should be chosen to reduce slip/trip hazards with consideration of colour and pattern changes for some groups of patients (e.g. dementia patients).
- The entrance doors and pathways should aim to allow two people to walk side by side with no trip hazards from steps/surface issues.
- Entrance doors should have hold-open mechanisms or automatic opening doors should be installed.
- Planning for garden beds and the selection of plants should ensure that plants do not spread onto/overhang the paths or drop leaves – where there are people with dementia, non-toxic vegetation should be provided.
- Planning for the manual handling of gardening equipment (e.g. wheelbarrows) that will need to access the outdoor areas should be undertaken.
- Watering system should not include hoses which may pose a trip/fall hazard.
- Security planning should allow patients to be monitored while outside in a secure area.
- Appropriate outdoor furniture should be provided to facilitate independence of patients.
- Built in or freestanding planter pots should have rounded edges to reduce striking risks.
- Plan for therapy such as steps, bridges and environmental challenges for rehabilitation and their safe incorporation into the outdoor area design.
- Raised garden beds allowing access for independent wheelchair patients or the elderly may be considered in a rehabilitation or aged care facility. Guidance for dimensions of raised garden beds as follows:
  - height of bed:
    – 600–650mm for wheelchair use
    – 720–850mm for standing use
  - width of bed:
    – 600mm for one-sided access
    – 1200mm for two-sided access.

APPENDICES

A. Design and people handling – Audit checklist
B. References

APPENDIX A: DESIGN AND PEOPLE HANDLING – AUDIT CHECKLIST

Health facility:
Department/work area:
Persons involved in the audit (manager, health and safety representative (HSR), staff members, designer):
Date of audit:

Audit objective

To identify patient handling risks that may be related to the design of an existing or planned workplace, with reference to *Designing Workplaces for Safer Handling of People*.

How to use the audit checklist

This checklist is designed to be used within a patient care department/work area so you may need to complete several checklists to cover your whole health facility.

- Existing workplaces – talk to staff and observe work being done to complete the checklist.
- Planned workplaces – use the scaled drawings of your proposed facility, a scaled ruler and a tape measure and work through the checklist.

Preliminary questions

Prior to completing the audit, you need to have an understanding of what patient handling activities are likely to occur in the work area. The following questions will help to explore these issues:

- What types of patients/residents will occupy the department/work area (both now and in the future)?
- What special patient care activities will be undertaken?
- What types of equipment and furniture will be used in the work area?
- How will this department/work area interact with other departments/work areas in the health facility?

Note: In the checklist, 'AFFL' refers to above finished floor level.

DESIGN AND PEOPLE HANDLING – AUDIT CHECKLIST

ITEM	YES/ NO/ NA	COMMENTS	ACTION
PATIENT ROOMS			
Workspace			
Is there enough space (minimum of 650mm clear space) on both sides of all beds for safe 'on bed' movement of patients?			
Is there enough space on at least one side of each bed to allow transfers on/ off the bed (i.e. 900mm for wheelchair/ commodes; 1100mm for mobile lifting hoists; 1500mm for standing lifter; 1500mm for slide sheet transfer from bed to trolley/shower trolley)?			
Is there enough clear space at the foot of all beds to allow safe handling and movement of patients (1000mm in single rooms; 1200mm in two-bed rooms; 1600mm – 800mm + 800mm – in two-bed rooms where beds are foot-end to foot-end)?			
Can the beds and patient handling equipment be easily moved around within the bedrooms when required?			
Access			
Can the beds and patient handling equipment be easily moved in and out of bedrooms when required? (The recommended door opening is 1100mm in aged care and 1350mm in acute.)			
Does the design and location of the door facilitate easy movement of people and equipment?			
Fittings			
Where appropriate, is overhead tracking installed and functional?			
Are the privacy curtains constructed/ located so as to enable unimpeded access to and movement of patients?			
Does the layout ensure that fixed furniture or fittings do not impede safe patient handling? (Consider storage cupboard, wash hand basin and sharps bin)			
Are the medical services within easy reach and functional?			
Are the recreation and communication devices (e.g. the television and telephone) within easy reach?			
Are light switches and power points easy to reach?			
Nurse call/emergency system			
Is the position of the nurse call button within easy reach of the patient with prominent and easy to use buttons?			
Is the 'turn off' switch for the nurse call button within easy reach of nurse?			

