

Renal care

Health Building Note 07-01: Satellite dialysis unit



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Renal care

Health Building Note 07-01: Satellite dialysis unit

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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

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. **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.**
- To find out about all DH Estates and Facilities publications, download the publications list from the link on the DH Estates and Facilities Knowledge and Information web page: www.dh.gov.uk/en/Policyandguidance/Organisationpolicy/Estatesandfacilitiesmanagement/DH_4118956
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Note

The new Health Building Notes have been 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 are 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 above.

Executive summary

Preamble

This guidance document is the first in the Health Building Note series on renal care, and provides guidance on the planning and design of satellite dialysis units. It supersedes HBN 53 Volume 1 – ‘Satellite dialysis units’, published in 2004. (Published separately, Health Building Note 07-02 is a guide to the planning and design of a main renal unit. Health Building Note 07-03 focuses on transplant units.)

Main differences from the previous editions

The 1996 edition generally accepted that most satellite dialysis units would be located on a hospital site. This volume points out that a satellite unit may not necessarily be a physically integral part of a main renal unit. Indeed, it recommends that the opportunity to locate a satellite dialysis unit within existing or planned community service buildings should be considered, as this may enable patients, carers and the community to feel more integrated and may allow for other activities unrelated to the dialysis day to be incorporated with least effort.

Access to the unit is another priority. It suggests that there should be designated patient car-parking spaces immediately adjacent to the unit. Based on a 12-station dialysis unit, it is recommended that there is one dedicated space for every three dialysis stations, of which one of the four should be a disabled-width bay.

Regulations and standards on water purity for dialysis have been updated (see below).

The schedules of accommodation are not included in this edition of the Health Building Note. For the latest version, see the schedule of accommodation database on the DH Estates and Facilities Knowledge and Information Portal (<http://estatesknowledge.dh.gov.uk>).

The engineering (Chapter 6) and cost information (Chapter 7) chapters have been updated and revised.

All references to legislation, standards and guidance have been updated and the **References section** accordingly revised.

A patient-centred service

Renal services of the future should be centred on the needs of people with established renal failure and designed to facilitate their “journey of care”. Wherever possible, haemodialysis treatment should be delivered at a time and place convenient for patients, in an environment that is clean, comfortable and conducive to treating them with respect and dignity.

It is most strongly recommended that, from the outset of a new capital project, all parties (including infection control teams) – and especially patients – should be involved in a consultation process and that the conclusions of these consultations be translated into a written brief.

The satellite unit

For the purposes of this building note, a satellite unit is defined as a facility for haemodialysis which:

- is not within the main renal facilities of a main hospital site but is not in the patient’s home; and
- can be used by a defined group of renal patients, based on local renal-disease demographics, who may come from a variety of ethnic and cultural backgrounds, and who are less likely to require the resources available in the area’s main renal centre.

This guidance examines various options for the location and management of satellite units, and considers the role of private contractors in the provision of dialysis services.

Accommodation and spaces

The accommodation described in the document is suitable for providing maintenance dialysis for adult patients with established renal failure. Specific areas within the unit and their design should reflect the function of the unit and be decided upon following discussions among the contractors, the unit’s management team and patients. These areas vary from satellite to satellite, but are likely to include some or all of the following:

- reception office;

- patients' waiting/refreshment area;
- patients' changing area which promotes privacy and dignity;
- patients' sanitary facilities, including a WC accessible to the disabled;
- wheelchair storage area;
- patients' monitoring area – for monitoring and recording patients' general health, weight and blood pressure before each treatment;
- multifunction/quiet room which can be used, for example, as a religious/cultural-observance room;
- dialysis area (containing a number of treatment stations) – this area could be open-plan or could be divided into appropriately-sized bays according to design options and patients' choice;
- isolation room – where medically stable patients may be dialysed in isolation if necessary;
- staff base;
- resuscitation trolley bay;
- consulting/examination room;
- treatment room – where staff may insert and change the lines and cannulae required by continuous ambulatory peritoneal dialysis (CAPD) and haemodialysis patients, and carry out a range of other clinical procedures;
- patient-training facilities where staff can teach patients how to perform tasks appropriate to their mode of dialysis. Exactly what these facilities should be, will depend on the tasks being taught and may vary from satellite to satellite;
- manager's office;
- multidisciplinary office/interview room;
- administration office;
- seminar room;
- water treatment plantroom – for the treatment of water for haemodialysis;
- maintenance room – for the maintenance and repair of dialysis machines;
- equipment room – for storing spare machines;
- separate store room for machines and equipment requiring repair or maintenance;
- clean utility;
- dirty utility;

- disposal room;
- staff rest room;
- pantries: patients and staff;
- staff change/locker room;
- equipment storeroom;
- fluid store;
- clean linen storage;
- cleaners' room;
- electrical distribution cupboard;
- IT room.

Water quality and water treatment

As drinking-water standards are inadequate for haemodialysis, water for dialysis should reach at least the following standards:

- the higher European Pharmacopoeia (EP) XVI standard: 'Water for diluting concentrated haemodialysis solutions';
- ISO 13959: 'Water for haemodialysis and related therapies'; or
- AAMI (Association for the Advancement of Medical Instrumentation) standards.

In preparing specifications for water treatment plant, project teams should seek the advice of the local water authority, a renal technologist, specialist water treatment companies and equipment manufacturers, particularly if haemofiltration or haemodiafiltration treatments are to be carried out, since it is essential that the highest standards for water treatment are routinely achieved or exceeded.

Future expansion

Project teams should ensure that the design of new-build satellite units is flexible enough to accommodate future expansion of the service.

Upgrading or adaptations of existing buildings

The standards set out in this guidance essentially apply to the provision of accommodation by new building, and it is not intended that they should be applied retrospectively to existing stock. However, the principles are equally valid and should be applied, so far as is reasonably practicable, when existing accommodation is being upgraded or new accommodation is being

constructed within an existing building which may previously have been used for other purposes.

When comparing the cost of upgrading or adapting an existing building to that of constructing a new building, due allowance – in addition to the building cost – must be made for the costs of relocating people, demolition, salvage, disruption of services in a phased project, and the temporary effects on running costs of any impaired functioning of areas of the building affected by the upgrading works.

Departmental Cost Allowance Guides

Departmental Cost Allowance Guides (DCAGs) related to this Health Building Note are officially notified in ‘Quarterly Briefing’, published by the Department of Health. A full listing of all DCAGs is published in the ‘Healthcare Capital Investment’ document; this can be downloaded from <http://estatesknowledge.dh.gov.uk> (under the “Quarterly Briefing” section within Publications).

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Contents

Preface		
Executive summary		
Acknowledgements		
Chapter 1	Scope of Health Building Note 07-01	1
	Introduction	
	Range of provision	
	Inclusions	
	Exclusions	
Chapter 2	General service considerations	2
	Introduction	
	The nephrological service	
	Dialysis	
	The role of a satellite dialysis unit	
	Organisation and patient flow	
	Factors affecting the size of a satellite renal service	
	Demand	
	Future developments	
	Value for money	
Chapter 3	General functional and design requirements	6
	Introduction	
	Location	
	Opening hours/shifts	
	Planning and design	
	Access to the unit	
	Functional relationships	
	Privacy and spatial arrangement in the dialysis area	
	Infection control	
	Future expansion	
	Information management and technology	
Chapter 4	Specific functional and design requirements	12
	Reception and waiting spaces	
	Reception office	
	Waiting/refreshment area	
	Patients' changing area/locker room	
	Patients' sanitary facilities	
	Wheelchair storage area	
	Treatment areas	
	Patient-monitoring area	
	Multifaith/quiet room	
	Dialysis area	
	Isolation room	
	Staff base	
	Resuscitation trolley bay	
	Consulting/examination room	
	Treatment room	

Training room
 Office accommodation
 Manager's office
 Multidisciplinary office/interview room
 Administration office
 Seminar room
 Support/utility spaces
 Water treatment plantroom
 Maintenance room
 Maintenance room: equipment storeroom
 Clean utility
 Dirty utility
 Disposal room
 Staff rest room
 Pantries: patients and staff
 Staff change/locker room
 Staff sanitary facilities
 Equipment storeroom
 Fluid store
 Clean linen storage
 Cleaners' room
 Electrical distribution cupboard
 IT room

Chapter 5

Other functional and design requirements

25

Introduction
 Statutory and other requirements
 Building components
 Upgrading or adaptations of existing buildings
 Damage to health buildings
 Signposting
 Disabled people
 Smoking
 Environment and design
 Art in health buildings
 Courtyards
 Natural and artificial lighting
 Telephones
 Internal environmental engineering considerations
 Internal rooms
 Ventilation
 Noise and sound attenuation
 Finishes
 Colour
 Floors
 Doors and frames
 Windows
 Maintenance and cleaning

Chapter 6

Engineering services

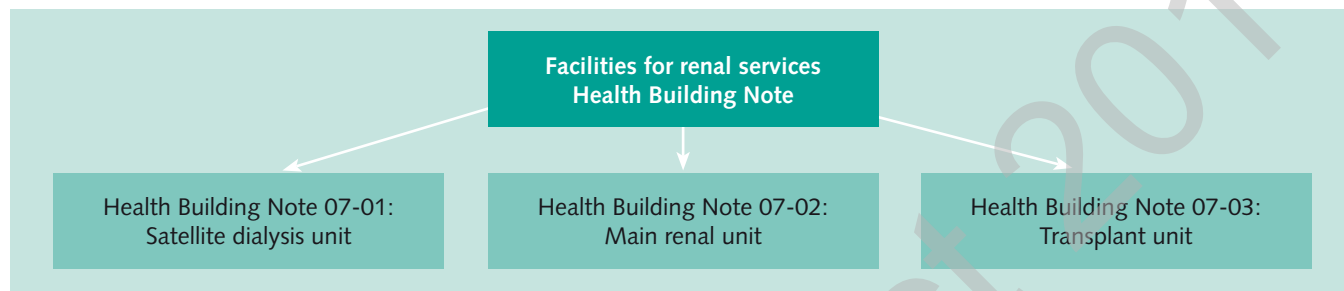
31

Introduction
 Flexibility of design
 Design for safety
 Space requirements for services and plant
 Decontamination
 Mechanical services

	Piped medical gases	
	Heating	
	Ventilation	
	Hot and cold water systems	
	Water services for haemodialysis	
	Water supply and pipework	
	Water treatment plant	
	Building management systems	
	Internal drainage	
	Acoustics	
	Fire safety	
	Fire detection and control systems	
	Engineering services – electrical	
	General	
	Electrical installation	
	Electrical interference	
	Electromagnetic compatibility	
	Main intake switchgear and distribution boards	
	Emergency electrical supplies	
	Small power distribution systems	
	Lighting systems	
	Patient/staff and staff emergency call systems	
	Security	
	IT and telephone wiring systems	
	Bedhead services and entertainment systems	
	Pneumatic tube transport systems	
	Lifts	
	Controlled drugs storage	
	Sustainability and energy efficiency	
	Commissioning and maintenance	
Chapter 7	Cost information	41
	Introduction	
	Departmental cost allowance guides	
	On-costs	
	Locational factors	
	Schedules of accommodation	
	Dimensions and areas	
	Circulation	
	Communication spaces	
	Land costs	
	Engineering services	
Appendix 1	Ergonomic drawings	43
	Reclining chair	
	Bed	
Appendix 2	Glossary	45
References		46
	Acts and Regulations	
	Department of Health publications	
	Health Building Notes	
	Health Technical Memoranda	
	Firecode publications	
	Health Guidance Notes	
	British and European standards	
	International standards	
	Other publications	

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1 Scope of Health Building Note 07-01



Introduction

- 1.1 This document provides guidance on how the built environment can be designed to improve the experience and outcome of renal patients.
- 1.2 It provides guidance on the planning and design of satellite dialysis units. It replaces and supersedes all previous editions of Health Building Note 53.

Note

Care has been taken to ensure that the guidance and recommendations for the accommodation described in this Health Building Note are economical and flexible without detriment to the standards required for the high-quality care and treatment of renal patients.

Range of provision

Inclusions

- 1.3 This document provides guidance on accommodation for maintenance dialysis, based in a satellite unit.
- 1.4 The unit described in this document includes accommodation suitable for:
 - the treatment of adult patients requiring haemodialysis;
 - teaching patients how to carry out appropriate tasks which, depending on local policies, may

include continuous ambulatory peritoneal dialysis (CAPD), automated peritoneal dialysis (APD) and how to operate haemodialysis machines for home haemodialysis, and self-care.

Exclusions

- 1.5 This Health Building Note excludes guidance on accommodation for:
 - nephrological services provided by highly specialised centres such as university and teaching hospitals;
 - nephrological services provided by main renal units in acute general hospitals, as this will be covered in Health Building Note 07-02;
 - renal transplantation, as this will be covered in Health Building Note 07-03;
 - children requiring renal services, as it is assumed that they will be treated in a paediatric nephrology department;
 - the preparation of dialysers marked for re-use. (Project teams intending to provide such facilities are advised to refer to the Medical and Healthcare products Regulatory Agency's (MHRA) 'Single-use medical devices: implications and consequences of reuse' and Health Service Circular 1999/179: 'Controls assurance in infection control: decontamination of medical devices'.)

2 General service considerations

Introduction

- 2.1 The main function of a satellite dialysis unit is to provide maintenance haemodialysis for adult patients with chronic established renal failure. Some satellite units also teach patients how to carry out continuous ambulatory peritoneal dialysis and train patients for home haemodialysis.
- 2.2 Patients attending a satellite dialysis unit:
- are mainly ambulant;
 - may be of any age (but not children); and
 - may be physically and/or sensorily handicapped.
- 2.3 New established renal failure patients requiring maintenance dialysis may be referred to a satellite unit by consultant nephrologists working in main renal units.

