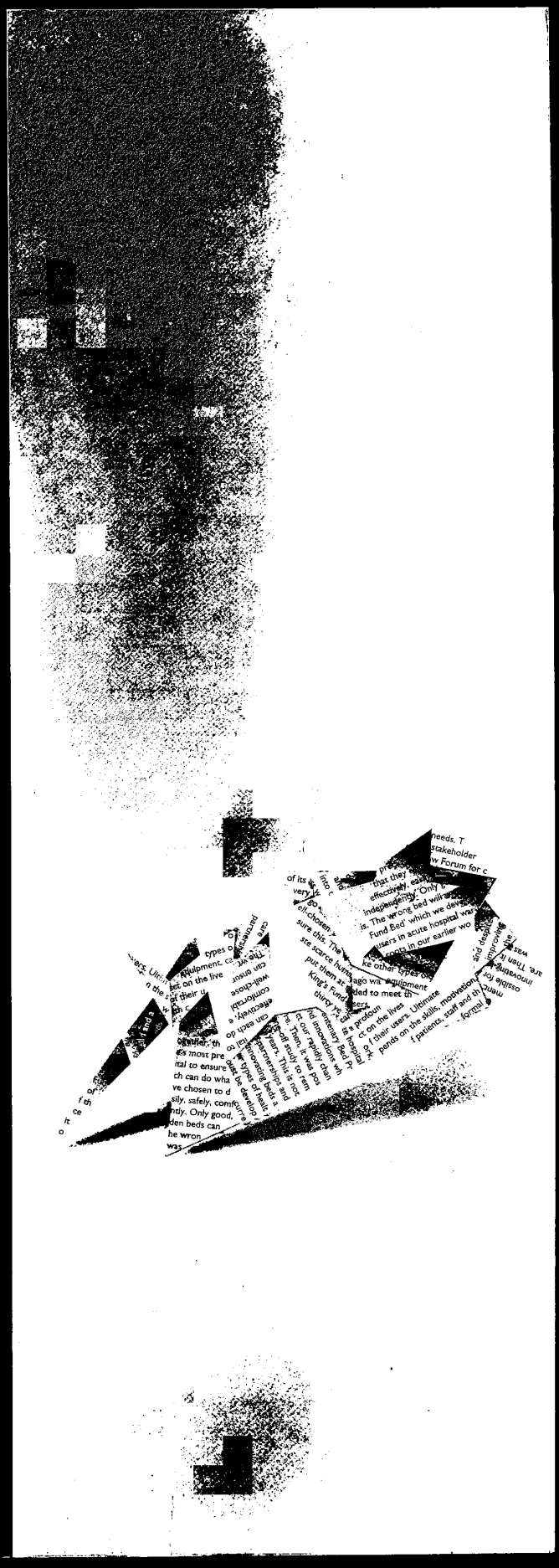
King's Fund

Choosing Beds for Hospitals

A guide

Judith Jones
Bardy McNair
John Mitchell



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Contents

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We are also grateful to the National Back Pain Association for permission to reproduce a number of the illustrations used in this *Guide*, and to the Medical Devices Agency for permission to reproduce their mattress testing procedures (Appendix 2).

Disclaimer

The authors have made every effort to ensure that the information contained in this *Guide* was accurate at the time of going to press, and that as wide a range as possible of different types of (non-specialist) beds available in the UK was covered.

The authors can accept no liability for errors or omissions and strongly recommend that details of any beds or equipment should be checked directly with the supplier(s) or manufacturer(s).

The authors are seeking to develop methods by which the information in this *Guide* can be kept systematically updated and distributed, but as yet there is no certainty that this will prove possible.

Introduction

Some people were surprised that we were writing a guide to buying beds. They did not think that there was enough to be said about them. To many people working in health care, beds are 'simply there', and only become noticeable when something goes wrong with them.

However, a bed is much more than a piece of furniture. It can have an impact upon the outcomes of medical and nursing care; and it can influence a patient's recovery, independence and morale. It is part of the working environment of health care staff and of carers, and can have an influence, for good or ill, upon *their* health as well.

This guide, together with its two companion guides, *Choosing Beds for Nursing and Residential Homes* and *Choosing Health Care Beds for Use at Home*, attempts to help those choosing beds, wherever they are, taking into account the needs of both the people *in* the beds and the people *around* the beds.

We consulted widely: many kinds of health care staff in a variety of settings, service managers, manufacturers, equipment experts and experts in fields such as tissue viability and ergonomics. We also put great emphasis on consulting those with experience as patients and residents in health care settings and as users of beds when coping with a disability. You can read about this consultation and its implications in *Better Beds for Health Care: Report of the King's Fund Centenary Bed Project.* (See Appendix 1.)

The guide – what it is and isn't

The first part of the guide (page 3) helps you to consider some of the important issues underlying the choice of beds.

The second part (page 21) helps you to make rational choices by giving information about beds and guidance on the process of choosing. You may find it helpful to work through this, following the suggestions for noting down information or using the checklists in the text and appendices. A downloadable version of the checklist is available from our Web site (*www.kingsfund.org.uk/*).

The aim here is to help you choose a *type* of bed. The guide does not name specific models or manufacturers, nor does it discuss 'specialist' beds in detail. No attempt is made to evaluate the quality of design or manufacture of any particular bed or item of equipment.

For an overview of the process of choosing, see the diagram on page 3, 'What's involved in choosing beds?'

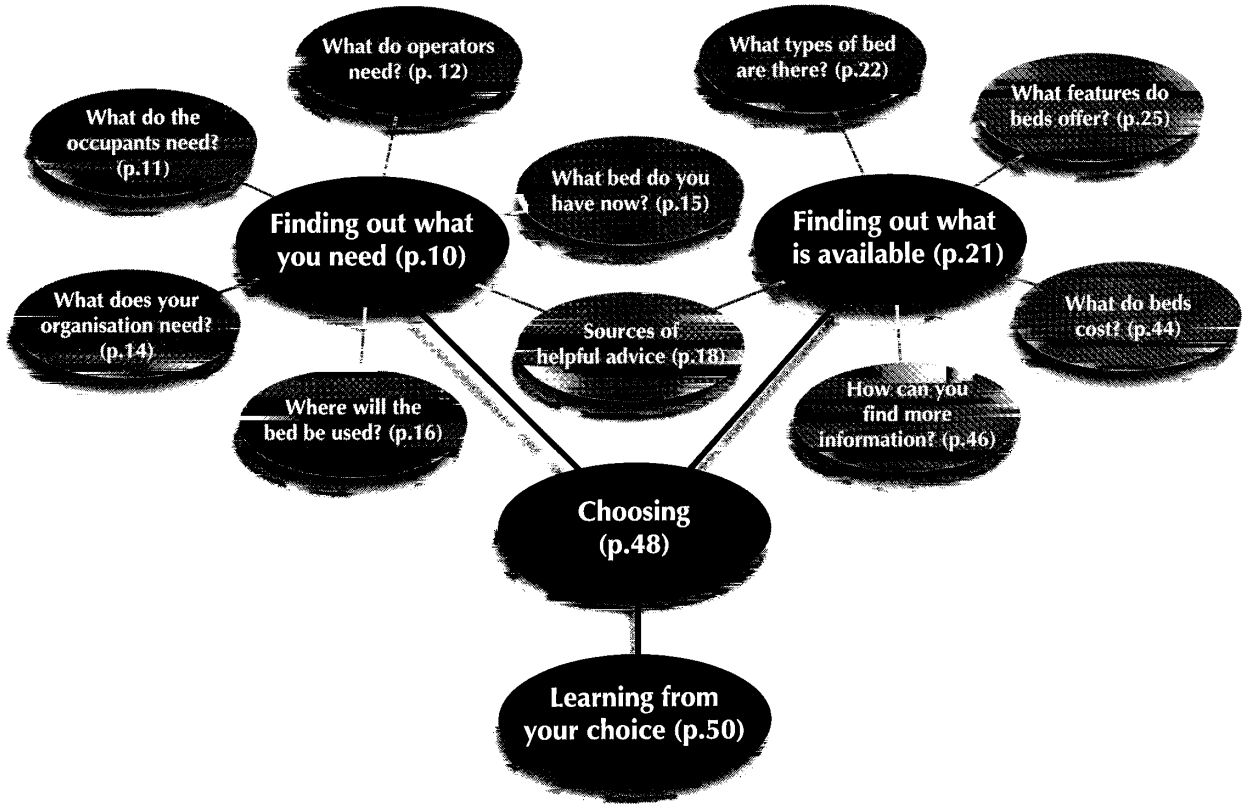
Defining our terms

By *occupant* we mean the person in the bed. In other circumstances they might be called the patient, but this is rather a narrow term which we think carries an unwelcome association of powerlessness.

By *operator* we mean someone who deals with the bed as part of their work. This is anyone involved in caring for the occupant, or involved in the cleaning, moving, or maintaining of beds.

What's involved in choosing beds?

This chart represents an overview of the process of choosing beds



Chapter 1

Why is the right bed important?

Whether you are choosing one bed for a particular location, or equipping a whole ward or hospital, you are addressing a complex set of needs which encompass both occupants and operators. Of the many factors which have to be considered, the three most important are the influence of the bed upon *work-related back pain* in staff, the influence upon the *tissue viability* of the occupants and of the bed upon their *independence*.