APPENDIX A
DESIGN AND PEOPLE HANDLING – AUDIT CHECKLIST

ITEM	YES/ NO/ NA	COMMENTS	ACTION
Can the nurse call/emergency system be easily heard within bedrooms with doors shut?			
Floor surface			
Is the floor surface appropriate for the type of patient and equipment being used? (Some carpets not recommended for manoeuvring some wheeled equipment.)			
Is the floor surface under the hand wash basin non-slip?			
Furniture			
Is the bed appropriate for type of patient, compatible with patient handling equipment and easy to move?			
Are the visitors' chairs functional and easy to move?			
Are the patient sitting chairs appropriate for type of patient, compatible with patient handling equipment and easy to move?			
Storage			
Is the patient belongings storage unit appropriately designed and located to facilitate safe use?			
Is there adequate storage for medical equipment?			
Bathrooms/ensuites			
Workspace			
Is there enough space in the bathroom to accommodate all equipment required (e.g. commode chair, shower chair, lifting machine, shower trolley)?			
Where there are dependent patients, are there enough toilets with space either side to allow staff to safely assist patients (i.e. at least 550mm on one side of the toilet bowl and 950mm on the other)?			
Where patients are independent, is there at least 950mm clearance on one or both sides of toilet to allow for sideways wheelchair transfers?			
Is there adequate space in front of the toilet for tasks and equipment (i.e. 1500mm required for standing lifters)?			
Is the toilet located within the bathroom to facilitate easy movement of patient handling equipment? (Ideal if directly opposite the door.)			

ITEM	YES/ NO/ NA	COMMENTS	ACTION
Is the height and design of the toilet suitable for patients' needs and compatible with equipment (i.e. 460–480mm to top of seat as per AS1428.1)?			
Does the bath (where used) have a fixed lifter, an overhead tracking system or space to manoeuvre a mobile hoist (bath base allows for legs of hoist)?			
Is the bath (where used) an appropriate height or height adjustable?			
Access			
Does the door open outwards, slide or be readily removable from outside (unless 1200mm between open door and toilet)?			
Is the door easy to open and without a self closer (or with an appropriately timed self closer)?			
Is the vacant/engaged indicator knob easy to open/close (outside and inside)?			
Is the door handle easy to use?			
Is the door wide enough to accommodate the required equipment (i.e. at least 900mm clear width when door fully open)?			
Is the turning circle into the bathroom large enough for all equipment (e.g. shower trolleys)?			
Fittings			
Are fixed grab rails positioned in optimum positions so as to assist but not impede access?			
If drop down grab rails used, are they easy to raise/lower, sturdy and positioned appropriately?			
If drop down grab rails used either side of a central toilet, is the nurse call button and toilet roll holder built into the rail furthest from the shower?			
Is the basin designed to allow a wheelchair underneath (as per AS1428.1-770 – 800mm to top of basin and 640–650mm to bottom of basin)?			
Is the mirror appropriately positioned for the type of patient?			
Is the shelf/space for personal belongings appropriately positioned for easy reach (as per AS1428.1, i.e. 900–1100mm AFFL)?			
Is the towel rail/ring appropriately positioned for easy reach?			
Are the hooks for clothing appropriately positioned for easy reach?			
Are the shower taps easy to reach for staff and patients?			

APPENDIX A
DESIGN AND PEOPLE HANDLING – AUDIT CHECKLIST

ITEM	YES/ NO/ NA	COMMENTS	ACTION
Is the shower rose adjustable in position?			
If a handheld shower, is the hose long enough for easy use with all equipment (e.g. shower trolleys)?			
Is the toilet roll holder easy to reach for patients?			
Is the toilet roll holder easy to reach for staff?			
Are the light switches and power points easy to reach?			
Nurse call/emergency			
Is the call button accessible and low enough to reach by a patient on the floor with prominent and easy to use buttons?			
Is the 'turn off' switch for the nurse call button within easy reach of nurse?			
Can the nurse call and emergency system be heard inside bathrooms (with door shut and shower on)?			
Floor surface			
Is the floor surface suitable for safe handling of patients (i.e. non-slip, free from steps or steep gradients)?			
Is the join in the floor surfaces between the bathroom and the adjacent room smooth and free from ridges/lips?			
Is there adequate drainage following the shower being used?			
Is the floor gradient for the shower located far enough away from the toilet to avoid wheelchairs rolling away down the slope?			
Furniture			
Is the furniture appropriate for the type of patient and easy to move around in a wet environment?			
Are the waste bins (linen and other) appropriately positioned and functional?			
Storage			
Is there adequate storage that is easy to reach?			
Corridors			
Workspace			
In main access corridors (e.g. to the Theatre or Radiology departments), is there 2350mm clear width (i.e. handrail to handrail)?			
In ward corridors (acute), is there at least 2100mm clear width?			
In aged care facility corridors (where patients are transported in beds), is there at least 1800mm clear width?			