The nephrological service

- 2.4 The function of a comprehensive nephrological service is the early detection, diagnosis and treatment of renal disease and the long-term management of its complications such as high blood pressure, anaemia, cardiovascular disease and bone disease.
- 2.5 Renal failure may be either acute or chronic. Acute renal failure occurs abruptly, often as a result of severe trauma, post-operative complications, and renal insults. Although it can be severe enough to influence patient morbidity and survival, it is often reversible. Dialysis is usually needed for only a few days or weeks before the renal function returns.
- 2.6 Chronic renal failure is the progressive loss of kidney function over months or years, and is irreversible. Established renal failure can be treated by renal replacement therapy (RRT), that is, dialysis and/or renal transplantation.

Dialysis

- 2.7 Renal dialysis involves the removal of waste products from the blood by allowing these products

to diffuse across a thin membrane into dialysis fluid which is then discarded along with the toxic waste products. The chemical composition of the fluid draws the waste products across the membrane without the blood coming into contact with the fluid. The various dialysis techniques are described in the Glossary in [Appendix 2](#).

The role of a satellite dialysis unit

- 2.8 The majority of dialysis patients are stable and, although requiring long-term care, do not need the highly specialised treatment provided in a main renal centre. In addition, according to the recommendations of the Kidney Alliance (2001) report 'End stage renal failure: a framework for planning and service delivery', patients should ideally have to travel no more than 30 minutes for their treatment. This principle to ensure equitable access for all may be met by locating satellite units in the community, allowing the provision of renal services close to patients' homes.
- 2.9 The options for the location of a satellite unit are discussed in [paragraph 3.1](#).
- 2.10 A satellite unit may be managed in a variety of ways. There are advantages and disadvantages to each one, but it is outside the scope of this document to detail these. Choice will be based on local factors:
- managed by a main renal centre:** these satellite units operate under the aegis of the specialist nephrological service at its parent hospital, usually located on another site. Patient care and management policy in the satellite unit are determined by staff in the main renal unit. Some satellite units may develop into sub-regional units. These units are autonomous, usually in everything but renal transplantation, and require at least one or two nephrologists permanently based on site;
 - contracted out to the private sector:** in such units, the private contractor provides a dialysis service which usually includes the building,

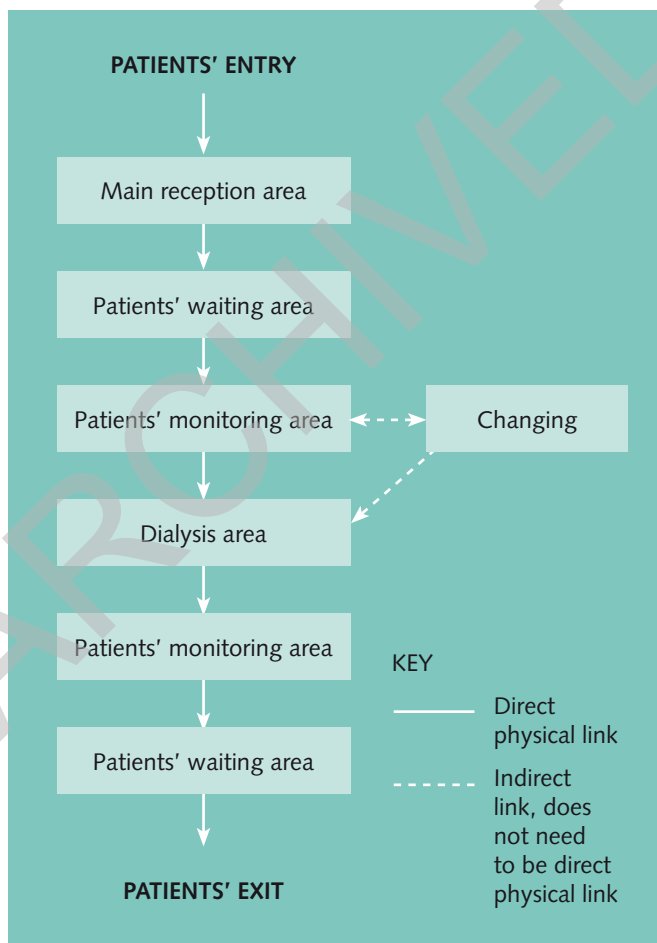
equipment, consumables and all the staff except the consultant medical staff. The contractor is paid an agreed fee for each episode of dialysis treatment. When located on an NHS site, all mains services are generally provided by the hospital, with the contractor being charged for consumption. The contractor may buy in support services from the hospital, for example cleaning, catering, portering, linen, laundry, pathology, maintenance etc;

- c. **self-managed option:** in such units, the building, equipment and consumables are provided by the private sector. The contract may be on a “number of sessions” basis or for a number of patients over a number of years. This type of facility may be shared by two or more trusts.

Organisation and patient flow

2.11 Patients normally undertake the following “journey” during a dialysis session at a satellite unit:

- On arrival at the unit, a patient will wait in the waiting area until the dialysis machine has been prepared for use.



- Patients transfer to the monitoring area, where they either take their own blood pressure and weigh themselves or ask for assistance to do so (renal data management systems are now also available which electronically transfer data, that is, blood pressure and weight, to the dialysis machines via smart cards). Many patients also choose to change into loose, comfortable clothes before going on the dialysis machine.
- At the treatment station, patients themselves may prepare supply trolleys or these will be already prepared, depending on the practice of the unit and patients' requirements. Patients are then either linked to the machine or link themselves with the necessary supervision. Dialysis generally takes about four hours, but varies according to individual prescriptions.
- The patients' temperature and blood pressure may be monitored during the treatment.
- After treatment, either the patients monitor their own blood pressure and weight or these are monitored for them. They then retrieve their possessions and either leave the unit or remain in the waiting area until their transport arrives.

Factors affecting the size of a satellite renal service

Demand

2.12 Diabetes is the leading cause of chronic renal failure (Roderick et al, 2002). If survival rates in Type II diabetes improve but nephropathy progresses, the number of people with diabetes needing dialysis will increase. The size and projected increase in the numbers of people with diabetes is the context for the National Service Framework (NSF) for Diabetes, which will set standards for care and service provision.

2.13 The dialysis population is becoming increasingly elderly, with a greater prevalence of comorbid illness. This will have a consequence for support activities, for example appropriately equipped emergency resuscitation facilities in the event of cardiac arrest (see [paragraph 4.43](#)) and the need for networked links to the main renal unit (see [paragraph 3.19](#)).

2.14 It is recognised that haemodialysis services are under considerable pressure in some areas, and project teams need to carry out a proper needs assessment to estimate how many patients will

require treatment over the coming years. This will enable them, together with clinicians working in this area, to plan what services will be needed and the most appropriate configuration of those services, taking account of local priorities.

- 2.15 Current predictions are that there is likely to be a substantial growth in the overall number of patients receiving dialysis treatment by 2010. It is likely that a steady state, where the number of new patients is equal to the number of patients who are transplanted or who die, will not be reached for another 10 to 20 years (Roderick et al, 2002).

Future developments

- 2.16 **The resurgence in home haemodialysis.** The benefits of carrying out haemodialysis in the home include not having to travel to a satellite or main renal unit and more choice about when the dialysis is carried out, so there may be less disruption to normal life. On the other hand, some patients and their carers find it a strain to have the responsibility

of carrying out the procedure, which can be time-consuming, and of dealing with any problems. Home haemodialysis has been the subject of a NICE review which recommends that it be available as an option for all suitable patients ('Guidance on home compared with hospital haemodialysis for patients with end-stage renal failure', National Institute of Clinical Excellence, 2002).

- 2.17 **Potential for offering daily haemodialysis as an option.** If the purported advantages of daily haemodialysis are confirmed, the proportion of patients on home haemodialysis may increase, as may the number of shifts offered by a satellite or main renal unit.

Value for money

- 2.18 The size of a dialysis unit will depend on local circumstances, such as the dialysis population, shift patterns and location (that is, whether rural, urban or inner-city). The dialysis area should consist of



The quality of water that can be achieved with a central water-treatment plant is generally far higher than that which can be obtained from individual units. Courtesy of Esler Crawford Photography; reproduced by kind permission of Belfast City Hospitals Trust

dialysis stations in increments of three. The schedules of accommodation for this guidance are based on a 12-, 18- and 24-station unit. The final number should take into account the provision of a spare station for routine maintenance, breakdowns and expansion.

- 2.19 Project teams will need to consider the number of treatment stations needed to ensure the economic viability of a central water treatment plant. The use of individual bedside water treatment units is a matter for local decision; however, required standards of water purity must still be monitored and achieved (see [paragraphs 6.32–6.37](#)). In general, these individual units are not advised for the following reasons:

- overall lifetime costs are generally higher compared with a central water-treatment plant;
- they take up more maintenance time for technicians;
- water purity tests need to be undertaken at regular intervals on each unit;
- the quality of water that can be achieved with a central water-treatment plant is generally far higher than that which can be obtained from individual units. This may stop the unit from undertaking haemodiafiltration.

3 General functional and design requirements

Introduction

Location

- 3.1 A satellite unit is not a physically integral part of a main renal unit. The appropriate location for a satellite dialysis unit will depend on a number of factors, including demography, transport links, case mix etc. Satellite dialysis units may serve populations that do not have easy access to a main renal unit. The opportunity to locate a satellite dialysis unit within existing or planned community service buildings should be considered, as this may enable patients, carers and the community to feel more integrated and may allow for other activities unrelated to the dialysis day to be incorporated with least effort. Patients usually require treatment at least three times a week, every week – a community-centre setting would go a long way to providing a less clinical environment.

Opening hours/shifts

- 3.2 Flexibility to accommodate patient choice is likely to be key to the opening hours and shift patterns of satellite dialysis units in the future. Most are likely to operate at least a two-shift system. Running a third shift in the evenings may appeal to some patients, for example those in full-time employment, and this is likely also to prove more economically viable since more patients can be treated without having to increase the number of treatment stations. Dialysis duration makes it possible to run a fourth shift if other factors allow, and there is increasing interest among patients and clinicians for daily dialysis. However, the provision of a third or fourth shift may not always be possible due to the practical problems associated with operating very late at night, such as the availability of transport, shortage of staff, and safety for patients and staff travelling home.
- 3.3 With one dialysis treatment usually taking between four and five hours, two to three patients can be dialysed per station per day (including the time

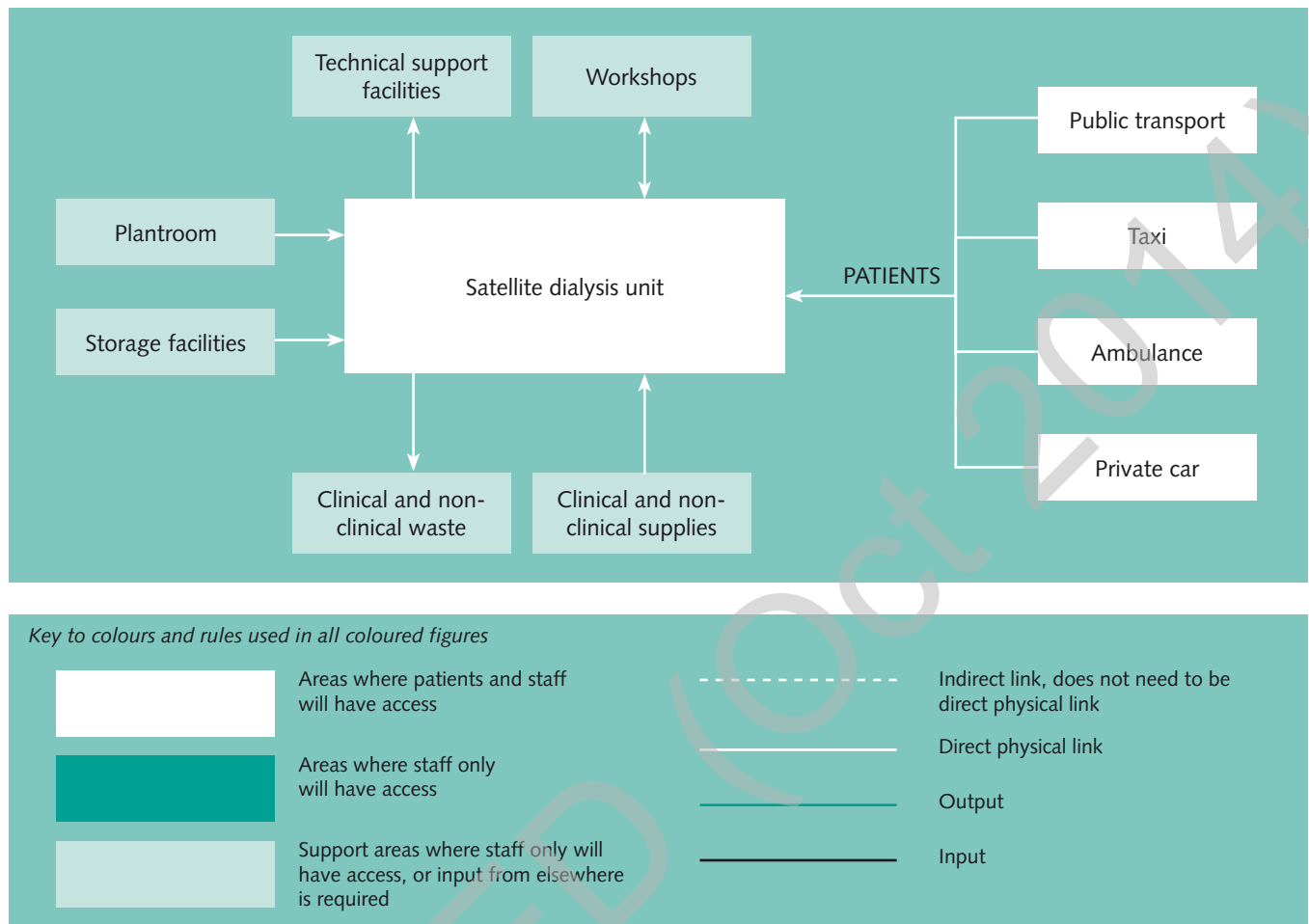
taken for cleaning between sessions). Patients should receive three treatments per week unless the clinician prescribes fewer hours or less frequency on medical grounds.

