

# HEALTH BUILDING NOTE 10-02:

## Day surgery facilities

2007

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Volume 1 Day surgery unit  
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## Surgery

# Health Building Note 10-02: Day surgery facilities



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Surgery

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# Preface

## About Health Building Notes

Health Building Notes give “best practice” guidance on the design and planning of new healthcare buildings and on the adaptation/extension of existing facilities.

They provide information to support the briefing and design processes for individual projects in the NHS building programme.

## Restructuring of the Health Building Note suite

Healthcare delivery is constantly changing, and so too are the boundaries between primary, secondary and tertiary care. The focus now is on delivering healthcare closer to people’s homes.

The traditional division of Health Building Notes into discrete books of information based on hospital departments is therefore no longer appropriate.

Instead, the new Health Building Note framework (shown below) is based on the patient’s experience across the spectrum of care from home to healthcare setting and back, using the national service frameworks (NSFs) as a model. This structure better reflects current policy and service delivery.

## New Health Building Note structure

The Health Building Notes have been organised into a suite of 17 core subjects.

**Care-group-based** Health Building Notes will provide information about a specific care group or pathway but will cross-refer to Health Building Notes on **generic (clinical) activities** or **support systems** as appropriate.

Core subjects will be subdivided into specific topics and classified by a two-digit suffix (-01, -02 etc), and may be further subdivided into Supplements A, B etc.

All Health Building Notes are supported by the overarching Health Building Note 00 in which the key areas of design and building are dealt with.

### Example

The Health Building Note on accommodation for adult in-patients will be represented as follows:

“Health Building Note 04-01: Adult in-patient facilities”

The supplement to Health Building Note 04-01 on isolation facilities will be represented as follows:

“Health Building Note 04-01: Supplement A – Isolation facilities in acute settings”

New Health Building Note number and series title	Type of Health Building Note
Health Building Note 00 – Core elements	Support-system-based
Health Building Note 01 – Cardiac care	Care-group-based
Health Building Note 02 – Cancer care	Care-group-based
Health Building Note 03 – Mental health	Care-group-based
Health Building Note 04 – In-patient care	Generic-activity-based
Health Building Note 05 – Older people	Care-group-based
Health Building Note 06 – Diagnostics	Generic-activity-based
Health Building Note 07 – Renal care	Care-group-based
Health Building Note 08 – Long-term conditions/long-stay care	Care-group-based
Health Building Note 09 – Children, young people and maternity services	Care-group-based
Health Building Note 10 – Surgery	Generic-activity-based
Health Building Note 11 – Community care	Generic-activity-based
Health Building Note 12 – Out-patient care	Generic-activity-based
Health Building Note 13 – Decontamination	Support-system-based
Health Building Note 14 – Medicines management	Support-system-based
Health Building Note 15 – Emergency care	Care-group-based
Health Building Note 16 – Pathology	Support-system-based

## Other resources in the DH Estates and Facilities knowledge series

### Health Technical Memoranda

Health Technical Memoranda give comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare (for example medical gas pipeline systems, and ventilation systems).

They are applicable to new and existing sites, and are for use at various stages during the inception, design, construction, refurbishment and maintenance of a building.

All Health Building Notes should be read in conjunction with the relevant parts of the Health Technical Memorandum series.

### Health Technical Memorandum Building Component series

All Health Building Notes refer to Health Technical Memorandum Building Component documents for specifications and design guidance on building components for healthcare buildings. All Health Building Notes should therefore be read in conjunction with the relevant parts of the Health Technical Memorandum Building Component series.

### Activity DataBase (ADB)

The Activity DataBase (ADB) data and software assists project teams with the briefing and design of the healthcare environment. Data is based on guidance given in the Health Building Notes, Health Technical Memoranda and Health Technical Memorandum Building Component series.

1. Room data sheets provide an activity-based approach to building design and include data on personnel, planning relationships, environmental considerations, design character, space requirements and graphical layouts.

2. Schedules of equipment/components are included for each room, which may be grouped into ergonomically arranged assemblies.
3. Schedules of equipment can also be obtained at department and project level.
4. Fully loaded drawings may be produced from the database.
5. Reference data is supplied with ADB that may be adapted and modified to suit the users' project-specific needs.

For further information please refer to the following DH website: [www.adb.dh.gov.uk/](http://www.adb.dh.gov.uk/)

## How to obtain publications

- To find out about publications that are finalised and currently being published, look under “new publications” on the DH Estates and Facilities Division Knowledge and Information Portal homepage at: [www.estatesknowledge.dh.gov.uk](http://www.estatesknowledge.dh.gov.uk). **NOTE that users should also check the Knowledge and Information Portal for latest versions of all publications, including Health Building Notes, and for any amendments to publications.**
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## Note

The new Health Building Notes will be progressively rolled out from spring 2007 onwards.

The sequence of numbering within each subject area does not necessarily indicate the order in which the Health Building Notes will be published/printed. However, the overall structure/number format will be maintained as described.

To find out how to access information on published documents, see the “How to obtain publications” section.

# Executive summary

This Health Building Note is the second volume in the series that gives guidance on facilities for surgical procedures in all healthcare settings. This volume describes the facilities required for a day surgery unit located within either an acute hospital or a treatment centre.

This document replaces Health Building Note 52 – ‘Accommodation for day care’, Volume 1 – ‘Day surgery unit’ (NHS Estates 1993). Since the publication of Volume 1 of Health Building Note 52, day surgery has become increasingly important for the delivery of elective surgery. This has had an impact on the way the service is delivered. Significant changes include the introduction of

admission suites and discharge lounges, where patients can wait in comfort before and after surgery.

For maximum flexibility, it is recommended that day surgery operating theatres meet the same standards as in-patient operating theatres. This guidance describes facilities to serve a population of 300,000 with provision for four operating theatres and associated accommodation.

It is recognised that excellent staff facilities will contribute to the morale of staff and efficient running of the unit. Facilities for staff rest, changing and associated accommodation are included in the guidance.

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# Contents

Executive summary		
Acknowledgements		
<b>Chapter 1</b>	Background	1
	Purpose and scope of the document	
	Impact of service delivery on facilities	
	National Programme for IT in the NHS	
	Independent healthcare facilities standards	
<b>Chapter 2</b>	General functional and design considerations	4
	Relationships with other services	
	Capacity planning	
	Infection control	
	Protecting a patient's privacy and dignity	
	Cultural considerations	
	Access for disabled people	
	Lifting and moving patients	
	Storage	
	Environmental impact/sustainable design	
	Creating the environment for care	
	Child-friendly environments	
	Art in hospitals	
	Natural lighting	
	Artificial lighting	
	Wayfinding	
	Activity DataBase	
<b>Chapter 3</b>	Specific functional and design requirements	9
	Clustering of accommodation	
	The patient journey	
	Main entrance	
	Reception	
	Waiting area	
	Pre-assessment facilities (optional)	
	Admission suite	
	Anaesthetic room	
	Scrub and gowning room (optional locations)	
	Preparation room	
	Operating theatre	
	Exit bay	
	Local equipment store	
	Reporting room	
	Imaging equipment bay	
	Cardiac arrest/emergency trolley	
	Flexible endoscope decontamination room and store	
	Theatre dirty utility room	
	Disposal hold	

	Storage areas	
	Laboratory	
	Digital communication	
	Blood refrigerator	
	Satellite pharmacy	
	Post Anaesthesia Care Unit (PACU) or first-stage recovery	
	Second-stage recovery	
	Second-stage recovery/discharge lounge communications base	
	Beverage bay	
	Discharge lounge	
	Interview room	
	Patients' clothing store	
	WCs	
	Equipment service room	
	Housekeeping	
	Switchroom	
	Uninterruptible power supply room	
<b>Chapter 4</b>	Support facilities – general and specific functional and design requirements	27
	Staff accommodation	
	Rest facilities	
	Beverage bay	
	WCs	
	Changing rooms and associated facilities	
	Theatre footwear washing	
	Office accommodation	
	Seminar room	
<b>Chapter 5</b>	Other general functional and design considerations	30
	Communications	
	Controlled Drugs cupboard	
	Noise and sound attenuation	
	Finishes	
	Colour	
	Floors	
	Walls	
	Ceilings	
	Doors and doorframes	
	Windows	
	Clinical wash-hand basins	
	Shelving and storage	
	Work surfaces and bins	
	Maintenance and cleaning	
<b>Chapter 6</b>	Engineering services	34
	Introduction	
	Energy conservation and sustainability	
	Space requirements for services and plant	
	Design for safety	
	Control of Substances Hazardous to Health (COSHH) Regulations 2005	
	Fire safety	
	Use of lasers in the operating theatre	
	Engineering services (mechanical)	
	Engineering services (electrical)	
<b>Chapter 7</b>	Cost information	45
	Introduction	

	Departmental Cost Allowance Guides	
	On-costs	
	Locational factors	
	Schedules of accommodation	
	Dimensions and areas	
	Circulation	
	Communications	
	Land costs	
	Engineering services	
<b>Appendix 1</b>	Capacity planning	52
	Introduction	
	Definitions	
	Method	
	Worked examples	
<b>Appendix 2</b>	Room layouts	54
<b>Appendix 3</b>	References	59
	Department of Health publications	
	Other Government publications	
	Legislation/Regulations	
	Standards	
	Others	
	Useful websites	



# 1 Background

## Purpose and scope of the document

- 1.1 This document provides best practice guidance on the built environment required to support the clinical and diagnostic invasive procedures that take place in a dedicated day surgery unit (DSU) located within either an acute hospital or a treatment centre serving a population of 300,000. It replaces Health Building Note 52 'Accommodation for day care', Volume 1 – 'Day surgery unit' (NHS Estates 1993).
- 1.2 This document uses the following accepted definition of day surgery:

"Day surgery is the admission of patients to hospital for a planned surgical procedure, returning home on the same day. 'True day surgery' patients are day case patients who require full operating theatre facilities and/or a general anaesthetic, and any day cases not included as an outpatient or endoscopy." *Day Surgery: operational guide* (DH 2002). See also BADS Directory of Procedures (British Association of Day Surgery 2006).
- 1.3 The guidance assumes that day surgery services are provided by a dedicated DSU with its own pre-operative, intra-operative and post-operative facilities, administrative office, patients' and staff facilities.
- 1.4 The DSU described in this guidance comprises an admission suite, four operating theatres, two recovery areas (including the discharge lounge) and facilities for staff support.
- 1.5 Most of the accommodation described should be integral to the DSU. However, in refurbishments, education, training and similar accommodation may be shared with in-patient surgical facilities. See [paragraph 3.2](#) for functional relationships of the spaces within a DSU.
- 1.6 Endoscopy facilities should be separate from day surgery facilities in larger acute hospitals serving a population of circa 300,000. However, in smaller acute hospitals or treatment centres endoscopy may be co-located with day surgery sharing, for

example, recovery and staff facilities. See also Health Building Note 52 Volume 2 – 'Endoscopy unit' (NHS Estates 1994).

## Impact of service delivery on facilities

- 1.7 There are several service delivery factors that will impact on the design of a DSU.

## The changing workforce

- 1.8 The NHS Changing Workforce Programme (CWP) has led to increased numbers of people working in different roles within a DSU.
  - The introduction of specialist practitioners and physician assistants places additional demands on the facilities required for surgery. The numbers are set to increase significantly from 2006, some of whom will work under the supervision of anaesthetists and surgeons. Anaesthetic rooms should be retained if this improved model of service delivery is to succeed.
  - For further information consult The National Association of Assistants to Surgical Practice (NAASP), the Royal College of Surgeons (RCS), the Royal College of Nursing (RCN) and the Association for Perioperative Practice (AFPP).
  - Pharmacists and other healthcare professionals, including physiotherapists, are spending increasing amounts of time supporting post-operative patients in DSUs.
  - Greater provision of education and training facilities within a DSU will be required, as continuing professional development (CPD) is now mandatory for all NHS staff. See DH Agenda for Change 2005.
  - Junior surgeons and anaesthetists are now required to undergo part of their training in a DSU where they are supervised by consultant surgeons and anaesthetists. This may have implications for staff rest rooms, office space and seminar rooms.

## Pre-operative assessment

- 1.9 Patients should undergo an assessment a few days prior to their scheduled date for surgery. Assessment may be undertaken in an out-patients department, in a primary healthcare centre or in a DSU. The Association of Anaesthetists of Great Britain and Ireland (AAGBI) “believes there are advantages if it is performed within the facility where the day surgery will take place. Patients and their relatives then have the opportunity to become accustomed to the environment and to meet some of the staff that will provide their future care” (‘Day surgery’, AAGBI 2005). Furthermore, in line with the guidelines issued by NICE in 2003, ‘Preoperative tests – the use of routine preoperative tests for elective surgery’, it is recommended that “arrangements should be put in place for all appropriate tests (for example blood tests, ECG and X-ray referrals) to be carried out at the time of the pre-assessment . . . with a mechanism in place to review all investigations undertaken”. A number of hospitals now include MRSA screening as part of the pre-operative assessment.
- 1.10 Pre-assessment, where undertaken in a DSU, will have an impact on space requirements. In a DSU with four operating theatres the number of people arriving for pre-assessment may be as many as 60 per day. See [paragraphs 3.22–3.25](#) for further details about pre-assessment facilities.

## Children

- 1.11 The Paediatric Forum of the RCS of England estimates that at least 75% of children requiring surgery are suitable for treatment as day cases (RCS 2000). However, children and young people should only be treated in a DSU that is designed to cater for their needs.
- 1.12 ‘Getting the right start: National Service Framework for Children, Young People and Maternity Services: Standards for hospital services’ (DH 2003) sets out clear standards for the care of children and young people in hospital. One of the standards is specific to the built environment: “Children are given the best possible care and treatment in an age-appropriate way and a suitable environment (‘safe and well suited to the age and development of the child or young person’).”
- 1.13 ‘Day Surgery: operational guide’ points out that day surgery is ideal for children, as overnight admission is often the most distressing part of visiting hospital for them. Day case surgery can

be carried out to a safe standard on a site where there is no paediatric service, but only if staff are able to deliver paediatric life support, and if a neighbouring children’s service takes formal responsibility for the children being managed there (see ‘Children’s Surgery – A First Class Service’, RCS 2000).

- 1.14 Children should be cared for pre- and post-operatively in areas that can be segregated from adult patients. Registered children’s nurses and play specialists should be available, and the environment should be child-friendly. See also [paragraphs 2.33–2.36](#).

## Imaging

- 1.15 Increasingly, imaging is part of the surgical procedure. Existing theatre technology, involving TV cameras, ultrasound and X-ray fluoroscopy, is also developing rapidly.
- 1.16 Changes in imaging practice will impact on theatre space and other requirements in a DSU and should be considered at planning stage.
- 1.17 See Health Building Note 6 – ‘Diagnostic imaging’, Volume 2 – ‘PACS and specialist imaging’ (NHS Estates 2002).

## National Programme for IT in the NHS

- 1.18 ‘Connecting for Health’ is delivering the National Programme for IT to bring modern computer systems into the NHS that will improve patient care and services. This is likely to have an impact on facilities in the near future (<http://www.connectingforhealth.nhs.uk/>).

## Independent healthcare facilities standards

- 1.19 Independent healthcare is guided by the ‘National Minimum Standards and Regulations’ published under Section 23 (1) of the Care Standards Act (2000).
- 1.20 The standards are divided up into eight core and seven service-specific sections which should be addressed by the independent healthcare provider in order to “ensure appropriate safeguards and quality assurance for their patients”. Section 5, core standards C17-10 gives details of standards required for “premises, facilities and equipment” and section 9, acute standard A20 of the same publication covers surgical facilities.

1.21 Private and Voluntary Regulation 25 'Fitness of premises' requires the independent healthcare provider to ensure premises are suitable for purpose. Regulation 15 'Quality of treatment and other service provision' requires the independent healthcare provider to reflect published research evidence and guidance. Whilst Health Building Notes are written in particular for the guidance of the NHS, independent healthcare providers are encouraged to reflect the principles of this guidance in their facilities.

## 2 General functional and design considerations

- 2.1 This chapter gives guidance on general functional design considerations related to all components of a day surgery unit.
- 2.2 This Health Building Note takes account, as far as possible, of statutory requirements and regulations available at the time of publication. References are made to Acts and Regulations throughout the guidance, where relevant.

### Relationships with other services

- 2.3 DSUs in acute hospitals should have easy access to sterile services, imaging departments and pharmacy. Strategies should be in place to transfer patients to overnight accommodation if required.

### Capacity planning

- 2.4 The number of operating theatres required in a DSU can be established using the method outlined in [Appendix 1](#). The method also provides an estimate of unused capacity. However, [Appendix 1](#) focuses on annual caseload, and planning teams should be mindful of the case mix when scheduling theatre usage by specialty.

### Infection control

- 2.5 Infection control teams should be consulted from the outset of any new build or renovation project, and should remain integral planning team members throughout. In a new-build project this means that they should be members of the team that develop the business case from its inception. Detailed information about the role of the infection control team in the built environment can be found in 'Infection control in the built environment' (NHS Estates 2002). This document should be the first point of reference for planning teams with regard to infection control and its relation to design. A new Code of Practice entitled 'Code of practice for the prevention and control of healthcare-associated infections 2006' has been introduced for NHS organisations. The Code itself does not have statutory force. However, failure to comply with

the Code may lead to a breach of the Health Act 2006 and, ultimately, action being taken by the Healthcare Commission.

### Decontamination

- 2.6 Improving and sustaining re-usable medical device decontamination services forms an important component of the Chief Medical Officer's strategy to combat healthcare-associated infection (HCAI); this strategy is included in the reports 'Winning Ways' and 'Getting Ahead of the Curve'.
- 2.7 Healthcare organisations are required to provide a safe decontamination service that generates a clean and sterile product and is embedded as part of the service culture in support of successful clinical outcomes and the associated well-being of patients and staff.
- 2.8 The risk of encountering healthcare-associated infection (HCAI) exists in all sectors of the healthcare economy.
- 2.9 Healthcare organisations will need to have in place modern services and, where relevant, facilities that ensure decontamination is achieved in compliance with current DH policy.

### Protecting a patient's privacy and dignity

- 2.10 Some surgical operations necessitate exposing patients in ways that they find distressing and embarrassing. Protecting their privacy and dignity is therefore a critical function. A number of measures can be taken to minimise the invasion of privacy, including the design and fitting of the building. All areas of the unit should be considered including pre-assessment, admission suite, operating theatre suite and recovery areas. The design of surgical facilities should incorporate strategies that allow control of sound and vision.
- 2.11 It is DH policy to separate men and women patients whenever possible, as mixed-sex facilities compromise privacy and dignity.

## Cultural considerations

- 2.12 In a multi-cultural society there are a number of religious practices that should be taken into account when caring for people of differing ethnic backgrounds (Murray Parkes et al 1996, Neuberger 2004).
- 2.13 Some of these practices impact on the built environment, such as the need in some cultures to segregate males from females. This requirement assumes a particular significance in the recovery unit where it should be possible to screen every patient, regardless of their culture, from view.
- 2.14 Most trusts now have a document that outlines protocols for cultural diversity within our population. Local planning teams should utilise these at the initial planning stage.
- 2.15 The cultural needs of staff should also be taken into consideration at the initial planning stage. Catering facilities also assume greater significance if there is a requirement to separate certain types of food, particularly meat, fish and dairy products, in the preparation, cooking and storage process. Local knowledge of the workforce and patient population will determine their specific requirements.
- 2.16 There may be a need for bilingual signage (for further advice see 'Wayfinding', NHS Estates 2005).

## Access for disabled people

- 2.17 Planning teams should meet the provisions of the Disability Discrimination Act (2005) and the Building Regulations (2000). For guidance see 'Approved Document M (2004): Access to and use of buildings'. See also BS 8300:2001 'Design of buildings and their approaches to meet the needs of disabled people – Code of Practice' (2005 edition).

## Lifting and moving patients

- 2.18 Manual handling regulations should be considered when designing surgical facilities, with particular regard to lifting and turning patients and moving heavy equipment. See also 'Management of Health & Safety at Work Regulations 1999'.
- 2.19 There is an increased requirement for lifting and handling equipment in view of the number of obese patients. Lifting or transferring unconscious patients (obese or otherwise) poses a particular challenge for the staff working in an operating department. Patients (most of whom are supine

while others are nursed prone in an operating department) will require transfer to and from the operating table with the aid of lifting equipment. The recovery unit will also require lifting and turning equipment.

- 2.20 Consideration should be given to the use of hoists in the recovery unit and a crane system in the operating theatre. Crane lifting systems need to take account of the other ceiling-mounted equipment and structure, for example laminar flow style ventilation canopies and ceiling-mounted microscopes and the potential obstructions to the lifting system. See also [paragraph 3.107](#).