Beds can impact upon work-related back pain

Causes and costs

'Manual handling' relates to lifting, pushing, pulling, carrying, lowering and supporting loads. In the health services in 1990/91, it accounted for almost 50 per cent of workplace accidents reportable to the Health & Safety Executive (i.e. over-three-day injury).[1] Such injuries most commonly affect the back.[2]

Where injury has destroyed a career, compensation awards have attracted between £150,000 and £345,000.[3] Costs to the organisation are also likely, from sickness absence, recruitment and training of replacement staff, and increased insurance premiums, among others.[4] Premiums may increase for hospitals with a poor track record for accidents. One trust improved its health and safety procedures and practices and reduced its quote of £500,000 in 1994 to a paid premium of just £53,800 in 1996.[4]

Single incidents are not the only cause of back pain. Cumulative back stress also predisposes the spine to pain and/or injury,[5] resulting from repeated spinal loading (e.g. heavy lifting), or from holding poor postures (e.g. stooping, twisting or bending sideways). Nurses have been estimated to spend 22 per cent of their shift in a stooped position.[6]

Who is affected

A variety of hospital staff are affected by back pain. A recent survey of nurses found that 52 per cent of handling accidents involved the bed itself, [7] while in a study of radiographers, 47 per cent related back pain to working with occupants who are in bed.[8] Domestic and maintenance staff also experience high levels of back pain relative to the general population.[9]

The need for adjustability and ease of use

Employers are legally required to avoid hazardous manual handling. Where this is not possible, tasks must be assessed and risks reduced as far as is reasonably practicable, using

an ergonomics approach.[1] The workstation (the bed) height must be suitable and be reached without undue bending and stretching. This is important when handling occupants, and when making or cleaning the bed.

Appropriate bed height depends on the task, and the height and body proportions of staff. '*The use of non-adjustable beds for [occupants] requiring more than an absolutely minimal degree of nursing care cannot be condoned.*' Beds must be of variable height, and the easier this is to adjust, the more likely it is to be used.[3] In one study, footpumps were rarely used by nurses during manual handling, in spite of the effect on posture. However, motorised height adjustment was used 86 per cent of the time when making the bed.[10]

All mechanisms must be easy and safe to operate. This facilitates, or even eliminates, manual handling. Most pull-out backrests cannot be operated with one hand and result in awkward postures, often while trying to hold an occupant forward. Some beds have handles which wind in a vertical plane to adjust tilt and profiling. These make staff stoop and twist, and where not retracted fully after use, may catch against people's legs. Electrically powered beds help considerably to ease manual handling, and also promote the independence of occupants.

Beds can impact upon tissue viability

The cost of pressure sores

Pressure sores represent a huge burden: to the patient, who suffers pain and added illness; to the staff, for whom the treatment of sores means extra work; and to the organisation providing health care, which bears the cost of treatment and care.

In 1988 the cost of treating one patient with a grade 4 pressure sore was nearly £26,000 (around £40,000 at 1998 costs). Had the bed not been occupied by this patient, 17 more people could have undergone joint replacement operations.[11] The annual cost to a 600-bed district general hospital of treating pressure sores was estimated in 1993 as between £640,000 and £1,153,500.[12] One award of damages against a hospital to a patient in 1990 amounted to nearly £200,000.[13]

Pressure sores are not only a matter of cost. Hospital staff are concerned for the welfare of their patients. Nobody wants patients to suffer preventable pressure sores.

Risks to tissue viability

The three major mechanisms by which pressure sores develop are:

- **by disproportionate pressure on bony prominences,** from the weight of an occupant lying on an ordinary mattress. Occlusion of the blood supply cuts off the supply of oxygen and nutrients, and leads to retention of waste products

- **by shearing force,** where an occupant is sitting in bed and slips down. The skin itself remains static, while deeper tissues below are dragged and blood vessels damaged
- **by friction,** often from the occupant being dragged rather than lifted, causing superficial skin damage, which is then liable to further damage.

The risk is further increased where skin remains moist, through poor ventilation or incontinence.

The mattress and tissue viability

'Specialist' beds, such as alternating pressure mattresses and air-fluidised beds, are reserved for those at highest risk of, or who already have, pressure sores.

General purpose beds should be suitable for low-to-medium risk occupants, providing a surface which 'conforms to the contours of the body so increasing the area of the body in contact with the mattress, with a resulting reduction in peak pressure'.[14]

'Pressure-reducing' foam mattresses are effective and have been compared in trials.[15] However, no 'best buy' has been identified. Foam and fibre-filled overlays are considered not very effective in reducing pressure;[16,17] it is preferable to replace the mattress rather than use such an overlay.

Care and replacement of foam mattresses are as important as the choice of mattress. Mattresses must be turned regularly (usually weekly) and tested frequently for 'bottoming-out', for integrity of the cover and for contamination (see Appendix 2) and replaced immediately on failing any of these tests.

The bedstead and tissue viability

The amount of *pressure* exerted upon vulnerable tissues is dependent largely upon the mattress, while *shear* and *friction* may be related to the type of bedstead. An occupant sitting in the bed with knees extended tends to slide down. Both shear and friction result from this, and also from staff lifting the occupant back up. Fully supporting the legs in slight flexion reduces these forces.[18] This can be achieved with a profiling bed. Beds which help minimise manual handling reduce the danger of friction and correspondingly, the risk of pressure sores.

Beds can impact upon the independence of occupants

Although financial calculations can be made about the cost of back pain and pressure sores, the financial implications of the avoidable dependence of occupants have yet to be assessed. It is possible that more independence might lead to savings in staff time, or in improved rates of recovery, but there is no published evidence for this. What we do

know is that independence is a major issue affecting the quality of life of those receiving health care.

Some beds inhibit independence

Our consultation showed how keenly occupants felt their loss of independence. They were frustrated by needing help to get comfortable, to sit up and get in and out of bed. They could not adjust backrests from within the bed. When the bed height was wrong and they could not change it, it affected their communication with visitors and staff and put things out of their reach.

> *'If the bed's not at the right height, they can't access the locker at all'*
> (Nurse on orthopaedic ward)

Some beds facilitate independence

Electric control in the hands of the occupant allows them to get comfortable:

> *'If you've got this facility, after ten minutes you would alter it again, you couldn't be bothering the nurses at every little whim. Like I say, that is brilliant'*
> (Woman after cardiac surgery)

A study comparing electrically powered with manually adjustable beds found that occupants in the electric beds sat up more than twice as often as those in the manual beds. The amount of manual handling with the electric beds was less than with the manual beds.[10]

Occupants become more able to do things for themselves:

> *'You can be in a sitting position with your feet out of bed and you can press it and it comes up high so that you can stand up, or even put your trousers on'*
> (Man disabled by stroke)

Another comparative study found that occupants often moved into more comfortable and convenient positions. They raised the beds to see out of the window, reach the tops of lockers and hold conversations, and lowered them to talk to seated visitors.[19]

Midwives in our study felt that beds which helped breastfeeding mothers to sit in bed with correct support would be helpful, especially after caesarean section.

Independence influences recovery:

> *'With this bed, you see, he could sit up, he could bend his legs and then ... he started to use his hands more because he could reach for a book, that sort of thing'*
> (Care assistant, residential home)

'Particularly with elderly patients, they lose confidence in front of your eyes ... and sometimes small interventions mean that their confidence grows and then they'll do more things and they'll succeed'
(Doctor, elderly care ward)

Beds and the control of infection

No evidence appears to be available to show that beds play a major role in the transmission of infection in hospitals. However, risk should be reduced wherever possible. Choosing new beds offers an opportunity for hospitals to purchase with ease of cleaning in mind, and to institute thorough and regular cleaning regimes.

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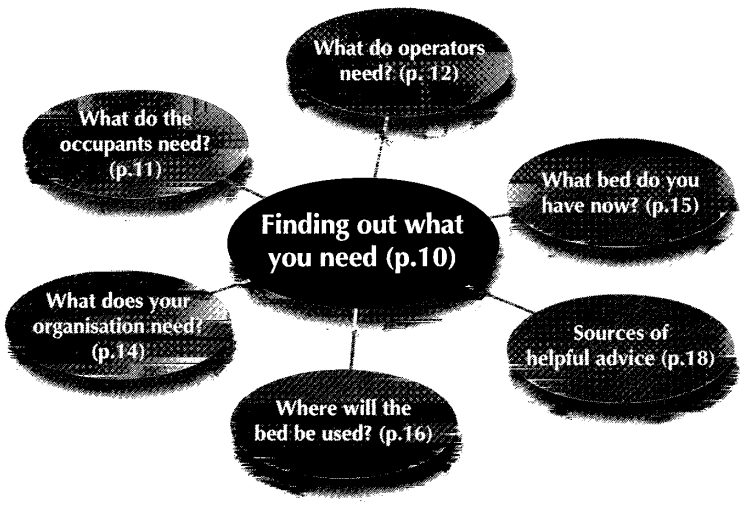
Chapter 2

Finding out what you need

A bed is used in some way by everyone who comes into contact with it, and it should be fit for all needs.

We suggest that before finding out what there is to choose from, you talk to the people who are going to use the beds every day and find out what they need. This first stage helps you consider your present position and to look at what you should take into account when choosing beds.



What do occupants need?

Occupants in bed may need to:

- rest and sleep
- communicate: see and hear what is going on around, talk with others, etc.
- move about in the bed: sit up, lie down, turn over, etc.
- get in and out
- stay in a sitting position in order to: reach things on a table or locker, watch TV, read, write, have a conversation, etc.
- care for themselves: eating, personal hygiene, etc.
- feed babies.

Do your present beds allow people to do these things **easily, effectively, comfortably, safely** and, where possible, **independently**?

Hospital beds are used by a long succession of occupants, with a wide range of problems. Bed occupants may need to overcome the following difficulties:

- movement difficulties (e.g. loss of muscle power; pain; joint stiffness; muscle spasticity or flaccidity)
- sensory difficulties (e.g. hearing; sight; awareness of joint position; skin sensation)
- mental difficulties (e.g. confusion; mental illness)
- respiratory or circulatory difficulties.

In addition, careful consideration should be given to problems which may be experienced by occupants who are very short or tall, very thin or very heavy.

Able-bodied occupants may also have problems. The design of beds may result in problems which are unrelated to an occupant's ability. For example, manual height adjustment is impossible for any occupant to alter while in bed, so they may need assistance to get out of bed.

What do operators need?