Planning and design

Access to the unit

- 3.4 Many patients attending a satellite unit are likely to arrive by their own transport. However, they may also travel to the unit by public transport or by NHS patient-transport services including taxis or ambulance. Where possible, therefore, satellite units should be located near public transport routes. It is also important to provide dropping-off points for ambulances and designated patients' car-parking spaces immediately adjacent to the unit. Based on a 12-station dialysis unit, it is recommended that there is one dedicated space for every three dialysis stations, of which one of the four should be a disabled-width bay. The entrance to the unit should be covered so that patients transferring from a vehicle into the unit are not exposed to the weather.
- 3.5 The unit should preferably be located on the ground floor and, ideally, have its own dedicated entrance. (Units based away from hospital sites are likely to have dedicated entrances by nature of their location.) Where the unit is based on a hospital site, this is to facilitate the comfort and passage of patients, especially at shift changes, during which congestion might occur if only a shared entrance is available.
- 3.6 The entrance should be easily accessible to people using wheelchairs or walking aids.
- 3.7 There should be access for large vehicles so that they can off-load at the various storage facilities without disturbing the unit's operation or traversing through patient or treatment areas.
- 3.8 The satellite unit will require large volumes of clinical and non-clinical supplies to be delivered and off-loaded routinely (see paragraphs

Figure 2 Access to the unit



4.94–4.97). This will lead to large volumes of clinical waste and non-clinical waste that will need to be removed daily (see paragraphs 4.82–4.85). Thus, the eventual location of the unit and plantroom must be considered carefully, as waste fluids in such volume require correct disposal.

3.9 Access to storage facilities, technical support facilities, workshops and the plantroom must be considered and adequate provision must be made:

- access from the outside of the building should be via separate, lockable double doors, and security camera surveillance should be considered;
- attention should be paid to access to allow removal or replacement of the units and for delivery of heavy goods such as salt for the water softeners;
- for the deliveries of goods and supplies (particularly as renal goods are delivered in bulk), a separate – possibly remote – entrance is required, as some deliveries are impromptu and

noisy. As some deliveries arrive very early in the day, this area needs to be well lit.

Functional relationships

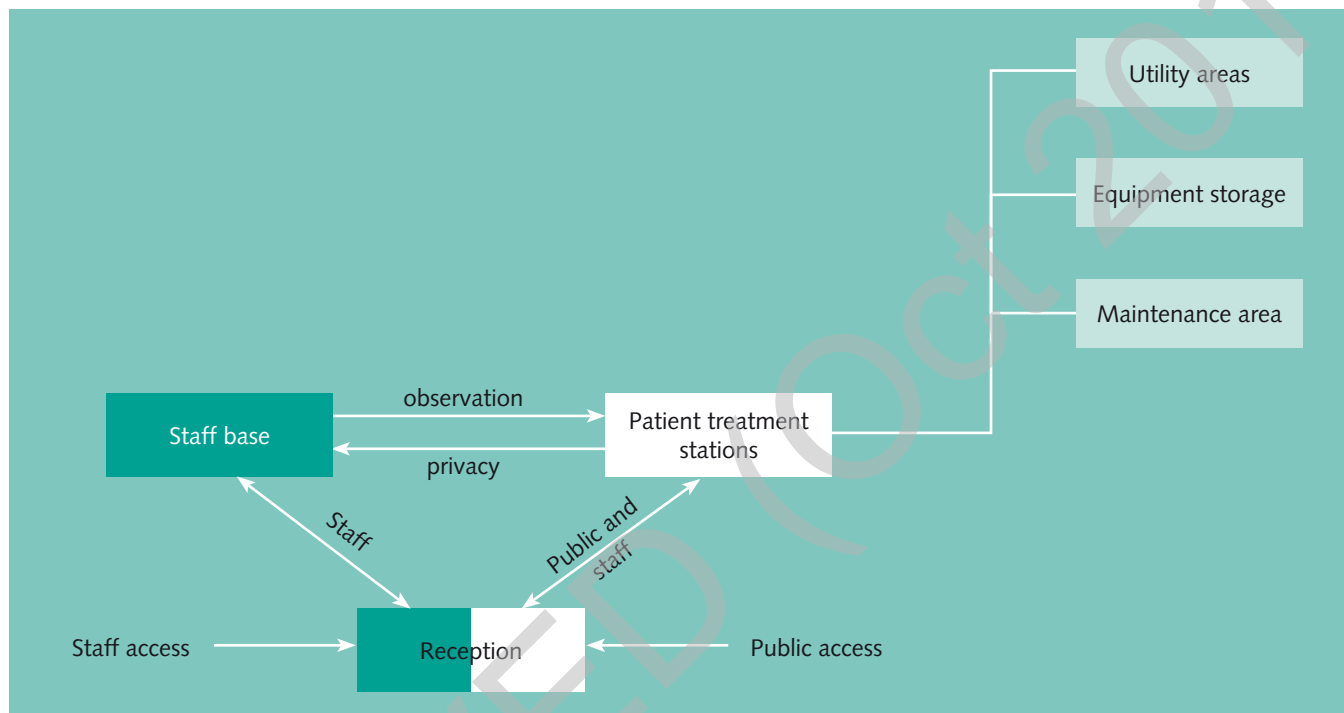
3.10 A satellite dialysis unit contains three zones: patient-treatment stations, associated support facilities, and staff areas. There are key functional relationships both within and between these zones which should be taken into account when designing accommodation. Details of these relationships are described below.

- **Staff-base/patient-treatment stations:** staff at the staff base must be able to see and hear patients in the dialysis area. A balance should be struck between providing adequate observation for staff and privacy for patients (see paragraph 3.11).
- **Patient-treatment stations/utilities and equipment storage:** utility areas and equipment storage and maintenance areas should be located to provide ease of access to patient-treatment stations.

- **Patient-treatment stations/staff areas:** staff rest rooms and offices should be separate from, but close to, patient-treatment stations.
- **Treatment station/treatment station:** the layout of the multi-station dialysis area should enable patients to talk to one another, and

nurses to call for assistance from one station to another, but care must be taken to allow sufficient space between dialysis stations to prevent the risk of cross-infection and for a degree of privacy (a preferred minimum of 900 mm between stations is required in this guidance: see [Appendix 1](#) for layout diagrams).

Figure 3 Functional relationships within the unit



Treatment stations could be arranged in modules, with demountable partitions. However, a balance must be maintained between privacy and the ability for staff to maintain eye contact with other patients and staff



Privacy and spatial arrangement in the dialysis area

- 3.11 Project teams should be aware that patient privacy can be compromised by the open-plan design of the dialysis area. A balance should be struck between patient privacy; patient/patient social interaction; need for blood-borne virus control; and the need for staff and patients to be able to observe one another. The ideal balance is likely to arise from local consultations among all parties, including patients, with their views being encompassed in a written design brief.
- 3.12 The use of non-fixed, partial barriers may offer flexibility in arrangements and give patients a greater sense of personal space. Treatment stations could be arranged in modules, with demountable partitions. However, a balance must be maintained between privacy and the ability for staff to maintain eye contact with other patients and staff. For further guidance on the use of partitions, reference should be made to HTM 56 – ‘Partitions’.
- 3.13 The module configuration must allow for staff to communicate with groups of patients, yet stay within the constraints of plumbing and electrical needs, as well as provide for an easy renovation or expansion of the facility.
- 3.14 Noise levels can be reduced by the use of acoustically treated ceiling tiles and partitions (see also [paragraphs 5.41–5.45](#) and [6.57–6.58](#)).

Infection control

- 3.15 The Public Health Laboratory Service (now subsumed under the Health Protection Agency) set up a working group to assess the risks of cross-infection from blood-borne viruses and how they may best be managed. Project teams should consider the working group’s recommendations: ‘Good practice guidelines for renal dialysis and transplantation units: prevention and control of blood-borne virus infection’ (Department of Health, 2002). See also the standard principles of infection control in ‘Infection control: Prevention of healthcare-associated infection in primary and community care’ (NICE, 2003), and guidance on “designing-in” infection control in HFN 30 – ‘Infection control in the built environment’ (NHS Estates, 2002).

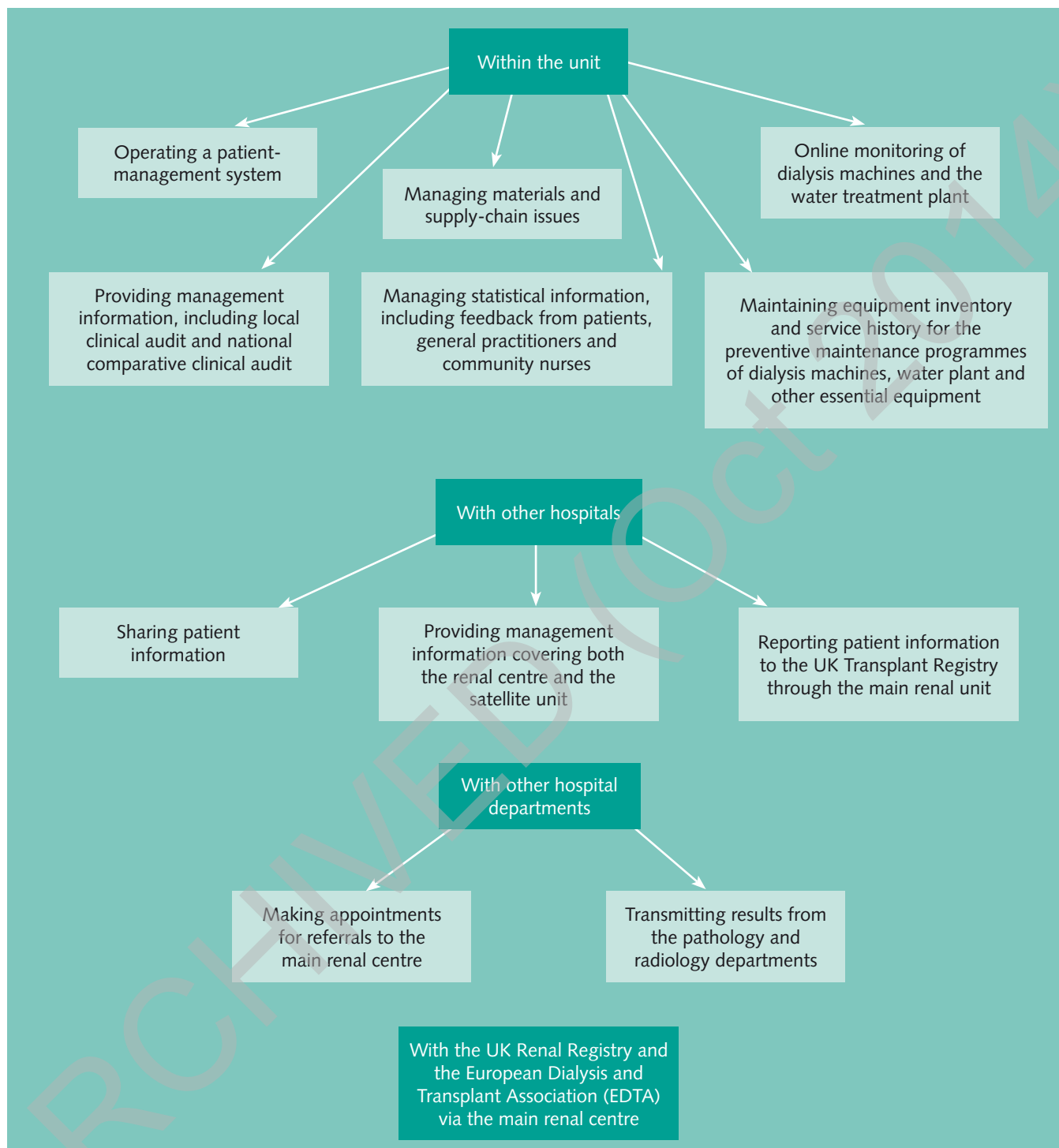
Future expansion

- 3.16 Project teams should allow for the future expansion of the dialysis service. Expansion may be achieved by developing existing internal spaces or by extending the building. Locating the dialysis area on an external wall will facilitate future expansion.

Information management and technology

- 3.17 Information management and technology (IM&T) is fundamental to the successful operation of a dialysis unit. The system selected should offer a wide range of facilities and be consistent with local and NHS IM&T strategies (see ‘Building the information core’ (Department of Health, 2001) and ‘Delivering 21st century IT support for the NHS’ (Department of Health, 2002)). More detailed guidance on local area networks (LANs) is contained in the NHS IT Standards Handbook (chapter 300) which may be downloaded from the NHS Information Authority web page (www.nhs.uk/napps/pages/documents/downloads/300_chap.pdf). The system should also reflect the requirements of the Renal Information Strategy published with the Renal NSF. Several national action programmes are already established or under development:
- Integrated Care Record Services (ICRS);
 - Datasets Development programme;
 - National electronic Library for Health (NeLH);
 - NHS Direct and Online (telephone advice and website);
 - National Health Informatics Development Programme (NHID).
- 3.18 The IM&T facilities provided for a satellite dialysis unit should be the same as those available at a hospital-based dialysis unit.
- 3.19 Choice of systems and matters such as the location of computer terminals, which functions to include on the system, and access levels to information, should be determined locally. Examples of data handling needs which can be met by installation of a network are shown in [Figure 4](#) overleaf.
- 3.20 Project teams should pay particular attention to the following:
- a. they should consider the IM&T needs of the unit at an early stage, taking account of the Renal Information Strategy published with the