## Storage

- 2.21 The amount of storage space required will vary according to the clinical specialty.
- 2.22 Adequate storage space should be ensured at planning stage for items including spare operating tables, additional operating table furniture, anaesthetic machines, mobile microscopes, laser equipment, surgical robots and their supplementary equipment.
- 2.23 An increasing number of UK hospitals have installed the "just-in-time" storage system, which involves a large centralised store on each site where all non-specialised clinical consumables are kept for regular distribution on a "top-up" basis to the different departments when required.
- 2.24 Where "just-in-time" (JIT) storage systems are used, agreement should be reached at the planning stage about the minimum level of consumables that should be stored in the department.
- 2.25 Where a DSU does not have access to a large centralised store, adequate storage will be required in the unit for it to be entirely self-sufficient. Operational disasters can ensue if storage is not properly planned.

## Environmental impact/sustainable design

- 2.26 The environmental impact of any new healthcare facility is important and is an integral part of NHS responsibility for the health and well-being of the community. Care should be taken to contain the environmental impact of activities to a practical minimum.
- 2.27 Surgical facilities annually produce a large amount of waste. Much of this is categorised as clinical

waste and should be treated in an appropriate manner as a legal requirement. See the Hazardous Waste (England and Wales) Regulations 2005 and the List of Wastes (England) Regulations 2005. These regulations impact on all generators and managers of hazardous waste, including NHS trusts and the NHS supply chain. See also Health Technical Memorandum 07-01 – ‘Safe management of healthcare waste’ (DH 2006), which provides a framework for best practice waste management to help healthcare organisations to meet legislative requirements.

- 2.28 A significant amount of waste is also generated that is classified as non-clinical waste. This should be recycled where possible.
- 2.29 For detailed guidance on all aspects of sustainability see the DH website.

## Creating the environment for care

- 2.30 An increasing number of patients undergo surgery without a general anaesthetic, remaining conscious throughout the entire procedure, and hence remain aware of their surroundings even in the operating theatre.
- 2.31 Designers should aim to create an environment that is conducive to making patients feel at ease and giving them confidence, thus aiding the healing process. At the same time it should facilitate efficient working, and contribute to staff morale.
- 2.32 To assist this complex design process, the Achieving Excellence Design Evaluation Toolkit (AEDET) has been developed in collaboration with the Commission for Architecture and the Built Environment (CABE) and the Construction Industry Council (CIC). This is downloadable from the DH website.

## Child-friendly environments

- 2.33 The ‘Acute hospital portfolio review: Day surgery’ (Healthcare Commission 2005) and the Kennedy Report (DH 2002) recommendations for children’s services have implications for all theatre and surgical facilities; however, in smaller hospitals a dedicated children’s unit within day surgery is not viable. One option that would meet the recommendations is to accommodate children pre- and post-operatively on a children’s ward, as described in Health Building Note 23 – ‘Hospital accommodation for children and young people’

(NHS Estates 2005), where the DSU is an integral part of an acute hospital.

- 2.34 A second option is to dedicate specific operating sessions for children; however, it is unlikely that all operating theatres could be so utilised, and segregation would not be achievable without providing dedicated children’s facilities.
- 2.35 Whatever solution is provided, it will still be necessary to ensure that children and young people at all times remain separated from adult patients. It should also be taken into account that parents or carers will be with them, for example in the anaesthetic room and recovery unit.
- 2.36 For further information see ‘Friendly healthcare environments for children and young people’ (NHS Estates 2003) and Health Building Note 23.

## Art in hospitals

- 2.37 Artwork is beneficial to people of all ages, providing it is selected with care and is appropriate to the environment.
- 2.38 Consultation should be made with the infection control team prior to selecting artwork in a DSU, as it is essential to ensure that it complies with cleaning and disinfection policy.
- 2.39 For further information see ‘The art of good health: using visual arts in healthcare’ and ‘The art of good health: a practical handbook’ (NHS Estates 2002).

## Natural lighting

- 2.40 Natural light is of particular importance to the well-being of patients and staff. All surgical facilities, where possible, should have natural daylight directly from windows or by means of borrowed light from windows across corridors. When selecting glazing, protecting the privacy and dignity of every patient is paramount (see [paragraph 2.10](#)).
- 2.41 The majority of the staff are unable to leave the department once they are on duty and, in a unit without windows, they may not see natural light for a number of days, particularly during the winter months. Lack of natural light is one of the most common complaints made by staff about their working environment.
- 2.42 Where natural light is not available through conventional means, consideration should be given to using recently-developed technology, which

allows natural light to be ducted to internal rooms even in multi-storey buildings.

- 2.43 Where possible, the following areas within the department should have natural light:
- operating theatres;
  - recovery unit;
  - staff rest room.

## Artificial lighting

- 2.44 The positioning of artificial lighting should be carefully considered.
- 2.45 Ceiling-mounted lighting should not be installed directly overhead in patient areas in the operating department. An awake or lightly-sedated patient cannot avoid the glare when lying on a trolley or bed. If ceiling-mounted fittings are used, they should be two-directional so that they can be adjusted to prevent unwanted glare. The lighting should be dimmable without flicker. Artificial lighting should include clinical task lighting in anaesthetic rooms and at each bed space in the recovery unit. This is essential for continuous clinical assessment of a patient's colour and general physical status.
- 2.46 In endoscopic procedures and minimally invasive surgery the main lighting is often reduced to facilitate the viewing of the visual display screens. See [paragraph 6.110](#). Adequate arrangements should be made for the illumination of the anaesthetic machines and monitors.
- 2.47 In the recovery unit the clinical task lighting individual to each bed space can be part of the medical supply unit. Each light should be dimmable from the patient's bedside and also from the communications base.
- 2.48 Floor or low-level lighting is an essential resource in order that the clinical staff can monitor patient equipment situated at a low level. The light can also be used to aid movement around the recovery bed space at night.
- 2.49 Artificial lighting, as well as providing levels of illumination to suit activities, makes an important contribution to interior design. Designers should

develop lighting schemes that will provide high-quality light for clinical activities, with non-clinical and soft environment lighting in as many spaces as possible.

- 2.50 For further information see 'Lighting and colour for hospital design' (Dalke et al, 2004). See also [paragraphs 6.103–6.111](#).
- 2.51 For further details of statutory requirements for lighting in the workplace see the Workplace (Health, Safety and Welfare) Regulations 1992.

## Wayfinding

- 2.52 On-call clinical staff frequently work in a variety of departments, and in an emergency situation it is essential that they can identify the correct venue immediately. Each operating theatre, anaesthetic room and recovery bed space should be clearly numbered to avoid any possible confusion.
- 2.53 For further guidance see 'Wayfinding'.

## Activity DataBase

- 2.54 The Activity DataBase (ADB) data and software assists project teams with the briefing and design of the healthcare environment.
- 2.55 Room data sheets provide an activity-based approach to building design and include data on personnel, planning relationships, environmental considerations, design character, space requirements and graphical layouts. Schedules of equipment/components are included for each room, which may be grouped into ergonomically arranged assemblies.
- 2.56 Schedules of equipment can also be obtained at department and project level.
- 2.57 Fully loaded drawings may be produced from the database.
- 2.58 Reference data is supplied with ADB, which may be adapted and modified to suit the users' project-specific needs.
- 2.59 For further information, refer to the ADB section available from a link on the Department of Health website (<http://www.adb.dh.gov.uk>).

## 3 Specific functional and design requirements

3.1 Most of the accommodation described in this guidance should be integral to the DSU. However, in refurbishments, education, training and similar accommodation may be shared with in-patient surgical facilities. **Figure 1** shows the patient journey through the facility with the functional relationship for each area.

### Clustering of accommodation

3.2 In a DSU serving a population of 300,000 people the following accommodation will be required:

- Reception and waiting area;
- Pre-assessment (optional accommodation);
- Six admission suites with en-suite changing rooms;
- Sub-wait;
- Four anaesthetic rooms;
- Four operating theatres (with associated ancillary accommodation);
- Post-anaesthesia care unit (PACU) with eight bed spaces plus one for flexibility that can be a critical care bed space (with associated ancillary accommodation);
- Second stage recovery unit with 16 spaces (with associated ancillary accommodation);
- Discharge lounge with eight reclining chairs;
- Interview room;
- Staff support facilities (changing facilities, rest rooms, reporting room);
- Storage areas;
- Pharmacy storage;
- Disposal areas;
- Seminar room;
- Administrative offices.

### The patient journey

3.3 The design of the facility should facilitate uninterrupted patient flow. On their operation day, patients make the following journey through a DSU:

- main reception area;
- admission suite;
- sub-waiting area;
- anaesthetic room;
- operating theatre;
- post-anaesthesia care unit (PACU);
- second-stage recovery;
- discharge lounge.

3.4 The operating theatres should be on the same floor as the admission suite and recovery areas.

### Main entrance

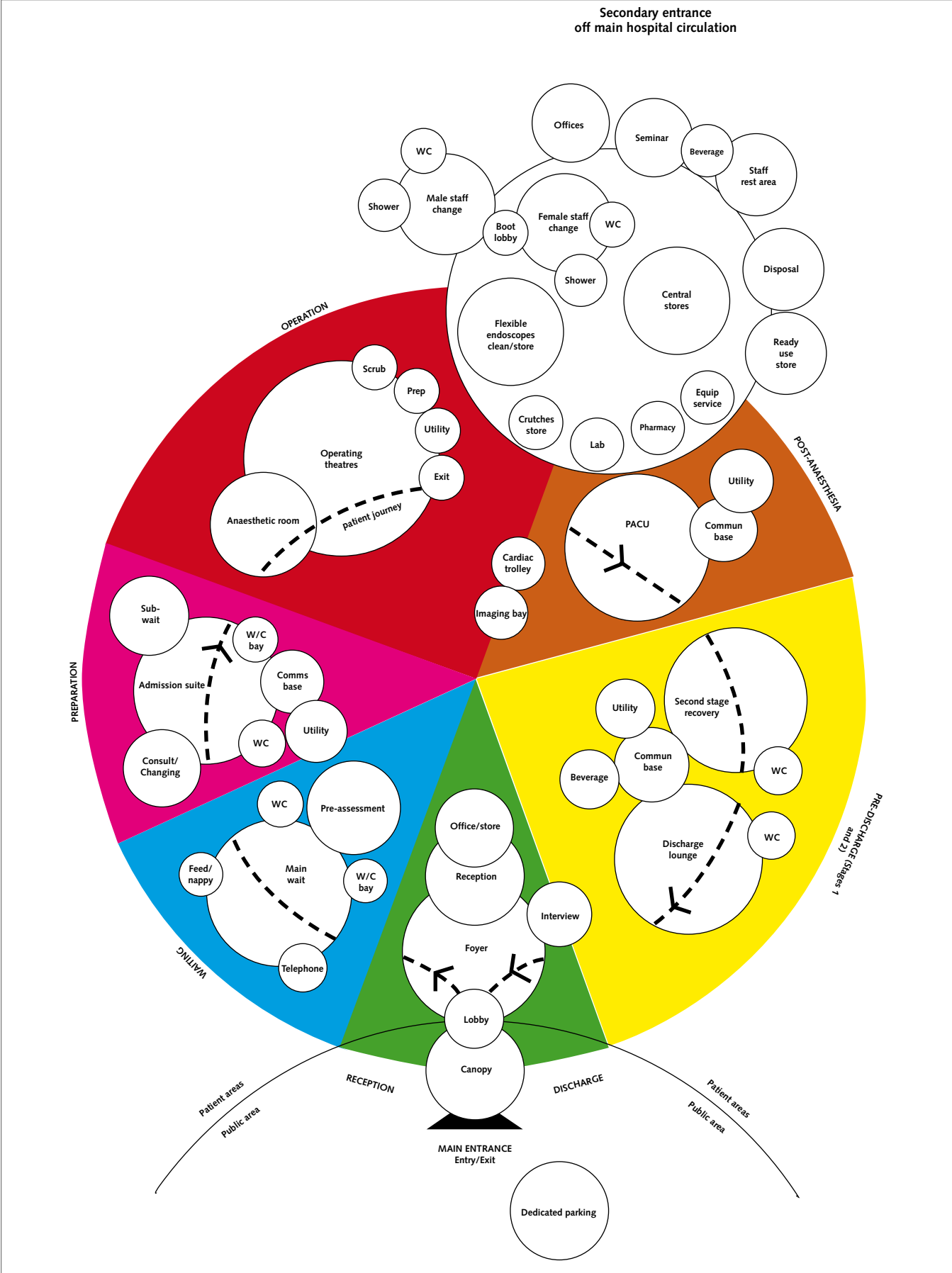
3.5 In order to establish a clear, unique identity within the hospital, a DSU should have its own main entrance.

3.6 There are two alternative settings:

1. a main entrance to the DSU directly accessible at road level. The entrance should be fitted with a canopy and draught lobby. It should also have a designated set down/pick-up area and nearby parking facilities with an appropriate percentage of accessible parking bays;
2. the DSU may be accessed from the hospital street within an acute hospital. The entrance should be clearly identified from the hospital street. Dedicated car parking spaces will still be required.

3.7 All visitors will enter the unit through the main entrance and report to reception. An open-door policy is dependent on having a member of staff monitoring the main entrance and the number of people requiring access throughout the day.

Figure 1 Functional relationships within a DSU



However, in order to enhance security, a CCTV system should be linked to the reception desk and reception staff should carry personal alarm transmitters.

- 3.8 A second entrance is required for staff and supplies, where a programmable close proximity card, transponder or similar systems should be fitted. Security measures should not inhibit emergency escape; see Firecode.
- 3.9 The second entrance in an acute hospital will also be used for the admission of patients to in-patient wards, where necessary, and for the access and return route for child patients to and from the day care ward of the children's department. CCTV will be required here.
- 3.10 Both entrances should be fitted with electronic automatic double doors. The doors should be able to revert to manual control or fail safe in the open position in the event of a power failure. There are a number of options for controlling the opening of

the automatic doors, and the preferred option should not interfere with the security requirements.

- 3.11 Corridors should be wide enough to allow two wheelchairs or two trolleys and accompanying equipment and staff to pass simultaneously.

## Reception

- 3.12 Reception areas should be warm, welcoming and well lit, and suitable for use by all. See 'Welcoming entrances and reception areas' (NHS Estates 2004), 'Friendly healthcare environments for children and young people' and Health Building Note 23.
- 3.13 The reception desk should be located so that it commands a clear, unobstructed view of the main entrance and waiting room and the patient entrance to the clinical area.
- 3.14 The design of the reception desk should be of a high quality and allow access for disabled people.
- 3.15 Secretarial support staff should be accommodated in an administration suite behind the reception



Reception at Gateway Surgical Centre



Main reception area at North Hampshire Diagnosis and Treatment Centre

area. Space should be provided for photocopying, faxing, printing equipment and the disposal of confidential waste paper etc. In the absence of computerised medical records, a secure records store will be required.

- 3.16 The reception desk should have a direct computer link to the whole hospital system as well as each admission suite in order to transfer electronic patient notes, where this system is used, and other information.

## Waiting area

- 3.17 The waiting area should be large enough to accommodate up to 20 people. Appropriate décor and natural daylight should create a calm and relaxing atmosphere. Different types of seating are required and should include those suitable for both older people and children. Space should be available for wheelchair users and those using walking aids.
- 3.18 The furnishings and fittings should be easy to clean, disinfect and maintain; see 'Infection control in the built environment' and Firecode Health Technical Memorandum 05-03 Part C – 'Textiles and furnishing' (forthcoming).
- 3.19 An infant feeding and nappy changing room, and a wheelchair parking bay, will be required. Public telephones and at least one WC should be wheelchair-accessible.
- 3.20 Secure doors are essential between the waiting area and the clinical areas in order to prevent unauthorised staff or visitors gaining access.
- 3.21 It is assumed in this guidance that all admissions, including children, for day surgery will arrive in tranches proceeding directly to the admission suite,

as recommended for best practice by the HCC (2005). This negates the need for a children's play area, with an associated buggy and pram store; however, the decision to include or omit remains a local option.

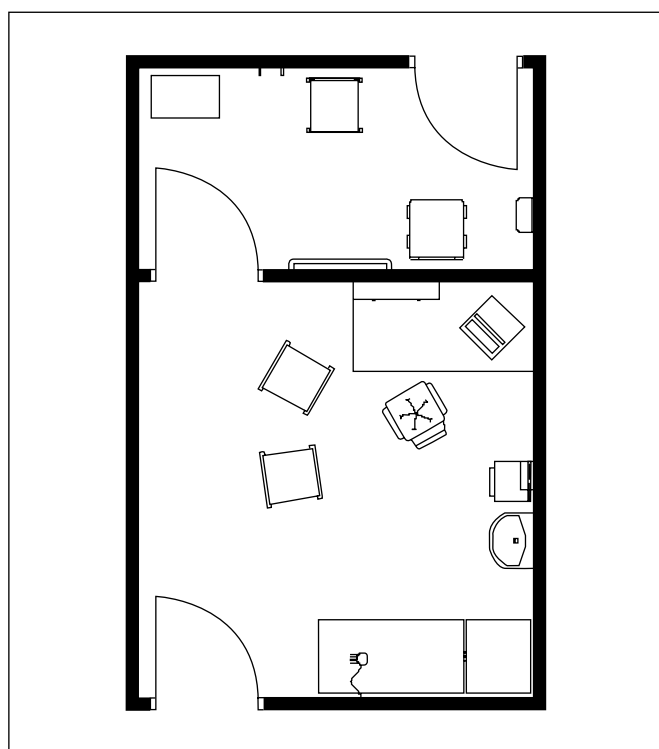
## Pre-assessment facilities (optional)

- 3.22 A person's suitability for day surgery is usually assessed a couple of weeks in advance of the planned admission date. A number of day surgery units have dedicated consulting/examination rooms located within the unit for the purpose of pre-assessments, while others do not. If consulting/examination rooms are included for pre-assessments, which is the Association of Anaesthetists' preferred option, the waiting area will need to be increased to accommodate these additional patients.
- 3.23 These rooms are not designed for same day admissions.
- 3.24 Each consulting/examination room should contain:
- examination couch with wipeable surface, accessible from both sides;
  - clinical wash-hand basin with non-touch taps;
  - wall-mounted antibacterial hand rub;
  - wall-mounted liquid soap, apron and gloves;
  - wall-mounted adjustable examination luminaire, which should have a smooth wipeable surface without crevices;
  - wall-mounted auroscope and ophthalmoscope;
  - mobile ECG;
  - mirror;
  - desk with a computer workstation for recording clinical information and viewing digital images, with an adjustable-height office chair; the computer requires an Internet connection and a printer.
  - a stainless steel dressings trolley;
  - two stackable plastic wipeable upright chairs;
  - personal alarm transmitters for the security of staff;
  - pedal-operated bin holders for disposal of clinical and general waste;
  - wall-mounted sharps box.

3.25 The consulting/examination room will require access to a specimen WC and utility room with slop hopper for the testing and safe disposal of urine samples. The utility room and WC can be shared with the admission suite. The laboratory sited within the DSU can be accessed for near-patient testing as and when required. See paragraphs 3.161–3.163.

## Admission suite

**Figure 2 Admission suite comprising admission and examination room with integral changing room**



3.26 Activities that take place in this suite include formal identification of patient, confidential discussion, attaching identification bands, marking the operation site, and patient changing.

### Admission and examination room

3.27 Each admission and examination room requires the following:

- clinical wash-hand basin with non-touch taps;
- wall-mounted antibacterial hand rub, liquid soap, apron and gloves;
- desk with a networked computer terminal and internal telephone;
- an examination couch;
- access to a WC and dirty utility, which can be shared with the pre-assessment facilities if provided (see paragraph 3.25).

3.28 All doors should be lockable and wheelchair-accessible. Patients will enter via the main waiting area.

### Changing room

3.29 For best practice, each admission and examination room should have an integral changing room. The room should be large enough to accommodate two people (in case the patient requires help with changing) and should be wheelchair-accessible. Patients will exit the admission and examination room from the changing room into a sub-waiting area.

3.30 Outdoor clothing will be transferred in individualised secure boxes to the second-stage recovery unit clothing store. Patients' personal effects such as spectacles, hearing aid and false teeth will only be removed once they are in the anaesthetic room. These effects will be stored in a bag attached to the patient's dedicated trolley.

### Sub-waiting area

3.31 Patients arriving in this area will be greeted by a member of staff and directed where to sit.

3.32 There are a number of options relating to patient movement and where patients may wait, once changed and prepared for surgery. Privacy and dignity, cultural sensitivities and operating lists that include men, women and children collectively suggest that the best design solution will be dedicated individual spaces for every patient. This solution ensures maximum access and flexibility without compromising the dignity of patients. Each space will require two chairs, one of which should be a recliner. There should be provision for up to six patients.

3.33 As a project option, separate male, female and children's sub-wait areas could be provided.

3.34 A staff base will be required adjacent to the sub-waiting area. A computer link should be provided between the admission suite and the operating department.

3.35 Accompanied by a member of staff, patients will then walk, or be taken by wheelchair, to the anaesthetic room.

- 3.36 A wheelchair bay should be provided in close proximity.
- 3.37 A unisex wheelchair-accessible WC should be provided in the sub-waiting area.