Nursing, therapy, medical, midwifery and other clinical staff may need to:

- communicate with the occupant
- move the occupant in bed
- move the occupant into and out of the bed
- help the occupant with eating, drinking, personal hygiene, etc.
- set up or use equipment
- examine the occupant
- give treatment, including emergency treatment
- help with feeding babies
- take blood
- dress wounds
- make the bed
- move the bed.

Domestic, maintenance and other staff may need to:

- clean the bed
- clean around the bed
- move the bed
- dismantle and reassemble the bed
- repair the bed.

With your present beds, can all the above staff perform their various tasks **easily, effectively, comfortably** and **safely**? Do any of these difficulties relate to the design or positioning of the beds, in particular the various bed features, adjustment mechanisms and related equipment?

When choosing beds, also bear in mind the following:

- ☐ ***Numbers of staff.*** Could the problem of low staffing levels be alleviated by having beds which facilitate independence or enable operators to perform some tasks more quickly and easily?
- ☐ ***Size.*** Does bed height suit all operators, from the smallest to the tallest, for the tasks they must undertake? A bed which adjusts easily and quickly is essential
- ☐ ***Pregnancy and health.*** Do manual handling tasks put at risk operators who are pregnant or who have a health problem, such as back trouble? Beds which facilitate the independence of occupants and reduce back stress should help

What does your organisation need?

The needs of your organisation should be considered when choosing beds. You may be influenced by:

- cost constraints
- time constraints (are you limited as to when the money can be spent?)
- the hospital's existing supply of equipment which attaches to, or interfaces with, beds, including pressure-reducing mattresses
- organisational policies which may affect which sort of beds can be bought (e.g. infection control, manual handling policies)
- existing maintenance contracts
- the organisation's existing relationship with suppliers.

What beds do you have now?

In choosing a new bed, or beds, it is easier to be clear in what you are doing if you first review your current stock, and keep a record for future reference. Make an inventory, noting type, age and condition of beds and mattresses, as well as any particularly good and bad points about them. Would you buy the same beds again? You may find the form in Appendix 3 helpful.

These questions may be useful:

- ☐ Are the bedsteads and related equipment (safety rails etc.) in good working order? Are all adjustments easy and safe to operate?
- ☐ (If records exist) what maintenance or repair has been done?
- ☐ Does the design of present bedsteads facilitate good health care and staff safety?
- ☐ Is their appearance acceptable?
- ☐ What is the condition of the mattresses? (See Appendix 2 for details of testing)

Where will the beds be used?

A bed should be compatible with the places in which it will be used. For instance, for electrically powered beds, you should check the availability, number, location and capacity of powerpoints both for operation and for battery charging. You should also find out whether the electrical system can cope with any increased demand. In addition, all types of user need to be consulted and should consider the tasks which must be undertaken, in day-to-day and emergency situations.

The questions listed below may help to identify potential problems in fitting beds into your environment.

Wards

- Is there enough room for the bed and any equipment or furniture? This also applies to other departments (e.g. theatres, X-ray)
- Is there enough storage for related equipment?
- Is there trunking on the walls? As the bed is raised, it may jam under the trunking, lifting it away from the wall

Bed storage space

- Is there space for storing specialist beds when not in use, and is access easy?

Lifts

- What is the maximum size of bed (with attachments) that will fit into the lifts?

Corridors

- Is there sufficient clearance for people and equipment on corridors down which the bed (with attachments) will travel?

Ramps/slopes

- Are there any ramps or slopes, either indoors or outside?

Corners

- Can the bed go around all relevant corners?

Surfaces

- Are beds pushed over uneven floors or rough ground, or on carpet? All of these make pushing harder

Some problems may be alleviated by a different bed. However, others may need a different solution (e.g. using different routes; resurfacing; using a motorised device for steering or slopes).

Who can give you helpful advice?

As well as talking to those who will use the beds, you can benefit from the advice of experts at all stages in the choosing process, including:

- **Users (occupants and operators),** to identify what is wrong with what you have at present, and what is needed. If you decide to run a trial of beds (see page 48), they can help at that stage

- **Specialists,** at all stages of the process. If you do not know of a local specialist in every related field, there are suggestions below as to how to find someone

- **Literature,** which can be found through a health library and may be able to answer some of your questions. Some suggested reading is in Appendix 1.

These organisations (see Appendix 4 for details) may be able to put you in touch with local specialists:

- Tissue Viability Society
- Infection Control Nurses' Association
- The Ergonomics Society
- Royal College of Nursing
- Royal College of Midwives
- College of Occupational Therapists
- Chartered Society of Physiotherapy
- National Back Exchange (for manual handling specialists).

Checklist: whom to consult

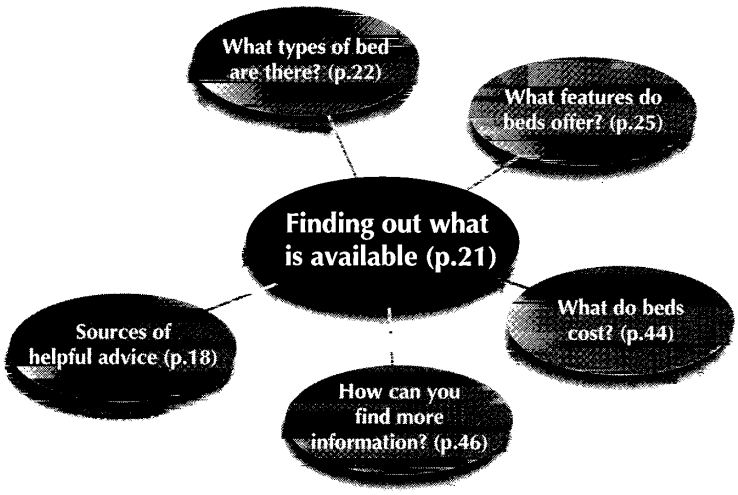
The following checklist may help with your decision-making. The three main columns represent the three stages of the selection process. Ticks show suggestions about whom you may wish to consult at each stage. Check off what you have done, by date and/or initial, in the right-hand side of the column.

Whom to consult	At which stage? Finding out what you need	Finding out what is available	Choosing (trial stage)
Users			
Occupants	✓ ☐	☐	✓ ☐
Family and friends of occupants	✓ ☐	☐	✓ ☐
Nurses	✓ ☐	☐	✓ ☐
Doctors	✓ ☐	☐	✓ ☐
Porters	✓ ☐	☐	✓ ☐
Domestic staff	✓ ☐	☐	✓ ☐
Physiotherapists	✓ ☐	☐	✓ ☐
Occupational therapists	✓ ☐	☐	✓ ☐
Radiographers	✓ ☐	☐	✓ ☐
Phlebotomists	✓ ☐	☐	✓ ☐
Others (*specify*)	☐	☐	✓ ☐
Specialists			
Tissue viability specialist	✓ ☐	✓ ☐	✓ ☐
Manual handling adviser	✓ ☐	✓ ☐	✓ ☐
Ergonomist	✓ ☐	✓ ☐	✓ ☐
Infection control specialist	✓ ☐	✓ ☐	✓ ☐
Health and safety officer/risk manager	✓ ☐	☐	✓ ☐
Fire officer	✓ ☐	☐	✓ ☐
Maintenance manager	✓ ☐	☐	✓ ☐
Your peers			
Others in your present workplace	✓ ☐	✓ ☐	✓ ☐
Others of your profession working in the same specialism elsewhere (can be contacted via special interest groups)	✓ ☐	✓ ☐	☐
Others			
Suppliers' and manufacturers' representatives	☐	✓ ☐	☐
Supplies department	✓ ☐	✓ ☐	✓ ☐

Chapter 3

Finding out what is available

This chapter aims to help you match what you need to what there is. It contains information about beds and points you to some further sources. It may be helpful to use the table on page 19 to ensure that you have consulted everyone who could help you at this stage. Those choosing beds for occupants who are to be discharged into the community may find it helpful to consult Choosing Health Care Beds for Use at Home: A guide for users and professionals *(see Appendix 1).*



What types of bed are there?

General purpose beds

King's Fund bed

The King's Fund bed is the most commonly used in British hospitals (see Fig.1). Any bed made to the British Standard for Hospital Bedsteads* is entitled to the name 'King's Fund bed'. In order to meet the Standard, the bed has to have certain features, which include:

- one-way tilt (Trendelenburg)
- adjustable backrest
- detachable interchangeable bed ends
- castors with centrally-operated brakes
- bed stripper
- adjustable height within a specified range
- bed extension
- (two-way tilt is optional).

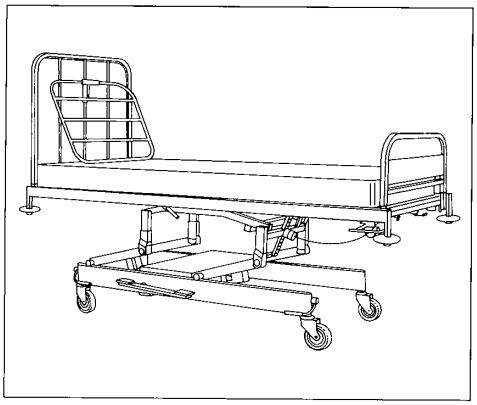


Fig. 1 A King's Fund bed

It must also meet dimensional, constructional, strength and stability requirements as well as requirements for its weight and surface finish. There are now electrically powered versions of such beds, sometimes called 'electric King's Fund beds'.

* British Standards Institution, *British Standard Specification for Hospital Bedsteads*. BS 4886: 1988.

Higher specification hospital beds

Some beds, while following the British Standard specification for quality and construction, may have more, and more sophisticated, features than a King's Fund bed, or may diverge from the Standard in, for instance, dimensions or weight. They are likely to have three- or four-section electrically-operated profiling, electric height adjustment, or even electrically-operated tilt, and may be constructed of materials other than steel. 'Acute care' beds (see below) generally fall into this category, but higher specification beds are also suitable for ordinary ward situations.

Nursing bed

A nursing bed is a hospital-style bed which does not fully meet the above British Standard. It may lack one or more of the features (e.g. height adjustment), or fall short of some standards (e.g. its dimensions or underbed clearance). Nursing beds are more often used in nursing homes or issued by loans stores to occupants at home.