Figure 4 Examples of the data handling needs of a satellite dialysis unit

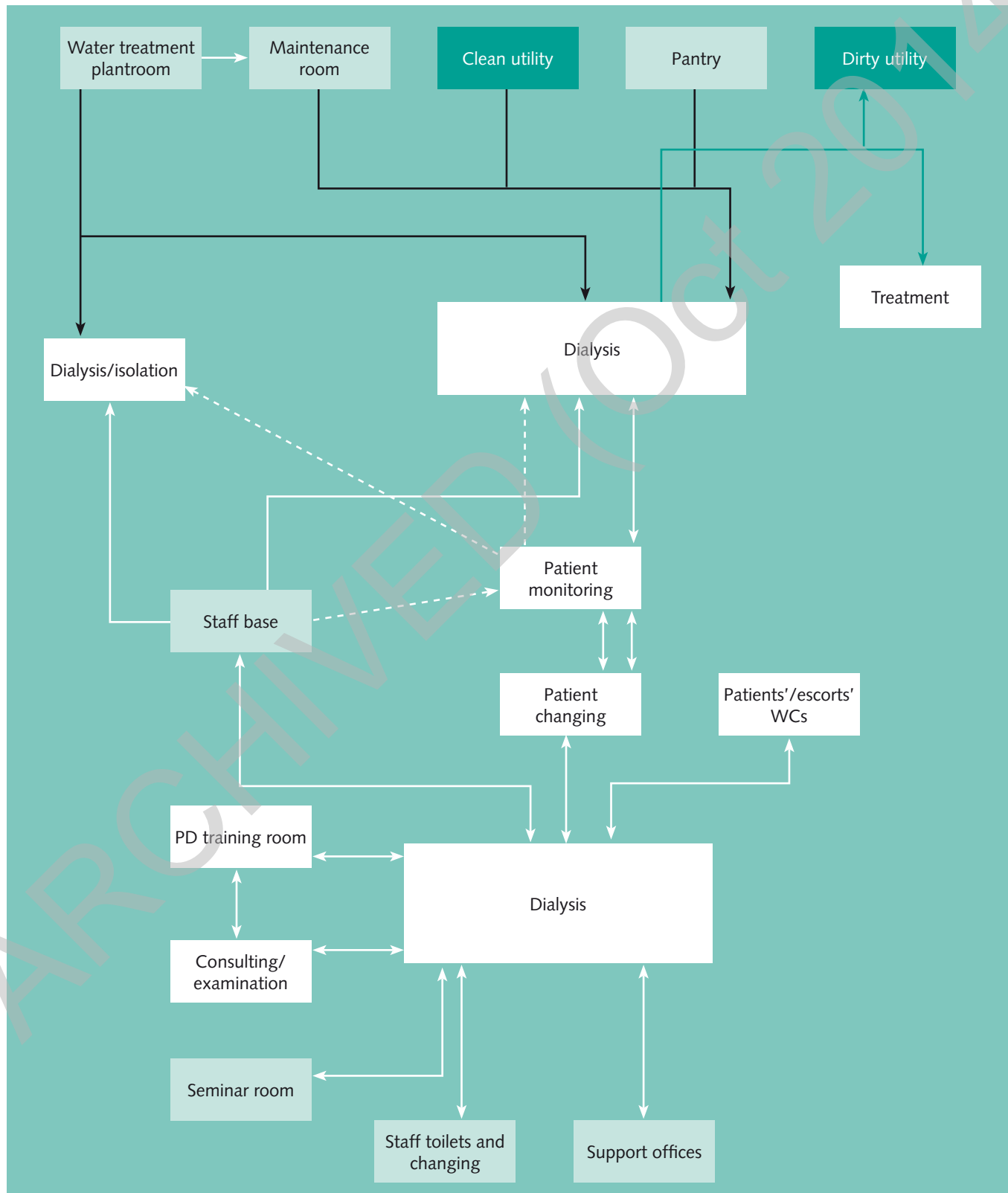


- a. Renal NSF and future expansion of the unit (for example, the introduction of individual patient care plans and the provision of integrated electronic patient records);
- b. they should review current IM&T developments nationally and at both the renal centre and any satellite units;
- c. they should check that proposals conform with local IM&T policies at both the renal centre and the satellite unit, which may or may not be within the same trust;
- d. they should ensure that sufficient space is provided at the design stage to meet the anticipated initial needs for special power supplies, modems, monitors, printers and

- associated software, stationery, and conduits for cables and for future expansion;
- e. it is likely that an area will be needed to contain either IT server equipment or IT communications equipment, or both. The room should be large enough to contain not only the equipment to be installed initially, but also any expansion of facilities at a later date. The team should also take into account that replacement equipment may need to be installed before existing equipment is removed;
 - f. ideally, the room should be separate from other equipment rooms in the unit and should be able to be secured separately. The equipment in the room should not be visible from outside the room;
 - g. arrangements should be made to ensure that the environment in the room is suitable for the equipment that may be kept in the room. This could include controlling the temperature, humidity, and levels of dust in the air. Space requirements and temperature limits should be obtained from the equipment manufacturers;
 - h. there must be adequate space for maintenance staff to access the equipment and carry out their work without inconveniencing the normal operation of the satellite unit;
 - j. they should ensure that monitors are sited so that the displayed text is not visible to members of the public (although it may be considered an advantage to be able to turn the screen to enable the patient to check the accuracy of the information entered);
 - k. they should ensure that the contents of the monitor screen are legible (see [paragraph 6.75](#));
 - m. they should ensure that equipment noise is controlled within acceptable limits and, where necessary, fit acoustic hoods or locate the equipment in a separate room;
 - n. they should ensure that adequate provision is made for the security of data and devices. If operational data is to be stored on equipment in the unit, arrangements need to be made to ensure that the data is copied onto separate storage media. These backups should be stored in a fire-proof safe in a secure, waterproof storage area off-site;
 - p. allowance should be made for the downloading of information from other medical devices including dialysis machines and physiological monitors.

4 Specific functional and design requirements

Figure 5 Specific functional relationships between areas



Reception and waiting area Courtesy of Esler Crawford Photography; reproduced by kind permission of Belfast City Hospitals Trust



Reception and waiting spaces

Reception office

- 4.1 An office is required at the entrance to the unit and adjacent to the waiting area for receiving and registering patients upon arrival and to provide the administrative and communication centre of the unit.
- 4.2 If the office has a welcoming, open-plan design which allows reception staff to see and receive patients entering the unit, it may not be necessary to provide a separate reception counter. It must be possible for patients, escorts and staff to communicate easily. It is important to ensure that the reception office is accessible to people in wheelchairs and that counters or reception desks are suitable for patients in wheelchairs to be able to communicate with staff at computer terminals.
- 4.3 Consideration should be given to routing all telephone calls to and from the unit through the reception office.
- 4.4 Workstations, computers and photocopying facilities will be required, as well as a fax machine for transmitting messages to the main renal unit, general practitioners and other personnel. Cupboards will be required for storing a working supply of stationery, information leaflets etc.
- 4.5 Confidential medical records will be stored in this office in lockable, fire-resistant filing cabinets or notes trolleys.
- 4.6 From the reception area, it should be possible to visually check persons entering the unit for security reasons.

Waiting/refreshment area

- 4.7 A waiting area should offer a comfortable and relaxing environment with domestic-type finishes and furnishings. Different types of seating are required, and should include those suitable for elderly people. The layout should be informal. There should be space for patients in wheelchairs and for people using walking aids. The waiting area can become very busy at changeover times and should be large enough to accommodate two shifts of patients.
- 4.8 The waiting area is an important social space. The provision of noticeboards and posters can help to lend a sense of identity to the unit. Project teams may wish to consider the provision of low-level background music, a TV/video system, facilities for personal entertainment, and Internet connections for patients using their own laptop computers. These may help patients relax, alleviate the boredom of essential waiting, and mask confidential discussions. A supply of reading material should be available.
- 4.9 Refreshment facilities should be provided, as patients may spend long periods waiting to be connected to machines and waiting for transport.
- 4.10 A public telephone with an acoustic hood should be provided in accordance with hospital policy (see also [paragraph 5.14](#)). A freephone for taxis may also be considered.
- 4.11 If pre-dialysis or routine clinics are to be held in the satellite unit (this will be a local decision), the waiting area will need to be larger to accommodate the additional numbers of patients who will be in the unit on these days.

Patients' changing area/locker room

- 4.12 Separate male and female patient change/locker rooms should be provided where patients can change into comfortable clothing before dialysis and can store their outdoor clothing and other personal items while they are on the machines.
- 4.13 Full-length lockers for the secure storage of dry outer and middle garments, footwear and small personal belongings are required. Hanging rails, with security, for the storage of wet outer garments, and lockers for large personal belongings should be provided. The number of lockers provided should be arrived at following consultation with patients, bearing in mind any likely future expansion of the

unit, and should be included in the design brief. Lockers could be at the bedside.

- 4.14 A shower can be provided en-suite, but this is optional. The patient change/locker room door should be lockable.

Patients' sanitary facilities

- 4.15 Separate male and female sanitary facilities, including WCs with hand-wash basins, should be located adjacent to the patient changing/locker room.
- 4.16 Patient sanitary facilities should include an accessible toilet, and baby-changing facilities.

Wheelchair storage area

- 4.17 A wheelchair storage area should be included for patients who, while being dialysed, have to leave their chairs.

Treatment areas

Patient-monitoring area

- 4.18 This space is used to monitor and record patients' weight, blood pressure and general health before each dialysis treatment. This area should be either within the dialysis area or adjacent to the dialysis area and/or the patient waiting area, depending on operational policy. Data may be recorded either on computer or on paper, depending on local policy.
- 4.19 Facilities required include: chair weighing scales and wheelchair weighing scales; a desk and chair; storage for blood pressure equipment. A clinical wash-hand basin, accessible by wheelchair patients, will also be required, as patients will need to wash their fistula arms before treatment.

- 4.20 There should be sufficient space to accommodate a nurse, one patient, a helper and wheelchair scales.

Multifaith/quiet room

- 4.21 This room will be used as a quiet room for worship, meditation, reflection and counselling. If provided, it should be available to everyone who attends the unit. The project team should give careful consideration to local needs, including the range of denominations and faiths wishing to use the accommodation, as this will vary according to the population served. The room should be comfortably furnished and include easy and upright chairs and an occasional table. Space and the arrangement of seating should accommodate

wheelchairs. Accessories of worship vary in accordance with denomination or faith, and therefore suitable storage cupboards should be provided. Appropriate washing facilities should be provided. This room is optional accommodation dependent on the needs of the population served.

Dialysis area

- 4.22 The dialysis area should consist of dialysis stations in increments of three. The schedules of accommodation for this guidance are based on a 12-, 18- and 24-station unit. The final number should take into account the provision of a spare station for routine maintenance, breakdowns and expansion. For guidance on spatial arrangement and patient privacy in the dialysis area, refer to [paragraphs 3.11–3.14](#).
- 4.23 Project teams should involve patients in the choice of chairs, and any conclusions should be included in the design brief (for example, this may include considering modified chairs that can be used by patients as cycle machines for exercise while on dialysis). Sufficient space must be allowed for the chair to be fully reclined, and for nurses to carry out procedures. Treatment stations will need to be arranged so that patients can be attached to the machine by either arm or by cannulae in their neck or groin. If beds are to be used instead of reclining chairs, floor areas for each station will need to be reviewed, as area allowance is slightly larger for bed provision. One emergency call button (with an audible and visual alarm) per station should be provided.
- 4.24 Facilities are required at the station for the storage of frequently-used medical items, and for patients to carry out seated activities, including watching television, while undergoing dialysis. Storage shelves should be located so that items can be seen



The dialysis area should have plenty of natural daylight with an outside view. Natural lighting is important to human well-being. Artificial lighting, as well as providing levels of illumination to suit activities, can make an important contribution to interior design. Designers should develop a lighting scheme that will help to promote a high-quality image of the services being offered and a non-clinical, soft environment. Uplighting, the level of which can be varied by patients, has been found to be very beneficial (see [paragraphs 5.27–5.31](#))

and reached easily by staff and patients. A mobile table may also be used by the patient for storing books, newspapers and other personal belongings, and by staff for recording the patient's notes.

- 4.25 Project teams should consider providing a computer outlet, telephone point and a network connection point at each station. Computer data points for staff use are likely to become increasingly important as remote electronic data access becomes more widespread.
- 4.26 There should be at least one wash-hand basin between two stations. The basin should be located as near to the station as possible without causing risk of splashing and cross-infection. At each station, there needs to be:
 - an alcohol hand-rub dispenser;
 - a wall-mounted soap dispenser;
 - a towel dispenser;
 - a clinical and non-clinical waste bin;
 - a sharps container.
- 4.27 The floor should be slip-resistant, easily cleanable (see NHS Estates' HFN 30 – 'Infection control in the built environment'), and have an impervious finish with coved skirting, as the risk of spillage of body fluids and other contaminants is high (see also [paragraph 5.9](#)).
- 4.28 Adequate adjustable lighting should be installed on walls and ceilings for use by staff carrying out procedures and by patients for reading, writing etc. Lighting controls should be within easy reach of patients and staff.
- 4.29 Consideration should be given to the provision of a communication and entertainment system with individual TV, radio, video and stereo headphone systems, and a telephone handset that allows patients to both make and receive calls. Televisions may be suspended from the ceiling, mounted on walls, placed on mobile units, or, if flat-screen, on a swing-out arm for each patient. To avoid disturbance to other patients, sound outputs from radios, televisions and other auditory equipment should be via headphones only. Consideration should also be given to providing access to the internet through a data point or wireless connection for patients who have laptop computers.¹

¹ If a bedside communication and entertainment system is to be procured for the satellite unit, the system supplier/

- 4.30 It is important to ensure the comfort of patients and staff in all weather conditions. The ability to keep the room temperature low is important for patient well-being and stability during dialysis and for staff working conditions. The extent of ventilation required will depend on the total heat gain within the dialysis area, but project teams should be aware that it is usually more cost-effective to install air-conditioning from the outset than to provide it after the facility has been completed.
- 4.31 The provision of medical gases, including oxygen and suction, at each station is for local consideration.

Isolation room

- 4.32 There is a strong and increasing body of opinion that an isolation room is essential and that it should not be necessary to transfer patients to a main renal centre if they are medically stable. Some stable patients may need to be dialysed in isolation from other patients either temporarily or on every occasion. This would usually be for infection control purposes, and the control measures taken would depend on the mode of spread of the particular pathogenic organism. There is a need to agree cross-infection/isolation requirements (including those for hepatitis B, hepatitis C, HIV and MRSA) with the local infection control team to allow maximum flexibility of the facility, taking into account local and national guidelines.
- 4.33 There should be an allocation of one to two isolation rooms per 12 stations.
- 4.34 In this HBN it is assumed that, in the isolation room, a negative air pressure facility may be required. It is vital that the negative pressure can be monitored within the unit and that the door to the room is alarmed.
- 4.35 An isolation room has the same equipment and spatial requirements as a standard treatment station, with the addition of hand-wash facilities, and should allow for either bed or chair provision. The room should be accessible from the main dialysis area, and a viewing window to that area should be provided. The door to the isolation room should be kept closed as much as possible so that

contractor may offer discounts or reach an agreement with the NHS trust about providing the service to patients free or for a nominal amount. These issues are best addressed locally

the required direction of air movement is minimally disturbed.