## Anaesthetic room

- 3.38 For safe practice, many patients are induced under general anaesthesia once they are positioned on the operating table within the theatre. Other clinical interventions, such as attaching monitoring lines and the insertion of intravenous infusions, initiating regional or local anaesthesia, also take place in the theatre.
- 3.39 Taking into account the above, it is still recommended that each day surgery theatre has its own anaesthetic room. Day surgical procedures can be of short duration and the throughput of patients per session rapid. The provision of an anaesthetic room will enhance utilisation of the operating theatre. Other fundamental considerations such as noise reduction, a calm, undisturbed environment, and maintenance of patient privacy are also more easily maintained (see Health Technical Memorandum 08-01 – ‘Acoustics’, forthcoming). See also [paragraphs 5.8–5.14](#).
- 3.40 The room should be large enough to accommodate at least four people as well as the patient, along with space for the storage of elective and emergency anaesthetic equipment.
- 3.41 It is essential to be able to access the patient from all sides. Each anaesthetic room should be identical, and not handed. It is preferable to have all the medical gas services, air, nitrous oxide, oxygen, vacuum and gas scavenging outlets wall-mounted. Ceiling-mounted medical supply units are not recommended as, in the view of the Association of Anaesthetists, access to the patient can be impeded in a relatively small space. To meet COSHH requirements, low-level extraction should be provided adjacent to the anaesthetic gas outlet (see Health Technical Memorandum 03-01 – ‘Specialised ventilation for healthcare premises’, forthcoming).
- 3.42 One set of double doors should open from the corridor into the anaesthetic room, with another set opening into the operating theatre. Anaesthetic rooms can be sited at right-angles to the operating theatres, therefore the entrance doors to the theatre do not have to be directly opposite the anaesthetic room entrance doors.
- 3.43 Installing either sliding or automatic doors is a project option. Each set of doors should be wide enough to admit the patient and associated equipment, minimum clear opening width of 1600 mm, and close quietly. Obscurable vision panels are required in both sets of doors. An electronic “in-use” sign should be located outside the main corridor entrance into each anaesthetic room. It should be possible to stand automatic doors in the open position.
- 3.44 A lockable controlled drugs cupboard is required in each anaesthetic room. Local policy will determine where emergency drugs are conveniently stored.
- 3.45 Storage units should not impinge on the working area required during the preparation of the patient.
- 3.46 An adjustable ceiling-mounted examination lamp is required for clinical procedures. In addition, a ceiling-mounted hoist should be supplied in order that staff can assist patients onto trolleys without incurring back injury. Ceiling reinforcement may be required, and the hoist should not conflict with the ceiling-mounted examination lamp.
- 3.47 A wall-mounted clinical wash-hand basin with non-touch taps, antibacterial hand rub and liquid soap should be provided. It should be sited at the end of the room opposite the foot of the couch.
- 3.48 All work surfaces should be lit. It should be possible to vary the level of general lighting.
- 3.49 A radio-controlled clock with sweep seconds hand should be located on the wall above the patient’s feet (see also [paragraph 6.121](#)).
- 3.50 When a child is undergoing a procedure, the anaesthetic room is the final destination for the parents escorting their child. Every anaesthetic room should be child-friendly (for specific guidance see ‘Friendly healthcare environments for children and young people’).
- 3.51 Patients of all ages report less anxiety, and are physiologically more stable, if they can listen to music pre-operatively. A music system may be provided for this purpose (see [paragraph 6.123](#)).
- 3.52 A wall-mounted push-button staff emergency call with re-set and indicator lamp should be located in each anaesthetic room, linked to the recovery unit and the staff rest area.
- 3.53 A wall-mounted “repeat” staff emergency call lamp should be located outside each anaesthetic room.

- 3.54 A telephone capable of ring or silent/light indication should be appropriately located (see [paragraph 6.129](#)).
- 3.55 It is recommended that tilting/reclining trolleys be used throughout the unit to aid recovery and obviate the need for reclining chairs in second-stage recovery.
- 3.56 A wall-mounted sharps box will be required.

## Scrub and gowning room (optional locations)

- 3.57 There are three project options for the location of the scrub area:
  1. dedicated scrub and gowning room for each operating theatre with sufficient space for a minimum of three people;
  2. shared scrub and gowning room between two operating theatres with sufficient space for six people;
  3. recessed scrub-up and gowning area in each theatre with sufficient space for a minimum of three people.
- 3.58 Options one and two should be accessible directly from the theatre corridor. In option three, in order to prevent water contamination, it is essential that the scrub area is recessed and located away from the area containing laid-up instrument trolleys.
- 3.59 The scrub room should be large enough to enable several staff to scrub, gown and circulate concurrently without risk of contamination from each other or from the surrounding fittings. Space should also be allowed for the siting of wall-mounted glove dispensers and floor-sited disposal bins.
- 3.60 The stainless steel sink and furniture should be at a height that facilitates hand- and arm-washing. The design and drainage should ensure that the floor does not become wet during scrub-up procedures. The floors should be slip-resistant.
- 3.61 Non-touch taps, scrub solution and nailbrush dispensers are required. Sensor taps are available that allow a sufficient run-on time for the scrub protocol to be completed. An access panel should be sited to the side of the stainless steel scrub sink to provide ease of maintenance of the thermostatic mixer valves and sensor controls to the taps. Wall-mounted paper towel holders should also be provided.
- 3.62 The rim of the scrub sink should not have an internal lip as this is a control of infection concern, as contaminated water during the scrub procedure drains from the elbows back into the sink. The area beneath the rim attracts debris, with a potential risk of infection. The splash-back should be a single waterproof sheet or seal mounting with polyurethane or wall glaze.
- 3.63 For further details on the specification and fitting of scrub sinks see Health Technical Memorandum 64 – ‘Sanitary assemblies’ (DH 2006).
- 3.64 Removable shelving is required for the storage of gown packs. Most theatres now use a gowning trolley, which should not be stored beneath the storage shelves. Another project option is the installation of an easily cleanable shelf/work surface, for example laminate, on which to open the gowns and packs. This should be at a height to facilitate gowning and gloving, and wide enough to allow gown packs to be fully opened.
- 3.65 Foot-operated quietly closing disposal bins for brushes and wastepaper should be provided.
- 3.66 It is not essential to have a door between the scrub room and theatre. If one is provided, it should be an automatic self-closing door to prevent scrubbed staff from re-contaminating their hands.

## Preparation room

- 3.67 The preparation room is used for preparing sterile instrument trolleys. Storage space will be required only for lotions, suture materials, sterile fluids, instrument and supplementary packs required for an operating list.
- 3.68 Each day surgery theatre should have its own dedicated, integral preparation room. Theatres should not share preparation rooms due to the potential risk of cross-infection via ventilation airflows.
- 3.69 In addition, due to the rapid turnover of patients, a day surgery preparation room should be large enough to accommodate a number of instrument trolleys and scrub teams and still maintain a sterile field.
- 3.70 There will be a minimum of two members of staff (scrub and circulating personnel) in this area. The work surfaces should be of sufficient height to store 870 mm high trolleys beneath in order to conserve space.

- 3.71 The layout of the preparation room requires special consideration. Staff should be able easily to locate items. The storage for sterile instrument trays, supplementary packs and other items should be common to all rooms. Consideration should be given to the best position for the work surface and heated lotion cabinet.
- 3.72 Direct access will be required from the preparation room to the operating theatre and from the preparation room to the corridor. The doors between the preparation room and the operating theatre and the preparation room and the corridor should be wide enough for instrument trolleys to enter without fear of contamination.
- 3.73 A wall-mounted sharps box is required.

## Operating theatre

- 3.74 For maximum flexibility, day surgery operating theatres should meet the same space requirements as in-patient operating theatres. Not all theatres need to be fully equipped for minimally invasive surgery. As the number of minimally invasive interventions is increasing year on year, however, it is recommended that all the medical services are installed from the outset so that every theatre can be reconfigured in the future.
- 3.75 Day surgery operating theatres should be located on the same floor as the admission suite and recovery areas. In refurbishments it may not be possible to locate the operating theatres and second-stage recovery and discharge lounge on the same floor. If this occurs, a dedicated lift should be provided.

## Standardised equipment

- 3.76 Each operating theatre requires the following minimum standardised services at the operating table. For maximum flexibility, medical gas and operating table electrical supplies should be located within two medical supply units, one for surgical and one for anaesthetic:
- 12 socket-outlets and connection to the UPS/IPS systems (see paragraphs 6.88–6.102), where risk considerations in terms of patient safety dictate;
  - Patient Administration System (PAS) networked to hospital mainframe;
  - 1 oxygen outlet;
  - 1 nitrous oxide outlet;

- 1 medical air outlet;
- 1 surgical air outlet;
- 2 medical vacuum points;
- anaesthetic gas scavenging points.

In addition a CO<sub>2</sub> outlet may be provided where there is a specific need. This could be alternatively provided on the medical supply unit described in paragraph 3.77.

- 3.77 The following items may be located on each medical supply unit:
- anaesthetic machine located on anaesthetic medical supply unit only;
  - flat-screen monitor and recording system for patient records;
  - 2 infusion pumps;
  - 3 syringe pumps;
  - blood warmer;
  - warm air patient warmer;
  - DVT prophylaxis system.
- 3.78 The concept of total intravenous anaesthesia is gaining credence. Additional infusion pumps and syringe drivers may be a future requirement.
- 3.79 For maximum flexibility, both medical supply units should be capable of accommodating the anaesthetic machine.
- 3.80 It is recommended that surgical and anaesthetic medical supply units have a tandem articulated pendant to allow cross-over of the arms depending on the procedure. If the surgical unit is provided with a single-arm setup, it is recommended that the arm be installed with a double mount to allow for an additional arm to be installed at a later date.
- 3.81 A wall-mounted sharps box is required.

## Doors within the operating suite

- 3.82 Doors through which trolleys will pass should be wide enough to allow their easy passage with attachments, including sterile drapes, and should be capable of standing in the open position. All doors should be fitted with vision panels capable of being obscured, and have laser-proof blinds. An illuminated “theatre in use” light should be located above each theatre door.
- 3.83 All doors should close quietly. It is recommended that all doors be either automatic swing doors or

automatic sliding doors with power failure to manual.

- 3.84 If manual swing doors are used, care should be taken to prevent the possibility of repetitive strain injuries. A number of the doors to the operating suite will be lead-lined for X-ray purposes and can weigh more than 100 kg per leaf. If the door is not hung correctly with quality stainless steel hinges, to comply with BS EN 1935:2002 minimum grade 13, the misalignment can cause considerable problems to the closer mechanism. The use of a cam-action closer is recommended. These units are adjustable, allowing minimum opening resistance.
- 3.85 When using automated lead-lined doors the critical factor is the weight per leaf. Mechanisms are available that can handle up to 250 kg per leaf. This maximum is application-specific, as a “slide” arm cannot handle as much weight as a “push” arm. If power operators are specified it should be ensured that they do not impede operation if the power supply fails.

### Video equipment

- 3.86 Surgical procedures are frequently video-recorded for litigation and teaching purposes; therefore, at the early design stage the IT requirements should be identified and agreed as part of the whole-hospital policy. All operating lamps should be fitted with provision for a video camera (see paragraphs 6.126–6.127).

### Lighting

- 3.87 Care should be taken when selecting the correct adjustable operating lamp, especially when the theatre has laminar flow style ventilation, to maintain minimal interference with downward airflow patterns (see also paragraphs 6.112–6.118).

### Theatre control panel

- 3.88 Additional facilities, such as lighting controls, double X-ray viewing screens, and a clock with a sweep seconds hand are usually arranged on a theatre control panel where it may easily be viewed by operating staff. Circuit monitoring details should also be present where IPS circuits are provided (see also paragraph 6.119).

### Computer equipment

- 3.89 Each operating theatre should have a clinical workstation and computer terminal so that the staff can retrieve information and input patient data

without leaving the theatre. Touch-screen monitors are recommended as they are easier to clean than keyboards. Alternatively a flat, wipeable keyboard may be used.

- 3.90 If standard keyboards are used for entering patient data they should be protected with a clear plastic cover, which can be cleaned and/or disposed of between each patient.
- 3.91 A work surface is required for the computer and for writing purposes, and should be large enough to accommodate archived material/X-rays and a large operation record book. It should be sited close to the theatre control panel so that the telemetry for the computer can be part of the panel.

### Swab count board

- 3.92 Two dry-wipe wall-mounted marker boards at least 800 mm × 600 mm are required. These boards should be fixed permanently to the theatre wall and be at a height and in a position that facilitates access and visibility during procedures. Weighing scales should be located on a trolley positioned in close proximity to the marker board. Two full-height stainless steel bowl stands should also be available.

### Laser protection

- 3.93 Each theatre requires a warning light located in the corridor above the theatre doors which will be activated prior to laser surgery or X-rays being undertaken.
- 3.94 Staff and the patient should wear appropriate eye protection when laser equipment is in use. The appropriate eye protection should be readily available at the entrance to each theatre.
- 3.95 Operating theatre windows require laser-proof blinds with electrical interlocks to the laser machine.
- 3.96 If laser surgery is being undertaken in the operating theatre it is important that reflective surfaces are kept to a minimum.

### Windows

- 3.97 Whilst it is essential to provide some natural light in operating theatres, there are some instances, for example during laser or urological surgery, when windows need to be blacked-out completely. This can be achieved through the installation of electrically-controlled opaque glass or double-

glazed windows with inset blinds. All windows should be of obscured glass for reasons of privacy.

- 3.98 Windows should be fixed non-openable. This is essential to support the clean environment, and to assist the air-conditioning by maintaining a positive/negative airflow.
- 3.99 See also [paragraph 5.38](#).

### Theatre ventilation

- 3.100 Theatre ventilation is a crucial issue at the initial design stage. The planning team should agree the principle for delivering a clean environment to each theatre.
- 3.101 Further information is given in paragraphs [6.44–6.55](#). See also Health Technical Memorandum 03-01.

### Operating microscopes

- 3.102 Operating microscopes are used in many types of surgery. As different surgical specialties require different types of microscope, each for a limited period during the working week, for maximum flexibility mobile microscopes are usually preferable to those that are ceiling-mounted. If mobile equipment is used, consideration should be given to transportation and storage of these bulky yet delicate instruments.
- 3.103 If a ceiling-mounted microscope is installed, a rigid supporting structure is required, otherwise vibration may occur. The size and weight of the microscope, and the importance of positioning it exactly where it is required, present considerable challenges. A further consideration in this type of microscope is the downtime of the operating theatre when it is being maintained.

### Background music system

- 3.104 Many patients undergo surgery without the need for a general anaesthetic and remain awake during the procedure. They may wish to listen to music. Some staff also find music beneficial in an operating theatre.
- 3.105 It is important that the project team consider the inclusion of a music system from the outset. Integral music systems are the preferred option, as there are potential hazards from cross-infection and interference with the existing power supply from stand-alone systems. For further information see [paragraphs 6.123–6.125](#).

### Ceilings

- 3.106 In operating theatres a minimum clear height of 3000 mm between the finished floor level and ceiling is required to allow unrestricted adjustment of the operating luminaire and other ceiling-mounted equipment. The building structure should be capable of supporting the loads generated when the ceiling-mounted medical supply unit is installed. Powered medical supply units allow unrestricted access to the patient and enable staff of all heights to operate them easily.

### Hoists

- 3.107 Where ceiling-mounted hoists are installed, care should be taken when calculating the correct position, as it may require ceiling reinforcement. This could conflict with the overhead operating luminaires and ductwork. Hoists may be an option in an operating theatre when combined with a medical supply unit for the delivery of medical gases. A ceiling-mounted hoist is inappropriate in a theatre with laminar flow style ventilation.

### Exit bay

- 3.108 An exit bay may be shared between two theatres; however, the floor layout should take into account that theatres should not be handed. Single exit bays may be more efficient because they will be less likely to get blocked with storage equipment. The area should be sufficient for the parking of two beds/patient trolleys with additional circulating space. Walls should be protected against heavy traffic in this area.
- 3.109 Ideally, the controls for lighting, heating and medical gas isolation valves should be located in each dedicated exit bay.
- 3.110 The bay may contain a local equipment store.

### Local equipment store

- 3.111 In a DSU where there is a rapid turnover of patients, a wide variety of surgical interventions take place that require different theatre furniture. Dedicated space will be required for each theatre for the storage of furniture accessories.
- 3.112 The storage space should be located in close proximity to the exit bay of each theatre for easy access.
- 3.113 Cupboards should be fitted with adjustable shelving, hooks and attachments.

## Reporting room

3.114 A room is required to record each completed operative procedure. The room should be located close to the operating theatres and can be shared by several people at one time. A desk with a computer terminal and external telephone is required. A secure cupboard is required for storing theatre documentation.

## Imaging equipment bay

3.115 An open bay should be provided close to the operating theatres for the storage of imaging equipment and protective lead aprons. A suitable socket-outlet should be provided for charging the imaging equipment. Lead aprons should be stored vertically to maintain their protective capability. Suitable wall brackets attached to a load-bearing wall, or mobile stands, are required for this purpose.

3.116 The bay should be large enough to accommodate one mobile imaging machine and a single ultrasound unit. A larger storage area is required if mobile image intensifiers are used. Regulations pertaining to the use of ionising radiation should be complied with, including IR (ME) R2000 and IRR 99.

## Cardiac arrest/emergency trolley

3.117 One cardiac arrest trolley with defibrillator should be sited within the recovery unit within easy access of all operating theatres. In addition, space will be required for a multi-drawer trolley containing all equipment including the fibre-optic bronchoscope light source for emergency use in difficult intubations. In case of vacuum failure in theatre areas, and the need for patient airway care, a portable suction unit will be required.

## Flexible endoscope decontamination room and store

3.118 Wherever decontamination of medical devices is undertaken within the healthcare environment, the requirements of product liability and the Consumer Protection Act need to be considered along with associated risks.

3.119 It is essential that the decontamination process considers the issues of effective management, compliant equipment, environment and health and safety.

3.120 Effective decontamination requires the attainment of acceptable standards at all stages of the lifecycle. Failure to address issues in any of these stages will result in inadequate decontamination. When designing facilities for reprocessing, the following should be taken into account:

- the existence of effective management arrangements;
- the location and activities where decontamination takes place;
- facilities and equipment at each location;
- ensuring that equipment used is validated, maintained and tested in accordance with manufacturer's guidelines and legislation;
- the existence of policies and procedures for all aspects of decontamination work.

3.121 An endoscope decontamination room and store is required, with a washroom where used equipment can be reprocessed and a separate clean room where reprocessed equipment can be stored (see Health Building Note 13 – 'Sterile services department').

3.122 It is recommended that all reprocessing of rigid endoscopes and accessories should be carried out by a sterile services department (SSD); (see 'Decontamination of Endoscopes', DB 2002(05), MDA 2002).

3.123 Single-use accessories should be used where practicable; however, if these are unavailable, re-usable accessories that are compatible with the decontamination process should be purchased. It is acknowledged that some flexible endoscopes and accessories are not compatible with steam sterilization and therefore may not be suitable for processing in an SSD; they should be processed in a designated washroom.

3.124 This should be equipped with automated endoscope reprocessors, and a double stainless steel sink with double drainer, which should be large enough to accommodate the cleaning and rinsing of endoscopes. Water for rinsing should be demineralised, or there should be facilities for filtration.

3.125 An easy-to-clean work surface and low-level cupboards for the storage of a supply of chemical sterilants, some of which have special handling requirements as hazardous substances, are also required.

- 3.126 A source of suction will be required if tubes and cannulae are irrigated. A separate hand-wash basin will be required. The area should be designed so that the workflow can facilitate sound infection control practices (Alvarado and Reichelderfer, 2000).
- 3.127 Automated endoscope reprocessors (AER) can be as large as 1250 mm wide × 1800 mm high. Machines require an electrical supply to support a minimum electrical power input of 1.8 kW, and three water supplies – hot, cold and demineralised/osmosis-purified.
- 3.128 AERs are available as a dual-sided unit, allowing it to be installed as a pass-through design between the pre-processing area, decontamination room, and the “clean” storage room.
- 3.129 Many units have alternative chemical substances for disinfection in accordance with DB 2002(05).
- 3.130 Toxic vapours produced during the cleansing and disinfecting process should immediately be removed by a local exhaust ventilation (LEV) system at bench level, thus excluding all possibility of inhalation. See the Control of Substances Hazardous to Health Regulations 2005 (COSHH) and the guidance document published by the Advisory Committee on Dangerous Pathogens, ‘Infection at Work: Controlling the Risks’ (HSE 2003).
- 3.131 Storage is required for appropriate personal protective equipment such as nitrile gloves, goggles, impermeable aprons, and respiratory protection equipment suitable for use when decontaminating endoscopes or mixing solutions of chemicals.
- 3.132 The “clean” area of the endoscope facilities and store should include units for the secure storage of:
- flexible endoscopes;
  - flexible accessories for endoscopes;
  - other sterile and non-sterile accessories for endoscopes.
- 3.133 There are a number of storage solutions available for the storage of flexible endoscopes. Whatever system is used, endoscopes should be stored in a vertical position to maintain and stabilise them.
- 3.134 Storage space is also required for procedure manuals, logging and charting supplies, and equipment manuals as well as other administrative materials (BSG Working Party Report, 2001).
- 3.135 Clinical hand-wash facilities with non-touch taps and pedal-operated sack-stands for the disposal of waste are also required.
- 3.136 A wall-mounted sharps bin is required.
- 3.137 From April 2006 the regulatory responsibility has resided with the Healthcare Commission, who use MDD 93/42 EEC as a basis for inspection.