ITEM	YES/ NO/ NA	COMMENTS	ACTION
In aged care facility corridors (where patients are not transported in beds), is there at least 1500mm clear width, and 1800mm clear width at doorways to bedrooms and communal bathrooms?			
Access			
Are the corridor doors wide enough to allow easy movement of equipment and people?			
Are the doors automatic or do they have a mechanism to hold them open?			
Are the doors easy to open/close?			
In busy areas, does the design of the corridor allow for visibility of oncoming traffic, especially wheeled equipment (parabolic mirror sometimes needed)?			
Fittings			
Are the handrails appropriate for the type of patient (e.g. adult, child)?			
Are the hand wash basins appropriately located and recessed?			
Are the light switches and power points easy to reach?			
Nurse call/emergency			
Are the nurse call indicators in the corridors suitable?			
Floor surface			
Is the floor surface level so that pushing equipment is easy?			
Is the floor surface suitable for the type of patient and equipment being used? (Some carpets not recommended for manoeuvring some wheeled equipment.)			
If there are changes in floor surface, are there appropriate joins/diminishing strips so that no trip hazard exists?			
If there is a need to link areas at different heights, is the slope gradual so that pushing equipment is easy?			
Furniture			
Are there fixed rest bays or spaces for chairs at regular intervals?			
Storage			
Are there enough storage bays to accommodate equipment?			
Are there enough storage cupboards to accommodate equipment?			
Are the storage cupboards functional (i.e. location, layout, height, doors)?			

APPENDIX A
DESIGN AND PEOPLE HANDLING – AUDIT CHECKLIST

ITEM	YES/ NO/ NA	COMMENTS	ACTION
General storage – equipment and materials			
Is there adequate and appropriate storage for all electrical equipment that requires space for charging, e.g. hoists, electric wheelchairs, scooters? (Consider strategic location of equipment, amount of space provided, ease of access.)			
Is there adequate and appropriate storage for all wheeled equipment used, e.g. trolleys, commodes, wheelchairs? (Consider strategic location of equipment and amount of space provided, ease of access.)			
Is there adequate and appropriate storage for other people handling equipment, e.g. slide sheets, bed sticks, walking aids, therapy equipment? (Consider strategic location of equipment and amount of space provided, ease of access.)			
Access/egress to the department/work area			
Workspace/location			
Is the front entrance located appropriately (e.g. with good visibility from reception area)?			
Is there adequate space (including turning circle) for all equipment and visitors? (Consider wheeled equipment, maintenance equipment etc.)			
Access			
Is the door wide enough to allow easy access for staff and visitors?			
Is the door easy to open (with a hold-open mechanism), or automatic opening?			
Is there easy access for persons in wheelchairs or using walking frames?			
Is there suitable access/egress for staff and patients in case of emergency?			
Floor surface			
Is the floor surface free from trip hazards (e.g. steps, changes in floor covering)?			
Is the floor surface non-slip?			
Is the floor surface easy to clean and compatible with cleaning equipment?			

ITEM	YES/ NO/ NA	COMMENTS	ACTION
Recreational area – dining/lounge/activity			
Workspace/location			
Is the location of the recreational area easily accessible for staff and patients?			
Is the workspace appropriate for the tasks and equipment used? (Consider furniture and equipment to be used and circulation space.)			
Access			
Does the door enable easy access for staff and equipment?			
Floor surface			
Is the floor surface appropriate for the type of patient and equipment being used? (Some carpets not recommended for manoeuvring some wheeled equipment.)			
Furniture			
Are the chairs suitably designed for safe patient and staff use?			
Are the dining tables suitably designed for safe patient and staff use?			
Storage			
Is there enough storage space to accommodate temporary storage of equipment (e.g. wheelie frames and wheelchairs)?			
Are there enough storage cupboards/ space to accommodate equipment permanently stored in the area?			
Is the storage functional, facilitating easy retrieval of the items stored?			
Other			

APPENDIX B
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- Department of Human Services Victoria, Rural and Regional Health and Aged Care
- Health and Community Services Union
- Health Services Union
- Royal Australian Institute of Architects
- Victorian Hospitals Industry Association.

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