- 4.36 An emergency call button is required, with an audible and visual alarm.
- 4.37 The floor should be slip-resistant, easily cleanable (see NHS Estates' HFN 30 – 'Infection control in the built environment') and have an impervious finish with coved skirting.
- 4.38 The room may also be used for "routine" dialysis, particularly when other treatment stations are fully utilised.

Staff base

- 4.39 The staff base/bases should be located so that staff sitting at the base can observe the patients in the dialysis area. If separating screens are used, they will need to be of a height to allow direct vision from a staff base, but allow privacy to patients. The number and location of the bases will depend on local policies and will be arrived at after consultation, the conclusions of which should be translated into the design brief. Staff bases must not be a source of disturbance to patients.
- 4.40 The likely numbers of nursing staff, the choice and location of monitoring and computing equipment,

storage policies and requirements for notes, forms and other stationery must be considered.

- 4.41 All communication systems should have a terminal here, including computer, telephones, fax, call systems and alarms.
- 4.42 It is recommended that a separate room be provided for staff handovers to promote privacy. The manager's office or the seminar room can be used for this function.

Resuscitation trolley bay

- 4.43 A resuscitation trolley bay, with space for parking a resuscitation trolley (with defibrillator), a mobile suction unit and a cylinder of oxygen on a trolley (if these are not piped to the bed or chair side), should be located with easy access to all spaces used by patients. Guidance on gas storage is contained in HTM 02-01 – 'Medical gas pipeline systems'.

Consulting/examination room

- 4.44 One or more (depending on the use to which the satellite unit is put, for example if the unit were to support a pre-dialysis clinic) combined consulting/examination rooms are required for consultation and examination.



The consulting/examination room with desk, chairs and an examination couch, screened by curtains. Space is needed for a mobile adjustable inspection lamp, an X-ray viewer, blood-pressure monitoring equipment, a computer terminal, an alarm call system and clinical wash-hand facilities. Courtesy of Esler Crawford Photography; reproduced by kind permission of Belfast City Hospitals Trust

- 4.45 The room should be large enough to accommodate a doctor, a nurse, a patient (who may be in a wheelchair), and an escort/carer. Space is needed for a desk and chairs, and an examination couch, screened by curtains. There should be enough space within the curtained area for a patient to undress/dress in privacy with assistance when required. Space is needed for storing small items of equipment, small quantities of supplies, a mobile adjustable inspection lamp, an X-ray viewer, blood-pressure monitoring equipment, a computer terminal and an alarm call system. Clinical hand-wash facilities are required (see NHS Estates' HFN 30 – 'Infection control in the built environment'). A telephone may also be required.

Treatment room

- 4.46 A treatment room is required for medical and nursing staff to perform minor diagnostic and treatment procedures requiring a clinical environment, for example inserting and changing the lines and cannulae required by CAPD and haemodialysis patients. This will require enclosed storage areas for equipment and disposable items. Ultimately, the kind of treatment room needed will depend on the procedures to be carried out, and these should be clarified at an early stage of planning.
- 4.47 An island couch should be provided, with space for staff to work from all sides. Facilities for recording patient data, and for storage and disposal of dressings and other disposables, should be supplied.
- 4.48 An examination luminaire should be provided over the treatment couch. It should be adjustable in pitch and rotation to allow the beam to be directed locally, and should provide reasonably shadow-free illumination with minimum heat gain to avoid injury to patients and staff. The examination luminaires should be manufactured and tested in accordance with the requirements specified in BS EN 60598-2-25.
- 4.49 A clinical wash-hand basin is required (see NHS Estates' HFN 30 – 'Infection control in the built environment'). The level of asepsis within this room should be commensurate with the procedures being carried out.
- 4.50 An emergency call system for the staff, and a nurse call system for the patient, should be provided.
- 4.51 The treatment room should be located adjacent to the dialysis area, dirty utility and clean utility.

Training room

- 4.52 There should be facilities for teaching patients how to perform a variety of tasks including continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis, and how to operate haemodialysis machines for home haemodialysis and self-care, and for carrying out administrative duties. Project teams should be aware that home haemodialysis patients and CAPD patients are trained differently and therefore need different facilities/environments. Training should take place in an informal, non-clinical environment that relates more to a patient's home environment.
- 4.53 There should be enough space to accommodate a nurse, two patients and two escorts. Clinical hand-wash facilities are required (see also NHS Estates' HFN 30 – 'Infection control in the built environment'), as well as a separate sink for the disposal of saline solution and other waste products.
- 4.54 A bag warmer is required. Facilities to operate an automated peritoneal system should be provided.
- 4.55 A variety of cupboards and shelves for the storage of CAPD equipment, stationery and other office supplies should be provided.
- 4.56 The peritoneal dialysis nurse will need a workstation and computer terminal. In units with a large number of CAPD patients, a separate administration office for CAPD staff may be required.
- 4.57 The training room is optional accommodation. However, where project teams do decide to include an area for PD training, a separate room for patients who come into the unit on a "drop-in" basis for advice and information should be considered. Alternatively, one of the consultation/examination rooms could be used for this purpose if the number of "drop-in" patients is likely to be few.

Office accommodation

Manager's office

- 4.58 This office is the administrative base for the unit manager. It should be sufficiently private for confidential discussions among staff. The office should accommodate a workstation with computer and keyboard, seating for up to three other persons, and storage for books and files, computer terminal keyboards and telephones.

Multidisciplinary office/interview room

- 4.59 This office space may be shared on a sessional basis by dietitians, social workers and other members of the renal team. It may also be used for counselling, interviews etc. The room should be comfortably furnished and include easy and upright chairs and an occasional table. A desk and chair should be provided to enable a member of staff to make notes while talking to a patient and/or escort. Space and the arrangement of seating should accommodate wheelchairs.

Administration office

- 4.60 Some units will have a dedicated person (or small team) who organises fluid deliveries, holiday arrangements etc on behalf of patients. The office should accommodate a workstation with computer and keyboard, seating for up to three other persons, and storage for books and files. This would depend on the size of the unit and number of patients.
- 4.61 Alternatively, this room could be optional if facilities and logistics allowed its functions to be carried out at the main renal centre.

Seminar room

- 4.62 A seminar room may be provided for teaching, tutorials, meetings, case conferences and clinical

instruction. Furniture and equipment should include upright stacking chairs with writing arms, a wall-mounted whiteboard, a video/TV monitor and computer-projection facilities, a wall-mounted display panel, and facilities for storing valuable and fragile items. Air-conditioning should also be installed.

- 4.63 The seminar room is essential complementary accommodation.

Support/utility spaces

Water treatment plantroom

- 4.64 Drinking water standards are inadequate for haemodialysis since patients are exposed to many thousands of litres of dialysis fluid annually. Water to be used for dialysis needs to be treated appropriately to remove impurities. For normal haemodialysis, water purity must meet the minimum standards for regular water quoted by the European Pharmacopoeia (third edition 1997, supplement 2001).² For haemodiafiltration, the water quality must achieve ultra-pure standards ('European Best Practice Guidelines for Haemodialysis (Part 1)', ERA-EDTA, 2002).

- 2 Renal care societies in many countries have similar endotoxin limits that apply locally. For example, France has a limit of 0.05 IU/ml for endotoxin levels (Nystrand, 2002)



Seminar room



Water to be used for dialysis needs to be treated appropriately to remove impurities. For normal haemodialysis, water purity must meet the minimum standards for regular water quoted by the European Pharmacopoeia

- To achieve ultra-pure water standards “double pass reverse osmosis (RO)” may be required, and this will have an effect on the space allocated to the water treatment room. It is also recommended that project teams refer to the Association for the Advancement of Medical Instrumentation’s (AAMI) standards. (See also paragraphs 6.32–6.37.)
- 4.65 The specification for the water treatment plant will be determined by the composition of the water supply; project teams should seek the advice of the local water authority, a renal technologist, the specialist water treatment plant supplier and the medical physics department.
- 4.66 It is important that the plant be close to the dialysis area (although not adjacent to it because of noise considerations), as this will shorten the distance covered by the distribution ring. It should also be located close to vehicle access to enable deliveries of chemicals and salt (if softening is required).
- 4.67 There should be sufficient space to accommodate a maximum of two people to monitor, adjust, service and repair the water treatment plant. For further guidance on accommodation for plant and services, refer to HTM 00 – ‘Policies and principles’.
- 4.68 The plantroom should be sized to accommodate the plant and storage of chemicals. Areas within the plantroom providing bulk storage of any corrosive liquids should be suitably sealed and bonded.
- 4.69 The plantroom floor should be sloped to a drain and treated with a chemical-resistant sealant, and the door accesses should have a lip and ramp to prevent water seeping to the rest of the unit in the event of a large water leak. The floor should also be “bundled” to contain any major water leakage (see also paragraphs 6.47–6.56 on “Drainage”).
- 4.70 The door should be lockable for security. The plantroom should be adequately lit and ventilated. Mechanical ventilation may be necessary if the heat gain from the water treatment plant cannot be controlled by natural ventilation.
- 4.71 The plantroom should have provision for local and remote monitoring of the water treatment plant.
- 4.72 The water treatment plantroom should not house any other equipment (for example calorifiers) other than that which is specific to its function.
- Maintenance room**
- 4.73 A workshop is required for the maintenance and repair of dialysis machines. The space provision should be sufficient to park and manoeuvre

equipment and accommodate a workbench with integral lockable cupboards. The floor should have an impervious finish with coved skirting.

- 4.74 A computer terminal should be provided to record all services and repairs on a central database. It is recommended that manufacturers' user manuals are kept in this room.
- 4.75 A clinical wash-hand basin, a sink for cleaning of components and disposal of non-toxic fluids, and also a wash-hand basin should be provided. Alternative disposal should also be made available for contaminated wastes.
- 4.76 A lobby associated with the equipment service room will provide space for holding equipment awaiting repair and/or calibration. A separate area should also be provided for machines that are already repaired and ready to go back into use.
- 4.77 The maintenance room requires a suitable electricity supply and a treated-water supply to the same specification as that being supplied to the dialysis area. A water supply and drainage facilities are also required.
- 4.78 There should be enough storage space for spare parts. There should also be suitable storage facilities for CMOS (complimentary metal oxide semiconductor) boards and other sensitive electronic components.
- 4.79 The maintenance room is essential complementary accommodation.

Maintenance room: equipment storeroom

- 4.80 A separate equipment storeroom will be needed to store spare and isolated dialysis machines. (The



A separate equipment storeroom will be needed to store spare and isolated dialysis machines – the maintenance room itself should not be used to store any spare machines

maintenance room itself should not be used to store any spare machines.) A treated water supply, power and drainage facilities are required.

Clean utility

- 4.81 A clean utility room is required for storing and preparing drugs, medicines and lotions, and for holding a working supply of clean and sterile supplies. A controlled drugs cupboard – attached to a load-bearing wall and alarmed – may be located here. A refrigerator will be required to store specialist drugs. The clean utility should be adjacent to the treatment room. Clinical hand-wash facilities are required. The floor should have an impervious finish.



The clean utility room is required for storing and preparing drugs, medicines and lotions, and for holding a working supply of clean and sterile supplies

Dirty utility

- 4.82 A dirty utility room should be provided, where items of equipment may be cleaned and for the disposal of liquid and solid waste. If a disposal room is not provided, the dirty utility should be large enough to temporarily hold materials for disposal and those items that need to be reprocessed.
- 4.83 The room should be fitted with a sluice sink, a sink-unit with drainer, a wash-hand basin, a work surface, cupboards and shelves. Bed-pan disposal facilities are required. Space should be available to park trolleys and for temporarily holding bags of soiled linen etc. Pedal-operated sack-stands are also required. The floor should have an impervious finish.



Dirty utility should have work surfaces, cupboards and shelves

- 4.84 A secure collection area for clinical waste and non-clinical waste should be provided. There should also be separate external access for clinical waste bins.

Disposal room

- 4.85 The disposal room is the temporary storage point for all items of supplies and equipment which have to be removed for cleaning, reprocessing or disposal, for example linen, waste disposal and sharps. The room should allow for cleaning of any spillage from the clinical waste bags. The floor should have an impervious finish.

Staff rest room

- 4.86 Rest room facilities are required where staff can relax and take beverages and snacks. This room is likely to be very busy at changeover periods and lunchtimes. An emergency call system should be located here.



The staff rest room should have windows with a pleasant outlook and be comfortably furnished

- 4.87 Rest rooms should have windows with a pleasant outlook and be comfortably furnished. Direct access to the staff pantry (see paragraph 4.88) is required.

Pantries: patients and staff

- 4.88 Pantry facilities, for both patients and staff, are required for the safe handling of food including the preparation of beverages and light snacks, for washing and storing crockery and cutlery, for storing a limited quantity of dry goods, and for the refrigerated storage of milk etc. Equipment should include a stainless-steel sink and drainer, an electric water boiler, a microwave oven, a worktop with cupboards, a commercial automatic dishwasher and a wash-hand basin. It would also be beneficial to provide an ice machine for patient comfort, as dialysis units can become very hot.