Profiling bed

This bed has a mattress platform split into three or four sections, which may be angled (usually electrically) for comfort and convenience. Profiling is discussed in detail on pages 36–39.

Specialist beds

Acute care bed

These have profiling, and usually a pressure-reducing or pressure-relieving mattress. They may have more, and more sophisticated, features than a King's Fund bed, such as a radiolucent section or integral weighing scales.

Birthing bed

This bed is designed to provide multiple postural adjustments to allow a labouring mother to adopt a wide variety of positions.

Cardiac bed

This is a profiling bed with the additional feature of having the foot end come down to form a chair shape.

Heavy duty bed

This is designed for occupants who exceed the usual weight capacity of hospital beds. It usually profiles into a chair shape (like the cardiac bed) to bring the occupant into a sitting position.

Pressure-reducing/relieving bed

Low air loss, alternating-pressure and air-fluidised beds are specialist beds for the prevention of pressure sores in those at medium or high risk, and for the treatment of existing pressure sores. They are discussed in the extensive literature on tissue viability, and not in this guide.

Stand-up bed

This bed tilts to bring the occupant into a standing position. It is useful for occupants who have had hip replacements (during initial post-operative care), for those with fixed hips, or whose post-operative management means there should be no spinal movement.

Supine to prone turning bed

This bed turns the occupant from supine to prone and vice versa, with minimum effort for staff and minimum disturbance for occupants.

Turning bed

This bed can turn from side to side, usually to a maximum angle of between 45 and 60 degrees. It is useful for heavy, dependent occupants and for those with pressure sores, extensive burns or major trauma. Some beds may 'tilt and turn' at the same time, to provide continuous movement for pressure relief and lung function for the very ill. They can be programmed to turn at fixed intervals. These beds tend to be wide and will require the use of manual handling aids for occupants.

What features do beds offer?

This section deals with features of beds, and helps you decide which features you need, and what to look for when choosing those features. Bear in mind your list of user needs (see pages 11–13). Appendix 5 may be useful in helping you to clarify your requirements.

Before you decide on features, however, consider the importance of *ease of cleaning* and of *maintenance* for your choice of bed. Despite the best of policies, and the best intentions, beds and accessories which are difficult to clean will be cleaned less effectively than ones which are easy. Corners and ledges harbour dirt for organisms to grow and thereby present a significant risk.

Manufacturers claim that modern hydraulic and mechanical systems are now so reliable, and replacement of electric motors so easy and relatively inexpensive, that preventive maintenance is largely unnecessary. However, some specialists regard it as important. Either way, you should ensure that if anything goes wrong, repairs can be carried out promptly.

The features discussed in this section are:

Backrest

A backrest supports the occupant in a sitting position. This facilitates communication and activities such as reading and eating. It will also assist those who are unable to lie flat (e.g. those with hiatus hernia or compromised respiratory function). All backrests tend to allow the occupant to slide down the bed. This may be counteracted by tipping up the foot end or, preferably, by using instead a profiling bed. Backrests may be pull-out or rising.

See Figs. 2 and 3. Figure 5 on page 34 shows use of a rising backrest.

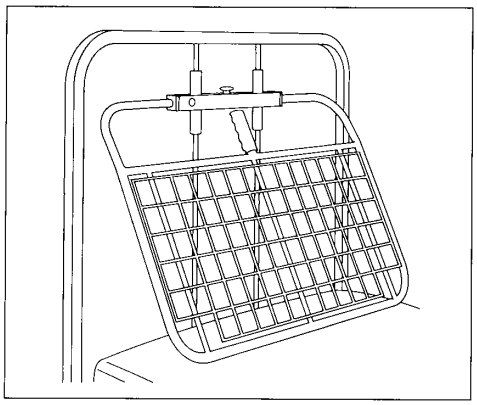


Fig. 2 A pull-out backrest

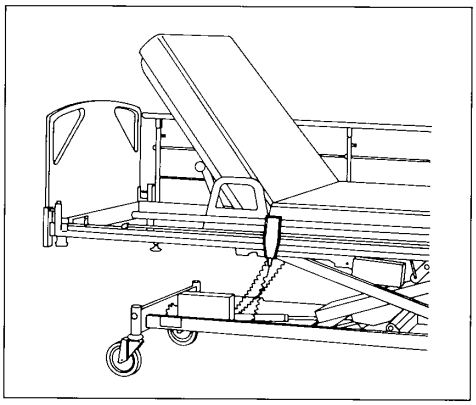


Fig. 3 A rising backrest

What to look for

- ☐ The British Standard* recommends at least 0–60 degrees of adjustment. However, more is better: the more upright the occupant, the easier the activity (e.g. eating and reading; manual handling). A pull-out backrest should have 0–90 degrees of adjustment
- ☐ Easy access to adjustment
- ☐ Easy to operate, to avoid back stress (easily positioned by one person working alone with a dependent occupant)
- ☐ Ideally, adjustable by the occupant while in bed (to increase independence and reduce staff input)
- ☐ Controlled rate of travel: this may be useful for occupants who suffer from dizziness
- ☐ Comfortable for the occupant

Pull-out backrests

A pull-out backrest is built into the bed end, being stowed away/pulled out as required.

! Watch points – Pull-out backrests

- Most cannot easily be adjusted by one person working alone with a dependent occupant. This is potentially dangerous
- Impossible for occupants to adjust safely while in bed
- Pulling the backrest over the mattress may be difficult, especially if the mattress is thick (more than 130 mm) or an overlay is used
- Bars are uncomfortable, as pillows tend to slip down

* British Standards Institution, *British Standard Specification for Hospital Bedsteads*. BS 4886: 1988.

Rising backrests

A rising backrest is the head end of a hinged, two-section mattress platform. This type may be electric, mechanical (handle winding in a vertical plane) or gas spring-assisted (with a release lever). Electrically powered versions have a quick-release mechanism, allowing a controlled descent to a flat position in a few seconds. Rising backrests form part of profiling beds (see page 36).

✓ Plus points – Rising backrests

Electric

- Promote occupant independence, for those capable of operating them
- Place less musculoskeletal stress on operators than hydraulic or mechanical mechanisms

! Watch points – Rising backrests

Gas spring-assisted

- May be hard to lower with light occupants or empty beds, or may be hard to raise with heavy occupants
- Some release levers may be too close to the head of the bed and so are obstructed by furniture (e.g. lockers)

Winder handles

- Some operators feel these are too slow to flatten in emergencies
- If sited at the foot of the bed these may obstruct bed stripper
- They make operators stoop and twist, causing back stress
- If sited too close to the buffer they may trap fingers
- If not fully stowed away they may catch against people
- May need many turns before the bed reaches the desired position. This is time-consuming
- Detachable winders may be lost

See also: mattress; profiling

Bed ends

Bed ends help retain the mattress and bedding, and provide a handhold when moving the bed.

What to look for

- ☐ Quick and easy to remove and replace. They should not be awkward or heavy to lift
- ☐ Robust construction and fittings
- ☐ Attachment points for lifting poles (monkey poles) should allow easy fitting
- ☐ No dirt traps
- ☐ Fittings for head and footends should allow them to be interchangeable
- ☐ Deep enough to retain a mattress with overlay

See also: equipment related to beds; tilt

Braking system

Effective brakes are essential for safety, but they are only as good as the floor on which the bed rests. If this is uneven or slippery, the bed may skid even though the brakes are on. Brakes may be on two or four individual castors, or all four castors may be braked via a central mechanism which is operated by a single control (e.g. lever at the foot of the bed).

What to look for

- ☐ Easy to reach and operate even when the bed is in its lowest position
- ☐ Operate on all four castors
- ☐ Easy to see if brakes are on or off

Watch points – Braking system

Individually braked castors

- Mean the operator must walk around the bed. Leaving some castors unbraked is dangerous
- Are awkward to reach when the wheel turns in under the bed. Operators balance on one leg while trying to reach under the bed with the other foot, or may kneel down and use their hand (an infection hazard)
- Are awkward to reach when some types of safety rail (cot side) are lowered, or when the bed is low
- Beds placed with the long side near a wall make access awkward to individual brakes on that side

See also: safety rail; stripper

Castors

Castors are swivelling wheels which allow a bed to be moved easily. They come in various sizes and may be left to free-wheel (all four castors allowed to swivel) or steer (one or two wheels lock, the others are left to swivel). The latter makes cornering easier. Anti-static castors (usually yellow) minimise the build-up of static electricity.

What to look for

- ☐ Sealed units, to reduce the build-up of dirt and allow easy cleaning. This also helps to keep castors running smoothly
- ☐ Minimum diameter of not less than 125mm (5"). The larger the castor, the easier the movement over thresholds (e.g. lift doorways), and also over carpet or uneven ground. However, a large castor may stop the bed from being lowered as far as may be necessary
- ☐ Easy to fit, for maintenance

Dimensions of the bed

The *British Standard Specification for Hospital Bedsteads* (BS 4886: 1988) recommends the following dimensions:

Length

- length between head and foot end of not less than 2010mm (6'7")
- when extended, length should be at least 2180mm (7'1")
- overall bed length (including buffers) of not more than 2235mm (7'4") or, when extended, 2415mm (7'11").

Width

- width of mattress platform of not less than 865mm (2'10")
- overall width (excluding buffers) of not more than 965mm (3'2").

Some beds are longer and wider than this. This can be comfortable and convenient for large occupants. However, wide beds increase the risk of injury to staff, as they must lean further over to reach the occupant. The size of the room or cubicle also needs to be considered.

Equipment related to beds

The main focus of this guide is on the selection of the bed itself. Related equipment is discussed only if it is important in relation to bed selection. If you are choosing handling equipment, you should talk to a manual handling specialist.

Types of equipment include:

- equipment which attaches to the bed (e.g. drip poles, monkey poles, safety rails, balkan beams (traction frames))
- equipment used alongside the bed (e.g. lockers, patient trolleys)
- equipment which must simultaneously fit underneath and over the bed (e.g. hoists, bed tables).