### Theatre dirty utility room

- 3.138 In view of the number of procedures undertaken in day surgery, one dirty utility can be provided for each operating theatre, or as a project option a dirty utility can be shared between two theatres.
- 3.139 The room should be large enough to enable cleaning of theatre equipment. Mops and buckets for immediate use in theatre are stored here, and a stainless steel bucket sink is required. A stainless steel slop hopper will also be required.
- 3.140 Mechanical extract ventilation and hand-washing facilities should be provided.
- 3.141 Contaminated re-usable instruments and equipment can be stored in a distribution trolley in the dirty utility prior to the distribution trolley being taken to the disposal hold to await collection from the sterile services department.
- 3.142 Space is not required for holding materials for disposal or reprocessing since sacks and bags, once full, should be closed and taken to the disposal hold to await collection.
- 3.143 The dirty utility can also be used as a holding bay for contaminated clinical equipment where it is cleaned prior to being taken to the equipment service room for maintenance.

### Disposal hold

- 3.144 The whole-hospital policy for disposal will determine the frequency of collection from the disposal hold. However, as there are a large number of patients in each operating session in day surgery units, the volume of waste generated will be considerable. Off-site regional decontamination facilities are becoming more common. Where these exist, a receipt and dispatch point for instrument sets will be required.
- 3.145 This locked room should be accessible from the hospital street or a secured external door in a stand-alone unit. Collections may then be made without the need for porters to enter the main

circulation space of the unit. Bagged refuse, Class A clinical waste, soiled linen and materials for recycling are held here safely and securely while awaiting collection. They are identified by colour-coding, in line with whole-hospital policy.

- 3.146 Full “sharps” containers from the anaesthetic rooms, operating theatres and recovery unit will be stored in the disposal hold. Project teams should also refer to the DH current decontamination policy to ensure that medical devices are stored and reprocessed or disposed of in a safe manner.
- 3.147 Instruments that have been used on a possible CJD or vCJD patient should not be re-used, but should be quarantined by securely storing in a rigid sealed container after use, until the diagnosis is confirmed. For further guidance see Advisory Committee on Dangerous Pathogens, Spongiform Encephalopathy Advisory Committee, ‘Transmissible spongiform encephalopathy agents: safe working and the prevention of infection’ (DH 2003) and ‘Biological agents: Managing the risks in laboratories and healthcare premises’ (DH DEFRA HSE 2005).
- 3.148 Dirty distribution trolleys will be stored in the hold while awaiting collection by the SSD.
- 3.149 Some trolleys are extremely large (1500 mm × 750 mm). When planning the size of the hold, the approximate number of trolleys to be stored following an operating session and frequency of collection should be taken into consideration.

## Storage areas

### Bulk store

- 3.150 Storage space is required for the packaged instrument trays, and supplies are delivered from the SSD on a daily basis. Non-sterile items are also stored here, along with some additional sterile instruments and equipment.
- 3.151 See Health Technical Memorandum 71 – ‘Materials management modular storage’ (NHS Estates 1998) for further information on shelving systems.
- 3.152 For ease of access, the entrance to the store should be a minimum of 1500 mm, a door and a half.
- 3.153 Mechanical extract ventilation will be required.
- 3.154 Larger bulk stores will be required in units that have integral pre-assessment units and those that do not have daily deliveries.

### Clinical equipment store

- 3.155 Floor space within the clinical equipment store is needed for a variety of items including drip stands, monitoring equipment and ultrasound machines. Clinical equipment should be stored off the floor where possible, to help maintain a dust-free environment. Shelf space is needed for smaller items such as infusion pumps, ventilator accessories, monitoring equipment and suction apparatus.
- 3.156 Electrical socket-outlets are required for charging equipment. Under-provision of storage for these items can lead to unused equipment being kept in patient areas. This store should be located within easy access of the recovery unit and adjacent to the equipment service room.

### Linen store

- 3.157 Storage is required for clean linen supplies, either in a linen store or on a linen exchange trolley. The amount of linen storage required depends on the linen supplies policy, the number of deliveries per day and the number of patients.
- 3.158 Due to the high patient turnover in a DSU, two linen stores will be required, one of which should be located close to the admission suite.

### Crutches and splint store

- 3.159 Many orthopaedic operations are now undertaken in day surgery units. Following such operations a number of patients will require crutches or splints before discharge. A store room will be required.

### Ready use store

- 3.160 A dedicated, easily accessible store for gas cylinders is required for the operating theatre. It should conform with the requirements of Health Technical Memorandum 02-01 – ‘Medical gas pipeline systems’ (DH 2006).

## Laboratory

- 3.161 A laboratory will be required for blood gas, electrolyte and glucose analysis and other tests carried out in the DSU. The main requirements are as follows:
- a stainless steel sink with three water supplies – hot, cold and demineralised/osmosis-purified;
  - impervious laboratory benching and adequate bench space onto which equipment is placed;

- electrical socket-outlet provision;
- ready-use storage for blood gas machine;
- a specimen fridge and sufficient space for staff to perform tests and use computer equipment;
- a small wall-mounted cupboard for storing cleaning materials.

3.162 Separate clinical hand-washing facilities are also required.

3.163 In an integral day surgery unit in an acute hospital there may be a pneumatic tube system which would be located in this room. (See Health Technical Memorandum 2009 for further details.)

### Digital communication

3.164 Digital Image Communication in Medicine (DICOM) has now been established for the sharing of medical images. For a stand-alone DSU that does not have access to a pathology department, DICOM using digital image laboratory microscopes can be computer-linked to an offsite pathologist. Additional bench space will be required for the microscope and the preparation of slides and specimens.

3.165 A computed radiography (CR) reader/processor and associated computer equipment will be required, as plain film X-rays are being replaced with laser-based technology. A conventional darkroom or daylight processing facility may no longer be required.

### Blood refrigerator

3.166 One blood refrigerator is required in a day surgery unit, and should be quickly and easily accessible from operating theatres and the recovery unit.

3.167 A clean utility is an ideal place to locate a blood refrigerator, which may require networking to a central monitoring system (see paragraphs 3.183–3.188).

3.168 The refrigerator should be wired in with central alarms and, possibly, barcode locks. Use of these refrigerators is governed by national and local blood transfusion service regulations.

### Satellite pharmacy

3.169 Every DSU should be serviced by a fully-equipped main hospital pharmacy. Separate locked storage space will be required for bulk pharmacy items prior to transfer of the drugs to individual lockable

drugs cupboards within each anaesthetic room and the recovery unit. The pharmacy will also store clinical lotions and intravenous fluids, which are usually dispensed in bulk and require significant and robust storage due to their weight and volume.

3.170 Some patients will require prescribed drugs to take home. An additional lockable drugs cupboard for this purpose should be located behind the communications base in the second-stage recovery.

### Post Anaesthesia Care Unit (PACU) or first-stage recovery

3.171 Each patient will be transferred from the operating table to a trolley and taken to PACU. Specific day surgery trolleys can eliminate the need for patient transfers from admission to discharge. The PACU should be located close to, and on the same floor as, the operating theatres. The use of modern drugs and techniques may allow early recovery to be complete by the time the patient leaves the operating theatre, allowing a significant number of patients (up to 42% in some studies) to bypass the first-stage recovery area ('Day surgery', AAGBI 2005, p 14).

3.172 It is essential that the environment reflect a therapeutic atmosphere whilst continuing to meet the clinical requirements. Natural daylight enhances the feeling of well-being and is desirable.

3.173 The PACU should be mechanically ventilated with low-level extraction, since exhaled anaesthetic gases pollute the air. Patient scavenging masks are not recommended (for further information see [paragraph 6.57](#)).

### Recovery bays

3.174 A PACU should contain two recovery bays per operating theatre, plus an additional bay to allow for flexibility. All PACU spaces should be able to accommodate a Level 2 patient for a short period of time until they are able to be transferred to a critical care bed. The additional bay may be designed to accommodate a Level 3 patient as described in Health Building Note 57 – 'Facilities for critical care' (NHS Estates 2003).

3.175 Each recovery bay should be provided with:

- 12 socket-outlets (six to be located either side of the bed, which may be from IPS circuits);
- 4-bar air outlet;
- oxygen outlet;

- two vacuum outlets;
- adjustable examination luminaire;
- push-button staff emergency call linked to an emergency call repeat lamp in the communications base and each theatre;
- flat screen monitor with recording system for patient records;
- wall-mounted antibacterial hand rub.

See also [paragraph 6.57](#).

- 3.176 Consideration should be given to the use of ceiling-mounted hoists in the recovery unit. For maximum flexibility, a hoist in every bay is the ideal solution for new facilities or a major refurbishment.
- 3.177 Wall-mounted delivery points are in common use, but mobile equipment suspended from rails increases the possibilities for more flexible use of space. Each bay should have an island solution so that staff may access patients from all sides.
- 3.178 A clinical wash-hand basin with non-touch taps is required at the front of each trolley bay. The main overhead lighting should be dimmable. A wall-mounted clock with a sweep seconds hand should be visible from all bed spaces.
- 3.179 See the Association of Anaesthetists booklet 'Immediate post-anaesthetic recovery' for information on the best practice in the post-operative environment (see [www.aagbi.org](http://www.aagbi.org)).
- 3.180 Consideration should be given to achieving a high standard of visual and acoustic privacy for patients.
- 3.181 Advice should be sought locally to determine when radiation protection will be required. In such circumstances, the wall behind the bed and the dividing partitions should be lead-lined.

### Sub-waiting area

- 3.182 It is now common practice for children and adults with special needs to be accompanied by carers into the anaesthetic room. A sub-waiting area will be required for these carers to wait in until they rejoin the patient post-operatively.

### Communication base

- 3.183 A dedicated communication base is required. All incoming information from the operating theatres arrives via computer at this central point. The base also serves as a focal point and observation post.

### Clean utility room

- 3.184 To reduce the risk of healthcare-associated infection, clean disposable items such as bedpans, urine bottles and vomit bowls should be stored only in the clean utility room.
- 3.185 Non-touch clinical hand-washing facilities with antibacterial hand-rub dispenser should be provided.
- 3.186 Equipment should include:
- lockable controlled drugs cupboard;
  - drug refrigerator;
  - warm blanket storage facility;
  - heated lotion cabinet.
- 3.187 Shelf space is needed for items of equipment such as infusion pumps, ventilator accessories, monitoring equipment and suction apparatus. Electrical socket-outlets are required for charging equipment.
- 3.188 One anaesthetic machine and a cardiac arrest trolley with defibrillator will be located here.
- 3.189 The blood refrigerator can also be located here.

### Dirty utility room

- 3.190 The equipment in the PACU dirty utility depends on whether disposable or re-usable items such as bedpans, urinals or vomit bowls are adopted. A suitable compliant bedpan washer (see Health Technical Memorandum 01-01) or macerator is required for the disposal of human waste.
- 3.191 Clinical hand-washing facilities are required.

### Second-stage recovery

- 3.192 Once patients have regained consciousness and are clinically stable, they will be transferred on their trolleys to the second-stage recovery area. Patients remain here until they are fit enough to get dressed and transfer to the discharge lounge.
- 3.193 For the DSU described in this guidance, 16 second-stage recovery trolley bays are required. Each trolley bay will require the services outlined in [paragraph 3.175](#).
- 3.194 Bays should be grouped in clusters of four to ensure maximum flexibility. One cluster should be designated for young children and should offer a child-friendly environment. See 'Friendly

healthcare environments for children and young people' and Health Building Note 23. This bay may be used by adults when there are no children on the list.

- 3.195 Two clinical wash-hand basins with non-touch taps should be provided in each four-bay cluster. An antibacterial hand-rub dispenser should be provided in every recovery bay. A wall-mounted sharps bin will also be required. Drinking water for patients should be provided (see paragraphs 3.200–3.201).
- 3.196 If a tilting/reclining trolley is used, this reduces the space requirements in each bay, as a reclining chair will not be required. A mobile storage or cantilevered over-bed table should be provided in each bay for patients' refreshments and personal effects. A standard chair for carers will also be required in each trolley bay.

### Second-stage recovery/discharge lounge communications base

- 3.197 A shared communications base is required to serve both second-stage recovery and the discharge lounge. This should be located at a central point between the two areas.
- 3.198 Administrative duties associated with the patient's recovery and discharge will take place here.
- 3.199 The base should be equipped with a computer and telephone. An emergency staff call system linked to PACU and the operating theatres is required. A minimal stock of sterile supplies and disposable items should be stored here for emergency use. Clinical hand-washing facilities are required.
- 3.200 Each patient will receive post-operative instructions and may be issued with prescribed drugs or medicines, therefore a lockable drugs cupboard will be required (see paragraphs 3.169–3.170).

### Beverage bay

- 3.201 A beverage bay should be located adjacent to the communication base where staff can prepare light refreshments and beverages for patients and their carers.
- 3.202 Facilities should be provided for the safe handling of food, for washing and storing crockery and cutlery, storing a limited quantity of dry goods, and for the refrigerated storage of milk. Equipment should include a fridge, dishwasher,

stainless steel sink and drainer, an electric water boiler, a worktop with cupboards, and a vitreous china or stainless steel wash-hand basin. Drinking water should be provided.

### Discharge lounge

- 3.203 Following discharge from second-stage recovery, patients continue to be observed in the discharge lounge. Patients do not require clinical monitoring equipment and should rest on reclining chairs, until allowed home.
- 3.204 This area should be located in close proximity to the main entrance. It should be an open area with informally-arranged seating and occasional tables with a relaxed atmosphere.

### Interview room

- 3.205 The general waiting room used by family and friends should not double up as a "breaking bad news room". A separate room should be designated for this purpose. In common with the general waiting room, this room should portray an area of calm and comfort. A telephone should be provided. An en-suite wheelchair-accessible WC should be included.

### Patients' clothing store

- 3.206 A lockable clothing store is required located close to the second-stage recovery area for storing the patients' clothing boxes that will be transferred from the admission suite. Suitable removable shelving will be required.

### WCs

- 3.207 Wheelchair-accessible toilet facilities should be located both in second-stage recovery and in the discharge lounge.

### Equipment service room

- 3.208 Separate on-site workshop facilities are required for equipment that needs regular maintenance and recharging. Technical support services should be available for urgent servicing and decontamination of equipment.
- 3.209 Visiting electronics and medical engineering (EME) technicians carry out minor scheduled or unscheduled servicing in this room. The space provided should be sufficient to park and manoeuvre equipment and to accommodate a



Discharge lounge at North Hampshire Diagnosis and Treatment Centre

workbench with integral lockable cupboards, preferably in a self-contained room or space. A vitreous china clinical wash-hand basin should also be provided. It is recommended that manufacturers' user manuals be kept in this room.

- 3.210 The supply to socket-outlets should be provided via a dedicated residual current protected circuit device, and emergency power isolation buttons should be installed at the workbench and adjacent to the room entrance. Medical gas outlets supplying oxygen, medical air, surgical air, nitrous oxide and vacuum together with gas scavenging facilities should be provided. Some items of equipment may require decontamination in the SSD prior to scheduled servicing being done elsewhere. Local policy will identify where this is undertaken (for example in the SSD and/or EME department).
- 3.211 Equipment should be held in the dirty utility, where it is cleaned prior to immediate transfer to the equipment service room.

## Housekeeping

- 3.212 A designated person should supervise the cleaning of a day surgery unit with planned preventative maintenance programmes in place as part of infection control. Cleaning should be carried out according to national specifications, infection

control guidelines and local policies, and this should be monitored as part of quality control. Cleaning is of major importance in the functioning of the operating suite. Adequate space should be provided for the convenient local storage of cleaning equipment and materials.

- 3.213 A lockable storeroom is required for the storage of cleaning supplies and domestic equipment. Extract ventilation will be required. Space will be required for floor-scrubbing equipment. Dry storage space is required for clean disposable cloths, new mop-heads and additional unused bags. Facilities should be provided in this space for filling and emptying cleaning equipment via a stainless steel bucket sink with hot and cold running water.
- 3.214 A stainless steel sluice hopper for the disposal of soiled mop water, a stainless steel sink for washing soiled mop buckets and a drainer should be provided, as well as a wash-hand basin. 'The Control of Substances Hazardous to Health – Guidance for the Initial Assessment in Hospitals' (DH 1989) relates to the safe storage and use of chemicals and cleaning materials.
- 3.215 In order to minimise the risk of cross-infection, it is recommended that identically equipped rooms be located in the following areas:
- reception/waiting/admission suite;

- operating theatre suite/PACU;
- second-stage recovery and discharge lounge;
- staff support facilities.

## Switchroom

**3.216** The departmental switchroom, which houses the main isolators and distribution circuit breakers, should be:

- sited within the department;
- accessible directly from a circulation area but not generally on a route used by beds or trolleys, providing clear and safe access for maintenance staff (access space may be part of the circulation area);
- sited away from water services; and
- lockable.

**3.217** Care should be taken to ensure that safety is not compromised during maintenance by passing traffic or the opening of adjacent doors.

## Uninterruptible power supply room

**3.218** A room of at least 3000 × 3000 mm is required to house the back-up system for essential electrical supply to the operating theatres and recovery area. It should be well ventilated, having due regard to equipment heat gain, and should be kept locked at all times, with access only for permitted staff. The room may be also used to house the data hub for the DSU.

**3.219** Monitoring of all the UPS status is advised – this may be connected to the communications base monitoring equipment where appropriate and/or the theatre control panel. The use of centralised rather than distributive UPS arrangements within operating theatres should be considered in view of the likely security and maintenance advantages. Due consideration should be given to resilience and the need for maintenance downtime.

**3.220** Where IPS (medical IT) circuits are considered necessary, additional space will be required for the isolation transformers and inverters.

## 4 Support facilities – general and specific functional and design requirements

### Staff accommodation

- 4.1 The provision of well-designed facilities helps morale and contributes to the efficient functioning of the department. Excellent staff facilities that are located within or adjacent to the unit will encourage this.
- 4.2 There are five main categories of staff facilities, all of which should be designated clearly as non-clinical areas:
1. rest facilities;
  2. changing rooms and associated facilities;
  3. office accommodation;
  4. facilities for education and training;
  5. storage.
- Areas 1 and 2 should be located adjacent to the DSU.
- 4.3 Non-authorised staff should be prevented from entering staff areas. Security locks with close proximity card entry are the preferred option, but planners and designers should be aware of hospital policy and consult with security experts.



Staff room at Gateway Surgical Centre

### Rest facilities

- 4.4 DSUs employ large numbers of staff all of whom will need access to the rest and recreation facilities.
- 4.5 A rest room is required where staff can relax and take beverages and snacks. The room should have windows with a pleasant outlook, be comfortably furnished, and have a telephone.
- 4.6 The room should have direct access to the beverage bay and should be located close to the operating theatres. A dining table and chairs should be provided to enable staff to eat and drink in comfort.

### Beverage bay

- 4.7 Facilities are required for making beverages and snacks, and for washing-up. Equipment should include a stainless steel sink/drain, refrigerator, dishwasher, microwave oven, toaster, and storage space for crockery and dry goods. A vitreous china or stainless steel wash-hand basin should be provided. Drinking water should be provided.
- 4.8 The beverage bay may be provided as a separate space adjacent to the staff rest room, but is normally designed as an integral part of the rest room.

### WCs

- 4.9 The requisite number of male and female WCs should be located within the rest and recreation facilities as well as in the staff changing rooms. For guidance see SI 1992/3004, the Workplace (Health, Safety and Welfare) Regulations 1992.
- 4.10 Designated WCs per theatre are not required. WCs, including provision for disabled people, should be located at strategic points throughout the department as well as in the staff changing rooms.
- 4.11 Each WC will require a wash-hand basin with non-touch taps and a WC with a non-touch flush valve. Extract ventilation should be provided.

## Changing rooms and associated facilities

- 4.12 Clinical staff are in frequent contact with patients' body fluids, encounter infection, and handle contaminated instruments and dressings on a daily basis. Consequently they will need to shower and change their clothes whilst on duty. It may not be feasible for all non-clinical staff to use the departmental changing facilities, but it is essential that all clinical staff are able to shower and change without having to leave the department.
- 4.13 Changing facilities should be located close to the operating theatres to minimise the movement of staff in their theatre clothing.
- 4.14 Provision should be made for separate male and female changing facilities. Estimates of changing space and locker provision should take into account the peak numbers of full-time and part-time staff including students and visitors.
- 4.15 Steps should be taken to ensure the security of personal belongings left in the staff changing rooms. There should be adequately-sized secure lockers for sessional usage similar to those used in swimming pools, leisure centres etc. Access to the areas should be via doors with close proximity card/transponder facilities.
- 4.16 Compartmentalised storage space is required for theatre clothing, as it is essential that it is instantly recognisable in size and availability. Laundry skips should be provided for soiled theatre clothing. Seating is also required for dressing and undressing. Some departments may wish to consider an exchange trolley system for theatre laundry.
- 4.17 The sanitary and shower facilities should be provided in self-contained, full-height rooms to provide maximum privacy. Cubicle partitions are not acceptable.
- 4.18 Dry changing areas equipped with mirrors, hair dryers and a shaving point are required.
- 4.19 Separate clean and dirty entrances are not required.