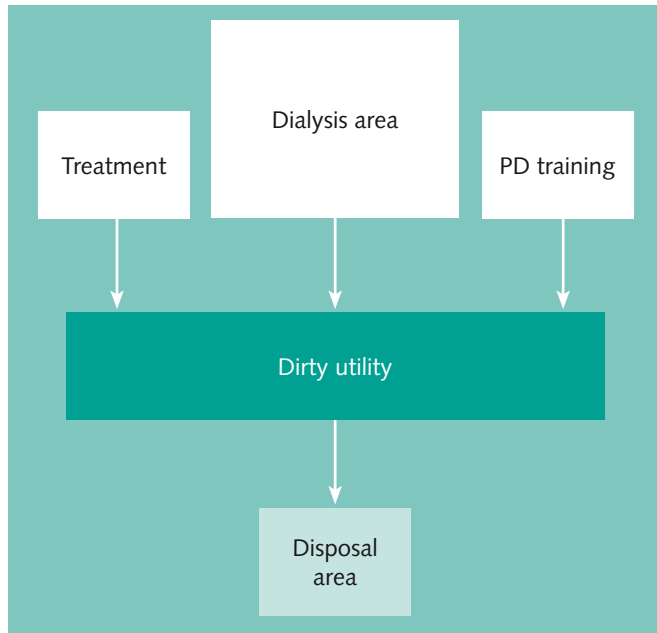


Pantry facilities

Staff change/locker room

- 4.89 Separate male and female staff change/locker rooms should be provided where staff can change into a uniform and store outdoor clothing and other personal items.
- 4.90 Personal full-length lockers for the secure storage of dry outer and middle garments, footwear and small items of personal belongings are required. Hanging rails, with security, for the storage of wet outer garments and lockers for large personal belongings should be provided. The number of lockers provided should be arrived at following consultation with staff, bearing in mind any likely future expansion of the unit, and should be included in the design brief.

Figure 6 Disposal flow



4.91 Separate male and female showers should be provided en-suite.

4.92 The staff change/locker room door should be lockable.

Staff sanitary facilities

4.93 Gender-specific sanitary facilities, including WCs with wash-hand basins and a WC accessible to the disabled, should be located adjacent to the staff change/locker room.

Equipment storeroom

4.94 Renal consumables should have a dedicated storeroom. This store should be large, with plenty of racking. The exact size of the store will depend



The equipment store will require lockable and alarmed double doors to the exterior for receiving delivered goods

upon how frequently supplies are delivered. However, it is worth pointing out that storage space is frequently understated. There should be provision for a bottled gas rack within this room.

4.95 The store will require lockable and alarmed double doors to the exterior for receiving delivered goods.

4.96 Additional storage space is required for the storage of equipment (chairs, drip-stands, etc) and of disposables. It is preferable to store these separately.

Fluid store

4.97 A storeroom for “bulk fluid” deliveries should be considered. This is a different way of providing dialysis fluid and requires one or more tanks to be installed for storing the fluid. The size of this room will depend on the number of stations and the frequency of delivery. This room is optional accommodation as not every unit will use this system.

Clean linen storage

4.98 There must be segregation of clean and dirty linen. Dirty linen should be temporarily held in the disposal room (see [paragraph 4.85](#)).

4.99 There should be sufficient space within the clean linen store for the storage of towels, pillows, blankets etc and access for linen trolleys to be loaded/unloaded.

Cleaners' room

4.100 Space and facilities must be sufficient for parking and manoeuvring cleaning machines and a cleaners' trolley, cleansing of cleaning equipment, and disposal of fluids and used cleaning materials. Hand-washing facilities are also required. Shelving and vertical storage should not encroach on the working space or restrict access to the cleaners' sink.

Electrical distribution cupboard

4.101 An electrical distribution cupboard, with lockable doors, housing the main isolators and distribution fuse switchgear, should be:

- accessible directly from a circulation area (access space may be part of the circulation area);
- sited away from water services; and
- lockable.



Renal consumables should have a large, dedicated storeroom with plenty of racking

4.102 The electrical distribution cupboard, where possible, should be sited within the unit. There should be clear and safe access for maintenance staff, and care should be taken to ensure that safety is not compromised, during maintenance, from passing traffic or the opening of adjacent doors. All equipment should be mounted at a height to give easy access from a standing position.

IT room

4.103 The IT room will contain network servers and communications equipment.

4.104 The room should be large enough, not only to contain the equipment intended to be installed initially, but also to allow for expansion of facilities at a later date. There may be a need at some time to install replacement equipment before existing equipment is removed.

4.105 The room should ideally be separate from other equipment rooms in the unit and should be separately securable. The equipment in the room should not be visible from outside the room.

4.106 Arrangements should be made to ensure that the environment in the room is suitable for the equipment that may be kept in the room. This could include controlling the temperature, humidity, and levels of dust etc in the air.

4.107 There must be adequate space for staff to be able to access the equipment for maintenance purposes. It should be ensured that this maintenance can be done without inconveniencing the normal operation of the unit.

4.108 A secure storage area should be provided for storing back-up media.

5 Other functional and design requirements

Introduction

- 5.1 This chapter contains additional guidance on aspects of function and design which are common to all health buildings.

Statutory and other requirements

- 5.2 The guidance takes account, as far as possible, of all statutory and other requirements in force at the time of publication. However, health authorities and trusts are reminded of their responsibility for ensuring compliance with all relevant statutes, regulations, codes and standards – in particular the Construction (Design and Management) Regulations 2007.
- 5.3 Satellite dialysis units operating in a community setting should comply with the National Care Standards Commission (NCSC) National Minimum Standards. Section 22 of the Care Standards Act 2000 sets out a broad range of regulation-making powers covering the conduct of services to be regulated by the NCSC. An important new requirement is that providers must have a system for assuring quality that includes seeking the views of patients. This approach is consistent with all National Service Frameworks. Regulation will be through the Commission for Healthcare Audit and Inspection (CHAI) from 2004.

Building components

- 5.4 The Building Components Database consists of a series of Health Technical Memoranda; numbers 54–70 provide specification and design guidance on building components for health buildings which are not adequately covered by current British Standards. No firms or products are listed. The numbers and titles of the various Health Technical Memoranda in the series are listed in the “References” section at the end of this Health Building Note.

Upgrading or adaptations of existing buildings

- 5.5 The standards set out in this guidance essentially apply to the provision of accommodation by new building, and it is not intended that they should be applied retrospectively to existing stock. However, the principles are equally valid and should be applied, so far as is reasonably practicable, when existing accommodation is being upgraded or new accommodation is being constructed within an existing building which may previously have been used for other purposes.
- 5.6 Before any decision is made to carry out an upgrading project, consideration must be given to the long-term strategy for the service, the space required for the new service, and the size of the existing building. Regard must also be paid to the orientation and aspect of the building, and the adequacy and location of all necessary support services.
- 5.7 If a prima facie case for upgrading emerges, the functional and physical condition of the existing building should be thoroughly examined. The check of physical and other aspects of existing buildings should include:
- availability of space for alterations and additions;
 - type of construction;
 - insulation;
 - age of the buildings and condition of building fabric – for example external and internal walls, floors, roofs, doors and windows – which may be determined by a condition survey;
 - life expectancy and adequacy of engineering services, adequate water pressure, ease of access and facility for installation of new wiring, pipework and ducts, and suitable drainage systems, if required;

- the height of ceilings. High ceilings do not necessarily call for the installation of false ceilings, which are costly and often impair natural ventilation;
- changes of floor level, to obviate any hazards to disabled people;
- fire precautions;
- physical constraints to adaptation, such as load-bearing walls and columns.

5.8 When comparing the cost of upgrading or adapting an existing building to that of constructing a new building, due allowance – in addition to the building cost – must be made for the costs of relocating people, demolition, salvage, disruption of services in a phased project, and the temporary effects on running costs of any impaired functioning of areas of the building affected by the upgrading works.

Damage to health buildings

5.9 When designing and equipping health buildings, the likely occurrence and effects of accidental damage should be considered. Damage to health buildings has increased over the years through the use of heavier mechanical equipment for the movement of patients and supplies and, to some extent, as a result of lightweight, often less robust, building materials. Most damage to doors, and to floor and wall surfaces, is caused by wheeled traffic. Measures to minimise damage should be taken in the form of protective corners, buffers and plates, and of proper continuation of floor coverings, that is, strong screeds and fully-bonded floor coverings. Protective devices should be capable of being renewed as the need arises.

5.10 Reference should be made to the relevant British Standards and to the guidance contained in Health Building Note 40 – ‘Common activity spaces’ (NHS Estates, 1995). Further information is provided in Health Technical Memoranda 56, 58 and 61.

Signposting

5.11 The Department of Health’s ‘Wayfinding’ (2005) should be consulted for general guidance.

Disabled people

5.12 It is a legal requirement to ensure that suitable access and facilities are provided for people who

have problems of mobility or orientation. This includes those who have difficulty walking, and may use sticks, crutches or other assistive devices; those who have a visual or hearing impairment; and those who use a wheelchair. Authorities are reminded of the need to comply with the provisions of:

- the Disability Discrimination Act 1995 (updated 2001);
- BS 8300: 2001 ‘Design of buildings and their approaches to meet the needs of disabled people. Code of practice’;
- the Building Regulations. Approved Document M: Access and facilities for disabled people, 1999;
- the Disabled Persons (Services, Consultation and Representation) Act 1986 (updated 2000).

5.13 Project teams are encouraged to refer to Health Building Note 40 – ‘Common activity spaces’ which gives guidance and a set of ergonomic data sheets on access, space and equipment relating to disabled people in health buildings.

5.14 It is recommended that project teams consult local representatives of disabled people, or the Centre for Accessible Environments, with regard to the planning of spaces used by patients and escorts.

5.15 In locations where public telephones are provided, one should be mounted at a height suitable for use by a person in a wheelchair and the handset fitted with an inductive coupler to assist any person using a hearing aid.

Smoking

5.16 No provision has been made in this Health Building Note for staff or patients who wish to smoke.

Environment and design

5.17 Designers should create an environment that will help patients feel at ease, be conducive to efficient working, and contribute to staff morale. This is particularly important in the dialysis area where patients spend so much time, but also in the reception and waiting areas.

5.18 Particular note should be taken of ‘Improving the patient experience – evaluation of the King’s Fund’s Enhancing the Healing Environment programme’ (2003), ‘Better by design’ (1994), ‘Environments

for quality care: health buildings in the community' (1994), 'Better health buildings', the Achieving Excellence Design Evaluation Toolkit (AEDET) and the 'Improving the patient experience' series, all by NHS Estates (see "References"). It is recommended that patients be consulted about the design, and that any agreed suggestions be included in the written design brief.

- 5.19 External landscaping is often of special value. The design process should also include the choice of well-designed furniture and fittings and co-ordination of carpets (only in non-clinical areas) and colour. External views and natural light are also very important issues in design (see 'Lighting and colour design for hospital environments', 2003), and it is recommended that patients be consulted about the design and that any agreed suggestions be included in the written design brief.

Art in health buildings

- 5.20 Works of art and craft can make a significant contribution towards the required standard of the interior of centres; this need not be limited to the conventional hanging of pictures on a wall. Every opportunity should be taken to include works by artists and craftspeople in appropriate spaces in centres. These may include paintings, murals, prints, photographs, sculptures, decorative tiles, ceramics, textile hangings and furniture.
- 5.21 Often it is works of art and craft which lend special identity to a waiting area and which help give a sense of locality. Again, it is recommended that patients be consulted about this aspect of the

aesthetics of the unit and that any agreed suggestions be included in the written design brief.

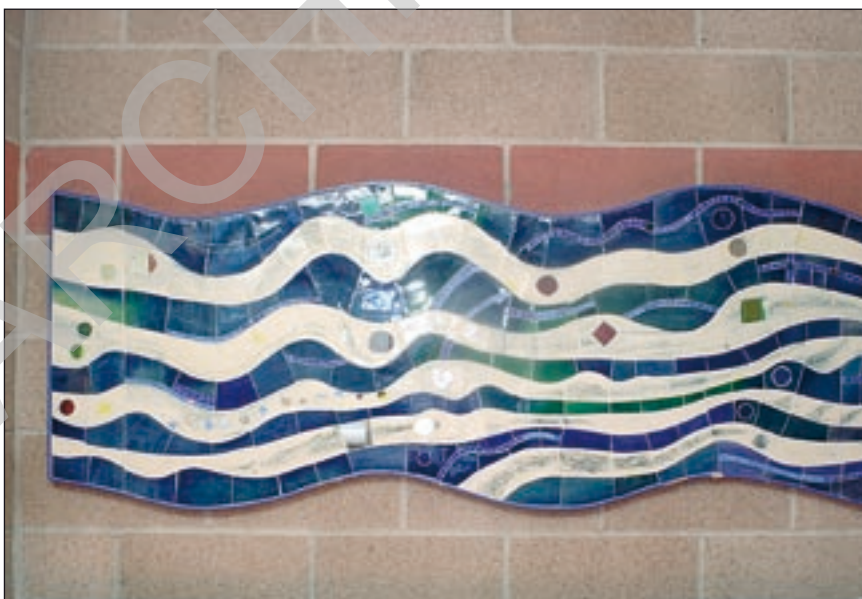
- 5.22 Advice should be sought from experts on:

- obtaining grants. In some cases, Regional Arts Boards or charitable trusts with a local interest may offer grants to add money within a capital scheme which is set aside for art or craft works. The Royal Society of Arts offers bursaries for collaborations between architects and artists;
- obtaining sponsorship. Local industries may see an advantage in supporting an arts project as a way of reaching a wide, or particular, audience;
- lottery funding.

- 5.23 NHS Estates published guidance to help trusts implement their own arts programmes. 'The art of good health – using the visual arts in healthcare' (NHS Estates, 2002) sets out the history and the benefits of the arts in healthcare and provides case studies and examples of its successful implementation. Its complementary publication 'The art of good health – a practical handbook' (NHS Estates, 2002) provides hands-on guidance to help trusts set up their own arts programme. It includes information on fundraising, commissioning, exhibitions, and general management.

Courtyards

- 5.24 Courtyards may be a feature of the design of a satellite unit located in an extension to an existing building. Courtyards enable more rooms to receive



Works of art and craft can make a significant contribution towards the required standard of the interior of satellite units

natural daylight and ventilation, and provide an outlook which can compensate patients for the lack of a longer view. Suitable layout and planting can help to preserve privacy in surrounding rooms. Ground-cover planting is preferred to grass as it is often more successful and is easier to maintain.