What to look for

Where relevant:

- ☐ easy fitting, removal and adjustment. Should allow the bed to pass through doorways and into lifts (e.g. drip poles; monkey poles; safety rails and balkan beams (traction frames))
- ☐ easy access by occupants from the bed (e.g. lockers)
- ☐ ease of access underneath, and sufficient clearance over the top (e.g. hoists and overbed tables)
- ☐ height compatibility with the bed (e.g. patient trolleys)

See also: bed ends

Extension

A bed extension lengthens the bed for tall occupants. A mattress wedge is used to lengthen the mattress itself. Staff should be aware that beds may be extended and know how to do this. Extensions are either an attachment, or an integral part of the bed frame to be pulled out as required. They should not inhibit use of other bed mechanisms (e.g. tilt or bed stripper) and should be easy to use and fit.

See Fig. 4.

NB: An integral extension may be preferable: those which are removable are easily lost.

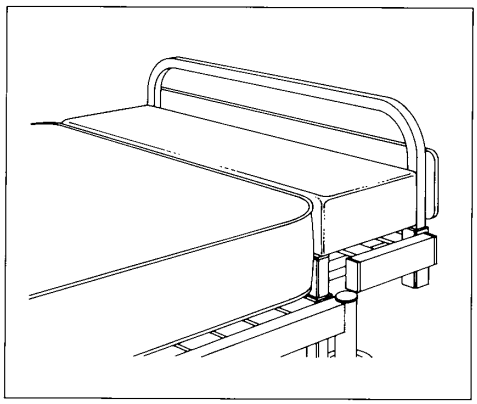


Fig. 4 A bed extension

See also: stripper; tilt

Height adjustment

Operators must be able to stay in a good posture when adjusting the height, at all stages. Height adjustability is essential, for the welfare of occupants and staff. Most hospital beds are variable to any point within a specified range. Most 1990s beds have a 'pedestal' system, where a hinged support raises the platform. They may be mechanical (foot pump), hydraulic (foot pump) or electric (switch).

Some older beds have winders which wind in a vertical plane, but these cause staff to stoop and twist when using them. Some newer designs have electric telescopic legs. However, there are also some beds (with telescopic legs), where the legs may also be set manually at one of a choice of fixed heights. As such, the specified range of variable height adjustment may begin at one of a number of heights. Controls for electric models are usually on a pendant handset. Occasionally, controls are on a panel at the foot or side of the bed, or built into the safety rails.

See Fig. 6.

What to look for

- ☐ As wide a range of height adjustment as possible, preferably going lower than the current British Standard* of between 355 and 405mm (14–16"). Some beds will go down to 300mm (12") or lower
- ☐ Easy access to controls, from both sides of the bed or from the foot
- ☐ Sufficient clearance for hoists, bed tables, etc. underneath
- ☐ Clear labelling of controls with their function, i.e. up, down
- ☐ All electrically powered beds should raise or lower only while the control is being activated

✓ Plus points – Height adjustment

- Telescopic legs have no underbed space taken up by mechanisms. This allows these beds to go lower than 'pedestal' beds
- Electric height adjustment increases independence for suitable occupants

! Watch points – Height adjustment

- When an overlay or thick mattress (more than 130mm/5") is used, most beds do not go low enough for wheelchair transfers or for small occupants to get into and out of bed unaided. This must be weighed against the advantages of a thick mattress for pressure reduction. The use of steps to overcome the height problem is not recommended, for safety reasons
- Some foot pedals are hard to reach when the bed is lowered or when some types of safety rail are lowered
- Hydraulic foot pumps can be hard work with a heavy occupant
- Hydraulic foot pumps may give less smooth height adjustment than electric motors

See also: equipment related to beds; mattress; profiling; safety rails; underbed mechanisms

* British Standards Institution, *British Standard Specification for Hospital Bedsteads*. BS 4886: 1988: Variable height.

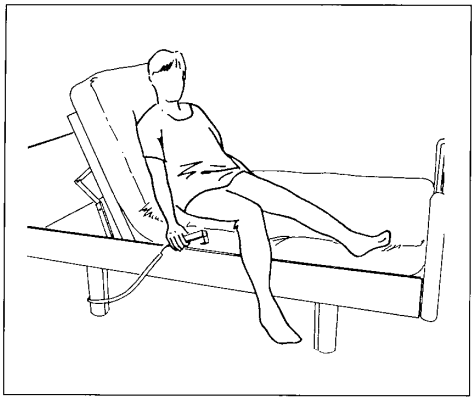


Fig. 5 Getting out of bed: using a rising backrest to sit up

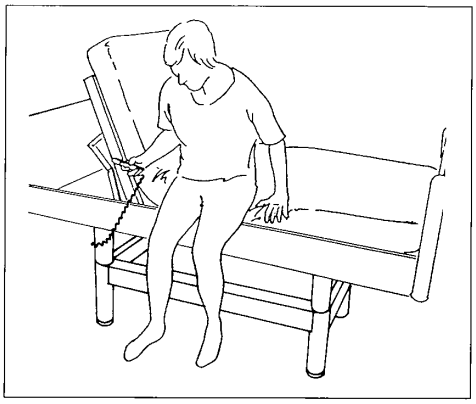


Fig. 6 Getting out of bed: using variable height to stand up

Mattress

A mattress should be comfortable, safe and suitable for the bed upon which it rests. A tissue viability specialist should be consulted before mattresses are chosen for a hospital. There is also a lot of information available to compare mattresses, such as that from the Medical Devices Agency (see Appendix 4 for details).

Types of mattress

Most hospital mattresses consist of a foam core encased in a waterproof cover. Standard mattresses are 130 and 150 mm thick. They are made of solid foam construction or of layers of foam of differing densities. Some have surfaces which are contoured or cut into cubes, to reduce interface pressures and shearing. Others have an outer 'frame' of foam of a higher density to give a firm edge to the mattress.

Published trials indicate that most foam 'pressure-reducing' mattresses are more effective than the now outdated, but still widely used, NHS contract mattress (marbled cover and now sold as the 'economy' mattress). No one of these has as yet been assessed as superior in all respects to the others.

The new NHS contract mattress (cream cover) introduced early in 1998, although it is not marketed as a pressure-reducing mattress, has much better pressure-reducing qualities than the old one.

Purchasing good quality mattresses which give adequate pressure reduction for 'low to medium risk' occupants is a better strategy than using overlays to compensate for inadequate mattresses.

Care and replacement

Care and replacement of foam mattresses is crucial. Mattresses should be turned regularly (usually weekly) to minimise indentation of the foam and should be tested regularly for 'bottoming-out',* for integrity of the cover (fluids penetrating the cover damage the foam) and for contamination. When they fail any of these tests, they should be replaced at once. Every hospital should have a testing and replacement protocol for mattresses and beds. Mattresses should be cleaned regularly with soapy water and dried thoroughly.

What to look for

- ☐ For general purpose use: suitability for occupants at 'low to medium risk' of pressure sores
- ☐ Waterproof cover which is strong enough to resist damage
- ☐ Two-way stretch, vapour-permeable fabric cover. Two-way stretch fabric cover significantly reduces interface pressures and is more durable and comfortable than a PVC-coated nylon cover. Vapour-permeable fabric allows moisture to dissipate, reducing the risk of skin maceration. Occupants will perspire less and be more comfortable
- ☐ Zipped removable cover, for cleaning, testing for water resistance and inspecting the foam core
- ☐ Space on cover to write the date of first use
- ☐ Easy identification of ends and sides, for use in the weekly turning regime
- ☐ For profiling beds or beds with rising backrests, mattresses should be hinged or highly flexible, so they conform to the profile of the bed

* 'Bottoming-out' or 'grounding' means that the mattress is worn or damaged and the mattress platform can be felt through it. For how to test for bottoming-out, see Appendix 2.

Watch points – Mattress

- A 150mm mattress may interfere with the use of a pull-out backrest
- The thicker the mattress, the higher the bed will be at its lowest setting. This may make it difficult for small occupants to get in and out. This disadvantage has to be weighed against the advantages of a thick mattress for pressure reduction

See also: backrest; height adjustment; profiling

Mattress platform

This is the base upon which the mattress rests and is held in place. It may be mesh, slatted, or perforated. Some beds have solid unventilated bases. These trap moisture.

What to look for

- ☐ No traps for moisture, spilled fluids or dirt. Perforated bases do not trap moisture and are easy to clean. Mesh bases are hardest to clean manually and so may be an infection hazard
- ☐ No sharp corners or edges on which bedding may snag or hands may be scratched
- ☐ Platform edges not more than 50mm (2") deep, to allow space underneath for an operator's knees if sitting (e.g. for venepuncture)
- ☐ No finger traps, especially when cleaning, making, or maintaining the bed
- ☐ Rotating buffer at each corner, to minimise damage to walls and furniture

See also: profiling

Profiling

Profiling mattress platforms are made in three or four sections (see Figs. 7 and 8). They support the head and torso, thighs, and lower legs respectively. Four-ection bases also have a piece for the buttocks. All sections may be angled to allow changes of posture, except for the buttock section. Duvets and fitted sheets may be more convenient on profiling beds. Pillows are best secured. The angling of the sections allows the occupant any choice of position between lying flat, through reclining, to sitting up. Knees may be flexed or extended in any of these positions.

Types of profiling

Models vary in the number of sections which may be operated independently of each other. For example, in some the knee break automatically rises as the backrest rises, whereas in others they work separately.

Profiling beds may be adjusted electrically, often with a manual knee break.* Some may be entirely manual, using winders (maybe more than one) and assisted mechanisms (gas spring).

Controls for electric models are usually on a pendant handset. Occasionally, controls are on a panel at the foot or side of the bed. Some beds have further panels built into the safety rails.