## Theatre footwear washing

- 4.20 Facilities should be provided for the storage of footwear on easily accessible boot racks in a space supplied with mechanical extract ventilation to limit odours.



Staff changing room at North Hampshire Diagnosis and Treatment Centre

- 4.21 Theatre footwear should be cleaned daily or if visibly contaminated. A washer should be conveniently located near to the male and female changing facilities.

## Office accommodation

- 4.22 Some office accommodation will be required within the department, for example the secretarial support. Where space is at a premium it is suggested that a number of offices are located adjacent to, rather than within, the DSU. If the office accommodation is adjacent to the department, it will require its own door with secure entry facilities.
- 4.23 Planners should consider including, as an alternative to more offices, one small informal room that is comfortably furnished and can be used for interviewing staff and visitors, and one larger interview/meeting room that could be utilised by members of staff when required.
- 4.24 Such a strategy would ensure maximum utilisation of interview/meeting rooms, and office space would not need to be increased. All confidential meetings could take place in absolute privacy. Offices can then be used exclusively for administration and clerical work. Most offices described here are similar in size and can be used flexibly. Where possible, every office should have a window and natural ventilation and should be equipped with a computer terminal with access to full IT services and internal and external telephones.

## Single-person offices

- 4.25 Some clinicians and managers will require access to single-person offices. These should be sufficiently private for confidential discussions between staff. They should accommodate an office workstation, with monitor and keyboard, seating for up to three other people, and storage for books and files. The offices should be close to each other and to the

secretarial office, and associated with other office accommodation.

## Multi-person staff offices

- 4.26 Multi-person offices are required for secretarial activities and administrative work. The number of offices will depend on local policy, and should be discussed and agreed with the design team during the initial planning meetings.

## Additional office space

- 4.27 Additional office accommodation may be required for people who may not be permanent members of staff but who may still spend substantial periods of time in the department. This accommodation should be located in close proximity to the department. Facilities are required to allow “hot-desking” by clinical staff. At least four networked computer terminals are required, with connection to IT services and points for telephone and fax transmission. This room should also provide facilities for self-education and study.

## Seminar room

- 4.28 A seminar room may be required within the unit for teaching, tutorials, meetings, case conferences and clinical instruction. Furniture and equipment should include upright stacking chairs with writing arms, a wall-mounted whiteboard, an imaging viewer, a video/TV monitor, and a computer and keyboard.
- 4.29 A computer image projector is required. A ceiling-mounted screen should be provided, and efficient blackout blinds and facilities for projection of slides and overhead transparencies.
- 4.30 An emergency recall system will be required between the seminar room and the operating theatres/recovery unit.

# 5 Other general functional and design considerations

## Communications

- 5.1 Provision of effective communication systems is essential for the efficient management of the DSU. These are described below (see also paragraphs 6.128–6.132).

### Telephones

- 5.2 In the waiting area, where public telephones are provided, at least one should be mounted at a height suitable for wheelchair users and the handset fitted with an inductive coupler to assist people using a hearing aid.
- 5.3 Telephones should be provided in accordance with the whole-hospital policy for telephone services. Where telephones are provided for reception use, and in theatres, anaesthetic room and recovery, consideration should be given to hands-free systems. Ringing telephones in and adjacent to treatment spaces are a particular nuisance at times of peak activity, and consideration should be given to the installation of a system that will enable calls to be intercepted at appropriate alternative locations.
- 5.4 Staff in different parts of the DSU are required to communicate with each other. Unnecessary or abortive staff movement can be reduced, and messages can be received “hands-free” of communications equipment, by provision of an intercom system. This system should utilise the standard telephone system and telephone instruments, be simple to use, and cover locations of high staff activity. It can also accommodate a wide range of functions, both routine and emergency, and enable staff to communicate rapidly and when they require assistance.

### Fax

- 5.5 Fax equipment will be required.

### Patient-to-staff and staff-to-staff call systems

- 5.6 Patient-to-staff call systems should be provided in all spaces where patients may be left alone

temporarily, such as recovery, admission lounge or patient WCs. Staff-to-staff call systems should be provided in all spaces where staff consult, examine and treat patients. Due to the nature of the department it is preferable that these systems work on the principle of flashing lights rather than ring-tones. Terminals to the call systems should be located at the communications base as well as staff rest facilities. See paragraphs 6.136–6.137.

## Controlled Drugs cupboard

- 5.7 See paragraph 6.120.

## Noise and sound attenuation

- 5.8 Any unwanted sound is a noise and may disturb patients and staff. Noise-sensitive areas should be located as remotely as possible from internal and external sources of unavoidable noise. Many surgical procedures should be undertaken in noise-free environments. It is therefore important that there is no transfer of noise between adjacent theatres.
- 5.9 Speech privacy is essential in spaces where personal and confidential discussions are held, such as interview rooms and any clinical areas. Particular care should be taken where the adjoining spaces are waiting areas.
- 5.10 Sound transmission can be reduced by use of sound-reducing partitions and doors. The use of soft floor coverings and acoustic treatment to walls and ceilings (where hygienically acceptable) will improve sound absorption in a space.
- 5.11 The current recommendation on room acoustics in Health Technical Memorandum 08-01 states that in spaces needed for communication it is important that noise levels created in the room “do not build up”. The noise levels in the room can increase due to sound reflections on a room’s surfaces. Hard surface materials, commonly used in healthcare buildings, contribute to the acoustic problems in buildings. Therefore, sound-absorbing properties of the room surfaces are very important.

- 5.12 Sound absorbers, for example acoustic ceilings or walls, are able to absorb a varying percentage of the sound hitting the surface and improve speech intelligibility by reducing the spread of airborne sound in the room.
- 5.13 Induction loops should be fitted where necessary in waiting areas.
- 5.14 See also [paragraphs 6.78–6.82](#).

## Finishes

- 5.15 The quality of finishes in all areas should be of a high standard.
- 5.16 Finishes should be robust enough to withstand accidental impact, and additional protection should be provided at likely points of contact. Trolleys and items of mobile equipment that may cause damage should be appropriately buffered. Wall protection is advised in all corridor and heavy traffic areas, plus storage rooms and bays. Cleaning regimes should be considered when materials are selected.
- 5.17 The infection control team should advise on the appropriate finishes throughout the project (see ‘Infection control in the built environment’).

## Colour

- 5.18 Colours of surfaces in spaces occupied by patients should not adversely affect the colour rendering of light sources.
- 5.19 It should be possible to clearly define and easily identify changes to a patient’s skin tone and colour. Décor should be light and attractive.

## Floors

- 5.20 Carpets are not acceptable anywhere in a DSU. Floors should be able to withstand harsh treatment, including:
- the rolling loads of heavy mobile equipment;
  - frequent spillages with subsequent “mopping-up”; and
  - regular hard cleaning.
- 5.21 Flooring should also have the following characteristics:
- hygienic finishes;
  - slip-resistant;
  - continuous;

- smooth;
- impervious;
- sealed joints;
- easily cleanable;
- wear-resistant.

See Health Technical Memorandum 61 – ‘Flooring’ (DH 2006) for further details.

- 5.22 Manufacturers’ information supplied on suitable cleaning, disinfection and maintenance procedures is important at the design stage.
- 5.23 There should be a continuous return between the floor and the wall, for example coved skirtings returned a minimum of 100 mm, which allow easy cleaning and avoid microbial colonisation. The skirting material used should be integral with, and have properties similar to, the floor finish. In areas where frequent wet cleaning methods are employed, the flooring material should be unaffected by germicidal cleaning solutions.
- 5.24 The floor finish should be properly anchored to the underlying surface.
- 5.25 Vinyl, linoleum or rubber are examples of slip-resistant flooring and should have welded joints. The flooring should be at least 2 mm thick. Such flooring is tolerant of small movements in the structural floor. The floor screed should be perfectly smooth, crack-free and stable. Adhesives should be powerful enough to resist the formation of “waves” in the floor finish that can result when heavy equipment is moved. Sufficient time should be allowed for the adhesive to set prior to use. Thresholds at doorways between adjacent rooms require particular attention because they are points of stress in the floor finish.
- 5.26 In theatres with laminar flow ventilation, the floor area enclosed by the hood should be marked with lines or a contrasting coloured area of flooring.

## Floor markings

- 5.27 Greater use could be made of marking of floors in operating theatres and anaesthetic rooms to show the correct and safe position for the equipment such as the operating table and anaesthetic machine. This helps the non-permanent and agency staff to ensure that patients are placed at minimal risk of injury from the equipment.

## Walls

- 5.28 Wall finishes in operating theatres should be impervious, durable and able to withstand wet cleaning and the accidental impact of trolleys and heavy mobile equipment. Especially vulnerable points should have additional protection. Protection measures should be considered at the initial design stage to prevent the need for regular maintenance which would require the unit to be closed for long periods.
- 5.29 Walls in the operating theatre should be constructed to provide radiation protection in accordance with SI 2000/1059 and SI 1999/3232.
- 5.30 Smooth, impervious, washable paint surfaces, not necessarily oil-based, are the easiest for cleaning.
- 5.31 Areas that could affect microbiological standards are:
- stability to prevent cracking and movement;
  - biological attack resistance;
  - mechanical damage resistance;
  - hygrothermal performance;
  - hygienic finishes;
  - thermal performance (may affect air flow patterns); and
  - suitability for cleaning, disinfection and maintenance.
- 5.32 Ceramic wall tiles are preferable in kitchen, shower and toilet areas. Grouting should be sealed.

## Ceilings

- 5.33 Modular ceilings are not acceptable in the operating theatre but may be required in associated areas for maintenance purposes. The ceiling in the operating theatre should also be able to withstand an occasional wash and have a completely sealed finish to maintain microbiological standards. If access hatches are required, they should be of the sealable type.
- 5.34 The choice of ceiling construction and finish should reflect the necessary compromise between sound control and the control of infection. A modest risk analysis may be the appropriate way of addressing this aspect of design. An acoustically absorbent ceiling helps to reduce noise. While some acoustic surfaces now available do not present an infection hazard, it is essential that the architect,

building services engineer, infection control officer and facilities manager together ensure that the choice of ceiling and the maintenance routines are satisfactory.

## Doors and doorframes

- 5.35 Materials used for doors and frames should be able to withstand frequent impact from mobile equipment. All double-swing doors should incorporate clear glass vision panels; however, privacy, safety and other considerations may require that panels can be obscured.
- 5.36 Automatic door openers can be provided to aid the movement of patients through the area.
- 5.37 Doors should be in compliance with Approved Document M and BS 8300.

## Windows

- 5.38 In addition to the various statutory requirements, the following issues require consideration:
- daylight and natural ventilation;
  - insulation against noise;
  - user comfort;
  - energy conservation;
  - the prevention of glare; and
  - the provision of a visual link with the outside world.
- 5.39 Windows should be completely weathertight, with the correct thermal performance so as not to affect microbiological standards and to prevent air flow pattern distortion and condensation.
- 5.40 All windows should be at least double-glazed as a minimum, to provide thermal and sound insulation as required by the Building Regulations, Approved Document L2 (ODPM, 2000).
- 5.41 Where required, blinds should be installed between the glass that can provide “black-out”, which is essential for ultrasound examinations and other imaging procedures. It may be necessary to provide triple glazing to allow the blinds to be maintained.
- 5.42 The windows should be easily accessible for cleaning, disinfection and maintenance. See also Health Technical Memorandum 55 – ‘Windows’ (NHS Estates 2005).

## Clinical wash-hand basins

- 5.43 The number of clinical wash-hand basins and their siting should be discussed and approved with the infection control team at the design stage. The basins should be placed in a prominent position to remind the staff of the importance of hand-washing. All clinical wash-hand basins should be wall-mounted and manufactured from vitreous china.
- 5.44 All basins should have curved sides with no plugs, have no overflows, and be fitted with infrared non-touch taps which should not be placed over the waste outlet. Mixer taps should be used, as very hot or very cold water discourages hand-washing. There should be sufficient space around the basin to wall-mount antibacterial hand rub, liquid soap, hand disinfectant and paper towels. The splashback should be a single waterproof sheet or seal mounting with polyurethane or wallglaze.
- 5.45 Non-touch taps should be mains-powered.
- 5.46 Non-touch soap dispensers are now available, and their use in conjunction with the non-touch taps at every clinical wash-hand basin is recommended.
- 5.47 The use of non-touch taps and WC flush valves helps to reduce water consumption in these areas by 30% in the short term and 50% in the long term. For further details of projects involved in water reduction see <http://www.watermark.gov.uk>.

## Shelving and storage

- 5.48 Clinical storage is required with removable shelves. The tops of cupboards should be fitted to ceiling height or should have sloping tops to prevent the accumulation of dust. Monitors should be fitted at a height where they can be cleaned easily. Items should not be stored on the floor. Paper towel wall dispensers are required. Sharps boxes should be wall-mounted.
- 5.49 All storage units and shelving should comply with Health Technical Memorandum 71.

5.50 The following should be considered with regard to controlling infection:

- the performance and strength of the units so they resist surface cracking, absorbance etc (manufacturer's data should be supplied);
- surface finishes;
- hygienic finishes;
- movable units should be easily disinfected, including the wheels;
- space-saving shelving on moveable runners.

## Work surfaces and bins

5.51 All work surfaces should be smooth and easily washable, coved to the wall, and preferably unjointed with integral sink. Joints should be sealed. The surface covering should be hard-wearing and should not damage easily. Edges should be rounded. Damaged work surfaces should be replaced rather than repaired. Foot-operated bins are essential.

## Maintenance and cleaning

- 5.52 Materials and finishes should be selected to minimise maintenance and be compatible with their intended function. Building elements that require frequent redecoration or are difficult to service or clean should be avoided. Special design consideration should be given to corners, partitions, counters and other elements that may be subjected to heavy use. Wall coverings should be chosen with cleaning in mind.
- 5.53 Guidance on these aspects is given in Health Technical Memorandums 54–71. See [Appendix 3](#), References.
- 5.54 The infection control team should advise on the maintenance and cleaning of the materials and finishes (see 'Infection control in the built environment').

## 6 Engineering services

### Introduction

- 6.1 The engineering requirements in respect of facilities for surgical procedures change constantly to meet the demands of advancing surgical technology. It follows that the engineering services needed to support the facilities will also change. It is not the intent of this guidance to be prescriptive in respect of design solutions, but to provide a point of reference from which individual designs can be developed.
- 6.2 Designers should ensure they take care to read this document as a whole, since further engineering requirements are outlined in other sections.

### Energy conservation and sustainability

- 6.3 The environment in which people live and work has a key influence on their health. Environmental considerations should therefore be taken into account when building or adapting facilities. (For general guidance see the DH website <http://www.dh.gov.uk/PolicyAndGuidance/OrganisationPolicy/EstatesAndFacilitiesManagement/SustainableDevelopment/fs/en>). The minimising of environmental impact by ensuring that energy is only used necessarily and efficiently is considered in this guidance with respect to:
- natural daylighting;
  - natural ventilation;
  - night set-back;
  - building regulations;
  - heat recovery.
- 6.4 Efforts should be made to maximise the use of natural lighting. Passive solar design (PSD) should be employed to ensure, as far as possible, that areas such as operating theatres, recovery units and office areas are located where they can benefit from natural daylight, whilst other areas, for example stores, WCs and utility rooms, are located towards the core of the facility.

- 6.5 Areas where glare may be a problem, for example rooms where VDUs are routinely used, should similarly be located away from direct natural daylight.
- 6.6 Whilst facilities for surgical procedures will be largely air-conditioned or mechanically ventilated, natural ventilation of rooms should be employed wherever appropriate. Design should incorporate measures for minimising solar heat gains, which, if uncontrolled, will precipitate a need for mechanical ventilation. Measures to minimise the need for cooling should include locating temperature-sensitive accommodation away from south-facing fascias, shading windows with brise soleil, and using solar reflecting glass where this is cost-effective.
- 6.7 Energy-using systems including heating, ventilation, cooling and lighting should be controlled to reduce consumption when the facility is not in use, for example at night or weekends.
- 6.8 Energy recovery systems should be employed on air-conditioning and ventilation systems.

### Space requirements for services and plant

- 6.9 A high level of availability of engineering plant and services is critical to the ability of the facility to function safely and efficiently. It is therefore essential that building design should incorporate adequate space for the installation and maintenance of plant, ductwork, pipework and cabling.
- 6.10 Space for plant and services should provide:
- easy and safe means of access;
  - secure accommodation protected from unauthorised access;
  - adequate space around plant and services to permit inspection and maintenance;

- sufficient space to permit redundant plant to be removed without the need to dismantle other major plant.
- 6.11 General guidance on spatial requirements for engineering plant and services are contained in Health Technical Memorandum 00 – ‘Best practice guidance for healthcare engineering’ (DH 2006). Further useful information regarding the provision of space for plant is contained in BSRIA Technical Note TN 9/92, and for building services distribution systems in BSRIA Technical Note TN 10/92.
- 6.12 Space should be allowed within walls and above ceilings to facilitate the concealment of electrical and mechanical services where possible. Securable demountable panels should be provided to allow access to control and isolation valves as well as any equipment that is necessarily concealed within the spaces. Each panel should be clearly, but discreetly, marked to identify the controls or equipment to be found behind the panel. The use of demountable panels is not acceptable in areas where infection control issues are paramount, for example in preparation rooms and operating theatres.
- 6.13 With the exception of drainage and heating pipework, engineering services should not be brought from the above-ceiling space of a floor below. Service distribution to a particular area should be contained in service spaces on that floor.
- 6.14 The design should ensure that the need to access services or equipment from within the theatre, anaesthetic room, preparation room or scrub room is kept to an absolute minimum. Wherever possible, access to plant and services should be from plantrooms or maintenance areas. Where this is not possible, every endeavour should be made to effect access from general circulation areas and not from clinical spaces.
- 6.15 In areas where wall-mounted heat emitters are installed, they should be contained within a 200 mm-wide perimeter zone. The 200 mm zone, together with the space required for minor engineering ducts required to service the emitter, is included in the building circulation allowance. The amount of space required for wall-mounted emitters can be limited by the use of ceiling emitters as an alternative.
- 6.16 Plantrooms, particularly for air-conditioning and ventilation, should be located as close as possible to the areas they serve, thus minimising the amount of space necessary to accommodate large ducts.

Ventilation plant serving theatres should be located immediately above the theatres, allowing ductwork to drop directly to the operating theatre below.

- 6.17 Care should be taken to ensure that noise and structure-borne vibration cannot be transmitted beyond the plantroom. Further guidance on acoustics and vibration can be found in Health Technical Memorandum 08-01.

## Design for safety

- 6.18 Health and safety legislation imposes a statutory duty on all who design, manufacture, import, supply, install or erect “articles for use at work” through a range of co-ordinated health and safety regulations enacted under the Health and Safety at Work etc Act 1974.
- 6.19 Key safety regulations relating to healthcare premises and equipment are:
- the Construction (Design and Management) Regulations 1994;
  - the Management of Health and Safety at Work Regulations 1999;
  - the Workplace (Health, Safety and Welfare) Regulations 1992;
  - the Provision and Use of Work Equipment Regulations 1998;
  - the Health and Safety (Safety Signs and Signals) Regulations 1996;
  - the Control of Noise at Work Regulations 2005;
  - the Pressure Systems and Transportable Gas Container Regulations 1989;
  - the Ionising Radiation (Medical Exposure) Regulations 2000;
  - the Ionising Radiation Regulations 1999;
  - the Gas Safety (Installation and Use) Regulations 2004.
- 6.20 The vulnerability of patients in healthcare premises, where many engineering systems impact on patient safety, introduces additional risks and calls for an increased awareness of the importance of engineering system integrity. This is particularly relevant in facilities for surgical procedures. Engineering systems should be designed to be especially robust to ensure that a failure in the quality or continuity of an essential engineering service cannot compromise patient safety.

- 6.21 Designers should be particularly aware of the role of engineering design in the control of infection, particularly in respect of water services (see Health Technical Memorandum 04-01 – ‘The control of Legionella, hygiene, “safe” hot water, cold water and drinking water systems’, DH 2006), ventilation systems (see Health Technical Memorandum 03-01) and electrical services (see Health Technical Memorandum 06-01 – ‘Electrical services supply and distribution’, DH 2007).
- 6.22 Clearly-identified devices for the control and isolation of primary engineering services should be located in areas where they can be protected against unauthorised interference, ideally in plantrooms, engineering service spaces, or circulation areas.
- 6.23 The need to employ formal “Permit to Work” procedures should be noted, particularly in respect of electrical systems. See Health Technical Memorandum 06-02 – ‘Electrical safety guidance for low voltage systems’ (DH 2006) and Health Technical Memorandum 06-03 – ‘Electrical safety guidance for high voltage systems’ (DH 2006). For medical gas systems see Health Technical Memorandum 02-01.