- 5.25 Access for maintenance should be from a corridor so that patients and staff are not disturbed. Staff should take care to ensure that they do not intrude on patient privacy when entering a courtyard.
- 5.26 Reference should be made to Health Building Note 45 – ‘External works for health buildings’ for more detailed guidance on this subject.

Natural and artificial lighting

- 5.27 Sunlight enhances colour and shape, and helps to make a room bright and cheerful. The harmful effects of solar glare can be dealt with by architectural detailing of window shape and depth of reveals, as well as by installing external and internal blinds and curtains.
- 5.28 Wherever possible, spaces to be occupied by patients, escorts or staff should have natural daylight with an outside view. Natural lighting is important to human well-being. However, the need for privacy should also be taken into account; thus, if a unit is on the ground floor, the glass may need to be one-way.
- 5.29 Artificial lighting, as well as providing levels of illumination to suit activities, can make an important contribution to interior design. Designers should develop a lighting scheme that will help to promote a high-quality image of the services being offered and a non-clinical, soft environment in as many spaces as possible. Uplighting, the level of which can be varied by patients, has been found to be very beneficial. (Levels of artificial light can easily be varied by the use of dimmer switches.) See also paragraphs 6.74–6.81.
- 5.30 Artificial lighting provided in spaces occupied by patients should enable any changes to skin tone and colour to be clearly defined and easily identified (see also paragraph 5.48). A huge impact on the environment can be created by the use of colour and lighting – by coordinating new paint colours and different lighting.
- 5.31 Fixed luminaires should not be sited immediately above positions where patients lie on a couch or

reclined chair. This applies to all spaces where patients are consulted, examined and treated.

Telephones

- 5.32 Telephones should be provided in accordance with the needs of the unit. Ringing telephones in and adjacent to consultation/examination/treatment spaces are a particular nuisance at any time, and consideration should be given to the installation of a telephone system which will enable any incoming calls to be intercepted at an appropriate location – for example the reception desk.
- 5.33 Public telephones will be required for the use of patients, their escorts and visitors, preferably in a convenient and accessible location in, or near to, the main entrance and/or waiting area. Reference should be made to paragraph 5.14 above with regard to the provision of public telephones for disabled people.
- 5.34 Consideration should also be given to providing patients with access to telephones while they are on the dialysis machines, especially if hospital/unit policy proscribes the use of mobile phones.
- 5.35 The Independent Expert Group on Mobile Phones (2000) produced a report advising that mobile phones should be switched off within healthcare premises and signage should be prominently displayed.

Internal environmental engineering considerations

Internal rooms

- 5.36 Internal rooms may contribute to economy in planning. If, however, additional artificial lighting and ventilation are required, both capital and running costs need to be evaluated and accepted.
- 5.37 Use of internal rooms should be limited to activities which:
 - a. need a controlled environment (excluding the dialysis area); or
 - b. are carried out intermittently by different individuals – for example in circulation areas and some storage areas.
- 5.38 Rooms that are likely to be occupied for any length of time by a patient, an escort or a member of staff should have natural light.

Ventilation

- 5.39 Natural ventilation is preferred unless there are internal spaces or clinical reasons that call for mechanical ventilation (for example an isolation room) or air-conditioning (see paragraphs 6.24–6.29).
- 5.40 Mechanical ventilation and air-conditioning systems are expensive in terms of capital and running costs; planning solutions should be sought which take maximum advantage of natural ventilation. Mechanical ventilation costs can be minimised by ensuring that, wherever practicable, core areas are reserved for rooms whose function requires mechanical ventilation irrespective of whether their location is internal or peripheral (for example sanitary facilities and dirty utility rooms).

Noise and sound attenuation

- 5.41 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.
- 5.42 Speech privacy is essential in spaces where personal and confidential discussions are held, such as interview rooms and consulting/examination spaces; it should not be possible to overhear any discussions taking place in adjoining spaces. Particular care should be taken where the adjoining spaces are in waiting areas.
- 5.43 Sound transmission can be reduced by use of sound-attenuating partitions and doors. Use of soft floor-coverings, provision of curtains, and acoustic treatment of walls and ceilings (where hygienically acceptable) will improve sound absorption in a space.
- 5.44 Provision of earphones for patient access to individual and communal television sets should be provided as part of dialysis-station bedhead services.
- 5.45 For guidance on speech privacy in the dialysis area, refer to paragraphs 3.11–3.14. See also paragraphs 6.57–6.58.

Finishes

- 5.46 The quality of finishes in all areas should be of a high standard; the cost allowance makes due recognition of this need. Guidance on the selection of finishes is provided in the relevant Health Technical Memoranda.

- 5.47 Finishes should be robust enough to withstand accidental impact, and additional protection should be provided at likely points of contact. They should also be able to withstand constant cleaning with occasional use of chlorine-releasing agents (for dealing with blood or body fluid spillage or infection). Trolleys and items of mobile equipment which may cause damage should be appropriately buffered (refer to HTM 69 – ‘Protection’).

Colour

- 5.48 The colours of surfaces in spaces occupied by patients should not distort the colour rendering of light sources. It must be possible to clearly define and easily identify any changes to a patient’s skin tone and colour (see also paragraphs 5.27–5.31). Decor colours should be light and pleasant (see ‘Lighting and colour design in hospital environments’, 2003).

Floors

- 5.49 Floor coverings and skirtings should contribute to the provision of a non-clinical environment, yet at the same time be hardwearing. They must not present a hazard to disabled people, nor should they restrict the movement of wheeled equipment. Floors should not be (nor appear to be) slippery, and the floor patterning should not induce disorientation. Changes of floor level should be avoided wherever possible. Surface drag, static electricity, flammability, infection hazards and impermeability to fluids have also to be considered. Health Technical Memorandum 61 – ‘Flooring’ should be consulted for advice on user requirements and performance selection.
- 5.50 Finishes should be appropriate for the activities to be carried out, restricted in variety for ease of cleaning, and compatible with agreed cleaning routines.

Doors and frames

- 5.51 Doors and frames are particularly liable to damage from mobile equipment, and materials which will withstand this should be used. All double swing-doors should incorporate clear glass vision panels, but privacy, safety or other considerations may require that the panels should be capable of being obscured. Where necessary, doors should be capable of being fastened in the “open” position. Magnetic door retainers should not restrict the movement of

traffic. Refer to Health Technical Memorandum 58 – ‘Internal doorsets’.

Windows

5.52 In addition to the various statutory requirements, the following aspects require consideration: illumination and ventilation; insulation against noise; user comfort; energy conservation; the prevention of glare; the provision of a visual link with the outside world. Adding windows to the dialysis area can provide an important diversion for patients during an otherwise stressful period. Windows should have a pleasant and stimulating outlook, and patients should be able to easily look out of the window while on dialysis. In certain circumstances one-way glass should be considered (see [paragraph 5.28](#)).

5.53 Design should ensure that it is possible for cleaners to have easy access to the inside and outside of windows. Guidance on types of windows and on safety aspects is available in Health Technical Memorandum 55 – ‘Windows’.

Maintenance and cleaning

5.54 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 which may be subjected to heavy use. Wall coverings should be chosen with cleaning in mind. Guidance on these aspects is given in Health Technical Memoranda 56: ‘Partitions’; 58: ‘Internal doorsets’; and 61: ‘Flooring’.

5.55 In liaison with local authorities, consideration may need to be given to the provision of a dedicated, secure, waste disposal area for both clinical and non-clinical waste.



Patients should be able to easily look out of windows while on dialysis

6 Engineering services

Introduction

- 6.1 This chapter describes the engineering services required within a satellite renal unit. The department will be a stand-alone facility and will need to be provided with a suitable infrastructure including utilities connection and heating, cooling, emergency power etc that are beyond the scope of this building note.
- 6.2 Consequently this guidance neither attempts to be definitive nor is it geared to a particular solution, but it is intended to acquaint project and design team members with a basis from which project-specific solutions can be developed. Further guidance can be sought from the current versions of the relevant Health Technical Memoranda.
- 6.3 The Health Technical Memorandum series is supported by the overarching publication Health Technical Memorandum 00 – ‘Policies and principles: best practice guidance for healthcare engineering’, which covers the following issues:
- a. overview of engineering services guidance;
 - b. statutory and legislative requirements;
 - c. professional support;
 - d. operational policy;
 - e. training and workforce development;
 - f. emergency procedures and contingency planning;
 - g. training, information and communications;
 - h. maintenance;
 - k. engineering services.
- 6.4 Guidance on specific types of engineering services can be found within the Health Technical Memorandum series of documents as follows:
- a. Decontamination (Health Technical Memorandum 01);
 - b. Medical gases (Health Technical Memorandum 02);
 - c. Ventilation systems (Health Technical Memorandum 03);
 - d. Water systems (Health Technical Memorandum 04);
 - e. Fire safety (Health Technical Memorandum 05);
 - f. Electrical services (Health Technical Memorandum 06);
 - g. Environment and sustainability (Health Technical Memorandum 07);
 - h. Specialist services (Health Technical Memorandum 08);
 - k. other existing HTM 2000 series guidance documents.
- ### Flexibility of design
- 6.5 In the light of the projected increase in demand for renal services, engineering services should be designed to accommodate future expansion.
- ### Design for safety
- 6.6 Designers should be 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’) and ventilation systems (see Health Technical Memorandum 03-01 – ‘Specialised ventilation in healthcare premises’).
- ### Space requirements for services and plant
- 6.7 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 the building design should incorporate adequate space for the full range of building services and the requirements for installation and maintenance of plant, ductwork, pipework and cabling.

- 6.8 Space for plant and services should provide:
- easy and safe means of access;
 - secure accommodation protected from unauthorised access;
 - adequate space around the plant services to permit inspection maintenance and replacement.
- 6.9 Guidance on spatial requirements for engineering plant and services is contained in Health Technical Memorandum 00. Further information regarding the provision of space for plant is contained in the following BSRIA technical notes:
- TN 9/92: 'Space and weight allowances for building services plant – inception stage design'; and
 - TN10/92: 'Space allowances for building services distribution systems'.
- 6.10 With the exception of drainage and some heating pipework, engineering services should not be brought from the above-ceiling space of a floor below.
- 6.11 Service distribution to a particular area should be contained within service spaces on that floor.
- 6.12 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.
- 6.13 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 – 'Acoustics' (in preparation; to replace Health Technical Memorandum 2045).

Decontamination

- 6.14 Decontamination is the combination of processes (including cleaning, disinfection and sterilization) used to render a reusable item safe for further use on patients and handling by staff. The effective decontamination of reusable surgical instruments is essential in minimising the risk of transmission of infectious agents. Further guidance is set out in Part A of Health Technical Memorandum 01-01 – 'Decontamination of reusable medical devices'.

Mechanical services

Piped medical gases

- 6.15 Piped medical gases should be designed in accordance with the requirements of Health Technical Memorandum 02-01 – 'Medical gas pipeline systems'.
- 6.16 At each patient location within a bedhead trunking system, oxygen and vacuum services will normally be required. In addition to the above, according to procedures to be undertaken, medical compressed air, nitrous oxide and local anaesthetic scavenging systems may also be required.

Heating

- 6.17 General space heating requirements may be met by a variety of systems including radiators and radiant panels, or within the air-conditioning system. Designers should ensure that the most appropriate method is employed with regard to the healthcare environment being provided.
- 6.18 Where heat emitters are used, the surface temperature should not exceed 43°C. Exposed heating pipework, accessible to touch, should be encased and/or insulated. Further information is given in Health Guidance Note – "Safe" hot water and surface temperatures'.
- 6.19 Care should be taken to ensure that heat emitters do not adversely affect the local temperature conditions of adjacent storage and preparation areas.
- 6.20 Where used, radiators should be located under windows or against exposed walls. There should be space between the top of the radiator and the windowsill to prevent curtains reducing the output. There should be adequate space underneath to allow cleaning equipment to be used.
- 6.21 Where appropriate, heating controls should be provided to modulate heating circuit flow temperatures in accordance with external temperature. Radiators or radiant panels 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 coordinated manner and do not cause the space to overheat.
- 6.22 Ceiling-mounted 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.

- 6.23 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.

Ventilation

General

- 6.24 Designers should undertake summertime temperature calculations to identify whether the internal temperature will rise to an unacceptable level. These calculations should take account of how both externally and internally generated heat gains may be reduced or controlled. It is important to achieve a balance between economy in capital and energy costs and creating appropriate levels of comfort through mechanical ventilation/comfort cooling. For areas where it is considered essential to install chilled ventilation systems, they should be designed in accordance with the requirements of Health Technical Memorandum 03-01 – ‘Specialised ventilation for healthcare premises’.
- 6.25 Air movement induced by mechanical ventilation should be from clean to dirty areas, where these areas can be defined. The design should allow for adequate flow of air into any spaces having only mechanical extract ventilation, via transfer grilles in doors or walls. However, such arrangements should avoid the introduction of untempered air and should not prejudice fire safety or privacy.
- 6.26 Local exhaust ventilation (LEV) will be required where exposure (by inhalation) to substances hazardous to health cannot be controlled by other means. 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 compliance with the Control of Substances Hazardous to Health Regulations 2002 (COSHH). Further guidance on the design of LEV systems may be found in Health Technical Memorandum 03-01.

Satellite unit

- 6.27 Designers may be required to provide engineering solutions not covered by existing guidance, but in so doing should remain aware that the solutions proposed must continue to be entirely compatible with the primary objective of maintaining infection control in the satellite unit.
- 6.28 The satellite unit should use 100% fresh-air, low-velocity ventilation systems. Where it is viable to do so, heat should be reclaimed from all extract systems using either recuperators or heat-recovery air-to-water coils.
- 6.29 Cooling should be considered for the dialysis/treatment areas and isolation room(s) to achieve good comfort levels. Vents should not be positioned directly above patient-occupied areas, that is, directly over beds or chair positions. Grilles and diffusers should be located to provide even air distribution (see Health Technical Memorandum 03-01).