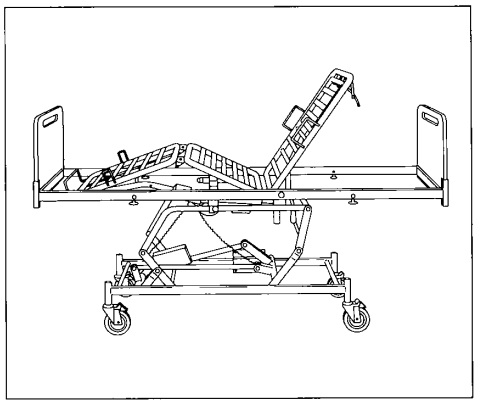


Fig. 7 Profiling: three-section

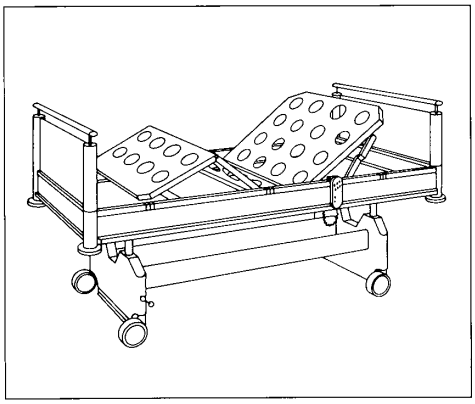


Fig. 8 Profiling: four-section

* 'Knee break' is the joint between the thigh and lower leg sections of a profiling mattress platform. As it rises or lowers, the occupant's knees flex or extend, respectively.

What to look for

- ☐ Four sections, preferably
- ☐ Independent operation of as many sections as possible
- ☐ Head section high enough to support occupant's head when sitting up
- ☐ A backrest which does not move the occupant away from the head of the bed (the backrest slides towards the head end) as it rises
- ☐ Split mattress (made in sections) or one flexible enough to follow the contours of the bed
- ☐ Easy to use and clear controls ideally with switches which can be distinguished in the dark, or by those with poor vision, and which can be operated by those with weak hands
- ☐ Robust pendant handset, which is easy to attach securely to the bed when not in use
- ☐ Easy adjustment of manual controls in a good posture
- ☐ Facility to disable occupant controls, where necessary
- ☐ Battery back-up, for use in a power failure

☑ **Plus points – Profiling**

- Occupant-controlled profiling facility promotes independence (e.g. sitting up, getting out of bed, adjusting posture for comfort), and may encourage drinking, reading, etc.
- Electric profiling substantially reduces manual handling and back stress. Even dependent occupants may be moved by one person
- Knee breaks help to prevent occupants from sliding down when sitting
- Enabling an occupant to move whenever necessary helps to avoid pressure sores

Watch points – Profiling

- Long periods of sitting with bent knees could encourage contractures in some occupants
- Three-section beds, though less expensive than four-section ones, tend to wedge occupants between the head and central sections as they come into a sitting position
- Backrests which do not slide back towards the head end on rising, leave occupants at a distance from the head end. This makes it harder to reach the locker, nurse call etc. and so may affect independence. It may also restrict leg room for tall occupants, by positioning them too close to the foot of the bed
- Handsets are easily dropped or mislaid. When left out of reach, independence is affected and help may be needed
- Mattress overlays may not conform properly to the bed profile
- Position of occupants' buttocks on the bed will affect their posture when profiled
- Winder handles may be problematic: they take many turns for the profiling to reach the desired position; if not fully stowed away, they may catch against people; and they are easily lost
- Handles which wind in a vertical plane make operators stoop and twist

See also: backrest; height adjustment; mattress; mattress platform

Safety rails (cot sides)

These attach to the sides of the bed and stop the occupant from accidentally rolling or slipping off the mattress. *They should not be used to prevent occupants from getting out of bed, as injury may occur if they try.* Not all occupants need safety rails. Safety rails (far side only) should be raised if a single operator is turning an occupant in bed (e.g. with a sliding sheet, turning slide or hoist), or if an occupant is sitting on a bed pan.

Types of safety rail

Safety rails may be an integral part of the bed, fit either side of the bed (universal), or only one (left/right fitting), which has obvious drawbacks. They may fold down flat, slide down through the attachment point, or drop down underneath the mattress platform. They may be continuous or be split into two pieces.

There is a risk of death from entrapment and asphyxiation of occupants where safety rails are fitted. Choose carefully and assess the occupant before fitting rails, as the size and physiological condition of some occupants may make the use of 'safety' rails actually unsafe. Ensure there is no risk of entrapment of the occupant (head or body) between rail and mattress, rail and bed parts, between split rails, or between bars of rail.

What to look for

- ☐ Easy attachment/detachment
- ☐ Height not less than 250mm, nor unacceptably high
- ☐ No significant obstruction to vision
- ☐ May be lowered without the need for removal
- ☐ No obstruction to activities (e.g. bed making), when rails are lowered
- ☐ Easy access to underbed mechanisms, when rails are lowered
- ☐ Lowered rails which do not protrude above the mattress
- ☐ Quiet to use
- ☐ Easy to see how to use
- ☐ Compatibility with beds
- ☐ If choosing continuous rails, they should be not less than two-thirds of the mattress platform length
- ☐ Able to be stored without increasing overall width of mattress platform

☑ **Plus points – Safety rails**

- Split rails provide a handhold for occupants when getting out of bed

Watch points – Safety rails

- Safety rails may become too low when an overlay or thick mattress is used. Extra-height rails may be available
- Rails which, when lowered, protrude above the mattress, make transfers awkward
- Lowered rails which obstruct activities may cause back stress, as it is awkward for operators to reach the occupant
- Rails which add to the bed width when they are stowed away can cause injury to occupants when getting in and out of bed
- Some rails have mechanisms at both ends which must be operated at the same time. These often need two staff to operate them.

See also: braking system; height adjustment

Stripper

A bed stripper is used as a platform on which to rest bed linen when the bed is being made. It should slide in and out easily and be capable of use with bed extensions. It should be robust and when pulled out should not block access to brakes or any adjustment mechanisms.

See Fig. 9.

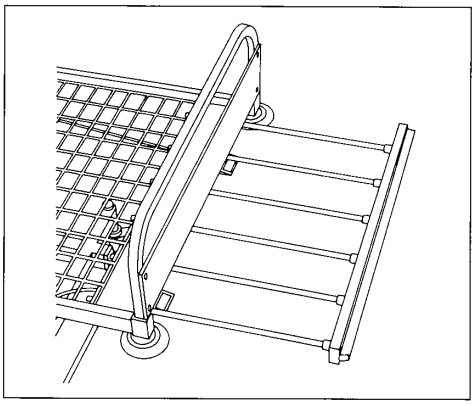


Fig. 9 Stripper

See also: braking system; extension

Tilt

Tilt allows the bed to be tilted head-down (Trendelenburg) or foot-down (reverse Trendelenburg). It may be used as part of treatment or during emergencies. Tilt may be manually operated from the foot of the bed; by release levers or a winder handle; or powered. One-way tilt must adjust up to 12 degrees. For two-way tilt, one way must adjust up to 12 degrees and the other must reach at least 6 degrees.*

See Fig. 10.

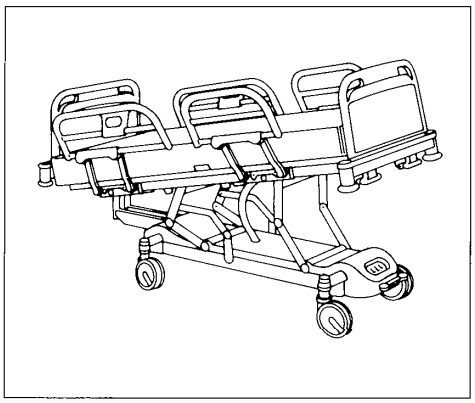


Fig. 10 Bed showing Trendelenburg tilt

What to look for

- ☐ Two-way tilt, preferably. Decide whether 6 or 12 degrees of the alternative tilt is needed. If one-way tilt is chosen, the bed must be designed to be reversible
- ☐ Easy to reach and use, not placing strain on the operator
- ☐ Fast enough for use during an emergency
- ☐ No obstruction from use of a bed extension

* British Standards Institution, *British Standard Specification for Hospital Bedsteads*. BS 4886: 1988.

Watch points – Tilt

- Some tilt mechanisms mean that operators take part of the weight of the occupant plus the bed, when the mechanism is released.This strain is potentially dangerous
- One-way tilt requires exchanging the head and foot ends and turning the bed round to achieve tilt in the opposite direction. This takes time and effort

See also: bed ends; extension

Underbed mechanisms

These are in the space between the mattress platform and the floor. They include any stand on which the platform rests, and any mechanisms attached to it for adjusting the bed.

What to look for

- ☐ Easy access and enough clearance for items such as portable hoists, overbed tables and X-ray equipment, at all height settings
- ☐ Easy access to adjustment controls (e.g. footpumps), at all height settings
- ☐ No trailing wires on which portable hoists, bed tables, etc. could catch
- ☐ Easy cleaning
- ☐ Easy access for maintenance
- ☐ No obstruction from battery (e.g. to motorised bed-moving devices, X-ray equipment)

See also: equipment related to beds; height adjustment

Weight capacity

This is the maximum safe load for the bed. The frame should be clearly labelled with this information, and staff should be aware of the weight capacity. Most beds in the UK take 140–180 kg (22–28 stone). However, there are heavy-duty beds which take more weight. They can be obtained at short notice from companies which hire out specialist beds. (See *What types of bed are there?*, page 22).

What do beds cost?

Purchasing

To give you an indication of how much different types of beds and related equipment cost to buy, we have included some approximate price ranges of different types of bed. The prices are for a single item, so remember that they normally drop as larger quantities are bought. Most manufacturers are happy to negotiate discounts. All prices are for 1998, based on items from a selection of manufacturers.