## Control of Substances Hazardous to Health (COSHH) Regulations 2005

- 6.24 The Health and Safety Executive publishes guidance notes, updated annually, on occupational exposure limits (Guidance Note EH40: ‘Occupational Exposure Limits’) for the control of exposure by inhalation of substances hazardous to health. The limits specified form part of the requirements of the Control of Substances Hazardous to Health (COSHH) Regulations 2005. Substances hazardous to health are in use in DSUs. Planning teams should comply with the COSHH Regulations.

## Fire safety

- 6.25 The policy in respect of fire safety is set out in Health Technical Memorandum 05-01 – ‘Managing healthcare fire safety’ (DH 2006). The trust should satisfy itself that the design meets the objectives of this guidance or a fire engineered solution that achieves similar objectives.
- 6.26 It is important to establish during the design stage those aspects of fire strategy that may affect the planning of a project. At appropriate stages of the design process the architect and engineer should discuss and verify their proposals with the relevant Building Control/Approved Inspector, and ensure that the project team and all other planning staff are fully acquainted with the fire safety strategy for the design. This will include operational aspects (staff responsibilities etc), equipment provision, and building and engineering layouts. Health Technical Memoranda 57–60 provide information on the selection of fire-resistant building components and materials (see [Appendix 3](#), References).

## Use of lasers in the operating theatre

- 6.27 Where lasers are to be used in an operating theatre, safety precautions in accordance with BS EN 60825 should be employed, including the provision of warning lamps at the entrances to the theatre and door interlocks preventing entry to the theatre when the laser is in use. These will need to have specified modifications, including caution on siting of pressure stabilisers. When used with a laser, the pressure stabilisers will need to be shielded to prevent sight lines. For further information see DB 9602 ‘Guidance on the safe use of lasers in medical and dental practice’ (MHRA 2003).

## Engineering services (mechanical)

### General

- 6.28 Mechanical services installation includes the distribution of the following services:
- heating;
  - hot and cold water;
  - ventilation systems;
  - refrigeration plant;
  - environmental control and building management systems;
  - medical gases and vacuum;
  - steam and condensate systems;
  - sterilizing and washer disinfectant equipment.
- 6.29 For the purposes of this guidance the installation is deemed to include each system from the point of entry to the department to the final connection to service outlets or specific equipment.

## Heating systems

- 6.30 In areas other than operating theatres, anaesthetic rooms, preparation rooms and scrub rooms (and other plenum ventilated/air-conditioned accommodation), general space heating requirements can be met either by wall-mounted low-pressure hot water radiators or ceiling-located low-pressure hot water emitters. A Building Management System (BMS) should control the heating system to ensure that it is automatically set back or turned off when the department, or zones within the department, are not in use. Heating throughout the building should be controlled to a minimum “set back” temperature of 12–15°C during “out of use” hours. The BMS should be equipped with a manual override to permit restoration of the plant to full operational status at short notice.
- 6.31 Where radiators are used they should be of the low surface temperature type and surface temperature should not exceed 43°C. Exposed heating pipework, accessible to touch, should be encased or insulated.
- 6.32 Radiators should normally be located under windows or against exposed walls, with sufficient clear space between the top of the radiator and the window sill to prevent curtains reducing heat output. There should be sufficient space under a radiator to allow cleaning machinery to be used. There should also be sufficient room behind the radiator for cleaning. Where a radiator is located on an external wall, back insulation should be provided to prevent excessive heat transmission through the building fabric.
- 6.33 All radiators should be fitted with thermostatic valves of robust construction, selected to match the pressure and temperature characteristics of the system. The thermostatic valve, fitted with a tamper-proof facility for pre-setting the maximum room temperature, should be controlled via a sensor located integrally or remotely as appropriate. To provide frost protection at its minimum setting the valve should not remain closed below a defined temperature.
- 6.34 Where appropriate, heating controls should be provided to modulate heating circuit flow temperatures in accordance with external temperature. Radiators may also be used to offset building fabric heat losses in mechanically ventilated spaces. The system should be designed to ensure that the heating and ventilation systems

operate in a co-ordinated manner and do not cause the space to overheat.

- 6.35 Ceiling heating panels can operate at higher surface temperatures than 43°C as long as the surface is not easily accessible. Heating panels should preferably run around the perimeter of the building. Panels should not be located over beds, patient trolley positions or in other locations where they might radiate directly onto a patient or member of staff for a prolonged period.
- 6.36 Ceiling panels should be selected to aesthetically match the adjacent ceiling and should be sealed to the adjacent ceiling by means of a gasket or similar.
- 6.37 Heating loops of ceiling panels should be controlled by automatic valves located above the ceiling and actuated from room thermostats. In large spaces several loops should be provided, each controlled from its own thermostat, to serve separate zones within the space.

## Hot and cold water systems

- 6.38 Hot and cold water storage and distribution systems should be designed in accordance with the requirements of Health Technical Memorandum 04-01.
- 6.39 Whilst cold water storage at high level will be the norm, care should be taken to ensure that all equipment proposed for the facility is capable of operation from the available static head. Where the static head is insufficient, a pressurisation set incorporating dual pumps should be installed.
- 6.40 All cold-water pipework, valves and fittings should be insulated and vapour-sealed to protect against frost, condensation and heat gain.
- 6.41 The domestic hot water supply should be taken from the calorifiers installation at a minimum outflow temperature of 60°C ± 2.5°C and distributed to all outlets in a manner that ensures all returns on the system maintain a temperature of at least 50°C.
- 6.42 Exposed hot water pipework, accessible to touch, should be encased or insulated.
- 6.43 Where possible, automatic water-conserving taps actuated by proximity detectors should be used. When specifying taps for scrub sinks, consideration should be given to the use of automatic mixer units providing water at a predetermined temperature.

### Ventilation systems (general)

- 6.44 Guidance on the design of ventilation systems for healthcare facilities may be found in Health Technical Memorandum 03-01. A section of the document is specifically concerned with design considerations related to operating theatre suites.
- 6.45 The ventilation system in the operating theatre suite has four main functions:
- dilution of bacterial contamination;
  - control of air movement within the theatre suite such that the transfer of airborne bacteria from less clean to cleaner areas is minimised;
  - control of space temperature and humidity;
  - to assist in the removal and dilution of waste anaesthetic gases.
- 6.46 Where operational policies depart from the provision of a conventional preparation room or anaesthetic room (see paragraphs 3.38–3.56), designers should satisfy themselves that robust solutions are provided that do not compromise the ability of theatre ventilation systems to contribute to the control of infection.

### Ventilation

- 6.47 The provision of a separate air handling plant for each theatre and its immediate support accommodation will facilitate economic operation, improved theatre availability and maintainability.
- 6.48 The ability to shut down plant when individual theatres are not in use will allow an overall reduction in energy consumption, whilst plant failure will only impact on the theatre served by that particular plant. Similarly, maintenance can be more easily planned when only one theatre is affected by maintenance shutdowns.
- 6.49 Care should be taken to ensure that the standards of Health Technical Memorandum 03-01 and Health Technical Memorandum 04-01 are achieved.
- 6.50 Subject to control of infection considerations, the ventilation systems of theatres may be set back or turned off during periods of non-use. When such a policy is implemented, note should be taken of the need to reinstate full ventilation well in advance of the commencement of operating. However, the system should ensure that the temperature within the theatre does not fall below 15°C to avoid lengthy temperature recovery periods.

### Ventilation (operating theatres – laminar flow)

- 6.51 Laminar flow style ventilation systems relate to the method of providing ventilation in the operating theatre only. Full design specifications can be found in Health Technical Memorandum 03-01 – ‘Specialised ventilation for healthcare premises’.
- 6.52 As with conventional systems, the provision of a separate air handling plant for each operating theatre and its immediate support accommodation will facilitate economic operation, improved theatre availability and maintainability.

### Ventilation (operating theatres – plant control and indication)

- 6.53 Theatre ventilation systems should be controlled by a Building Management System (BMS) which, in conjunction with an occupancy detector, will automatically set back or turn off plant when a theatre is not in use.
- 6.54 Ventilation systems should be controlled to ensure a minimum “set-back” temperature of 15°C during “out of use” hours to facilitate rapid warm-up if necessary, and the BMS should be equipped with a manual override to permit restoration of the plant to full operational status at short notice.
- 6.55 The theatre control panel in each theatre should indicate the status of the associated ventilation plant. The panel should indicate the actual theatre temperature and humidity, and controls on the panel should allow for adjustment of both.
- 6.56 For further guidance see Health Technical Memorandum 03-01.

### Ventilation (recovery units and anaesthetic rooms)

- 6.57 Recovery units and anaesthetic rooms should be ventilated to ensure dilution of anaesthetic gases. Where compartmentalisation of the recovery unit is envisaged to provide one or more critical care beds, care should be taken to ensure that air input to the partitioned area maintains an adequate air change rate.

### Ventilation cooling systems

- 6.58 Refrigeration loads for theatre suite ventilation systems should be met by a water chiller plant. Direct expansion systems are not advocated unless the refrigeration load is small, since direct expansion plant can only be controlled in steps (unlike chilled water, which can be continuously modulated).

- 6.59 Heat rejection plant should consist of air-cooled condensers. Wet cooling towers should not be used.

### **Building management systems**

- 6.60 All engineering plant and equipment associated with the internal environment should be monitored and regulated by a Building Management System (BMS) in accordance with the provisions of Health Technical Memorandum 2005 – ‘Building management systems’ (NHS Estates 1996). The BMS should also monitor, measure and record energy consumption for the facility.
- 6.61 If the DSU is located within another facility, its control should be set up as an outstation of the main BMS so that systems serving the DSU can be monitored and controlled at a central station.
- 6.62 Management of the engineering systems within the facility should be capable of control both from the central station and from the outstation itself.
- 6.63 Links from the outstation to the central station can be achieved by, for example, hard wire, modem or radio communication. It is important to ensure that sensitive medical equipment is not adversely affected by radio communication interference.

### **Piped medical gases**

- 6.64 Piped medical gases, in compliance with Health Technical Memorandum 02-01, should be provided to the operating theatre, anaesthetic room, recovery unit, and to the medical equipment maintenance area if required.
- 6.65 In a conventionally ventilated operating theatre, medical gases should be provided to medical supply units located at each end of the operating table. One medical supply unit will be located at the end of the table normally occupied by the anaesthetist and will carry oxygen, nitrous oxide, medical (400 kPa) air, vacuum, anaesthetic gas scavenging and, as an option, surgical (700 kPa) air.
- 6.66 The provision of surgical air at both ends of the operating table will allow greater flexibility in the use of the theatre. However, this flexibility may be compromised if it is policy to use docking anaesthetic machines that attach to the anaesthetists medical supply unit, thus committing the anaesthetist to work from one end of the table.
- 6.67 If docking medical supply units are to be used, the structural engineer should be consulted so that appropriate structural support can be provided.

- 6.68 A second medical supply unit at the opposite end of the operating table will carry oxygen, nitrous oxide, medical (400 kPa) and surgical (700 kPa) air, vacuum and anaesthetic gas scavenging.

- 6.69 When providing piped medical gases to anaesthetist and surgeon positions in a theatre fitted with laminar flow style ventilation, consideration should be given to the location of medical gas supply outlets in the support framework of the canopy, thus obviating the need for medical supply units which cause turbulence in the air flow.

- 6.70 When providing piped medical gases to an anaesthetic room, these should be provided via wall-mounted units.

### **Steam**

- 6.71 The requirement for steam within the facility will be limited to humidification equipment associated with the air handling plant. See Health Technical Memorandum 03-01.

### **Internal drainage**

- 6.72 A system of soil and waste drainage including anti-siphon and ventilation pipework should be provided in accordance with BS 5722.
- 6.73 Where plastic pipework materials are used, suitable intumescent collars should be fitted when breaching fire compartments, and acoustic wrapping should be applied where drainage runs above wards and other sensitive areas.
- 6.74 The gradient of branch drains should be uniform and adequate to convey the maximum discharge to the stack without blockage. Practical considerations such as available angles of bends, junctions and their assembly, as well as space constraints, will normally limit the gradient to about 1:50 (20 mm/m).
- 6.75 For larger pipes, for example 100 mm diameter, the gradient may be less, but this will require high-quality workmanship if an adequate self-cleaning flow is to be maintained.
- 6.76 Bedpan washers or macerators should discharge with a short branch to a vertical stack or horizontal drain. The waste should not be installed above or close to heating or hot water mains. If a bedpan washer or macerator discharges to a 100 mm drain, frequently used large volume appliances should be situated upstream of its connection to provide additional flushing.

6.77 Provision for inspection, rodding and maintenance should ensure “full bore” access and be located outside user accommodation. The location of manholes within the building should be avoided.

### Noise

6.78 Excessive noise in individual areas, whether generated by plant or by external sources such as passing traffic, can be intrusive and impact adversely on operational efficiency. Further guidance on acoustics and vibration can be found in Health Technical Memorandum 08-01.

6.79 Ventilation systems should be designed so that noise from air handling plant is not transmitted into working areas and that ductwork itself neither generates nor amplifies sound. Ventilation systems should not be able to breach confidentiality by transmitting conversation from area to area.

6.80 Consideration should be given to the containment of noise from the anaesthetic gas scavenging plant.

6.81 A suitable acoustic enclosure may be required to effect compliance with the noise levels deemed acceptable in Health Technical Memorandum 02-01.

6.82 Ventilation noise levels within the theatre suite generally should be in accordance with the requirements of Health Technical Memorandum 03-01.

## Engineering services (electrical)

### General

6.83 In general, electrical services will include:

- incoming supply and distribution board;
- emergency electrical supplies;
- small power distribution systems;
- lighting systems;
- IT cabling systems;
- telephone systems;
- security systems;
- staff call, public address;
- entertainment systems;
- lightning protection;
- warning signs such as “X-rays/Lasers in Use”.

6.84 Electrical installations should comply with the current editions of BS 7671 IEE Wiring Regulations together with Guidance Note 7 (Special Locations), and Health Technical Memorandum 06-01. See also ‘Medical Electrical Installation Guidance Notes’ (MEIGaN), (MHRA 2005).

6.85 Care should be taken to avoid mains-borne interference and electrical radio frequency interference affecting diagnostic and monitoring equipment, computers or other sensitive electronic equipment. Guidance on the avoidance and abatement of electrical interference is given in Health Technical Memorandum 06-01.

### Incoming supply and distribution board

6.86 The point of entry for the electrical supply will be a switchroom housing the main isolators and distribution equipment. This space will also be the centre for subdistribution electrical services. Wherever possible, all equipment should be mounted at a height to give easy access from a standing position. Further guidance is given in Health Technical Memorandum 00.

6.87 All switchgear should be capable of being locked in the “off” position.

### Emergency electrical supplies

6.88 Emergency electrical provision should comply with the requirements of Health Technical Memorandum 06-01.

6.89 The emergency generator providing electricity in the event of a main supply failure should be capable of providing full (100%) backup to the DSU to the exclusion of refrigeration plant serving air-conditioning and comfort-cooling plant.

6.90 If an existing generator is to be used, the ability to provide 100% emergency coverage will be dependent on the spare capacity available. If this minimum requirement cannot be met, it will be necessary to either replace the existing generator with a larger set, provide an additional generator that can be run in parallel, or provide an additional generator dedicated to the surgical procedures facility.

6.91 Equipment and systems that cannot tolerate the delay inherent in bringing an emergency generator supply online (including theatre operating lights, physiological monitoring equipment, computer systems, and clocks on the theatre control panel

and in anaesthetic rooms and recovery areas) should be further protected against generator start-up delays by the provision of uninterruptible power supplies. See also paragraphs 6.93–6.99.

- 6.92 In the event of a main supply or local final circuit failure, escape routes should be illuminated by self-contained, battery-powered luminaires charged continuously from the main supply and capable of providing illumination for a period of three hours.

### Small power distribution systems

- 6.93 The particular requirements of BS 7671 Guidance Note 7 (Special Locations) in respect of medical locations and associated areas should be adhered to in respect of operating theatres, anaesthetic rooms, recovery units and any other treatment areas identified as “medical locations”. Consideration should be given to socket-outlets in critical areas, for example recovery and critical care, to be unswitched, thus obviating the possibility of essential equipment being accidentally switched off.
- 6.94 Circuit protection should be either by using a residual current device or from an isolated power supply as defined in BS 7671 Guidance Note 7. Monitoring panels should be installed within the treatment area and may be an integral part of the theatre panel. Consideration should also be given to the use of two circuits per area supplied for resilience.
- 6.95 Consideration should also be given to the use of interleaved circuits and duplex supply units (IPS and UPS) such that the loss of power in any one unit or circuit does not compromise the safety of supplies to any one area. The provision of IPS supplies back-up by UPS is to ensure the resilience of the final sub-circuits.
- 6.96 In non-medical locations 13-amp switched and shuttered socket-outlets should be provided in accordance with the normal requirements of BS 7671 (IEE Regulations – 16th edition).
- 6.97 Wherever possible, cables and cable containment systems should be concealed behind walls and ceilings. Where equipment is permanently installed or where there is a possibility of equipment theft, for example televisions in staff rest rooms, switched double-pole 13-amp spur outlets should be used in preference to socket-outlets. The spur outlet should incorporate a red neon lamp indicating when the supply to the equipment is live.

- 6.98 Equipment requiring a three-phase supply should be permanently connected to a separate sub-circuit. The sub-circuits, incorporating a circuit breaker, should be fed from the distribution board and terminate in a local isolator. Care should be taken to ensure that earth bonding is carried out in accordance with BS 7671.
- 6.99 Guidance on the power supply requirements for fixed radiodiagnostic equipment is contained in MEIGaN. See also Health Building Note 6 – ‘Facilities for diagnostic imaging and interventional radiology’.
- 6.100 Adequate provision should be made in circulation areas, for example corridors and lobbies, to permit the use of domestic cleaning equipment with flexible cords up to 9 metres long. In clinical areas with IPS sockets, particular consideration should be given to prevent the incorrect use of circuits (defined “For medical equipment only”) by cleaning equipment.
- 6.101 Isolation switches should be provided immediately adjacent to all engineering plant and equipment, clearly labelled to identify the equipment that they relate to.
- 6.102 Heating appliances and automatic equipment should be provided with red neon lamps indicating when they are energised. The neon lamps should be incorporated in the control panel of the equipment, in the control switch, or in the socket-outlet or spur unit from which the equipment derives its supply.

### Lighting (general)

- 6.103 To achieve energy efficiency, lighting systems should be designed to:
- maximise natural daylight;
  - avoid unnecessarily high levels of illumination;
  - incorporate efficient luminaires, control gear and lamps;
  - incorporate effective controls.
- 6.104 For further information see CIBSE Guide – ‘Energy Efficiency in Buildings’. The CIBSE Lighting Guide LG2, ‘Hospitals and Health Care Buildings’ should be consulted to obtain detail regarding illumination levels.
- 6.105 Lighting within the facility should be co-ordinated with architectural design. In particular there should be collaboration to ensure that decorative

finishes are compatible with the colour-rendering properties of lamps and that the spectral distribution of the light source is not adversely affected.

- 6.106** Lighting switches should be provided in easily-accessible positions within each area, and at appropriate locations in corridors and general circulation areas. In areas with multiple luminaires, switching should allow the selection of luminaires appropriate only to that area requiring illumination.
- 6.107** Where local circumstances permit, the provision of time switches or occupancy controls using infrared, acoustic or ultrasonic detectors should be considered.
- 6.108** Generally, luminaires should be fitted with fluorescent lamps equipped with low-loss or high frequency control gear. Where luminaires are infrequently used, or where the design intent of the architect in respect of ambience dictates, LV lamps or tungsten lamps may be considered. Where necessary, general lighting should be supplemented with dedicated task lighting.
- 6.109** Anaesthetic rooms should be provided with adjustable ceiling-mounted examination lamps. The emergency electrical provision to the examination lamp should include a battery backup to cater for the delay in a generator supply becoming available and also to provide short-term protection against possible failure of the generator.
- 6.110** In areas where visual display terminals are in use, lighting should be designed to avoid any bright reflections from the screen. Generally, the lighting in such circumstances should comply with the guidance given in CIBSE Lighting Guide LG3.
- 6.111** Safety escape lighting should be provided on primary escape routes in accordance with the provisions of Health Technical Memorandum 06-01 and the CIBSE Lighting Guide LG2 – Hospitals and Health Care Buildings.
- 6.112** Luminaires should comprise high-efficiency fluorescent units selected to ensure correct colour rendition. The luminaires should be recessed or semi-recessed units protected against the ingress of moisture. See BS EN 60598-2-25:1995, IEC 60598-2-25:1994 'Luminaires for use in clinical areas of hospitals and healthcare buildings'. Luminaires should be easily accessible to facilitate lamp changing, maintenance and cleaning.
- 6.114** Operating theatre luminaires should be individually or collectively dimmable.
- 6.115** One or more operating table luminaires should be installed to comply with the requirements of BS EN 60598 and selected to meet the clinical function of the particular operating theatre. In a conventionally ventilated theatre, the design of the lamp casing(s) is relatively unimportant other than it should be easily cleanable. Operating luminaires for laminar flow style ventilation applications should be selected to minimise the creation of turbulence in the air flow (see Health Technical Memorandum 03-01).
- 6.116** It should be noted that operating table lighting systems that do not require the provision of suspended luminaires are in an advanced state of development and should be considered as a possible alternative to conventional operating lamp provision.
- 6.117** Operating luminaires should be designed to operate at low voltage (24 V AC/DC), with the main supply being backed up both by an essential supply and a battery and associated equipment to provide continuity of supply. The battery capacity should be able to provide power to the operating luminaire(s) for a period of three hours. Automatic changeover facilities should be incorporated to ensure that there is no perceptible break in supply.
- 6.118** Where more than one operating luminaire is provided, each luminaire should be separately supplied, with no commonality of transformer, rectifier, battery equipment or control equipment.