Beds

Mattress platform	*Height adjustment*	*Backrest*	*Tilt*	*Knee break*	*No. of models*[1]	*Price (£)*[2] *Range*	*Median*
One-piece	Manual	Pull-out	Manual	N/A	7	515–850	660
Two-piece	Manual	Manual rising	Manual	N/A	7	545–855	645
	Electric	Electric rising	Manual	N/A	5	935–1,255	1,010
Four-piece	Manual	Manual rising	Manual	Manual	6	795–925	870
	Electric	Electric rising	Manual	Electric	7	1,150–2,030	1,285
	Electric	Electric rising	Electric	Electric	3	1,700–2,350	1,995[3]

Related equipment

Item	*Type*	*No. of models*[1]	*Price (£)*[2] *Range*	*Median*
Bed extension	Detachable	5	45–150	95
Mattress squab for extension	Standard	2	15	N/A
	Pressure relieving	3	25–40	35
Monkey pole	Detachable	5	34–90	50
Safety rail	Fold down	3	100–105	105
	Fold down, extra height	2	135	N/A
	Telescopic	3	125–175	125
	Telescopic, extra height	1	135	N/A
Bed cradle		2	30	N/A
Drip pole	Clamp on	5	30–90	30
	Mobile	1	70	N/A
Bed table		8	95–190	125

Notes
1. Number of models on which the figures are based
2. To the nearest £5
3. This model included four half-side rails plus one drip pole and a bed extension

Leasing

You will need to decide whether to buy or lease your beds. The pros and cons of each should be discussed with your supplies department who should also be able to provide details of the range of available financial terms and packages. You may be able to include a contract for maintenance, cleaning and training in the arrangement.

Ongoing costs

The cost of a bed does not begin and end with the purchase price. Your choice of bed may be affected by:

- maintenance and repair, including spare parts
- electricity, for powered beds
- cleaning
- wear and tear on furniture, equipment and fabric of the building.

Hidden costs

Choosing a bed which does not meet your needs also brings costs. Where there is injury, tissue damage or avoidable dependence, there are human and financial costs. The purchase price of a bed should be set against the possible costs of litigation, staff sickness, increased insurance premiums, treatment of pressure sores and increased workload (discussed in detail in *Why is the right bed important?*, on page 5). Buying a bed on the basis of its purchase price alone may not be cost-effective in the long term.

How can you find more information?

Contact details for the organisations listed below are given in Appendix 4.

British Surgical Trades Association

Trade association of suppliers of equipment in the UK, including beds and related equipment. The Association can give you names and addresses of UK manufacturers and suppliers.

The Disability Information Trust

Publications provide detailed independent information on the wide range of equipment available. *Furniture* has information on beds and related equipment (£10 at 1998 prices).

Disabled Living Centres (DLCs)

Impartial information on a wide range of equipment, supplied by professionals, in person, over the telephone, or by letter, to disabled people, professionals, relatives and friends. Items may be seen and tried out free of charge. The Disabled Living Centres Council can put you in touch with your nearest centre.

Disabled Living Foundation (DLF)

The DLF has a helpline, open to all, which can provide information about beds, mattresses and related equipment and which can give contact details for a range of disability organisations. It also produces the *Disabled Living Foundation Data-Off-Line* (CD-ROM) and the *Hamilton Index*, which contain full details of many products. Each section of the *Hamilton Index* is updated on a 16-month rotational basis. They may be obtained individually, at £8 each (1998 prices). Most occupational therapy departments and DLCs will have a copy or will know where one may be accessed. Relevant sections in relation to beds are:

- Part 1, section 3: *Beds and Bed Accessories*
- Part 2, section 9: *Pressure Relief*
- Part 4, section 20: *Manual Handling, Hoists and Lifting Equipment*.

Independent Living Exhibitions

Commercially run exhibitions with displays from suppliers and disability organisations, held regionally several times a year. Entrance free. Details available from *Independent Living*.

Medical Devices Agency

Evaluative reports on equipment, including foam mattresses, alternating-pressure mattress overlays, static mattress overlays and moving and transfer equipment. A copy may be available in your hospital library. If not, reports are free of charge to health care professionals, otherwise costing between £20 and £35 per report (1998 prices).

The Adverse Incident Centre gathers and investigates reports of incidents concerning medical devices. If a problem is found with the device, the centre distributes a hazard warning. You can contact them to find out about any which may have been issued in relation to beds, accessories and pressure-relieving devices. It is important to report any adverse incidents to the MDA.

Exhibitions

EMAP Health Care Exhibitions

Organise annual exhibitions, including equipment, in Glasgow, Belfast and London.

Naidex Exhibition

Commercially run exhibition of equipment and services for disability. Held annually at the NEC in Birmingham. Details available from Reed Exhibitions Co. (UK) Ltd.

Royal College of Nursing Annual Congress

This has a trade exhibition alongside.

Other sources

These include: trade press (e.g. *Hospital Equipment & Supplies*) and supplements in the *Health Service Journal*; manufacturers' literature; manufacturers' representatives; advertisements in professional journals; and health libraries.

Chapter 4

Choosing

Having chosen the *type* of bed you need, you should shortlist suitable *models*. Consult your supplies department, who will have access to brochures from a variety of manufacturers. They can also help to arrange a trial of models in which you are interested, to see which best meets your needs and to highlight any unforeseen problems. If you cannot find a bed which meets your needs, a manufacturer may be willing to alter a design (especially if you are likely to place a large order). However, make sure there will be no problems with repairs or spare parts.

Conducting a trial

The extent of the trial will depend on the scale of your purchase/lease. Prior to trial by staff and/or occupants, you should ask the manufacturer or supplier to sign an indemnity form (available from your supplies department). If you fail to do this, you will not be covered if an accident occurs. Usual safety checks must still be made, even if the bed is only on short-term loan. For a checklist of people to consult, see *Whom to consult*, on page 19.

Small scale trial

Having decided upon one or more models or suppliers, ask if you can have the bed(s) on a trial basis to see if they meet your needs. Once in use on the wards, ask everyone who will use them, including occupants, to comment on good and bad points. Make sure you try all necessary interfacing equipment or furniture to see if they are compatible. Are there problems with ease of use, safety, manual handling, tissue viability, infection control or independence? The manufacturer may be able to help with alterations or you may need to find a different model.

Large scale trial

This is a more in-depth version of the above. You will need to consult widely and it may be best to form a working party of representatives, from *'Whom to consult'*, the checklist on page 19. Consider the following:

- where will the beds be used? This will help to identify the areas in which they should be trialled. No single design of bed is likely to suit all areas (e.g. orthopaedic occupants do not tend to use a knee break; ITU may want a radiolucent backrest but not a headend)

- what tasks are undertaken by different staff and what equipment or furniture is used with the bed? Ask staff to comment on ease of use and any problems experienced with these tasks. Also ask your maintenance staff about any problems with types of mechanism and ease of maintenance, and obtain a likely estimate of costs
- ask occupants about any problems they had with the beds
- how, and for how long, will you collect people's opinions (e.g. by questionnaire; face-to-face interviews; or comments sheet attached to bed)?
- how long should the trial last?

Training

It will not be obvious to everyone how to make the best use of a more sophisticated bed than they may be used to. Staff will need training, particularly with regard to using the bed to facilitate occupant independence. Find out about the quantity and quality of instructions supplied with the bed. Does the manufacturer offer videos or training packages? Can they offer training within the purchase price of the bed?

Chapter 5

Learning from your choice

It is important for you and your colleagues to learn from the experience of choosing and using beds. Once the beds have been in place long enough for you to be able to make a judgement, reflect on how well they have met your needs. This is valuable information, so the next step is to pass this on to others, so you can learn from each other's experiences.

Evaluating your choice

How good has your choice proved to be?

What has changed since you made your selection?
Consider any change in circumstance regarding:

- condition of the occupant for whom the bed was intended
- operator capabilities (e.g. staffing levels)
- the environment.

Were your original expectations realistic?

Consider whether:

- problems and priorities were correctly identified
- hopes and expectations were realistic
- what was important then remains so now.

How well has the bed solved the problems which were identified?

This is in relation to:

- occupant independence
- occupant comfort and tissue viability
- reduced musculoskeletal stress of operators
- time taken for certain tasks.

How is the bed now performing?

Consider the following:

- in what ways has it been successful?
- how could it do better?
- are all the selected features put to good use?

Passing on your experiences to others

There will be a number of people interested in hearing of your experiences. This may mean passing on information informally (e.g. talking to colleagues), or formally within your own organisation (e.g. supplies department, branches of special interest groups, your line or senior manager, newsletters, networking). It may mean disseminating it at a local level (e.g. branches of special interest groups, manufacturers, other local groups) or nationally (e.g. NHS Supplies, special interest groups, disability groups, manufacturers, professional associations).

Conclusion

The equipment we use has an important impact upon the quality of the care we give. It has to accommodate the changes taking place in the ways in which services are provided and the increasing expectations of those who deliver, as well as those who use, services.

The original King's Fund specification brought a high minimum standard to the provision of hospital beds, which has lasted over 30 years. While this remains a good minimum standard, needs have become more complex and more diverse than can be accommodated by a single, universal bed. The technology for making beds which 'do more' for both occupant and operator has become better and cheaper. Designs are being rethought, and new beds are becoming available now which in appearance have little in common with the hospital bed as it is commonly known. What is needed is the vision and resources of those providing services to make full use of what is available, for the benefit of all.

We hope that 20 years from now, a bed without electric variable height and profiling will be as rare in acute hospitals as is a fixed-height bed now. We hope this will have had a significant impact upon the rates of staff injury and of pressure sores. We hope that every occupant will be as free as their personal capabilities allow to position themselves for comfort and to move in and around the bed independently, with the aid of the simple technology which a bed can offer.

Appendix 1

Suggested further reading

Department of Health. *NHS Estates Health Building Note No. 40. Common activity spaces: treatment areas*, 11. London: HMSO, 1995

Department of Health. *Pressure Sores: A key quality indicator.* London: Department of Health, 1993

Dhoot R, Georgieva C. *The Evolution Bed in the NHS Hospital Environment.* The Management School, Lancaster University, 1995

Disabled Living Foundation Hamilton Index. *Beds & Bed Accessories*, Part 1, Section 3, September 1997

Disabled Living Foundation Hamilton Index. *Manual Handling, Hoists & Lifting Equipment.* Part 4, Section 20, May 1997

Disabled Living Foundation Hamilton Index. *Pressure Relief.* Part 2, Section 9, January 1998

ECRI. *Beds, Electric.* Plymouth Meeting, September 1995

Health Services Advisory Committee. *Manual Handling in the Health Services.* Suffolk: HSE Books, 1998 (This replaces Health Services Advisory Committee. *Guidance on Manual Handling of Loads in the Health Services.* London: HMSO, 1992)

Health & Safety Executive. *A Guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations* 1995. L73 HSE Books, 1996

Health & Safety Executive. *Management of Health & Safety at Work Regulations 1992 – Approved code of practice.* L21 HSE Books, 1992

Health & Safety Executive. *Manual Handling Operations Regulations 1992 – Guidance on regulations.* L23 HSE Books, 1992

Health & Safety Executive. Workplace (*Health, Safety & Welfare*) *Regulations 1992 – Approved code of practice and guidance.* HSE Books, 1992

Hibbs P. *Pressure Area Care for the Bart's NHS Trust*. London: The Bart's NHS Trust, 1992

McNair B, Jones JAR, Mitchell J. *Choosing Beds for Nursing and Residential Homes: A guide*. London: King's Fund, 1998.

Medical Devices Agency. *Evaluation: Foam mattresses*. No. PS1, 1993

Mitchell JC, Jones JAR, McNair B, McClenahan JW. *Better Beds for Health Care: Report of the King's Fund Centenary Bed Project*. London: King's Fund, 1998

Mitchell JC, McNair B, Jones JAR. *Choosing Health Care Beds for Use at Home: A guide for users and professionals*. London: King's Fund, 1998

National Back Pain Association/Royal College of Nursing. *The Guide to the Handling of Patients – Introducing a safer handling policy*. 4th edition. Teddington: NBPA, 1997

Nuffield Institute for Health/University of York NHS Centre for Reviews & Dissemination. *Effective Health Care: The prevention and treatment of pressure sores*. 1995

Smith G, Seccombe I. *Manual Handling: Issues for nurses*. Brighton: The Institute for Employment Studies for the RCN, 1996

Soderback I, Lassfolk A. The usefulness of four methods of assessing the benefits of electrically adjustable beds in relation to their costs. *International Journal of Technology Assessment in Health Care* 1993; 9(4): 573–87

Tarling C, Burns N. Let the bed take the strain. *Professional Nurse* 1994; pp.759–63

Appendix 2

Testing foam mattresses

Visual inspection

- Is cover split or perforated?
- Does core show signs of staining, dampness or obvious compression set?

Hand compression assessment*

This is a test for whether the mattress is 'bottomed out' or 'grounded':

1. Using both fists and starting at the foot end of the bed, press down using full body weight
2. Note any variation in the density of the foam, including whether the base of the bed can be felt through the foam
3. Repeat at intervals up the entire length of the bed.

If you can feel the base through the foam, the mattress is 'bottomed out'. If it is, the pressure applied to the occupant's tissues is likely to be nearly the same as if he or she were lying directly on the mattress platform. Some experts suggest sitting on the mattress rather than using the hands to feel for 'bottoming-out'.

Water penetration test*

1. Undo zip and place a sheet of absorbent paper between cover and foam core
2. Using fist, indent the mattress to form a shallow well and pour tap water (about half a cup) into the well
3. Agitate the surface with the fist for approximately one minute to increase contact, then mop up water
4. Inspect tissue for water marking
5. Repeat procedure on reverse side of mattress.

If there is any penetration, the mattress is able to harbour bacteria from body fluids and will be prone to damage by fluid. It should not be used.

* As described by the Medical Devices Directorate, *Evaluation: Foam mattresses*, No. PS1, 1993. Crown Copyright is reproduced with the permission of the Controller of Her Majesty' Stationery Office.

Appendix 3

Inventory

Location	No.	Type	Manufacturer	When bought	Condition	Comments

Appendix 4

Useful addresses

Disability information

The Disability Information Trust
Mary Marlborough Centre
Nuffield Orthopaedic Centre
Headington
OXFORD
Oxfordshire
OX3 7LD
Tel: 01865 227592
Fax: 01865 227596

Disabled Living Centres Council
Winchester House
Cranmer Road
Kennington Park
LONDON
SW9 6EJ
Tel: 0171 820 0567
Fax: 0171 735 0278
Website: http://www.dlcc.demon.co.uk
e-mail: dlcc@dlcc.demon.co.uk

Disabled Living Foundation
380–384 Harrow Road
LONDON
W9 2HU
Tel: 0171 289 6111
Fax: 0171 266 2922
Help Line: 0870 6039177 (calls charged at 8p per minute)
Minicom: 0870 6039176
Website: http://www.dlf.org.uk
e-mail queries: advisor@dlf.org.uk

National Back Pain Association
16 Elmtree Road
TEDDINGTON
Middlesex
TW11 8ST
Tel: 0181 977 5474
Fax: 0181 943 5318

Exhibition organisers

EMAP Health Care Exhibitions
Porters South
Crinan Street
LONDON
N1 9XW
Tel: 0171 843 4841
Fax: 0171 843 4849

Independent Living
PO Box 513
BRISTOL
BS99 2AH
Tel/Fax: 01275 892609

Reed Exhibitions Co. (UK) Ltd
Oriel House
26 The Quadrant
RICHMOND
Surrey
TW9 1DL
Tel: 0181 910 7873
Fax: 0181 910 7926

Manufacturers

British Surgical Trades Association
1 Webbs Court
Buckhurst Avenue
SEVENOAKS
Kent
TN13 1LZ
Tel: 01732 458868
Fax: 01732 459225

Professional organisations

College of Occupational Therapists
6–8 Marshalsea Rd
Southwark
LONDON
SE1 1HL
Tel: 0171 357 6480
Fax: 0171 378 1353

Chartered Society of Physiotherapy
14 Bedford Row
LONDON
WC1R 4ED
Tel: 0171 306 6666
Fax: 0171 306 6611

The Ergonomics Society
Devonshire House
Devonshire Square
LOUGHBOROUGH
Leicestershire
LE11 3DW
Tel/Fax: 01509 234904

Infection Control Nurses' Association
Contact via Royal College of Nursing
Tel: RCN Direct (information line):
0345 726100

National Back Exchange
Contact either the DLF or the National Back Pain Association for details of the current membership secretary

Royal College of Midwives
15 Mansfield Street
LONDON
W1M 0BE
Tel: 0171 872 5100
Fax: 0171 872 5101

Royal College of Nursing
20 Cavendish Square
LONDON
W1M 0AB
Tel: RCN Direct (information line): 0345 726100

The Tissue Viability Society
Glanville Centre
Salisbury District Hospital
SALISBURY
SP2 8BJ
Tel: 01722 336262 (x 4087)
Fax: 01722 425263

Safety and evaluation

HSE Books
PO Box 1999
SUDBURY
Suffolk
CO10 6FS
Tel: 01787 881165
Fax: 01787 313995

Evaluative reports
Medical Devices Agency
Evaluative reports
Room 2/505
Crown Buildings
Kingston By-Pass
SURBITON
Surrey
KT6 5QN
Tel: 0181 268 4488
Fax: 0181 268 4496
Website: www.medical_devices.gov.uk

Adverse incidents
Medical Devices Agency
Adverse Incident Centre
Hannibal House
Elephant and Castle
LONDON
SE1 6TQ
Tel: 0171 972 8080
Fax: 0171 972 8109

Appendix 5

Choosing features of a hospital bed

For each feature that you require, work from left to right and tick the type and option which you prefer.

	Possibilities			
Feature	**Type**		**Options**	
Backrest	rising ☐ pull-out ☐ part of profiling ☐	electric ☐	manual ☐	
Brakes	central ☐ individual ☐	electric ☐	manual ☐	
Extension	detachable ☐ integral ☐			
Height adjustment	variable ☐	electric ☐	manual hydraulic ☐	manual mechanical ☐
Mattress platform	mesh ☐ perforated ☐ solid ☐			
Profiling	3 sections ☐ 4 sections ☐	electric ☐	electric with manual knee break ☐	manual ☐
Safety rails	detachable ☐ integral ☐	left/right ☐ universal ☐	continuous ☐ split ☐	fold flat ☐ slide down ☐ fold flat ☐ fold under ☐
Tilt	one way ☐ two way ☐	12/6 degrees min. ☐	12/12 degrees min. ☐	
Weight capacity		up to 140 Kg ☐	140 to 180 Kg ☐	over 180 Kg ☐

Notes

Hospital beds should come with detachable bed ends, four castors and a bed stripper.

King's Fund
54001000718208

000 048572 020000

What makes a better bed for health care?

In the 1960s, the King's Fund caused a major stir when it developed a new specification for hospital beds. Manufacturers implemented the specification as the 'King's Fund bed', which was revolutionary in its time and a major step forward in patient care.

Today, more than 30 years later, the bed – large, solid and built to last – is still in widespread use throughout hospitals and other health care organisations in the UK. However, our research shows that modern requirements can no longer be met by a single basic specification – better beds are now needed, not only in hospitals, but also in the community and in nursing and residential homes.

Choosing Beds for Hospitals provides practical information and a systematic process to help in choosing the most suitable type of bed for use in hospitals, taking into account the needs of individuals, carers and health professionals. It can be used by nurses and nurse managers, midwives, doctors, therapists, supplies managers and others, individually or as part of a team, in choosing beds.

Other reports in the series are:

Choosing Beds for Nursing and Residential Homes: A guide
Choosing Health Care Beds for Use at Home: A guide for users and professionals
Better Beds for Health Care: Report of the King's Fund Centenary Bed Project

ISBN 1-85717-205-1