### *Lighting (operating theatres)*

- 6.112** Detailed guidance regarding the provision of lighting in operating theatres is given in the CIBSE Lighting Guide LG2, 'Hospitals and Health Care Buildings'. General lighting, which should be supplied by at least two independent circuits, should give an even distribution of illumination throughout the theatre.

### **Theatre control panel**

- 6.119** Each theatre should be equipped with a control panel to accommodate environmental controls, alarms and instrumentation, clocks, X-ray viewing screens, and lighting controls. The control panel should be fully recessed and ideally should be accessible for maintenance from outside the theatre. All internal cabling should be LSF insulated.

### Controlled Drugs (DDA) cupboard

6.120 Drug cupboards should be provided to BS 2881 – ‘Specification for hospital cupboards (wall fixing) for poisons and dangerous drugs’. The controlling pharmacist should confirm the position, type and size. See also Health Technical Memorandum 63.

### Clocks

6.121 Clocks in theatres and the associated anaesthetic room should show identical times and be radio-controlled with sweep seconds hand. In these rooms, synchronous clocks connected to lighting circuits with fuses local to each clock should be employed, with back-up to ensure continuity of operation during the changeover delay at times of power failure.

6.122 Other clocks in the department may be either synchronous clocks connected to lighting circuits with fuses local to each clock, or powered by an internal battery.

### Background music systems

6.123 It has become common to have background music in operating theatres to improve the working environment. Where such provision has been embraced, a wired-in system should be provided with the player unit, compact disc or audio tape being located in an adjacent non-sterile area, for example the clean corridor immediately outside the theatre.

6.124 The player should be contained in a lockable enclosure and should be wired into an adjacent spur outlet to discourage unauthorised removal.

6.125 Speakers within the theatre should be ceiling-mounted and moisture-resistant.

### Information Technology (IT) systems

6.126 The approach to provision of IT and telephone infrastructure within the DSU may be conditioned by existing systems. However, where possible, a structured wiring system as described in the HGN – ‘Structured cabling for IT systems’ should be provided. This will permit a unified approach to the provision of cabling for:

- voice systems;
- data systems;
- imaging systems;
- CCTV;

- alarm systems.

6.127 In determining the nature of the IT system to be provided, it is necessary to identify:

- rooms to be served;
- whether structured cabling will be used;
- what density of outlets is to be provided (not less than two per workstation);
- whether wiring will be on a “flood” or “as required” basis.

### Telephone systems

6.128 As stated in the above paragraphs, it may be beneficial to integrate voice cabling with the structured wiring system for IT if provided. Where a cabling system supporting voice/data is not available, the existing hospital block wiring should be extended to serve telephones within the department.

6.129 Telephones with visual indication (no bell) are required for rooms directly adjacent to operating theatres. Telephone handsets should be capable of hands-free operation, and theatre telephone instruments should be equipped with amplifiers and a volume control.

6.130 The telephone system should be capable of use as an intercommunication system between the various areas within the DSU using abbreviated dialling code techniques.

6.131 Coin- and/or card-operated payphones should be provided in the reception area for waiting relatives and visitors. Payphones should incorporate acoustic hoods. The payphone should be accessible for use by disabled people.

### Security systems

6.132 The entrance(s) to the DSU should be protected by one of the variety of electronic access control systems available.

6.133 Points of ingress and egress from the department should be monitored by high-definition, closed-circuit television cameras equipped with pan and tilt facility and capable of producing high-quality images at low levels of light. Positioning of cameras should be determined with care, selecting optimum positioning for maximum field of coverage. Monitors should be sited at a location that is permanently staffed whilst the department is in use.

6.134 Rooms in which members of staff are likely to be alone with adult members of the public, for example relatives, should be equipped with panic alarm buttons that can signal difficulty to a location that is permanently staffed whilst the department is in use.

### Fire detection and alarm systems

6.135 A fire detection and alarm system complying with Health Technical Memorandum 05-03 Part B – ‘Fire detection and alarm systems’ (DH 2006) should be installed throughout the department.

### Staff call systems

6.136 Each recovery bed position should incorporate a bedhead unit providing the following:

- 13-amp switched and shuttered socket-outlets supplied from an IPS circuit as appropriate;
- medical oxygen, air and vacuum outlets;
- bedhead luminaire switch;
- nurse call button/indicator lamp;
- staff/staff emergency pull switch;
- socket for patient handset;
- IT connection(s).

6.137 Where patients may temporarily be left alone, for example WCs, a staff call system should be provided to permit the summoning of assistance if required. The alarms should be capable of operation by a disabled person.

## 7 Cost information

### Introduction

7.1 For all types of health building, it is important that building costs and revenue expenditure are best-value and consistent with acceptable standards. In applying this guidance, the need for economy should always be of prime concern. Where appropriate, space should be shared between similar activities taking place at different times. However, this solution should not be detrimental to the proper functioning of the spaces involved nor to the needs of users.

### Departmental Cost Allowance Guides

- 7.2 Departmental Cost Allowance Guides (DCAGs) related to this Health Building Note are officially notified in 'Quarterly Briefing', published by the Department of Health. For further information, or to subscribe (see <http://www.dh.gov.uk>). For a full listing of all DCAGs see 'Healthcare Capital Investment' on the DH Estates and Facilities Knowledge and Information Portal (KIP; <http://estatesknowledge.dh.gov.uk>).
- 7.3 For general guidance on producing business cases and ensuring robust cost information is obtained to underpin business cases, see 'How to cost a hospital' (NHS Estates, 2005).
- 7.4 The attention of the project team is drawn to the Capital Investment Manual (CIM – Business Case Guide; see <http://www.dh.gov.uk>). This aims to reduce planning work and to encourage the production of sound business case support of both capital and revenue expenditure. Capital works estimates should be based, wherever applicable, on industry norms, such as DCAGs plus a percentage to cover on-costs.
- 7.5 The DCAGs for this Health Building Note reflect the total building, engineering and accommodation requirements for day surgery services generally located on an acute hospital site, where common services are shared. Costs are based on a typical

two-storey new-build unit on a greenfield site with no planning constraints.

- 7.6 DCAGs are exclusive of VAT, building and planning fees and all local authority charges, and are based on a location factor of 1.00.

### On-costs

- 7.7 An allowance for on-costs (such as communication space, external works, external engineering services and abnormals) should be added to the DCAGs. Abnormals will largely be determined by site characteristics (such as an inner-city location or poor ground conditions) and by the condition or type of any building to be refurbished.
- 7.8 Project teams should assess all likely on-cost implications of individual sites and schemes at the earliest opportunity.

### Locational factors

- 7.9 Locational factor adjustments should be applied to works costs (that is, DCAGs plus established on-costs) to take account of local market conditions. For further information, see 'Quarterly Briefing'.

### Schedules of accommodation

- 7.10 The schedule of accommodation shows a notional whole department, which highlights the scope for sharing accommodation. This example is not to be taken as ideal provision for any particular project.
- 7.11 The example is as follows:
- Example 1: Dedicated DSU within an acute hospital or treatment centre (serving a population of 300,000). This example includes pre-assessment facilities.
- Example 2: Dedicated DSU within an acute hospital or treatment centre (serving a population of 300,000).
- 7.12 The schedules of accommodation in this document may be updated from time to time. For the latest

version see the schedule of accommodation database on the DH Estates and Facilities Knowledge and Information Portal (KIP; <http://estatesknowledge.dh.gov.uk>).

## Dimensions and areas

- 7.13 The critical dimensions of an area are determined by the spatial requirements of any activities to be carried out within it. Studies to establish dimensional requirements, in the form of critical dimensions, appear as diagrams in [Appendix 2](#) of this document and in Health Building Note 00-04 – ‘Circulation and communication spaces’.
- 7.14 Planning teams should have data available at the earliest stages of a project to enable the approximate assessment of sizes involved. Areas used for the purpose of establishing cost allowances are listed in the schedules of accommodation at the end of this chapter. These areas do not represent recommended sizes and should not be regarded as specific individual entitlements.
- 7.15 The efficient planning of a building may necessitate a variation to the areas given. For example, in the refurbishment/conversion of older property:
- rooms tend to be larger than the areas given;
  - some rooms may be too small or in the wrong location for efficient use;
  - circulation space tends to form a larger than normal proportion of the total area.

## Circulation

- 7.16 All internal corridors, small vertical ducts, spaces occupied by partitions/walls and other space for circulation, are costed in the DCAGs. Provision is also made for a 5% planning zone and 3% engineering zone adjacent to the external walls.
- 7.17 Circulation figures included in the DCAGs are those anticipated for new-build facilities. Where constraints are encountered, for example in refurbishment/conversion of older types of property, this figure may increase.

## Communications

- 7.18 Hospital “streets”, staircases and lifts (linking spaces) are not included in the DCAGs. Costs related to these elements, along with a suitable space allowance, should be made in the on-costs.

## Land costs

- 7.19 DCAGs are exclusive of all land costs and associated fees. However, costs associated with land costs should be included in business case submissions (as detailed in the Capital Investment Manual) and may therefore have an important impact on the overall cost viability of a scheme.

## Engineering services

- 7.20 The following engineering services are included in the cost allowances (see [Chapter 6](#) and Activity DataBase for further information). Primary engineering services are assumed to be conveniently available at the boundary of the department.
- 7.21 Mechanical services:
- heating – low-pressure hot water system;
  - ventilation – mechanical supply to, and extraction from, the recovery area and anaesthetic rooms, and other areas requiring mechanical ventilation such as WCs and showers (excludes ventilation plant, such as air-handling units or extract fans);
  - air-conditioning – to operating theatres. The allowance includes for a separate supply and extract plant per theatre, refrigeration plant and local steam generators (humidification);
  - cold water – central supply to service points including drinking water (excludes storage tanks);
  - hot water – supply from a central system (excludes storage and generation);
  - piped medical gases – oxygen, nitrous oxide, medical air (400 kPa) and surgical air (700 kPa), carbon dioxide and medical vacuum (excludes medical compressed air and vacuum plant);
  - automatic anaesthetic gas scavenging (AGS) system in the operating theatre.
- 7.22 Electrical services:
- departmental distribution boards;
  - general lighting, as required by task;
  - staff location system;
  - emergency luminaires, as appropriate;
  - socket-outlets and other power outlets for fixed and portable equipment;

## Surgery: Health Building Note 10-02 – Day surgery

- supplementary equipotential earth bonding;
- uninterruptible power supply (UPS) and equipment;
- fire, security, and Controlled Drug cupboard alarm systems;
- TV/radio wireways;
- telephone internal cabling distribution and outlets (excludes handsets);

- data wireways;
- building management system.

### 7.23 Equipment (Group 1):

- X-ray viewers;
- Controlled Drugs cupboards.

## Health Building Note 10-02 Day surgery

Dedicated DSU within an acute hospital or a treatment centre (Serving a population of 300,000)

	Example 1	Example 2
Day surgery facilities comprising:		
Entrance facilities	External entrance	Internal entrance
Pre-assessment accommodation	2 Consulting/examination rooms	Not included
Admission suite facilities	6 suites	6 suites
Operating theatre facilities	4 theatres	4 theatres
Recovery facilities: Post anaesthesia care unit (PACU)	9 places	9 places
Recovery facilities: Second stage	16 places	16 places
Discharge facilities	8 places	8 places
Staff & support facilities	Integrated	Integrated

Activity Space	Qty	Area	Total Area	Qty	Area	Total Area	Para	Notes
<b>Entrance reception &amp; waiting facilities</b>								
Vehicle drop-off point	–	–	–	–	–	–	Para 3.6	External allowance, Designated
Car parking spaces	–	–	–	–	–	–	Para 3.6	External allowance, Dedicated – Number project-specific
Car parking spaces for people with disabilities	–	–	–	–	–	–	Para 3.6	External allowance, Dedicated – Number project-specific
Main entrance draught lobby	1	11.0	11.0	N/A	–	–	Para 3.6	Includes entrance canopy area
Foyer/concourse area	1	–	–	1	–	–	–	Circulation allowance
Reception: 2 staff	1	10.0	10.0	1	10.0	10.0	Para 3.12	Associated with Administration suite
Waiting area: 20 persons including 2 wheelchair users	–	–	–	1	33.0	33.0	Para 3.17	
Waiting area: 30 persons including 3 wheelchair users	1	49.5	49.5	–	–	–	Para 3.17, 3.22	Includes pre-assessment waiting
Infant feeding room	1	5.5	5.5	1	5.5	5.5	Para 3.19	
Nappy change room with handwash	1	4.0	4.0	1	4.0	4.0	Para 3.19	
Public telephone: single booth	1	1.5	1.5	1	1.5	1.5	Para 3.19, 5.2	
Public telephone: single booth, accessible	1	2.0	2.0	1	2.0	2.0	Para 3.19, 5.2	
Parking bay: 3 wheelchairs	1	2.0	2.0	1	2.0	2.0	Para 3.19	
WC & hand-wash: accessible, wheelchair	1	4.5	4.5	1	4.5	4.5	Para 3.19	
WC & hand-wash: semi-ambulant	4	2.5	10.0	2	2.5	5.0	Para 3.19	
Secondary entrance	1	–	–	1	–	–	Para 3.8, 3.9	Circulation allowance Entrance for staff & supplies

Activity Space	Qty	Area	Total Area	Qty	Area	Total Area	Para	Notes
<b>Pre-assessment facilities</b>								<b>Optional provision</b>
Consulting/examination room: both sides couch access	2	16.5	33.0	N/A	–	–	Para 3.24	
<b>Admission suite facilities</b>								
Admission & examination room	6	13.5	81.0	6	13.5	81.0	Para 3.27	Direct access to changing room Dual entry/exit
Patient changing room: accessible, wheelchair: 1 person	6	6.0	36.0	6	6.0	36.0	Para 3.29	
Waiting area: individual bay, 2 person	6	5.0	30.0	6	5.0	30.0	Para 3.32	
WC & hand-wash: accessible, wheelchair-assisted	1	4.5	4.5	1	4.5	4.5	Para 3.37	
Staff base: 2 staff	1	6.0	6.0	1	6.0	6.0	Para 3.34	
Parking bay: 3 wheelchairs	1	2.0	2.0	1	2.0	2.0	Para 3.36	
WC & hand-wash: specimen, accessible, wheelchair	1	4.5	4.5	1	4.5	4.5	Para 3.25, 3.27	
Dirty utility: urine test	1	9.0	9.0	1	9.0	9.0	Para 3.25, 3.27	
<b>Operating theatre suite facilities</b>								
Anaesthetic room	4	19.0	76.0	4	19.0	76.0	Para 3.38	See optional accommodation
Scrub-up & gowning room: 3 places	4	11.0	44.0	4	11.0	44.0	Para 3.57	
Preparation room	4	12.0	48.0	4	12.0	48.0	Para 3.67	See optional laminar flow theatre
Operating theatre: day surgery	4	55.0	220.0	4	55.0	220.0	Para 3.74	
Exit/parking bay: theatre, 1 bed/trolley	4	12.0	48.0	4	12.0	48.0	Para 3.108	
Store: equipment, local to theatre	4	1.0	4.0	4	1.0	4.0	Para 3.111	
Dirty utility: serving 1 theatre	4	12.0	48.0	4	12.0	48.0	Para 3.138	See optional accommodation
<b>Recovery unit or Post-Anaesthetic Care Unit (PACU) facilities</b>								
Recovery bay: post-anaesthetic, 1 place	9	13.5	121.5	9	13.5	121.5	Para 3.174	Patients & carers En-suite to Interview room Second stage recovery Second stage recovery & discharge lounge
Staff & communications base: enclosed: 2 staff	1	11.0	11.0	1	11.0	11.0	Para 3.183	
Clean utility with blood bank	1	17.0	17.0	1	17.0	17.0	Para 3.184, 3.166	
Dirty utility: bedpan disposal & urine test	1	12.0	12.0	1	12.0	12.0	Para 3.190	
Waiting area: 5 persons including 1 wheelchair user	1	9.0	9.0	1	9.0	9.0	Para 3.182	
Recovery bay: second-stage	16	6.0	96.0	16	6.0	96.0	Para 3.192	
Staff & communications base: enclosed: 2 staff	1	11.0	11.0	1	11.0	11.0	Para 3.197	
Beverage & snack preparation bay	1	6.0	6.0	1	6.0	6.0	Para 3.201	
Discharge lounge: 8 places	1	20.0	20.0	1	20.0	20.0	Para 3.203	
Interview & counselling room: 5 places	1	9.0	9.0	1	9.0	9.0	Para 3.205	
WC & hand-wash: accessible, wheelchair	1	4.5	4.5	1	4.5	4.5	Para 3.205	
Store: patients' clothing	1	4.0	4.0	1	4.0	4.0	Para 3.30, 3.206	
WC & handwash: accessible, wheelchair	2	4.5	9.0	2	4.5	9.0	Para 3.207	

Activity Space	Qty	Area	Total Area	Qty	Area	Total Area	Para	Notes	
<b>Support facilities</b>									
Office: medical reporting: 2 staff	1	13.0	13.0	1	13.0	13.0	Para 3.114	Shared with Pre-assessment facilities	
Near patient testing/status laboratory	1	8.5	8.5	1	8.5	8.5	Para 3.161		
Service room: equipment	1	12.0	12.0	1	12.0	12.0	Para 3.208		
Parking bay: mobile X-ray & ultrasound unit	1	5.0	5.0	1	5.0	5.0	Para 3.115		
Parking bay: resuscitation trolley	1	1.0	1.0	1	1.0	1.0	Para 3.117		
Parking bay: fibre optic bronchoscope light source trolley	1	1.0	1.0	1	1.0	1.0	Para 3.117		
Utility: cleaning room, flexible endoscope	1	15.0	15.0	1	15.0	15.0	Para 3.118		
Store: Clean flexible endoscopes	1	6.0	6.0	1	6.0	6.0	Para 3.118		
Store: satellite pharmacy	1	6.0	6.0	1	6.0	6.0	Para 3.169		
Store: bulk supplies	–	–	–	1	60.0	60.0	Para 3.150		
Store: bulk supplies	1	80.0	80.0	–	–	–	Para 3.150		
Store: clinical equipment	1	30.0	30.0	1	30.0	30.0	Para 3.155		
Store: Linen	2	3.0	6.0	2	3.0	6.0	Para 3.157		Associated with theatre accommodation & admission suite
Store: ready-to-use medical gas cylinders	1	4.0	4.0	1	4.0	4.0	Para 3.160		
Store: crutches and splints	1	2.0	2.0	1	2.0	2.0	Para 3.159		
Hold: disposal	1	15.0	15.0	1	15.0	15.0	Para 3.144		
Cleaners (Housekeeping) room	4	7.0	28.0	4	7.0	28.0	Para 3.212	Associated with various areas of the unit	
Switchgear room	1	4.0	4.0	1	4.0	4.0	Para 3.216, 6.86		
UPS & IT hub room	1	9.0	9.0	1	9.0	9.0	Para 3.218		
<b>Staff support facilities</b>									
Rest & dining room with beverage & snack preparation bay: 25 staff	1	33.0	33.0	1	33.0	33.0	Para 4.4, 4.7	Secretarial/Admin	
WC & wash: ambulant	2	2.0	4.0	2	2.0	4.0	Para 4.9		
WC & handwash: ambulant	4	2.0	8.0	4	2.0	8.0	Para 4.9		
WC & handwash: accessible, wheelchair	1	4.5	4.5	1	4.5	4.5	Para 4.10		
Shower: ambulant (non-patient)	4	2.5	10.0	4	2.5	10.0	Para 4.12		
Staff changing room including boot change: 30 places	1	25.0	25.0	1	25.0	25.0	Para 4.12		
Staff changing room including boot change: 30 places	1	25.0	25.0	1	25.0	25.0	Para 4.12		
Utility: footwear washing	1	4.0	4.0	1	4.0	4.0	Para 4.21		
Interview/meeting room: 6 persons	1	14.0	14.0	1	14.0	14.0	Para 4.23		
Office: 1 staff	2	10.5	21.0	2	10.5	21.0	Para 4.25		
Office: 3 staff	1	18.0	18.0	1	18.0	18.0	Para 4.26		

Activity Space	Total Area		Total Area	
Net Allowance	1536.0		1450.5	
5% Planning Allowance	77.0		72.5	
Total	1613.0		1523.0	
3% Engineering Allowance	48.5		45.5	
27% Circulation Allowance	435.5		411.0	
Total Allowance	2097.0		1979.5	
<b>Essential complementary/shared accommodation</b>				
Activity Space	Area	Total Area	Para	Notes
Seminar room: 20 persons	30.0	40.5	Para 4.28	Office & IT study
Office: 4 staff	24.0	32.5	Para 4.27	
<b>Optional Accommodation</b>				
Waiting play area: 5 children	13.0	17.5	Para 3.21	Shared between 2 theatres Shared between 2 theatres Within theatre Additional area allowance to theatre allowance Optional extra over for laminar flow theatres
Parking bay: shopping, prams & pushchairs	6.0	8.0	Para 3.21	
Dirty utility: serving 2 theatres	14.0	19.0	Para 3.138	
Scrub-up & gowning room: 6 places	16.0	21.6	Para 3.57	
Scrub-up & gowning bay: 3 places	7.0	9.5	Para 3.57	
Operating theatre: laminar flow, day surgery	55.0	74.5	Para 6.51	
Parking bay: mobile X-ray, image intensifier & ultrasound unit	8.0	11.0	Para 3.116	
Recovery room: post anaesthetic, 1 place				
Store: bulk supplies	26.0	35.0	Para 3.174	
Store: bulk supplies	80.0	108.0	Para 3.150	
Printer/photocopier room	100.0	135.0	Para 3.150	
Interview & counselling room: 5 persons (non-patient)	8.0	11.0	Para 3.15	
	9.0	12.0	Para 4.23	

# Appendix 1 – Capacity planning

## Introduction

Appendix 2 provides a method which may be used to calculate the number of operating theatres required in a day surgery unit. The method is illustrated by worked examples.

## Definitions

### Workload per annum

The workload per annum is the number of day surgery cases to be performed in the operating theatres of the day surgery unit.

### Workload capacity of one operating theatre

The workload capacity of one operating theatre is the number of day surgery cases per annum that can be accommodated in one operating theatre.

## Method

### Workload per annum

The workload per annum should be forecast locally. In estimating the future number of day surgery cases, account should be taken of a range of factors, including:

- the size and content of past and present workload;
- developments and increase in future workload;
- the demography of the population to be served.

### Workload capacity of one operating theatre

The workload capacity of one operating theatre is the product of:

- the average number of cases per working day;
- the length of the working week;
- the length of the working year.

In identifying the average number of cases per working day, consideration should be given to the length of the working day: this may, for example, include provision for evening sessions.

The length of the working week should be at least 5 days. Planned preventative maintenance should be carried out when the operating theatres are closed.

The length of the working year would not be expected to be less than 50 weeks.

### The number of operating theatres required

The number of operating theatres required in the day surgery unit is the workload per annum divided by the workload capacity of one operating theatre.

The number of operating theatres required will seldom be an exact whole number. It will generally be necessary to round up the answer to the next highest whole number; this inevitably introduces some spare capacity.

If, however, the number of operating theatres only slightly exceeds a whole number (for example if the figure is 2.1 or 4.2), assumptions should be checked to see whether small changes can be made which would make it possible to provide the rounded down number of operating theatres.

## Worked examples

The method described above is illustrated by three worked examples.

### Worked example 1

The following assumed figures are used in worked example 1 to illustrate the method:

- workload per annum (number of cases) = 7000;
- number of cases per working day = 15;
- length of working week in days = 5;
- length of working year in weeks = 50.

The workload capacity of one operating theatre is  $15 \times 5 \times 50$  cases

= 3750 cases.

The number of operating theatres required is

$$\frac{7000}{3750}$$

= 1.87

Rounded up = 2.

### Worked example 2

The following assumed figures are used in worked example 2 to illustrate the method:

- workload per annum (number of cases) = 8500;
- number of cases per working day = 15;
- length of working week in days = 5;
- length of working year in weeks = 50.
- number of cases per evening session = 6;
- number of evening sessions per week = 2.

The workload capacity of one operating theatre is

$$(15 \times 5 \times 50) + (6 \times 2 \times 50) \text{ cases}$$

$$= 3750 + 600 \text{ cases}$$

$$= 4350 \text{ cases.}$$

The number of operating theatres required is

$$\frac{8500}{4350}$$

$$= 1.95$$

Rounded up = 2.

### Worked example 3

The following assumed figures are used in worked example 3 to illustrate the method:

- workload per annum (number of cases) = 13,000;
- number of cases per working day = 15;
- length of working week in days = 5;
- length of working year in weeks = 50.

The workload capacity of one operating theatre is

$$15 \times 5 \times 50 \text{ cases}$$

$$= 4500 \text{ cases.}$$

The number of operating theatres required is

$$\frac{13,000}{3,750}$$

$$= 3.47$$

$$= 3.47$$

Rounded up = 4.

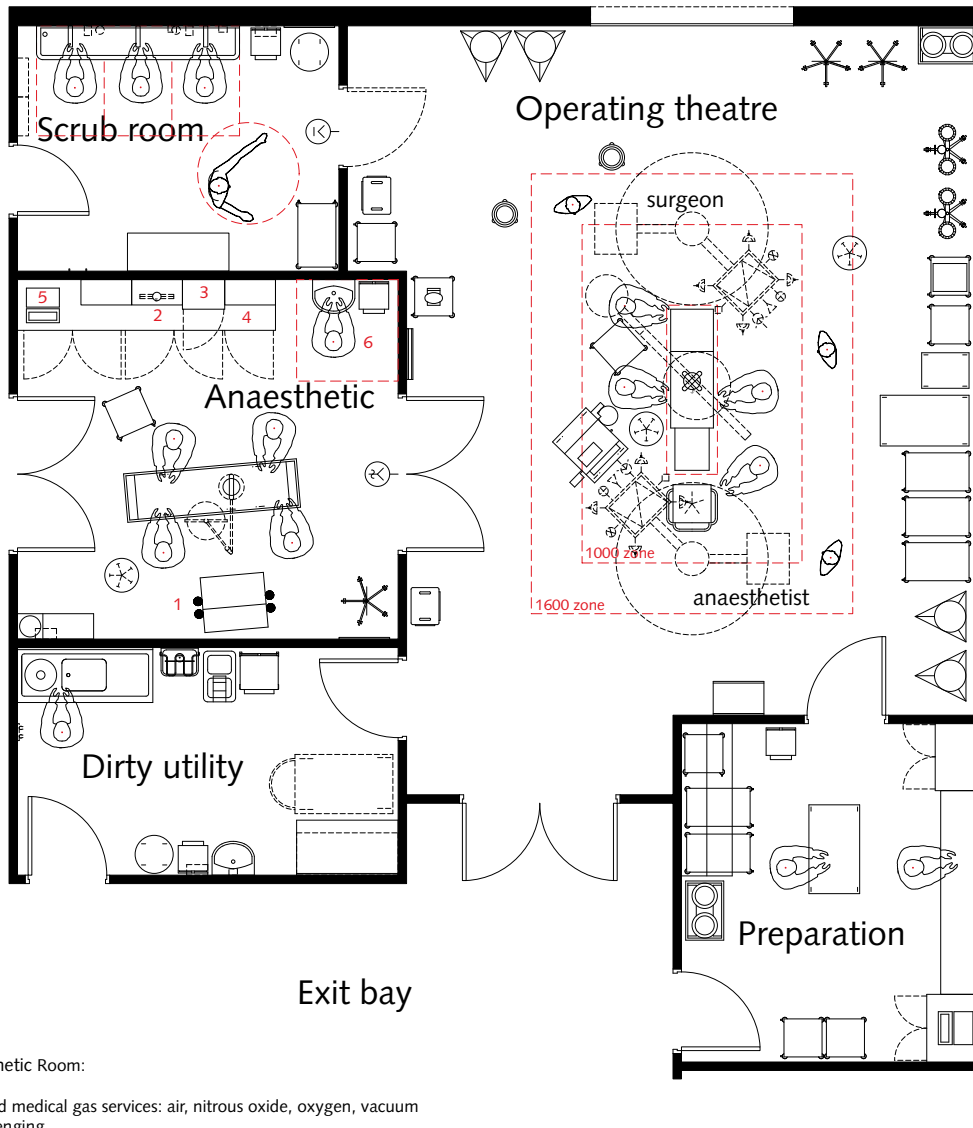
## Appendix 2 – Room layouts

- 1) Operating theatre suite 1
- 2) Operating theatre suite 2
- 3) Operating theatre suite 3
- 4) Shared scrub rooms 4

# Operating theatre suite

Typical operating theatre suite

Sheet 1



Key for Anaesthetic Room:

1. Wall-mounted medical gas services: air, nitrous oxide, oxygen, vacuum and gas scavenging
2. Lockable controlled drugs cupboard
3. Lockable drugs refrigerator
4. Work surface and storage units
5. Computer terminal
6. Clinical wash-hand basin with non-touch taps, soap and paper towel dispenser, clinical waste holder



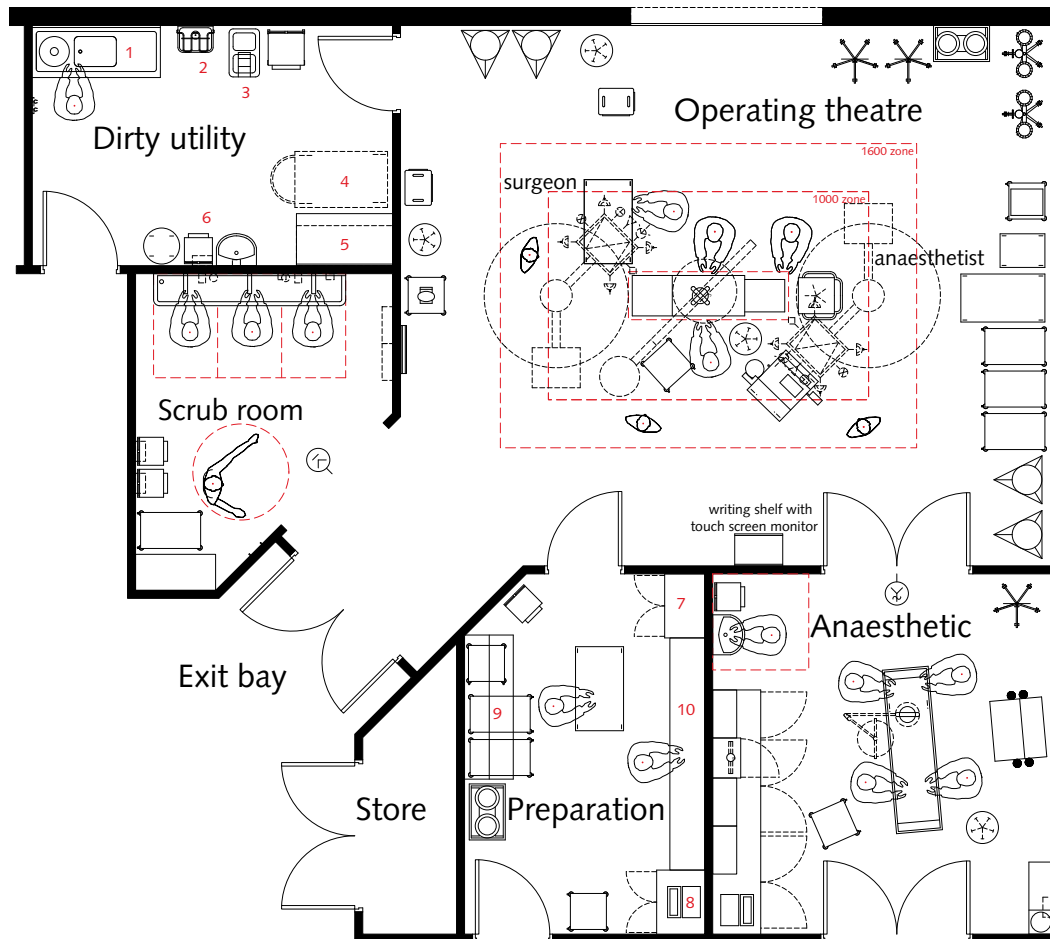
For key to other rooms see:

- [Preparation room and dirty utility – Sheet 2](#)
- [Operating theatre – Sheet 3](#)
- [Scrub room – Sheet 4](#)

# Operating theatre suite

Typical operating theatre suite with integral scrub room

Sheet 2



Key for Preparation room and dirty utility

- 1. Sink and slop hopper with cistern
- 2. Bucket sink
- 3. Double mop bucket
- 4. Instrument tray collection trolley
- 5. Worktop and shelving/cupboard
- 6. Clinical wash-hand basin with non-touch taps, soap and paper towel dispenser, clinical waste holder

The inclusion of a macerator or steam washer in dirty utility is a project option.

- 7. Lotion cabinet
- 8. Computer workstation
- 9. Work surface with trolley storage below
- 10. Open storage units



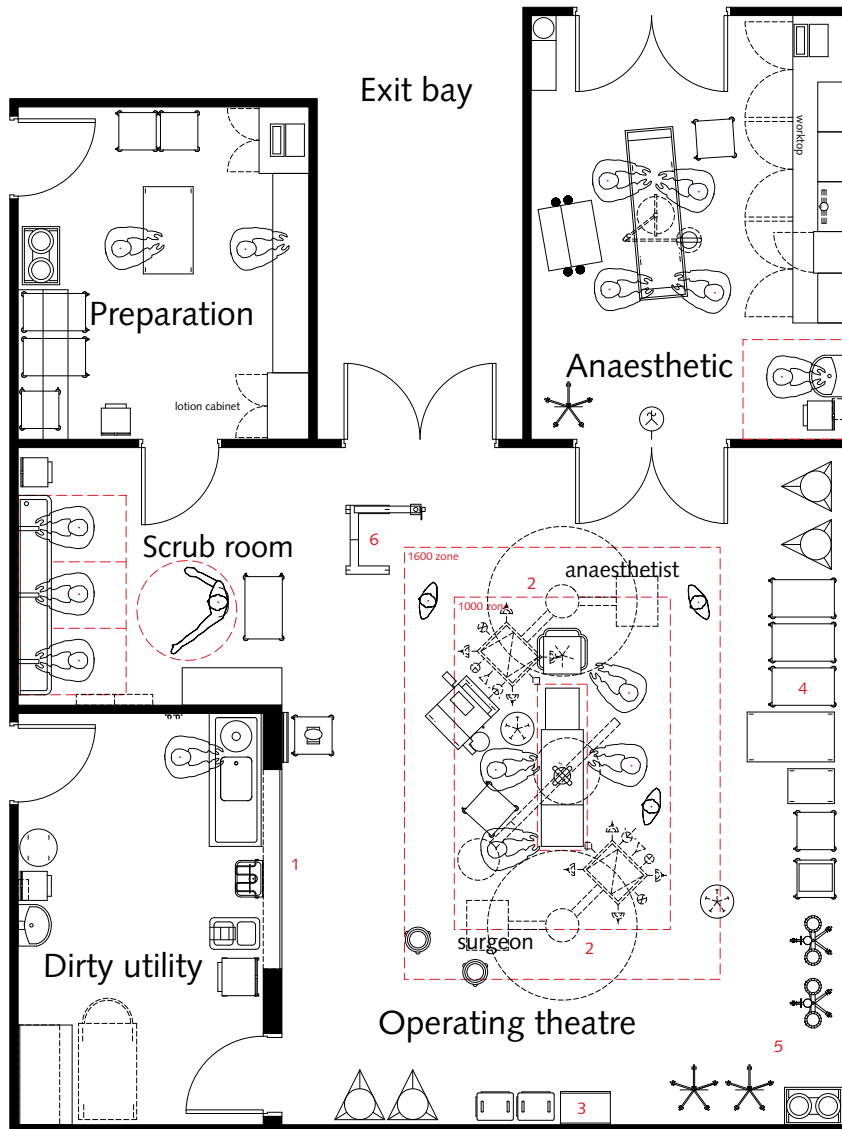
For key to other rooms see:

- Anaesthetic room – Sheet 1
- Operating theatre – Sheet 3
- Scrub room – Sheet 4

# Operating theatre suite

Typical operating theatre suite with integral Scrub room

Sheet 3



Key to operating theatre:

1. Theatre control panel
2. Surgical and anaesthetic medical supply units
3. Writing shelf with touch-screen monitor
4. Various dressing trolleys (7–10) including trolleys for equipment, for example swab weighing scales and diathermy machine
5. Drip stands, bowl stands, suction unit
6. Operating microscope



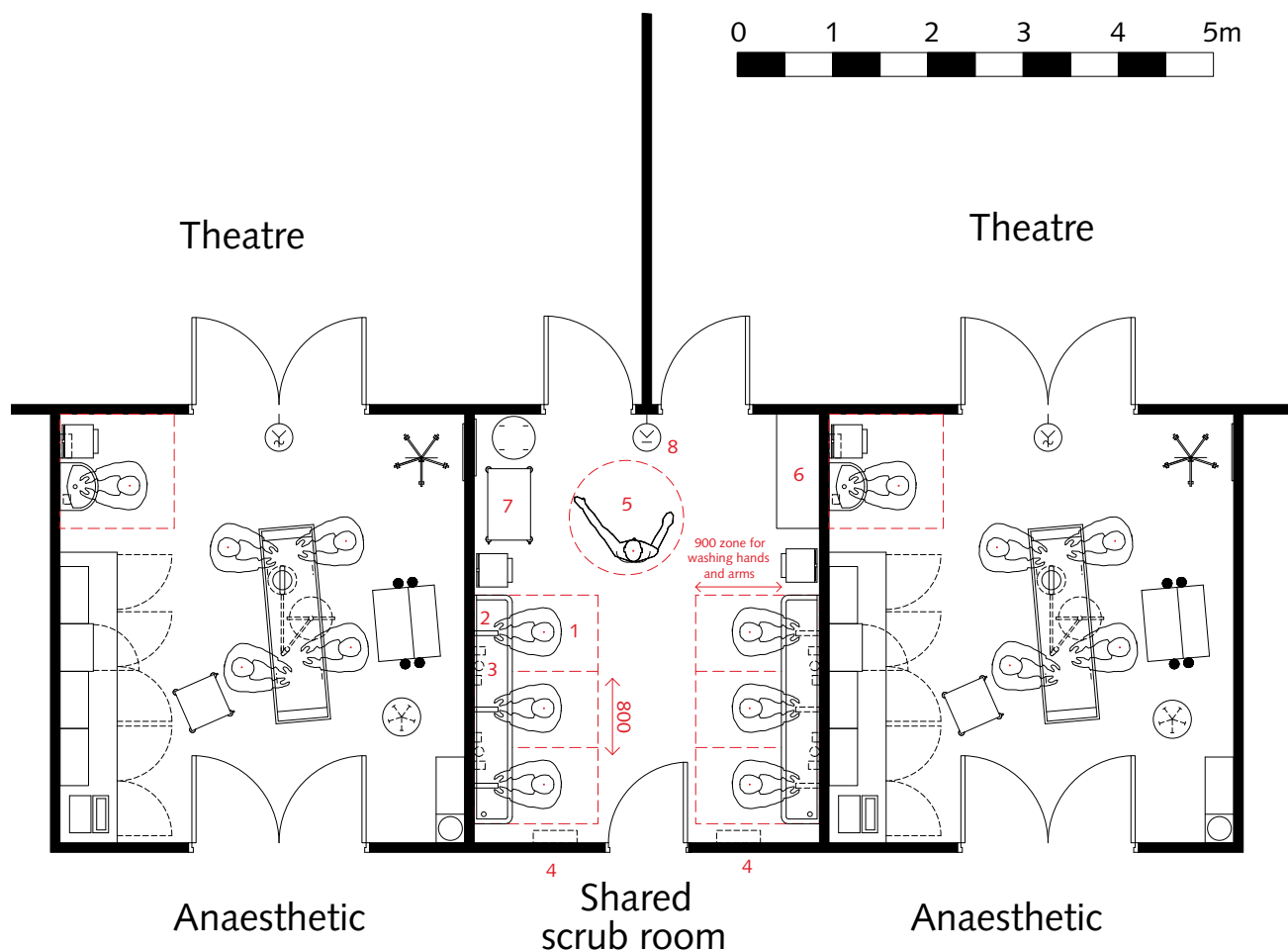
For key to other rooms see:

- Anaesthetic room – Sheet 1
- Preparation room and dirty utility – Sheet 2
- Scrub room – Sheet 4

# Shared Scrub Room

Two theatre suites sharing combined Scrub room

Sheet 4



1. A zone of 800 mm wide by 900 mm deep is required for washing hands and forearms in front of each scrub tap
2. Non-touch scrub taps are recommended
3. Shared non-touch scrub solution dispensers located in a 200 mm zone between each tap
  - For the height of the scrub trough and water outlets, see Health Technical Memorandum 64
  - Water outlets, liquid soap and nail brush dispensers should be 1100–1200 mm above finished floor level
4. Disposable glove, apron and mask dispenser
5. 1200 mm clear space is required for arms in extended position during gowning procedure, with an additional 300 mm minimum side clearance to prevent contamination

6. Shelf space is required for storage of gown packs. These should be sited conveniently but not above gowning trolley
7. Sufficient space should be provided around gowning trolley to permit safe opening of the gown pack
8. Radio-controlled clock with sweep seconds hand.

All anaesthetic rooms should be identical and under no circumstances can they be handed/mirrored

For key to other rooms see:

[Anaesthetic room – Sheet 1](#)

[Preparation room and dirty utility – Sheet 2](#)

[Operating theatre – Sheet 3](#)

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