Hot and cold water systems

- 6.30 Hot and cold water storage and distribution systems should be designed in accordance with the requirements of Health Technical Memorandum 04-01 – ‘The control of *Legionella*, hygiene, “safe” hot water, cold water and drinking water systems’.
- 6.31 Exposed hot-water pipework, accessible to touch, should be encased or insulated. Special care should be taken when facilities are being provided for older, confused or mental health patients.

Water services for haemodialysis

- 6.32 Developing technology and the specialised nature of dialysis equipment will necessitate advice being sought from specialist water treatment companies, a renal technologist with specialist knowledge of treated water for dialysis, and equipment manufacturers.
- 6.33 A chemical water analysis from the local water authority should be obtained before selection of the water treatment plant is made. If on a hospital site, hospitals should conduct their water analysis as close to the proposed point of use as possible, as local pipework may have an effect on the results. The plantroom should be located as near as possible to the renal unit in order to reduce pipe runs. Plant should be in a separate area to hot water/heating services.

- 6.34 Water for dialysis should reach at least the standards given in the following:
- the higher European Pharmacopoeia (EP) XVI standard: ‘Water for diluting concentrated haemodialysis solutions’;
 - ISO 13959: ‘Water for haemodialysis and related therapies’; or
 - AAMI RD-52 2004 (Association for the Advancement of Medical Instrumentation) standards.
- 6.35 New equipment should be capable of producing ultrapure dialysis fluid (bacterial counts <0.1 CFU/mL, and endotoxin <0.03 EU/mL) in order to meet the recommendations given in the European Renal Association-European Dialysis and Transplant Association’s (ERA-EDTA) ‘European best practice guidelines for haemodialysis’. Ideally, this should be achieved using ultrapure water; however, water that meets the minimum standards can be used together with point-of-use filtration on the dialysis fluid.
- 6.36 A routine testing procedure for water to be used in dialysis should form part of the satellite unit’s policy (Renal Association, 2007).

Note

The limits for bacterial counts are based on the European Pharmacopoeia and on ERA-EDTA’s ‘European best practice guidelines for haemodialysis’.

A revision of ISO 13952 is currently at the “Committee Draft” stage and should be available by 2008.

- 6.37 To avoid rescheduling of patients in the event of equipment failure, it is essential that the appropriate levels of redundancy be provided. Central water treatment plants should be duplicated to facilitate maintenance work being carried out.

Water supply and pipework

- 6.38 For a satellite unit, the central installation providing water for dialysis should be distributed through a recirculation pipework ring. The design of this ring should minimise the number of direction changes and dead-legs so that the risks from bacteriological infection are reduced, and should also minimise sharp bends and shoulders in joints. The rings should be installed above the

floor in the dialysis area and the maintenance room. Installations that utilise ceiling or floor voids are not advised, as these introduce unnecessary dead legs within the ring:

- the pipework should be constructed from rigid ABS, food-quality PEX tubing, hardwearing PVC or stainless steel, depending on the disinfection process to be used;
- the pipework should be capable of being cleaned and/or disinfected by either chemical or heat treatment to maintain hygiene:
 - (i) PEX can support both chemical and heat treatment;
 - (ii) it will be possible to use only chemical decontamination with ABS and PVC pipework (not heat);
- all treated water connections to dialysis machines should be of the dead-free-space design or have an automated facility to disinfect the tubing connecting to the dialysis machine on a regular basis.

- 6.39 Flexible hoses connecting the dialysis machine to the water supply and drainage outlet points should be provided with quick-release couplings. To avoid the risk of accidentally dislodging the drainage hoses from dialysis machines, it is recommended that the quick-release coupling be of a different size to the water-supply coupling to avoid confusion and cross-connection.
- 6.40 The water-supply outlet point for each dialysis station and, as appropriate, in the maintenance room, should be kept as short as possible. This outlet point should also incorporate a means of isolation and a quick-release coupling.

Water treatment plant

- 6.41 Depending on the water supply, the water treatment plant may consist of the following water treatment stages (other equipment may be required for particular problems, high iron, nitrate etc):
- raw water break tank (to water supply regulation standards);
 - water-softening plant;
 - inorganic and organic scavengers;
 - pre-filters;
 - two granular-activated carbon (GAC) filters for chlorine and chloramine removal;

- final fine filtration just before reverse osmosis (RO);
- a final treatment RO-RO unit.

- 6.42 The water treatment plant conditions should be monitored by the BMS and a plant status alarm panel providing visual or audible signals. The plant conditions should be capable of being transmitted to remote alarm panels.
- 6.43 The water treatment plant should provide for total redundancy with dual softeners, circulating pumps, RO equipment and carbon filters. Carbon filters should be selected to achieve sufficient contact time to remove all chlorine and chloramines. Connection to the supply must conform to water regulations (the Water Supply (Water Fittings) Regulations 1999).

Maintenance

- 6.44 With regard to the protection of the RO water treatment plant, devices for the control and safe isolation of engineering services should be in a separate secured room.

Building management systems

- 6.45 All engineering plant and equipment associated with the internal environment should, where possible, be controlled, monitored and regulated by a building management system (BMS) in accordance with the provisions of Health Technical Memorandum 08-05 – ‘Building management systems’ (in preparation; to replace Health Technical Memorandum 2005).
- 6.46 Requirements for the monitoring and control of plant and systems are also covered in the Health Technical Memorandum that relates to the particular plant or system.

Internal drainage

General

- 6.47 A system of soil and waste drainage including anti-siphon and ventilation pipework should be provided in accordance with BS EN 12056.
- 6.48 Where plastic pipework materials are used, suitable intumescent collars should be fitted when breaching fire compartments.
- 6.49 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.

- 6.50 To prevent the ingress of bacteria, waste outlets from distillation plant and refrigerators should be connected outside of the department, not be directly connected to the drainage system and discharge via a trapped tundish or gully.
- 6.51 Drainage/waste systems from air-conditioning units should be installed to prevent legionnaires’ disease and other bacteria back-feeding.
- 6.52 All drainage that may be used for the passage of contaminated effluent should be clearly labelled.

Satellite unit

- 6.53 The used dialysis solution should be discharged to a drainage outlet point and drainage system for each dialysis station and, as appropriate, in the maintenance room. This outlet point should incorporate a suitable air break, means of isolation, and a quick-release coupling of a different size to that of the water supply outlet point. Drainage pipework materials should be suitable for high-temperature waste at times of automatic cleaning and disinfection (and also a range of disinfecting chemicals).
- 6.54 It is possible that a protein-type residue will build up in the dialysis (solution) drainage pipework. It is therefore recommended that the pipework gradient from the discharge outlet point to the drainage system be greater than the usual 1 in 50.
- 6.55 At an early stage in the design process, designers should familiarise themselves with the types of discharge produced, and check with the client what effect the mixing of various chemical discharges may have upon the drainage system.
- 6.56 Proposals for the collection and discharge of chemical-contaminated effluent should be discussed and verified with the sewerage undertaker. Some water authorities may impose restrictions on the quantity and rate of discharge of such effluent into public sewers.

Acoustics

- 6.57 Excessive noise in individual areas, whether internally or externally generated and transmitted, can adversely affect the operational efficiency of the satellite unit and cause discomfort. The limits and means of control are described in Health Technical Memorandum 08-01 – ‘Acoustics’.
- 6.58 There will also be a need to ensure auditory privacy in certain rooms. This typically, but not exclusively, is required in the dialysis treatment

stations, consulting/examination rooms and isolation room(s); it should not be possible to overhear any discussions taking place in adjoining spaces. Particular care should also be taken where the adjoining spaces are waiting areas. Efforts to ensure auditory privacy should not compromise patient safety during dialysis treatment (by interfering with clinical observation) and should not result in any requirement to increase nursing staffing levels.

Fire safety

- 6.59 Fire safety standards in healthcare premises need to be high owing to the vulnerability of occupants. The policy in respect of fire safety is set out in Health Technical Memorandum 05-01 – ‘Managing healthcare fire safety’. The design team should satisfy itself that the design meets the objectives of this guidance or provide a fire-engineered solution that achieves similar objectives.
- 6.60 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 appropriate design team members should discuss 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 strategy for the design. This will include operational aspects (staff responsibilities etc), equipment provision, and building and engineering layouts.

Fire detection and control systems

- 6.61 Fire detection, alarm and control systems are an integral part of the overall fire plan for a building. Close coordination between the architect and design engineer is essential to ensure that compartmentation, high-risk processes, dangerous goods and other fire-related risk issues are fully understood and embraced in the fire management solution.
- 6.62 For guidance see the ‘Firecode’ suite of documents (Health Technical Memorandum 05).

Engineering services – electrical

General

- 6.63 Electrical installations should comply with the current edition of BS 7671 IEE Wiring Regulations together with Guidance Note 7

(Special Locations) and Health Technical Memorandum 06-01 – ‘Electrical services supply and distribution’. See also ‘Medical Electrical Installation Guidance Notes’ (MEIGaN; MHRA).

- 6.64 Prior to final design, a full assessment should be made of the risk, function, occupation, equipment and resilience requirements for the area. This will influence the extent and location of services, the availability of alternative electrical supply distribution and the need for local standby supplies if appropriate.

Electrical installation

- 6.65 The electrical supply connections to electro-medical equipment should comply with BS EN 60601-1-2:2002 to avoid corruption of input data; some equipment may require automatic disconnection, with manual reset, following mains failure. Specific dialysis machine requirements are covered by BS EN 60601-2-16:1998.

Electrical interference

- 6.66 Care should be taken to avoid mains-borne interference, harmonics and electrical radio frequency interference affecting computers and other electronic equipment used in the satellite unit.

Electromagnetic compatibility

- 6.67 Care should be taken to avoid mains-borne 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 – ‘Electrical services supply and distribution’.

Main intake switchgear and distribution boards

- 6.68 The main electrical supply should be part of the whole site/building network and provide adequate capacity for both normal and all assessed business-critical needs.
- 6.69 Main intake and distribution equipment should be sited away from patient areas and areas where access would disrupt normal communication routes.
- 6.70 Careful consideration should also be given to the impact from flooding, pipework leaks and mechanical damage.

Emergency electrical supplies

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

Small power distribution systems

- 6.72 Depending upon the capacity of the emergency generator installation and risk assessment, it may be appropriate to provide separate essential and non-essential small power distribution systems.
- 6.73 Adequate provision should be made in circulation areas, for example corridors and lobbies, to allow the use of domestic cleaning equipment having flexible cords up to 9 metres long.

Lighting systems

- 6.74 Lighting services, including lighting controls, should comply with CIBSE's:
- Guide LG2 – 'Hospitals and healthcare buildings'; and
 - Guide F – 'Energy efficiency in buildings'.
- 6.75 In areas where VDUs are in use, lighting should be designed to comply with the guidance given in CIBSE Guide LG3 – 'The visual environment for display screen use'.
- 6.76 To achieve energy efficiency, lighting systems should be designed to:
- a. maximise use of natural daylight;
 - b. avoid unnecessarily high levels of illumination;
 - c. incorporate efficient luminaires, control gear and lamps;
 - d. incorporate effective controls.
- 6.77 Lighting and the appearance of luminaires should be coordinated 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. See also 'Lighting and colour for hospital design – a report on an NHS-funded research project' (Dalke et al, 2004).
- 6.78 Light switches should be provided in easily accessible positions and at appropriate locations in corridors and general circulation areas. In areas with multiple luminaires, switches should permit the selection of luminaires appropriate to the area requiring illumination.

- 6.79 Where local circumstances permit, the provision of time switches or occupancy controls using infrared, acoustic or ultrasonic detectors should be encouraged. Additionally, low-energy or ultra-low-energy lighting should be considered as the primary lighting source.
- 6.80 Safety escape lighting should be provided on primary escape routes in accordance with the provisions of Health Technical Memorandum 06-01, Health Technical Memorandum 05-02 – 'Guidance in support of functional provisions for healthcare premises', and CIBSE's Lighting Guide LG2 – 'Hospitals and healthcare buildings'.
- 6.81 It is essential that fluorescent lighting in all areas where medicines or containers are processed, including stores, is derived from lamps having suitable colour-rendering characteristics.

Patient/staff and staff emergency call systems

- 6.82 Patient/staff and staff emergency call systems should comply with the requirements of Health Technical Memorandum 08-03 'Bedhead services' (in preparation; to replace Health Technical Memorandum 2015).
- 6.83 Patient/staff call points should be provided in all spaces where a patient/attendee may be left alone temporarily – for example consulting, examination and treatment rooms and WCs.
- 6.84 Staff emergency call points are for a member of staff to call for assistance from another member of staff. They should be provided in all spaces where staff consult, examine and treat attendees/patients. Consideration should be given to the use of technology as a deterrent or to enable a response to an incident.
- 6.85 The patient/staff and staff emergency call systems may be hard-wired or radio systems.
- 6.86 Where considered necessary, staff crash call points may be specifically provided for members of staff to call the crash team. This is not required as a standard installation, and needs to be specified for individual rooms where the patient is at high risk of suffering a cardiac arrest.
- 6.87 A visual and audible indication of the operation of each system should be provided at a suitable staff base to give responding staff unambiguous identification of the call source, with a repeater unit in the staff rest room.



The water treatment plant conditions should be monitored by a plant status alarm panel providing visual or audible signals



The water treatment plant should provide for total redundancy with dual softeners, circulating pumps, RO equipment and carbon filters

Security

- 6.88 Measures should be incorporated in the design of all NHS buildings to help protect the safety of staff, patients and visitors and the security of the premises. Security systems will require a local risk assessment and crime prevention survey to be carried out for both daytime and out of hours, to include swipe cards, smart cards, CCTV and other available technological solutions. The project team should discuss security with the local police crime prevention officer and the trust's nominated local security management specialist (LSMS) at an early stage in the design process.
- 6.89 See the Department of Health's 'Directions to NHS bodies on security management measures 2004 (amendment) directions 2006' and 'A professional approach to managing security in the NHS' (NHS Security Management Service, 2003).
- 6.90 The local fire officer and local security management specialist (LSMS) should be consulted concurrently to avoid the possibility of the demands of security and fire safety conflicting.

IT and telephone wiring systems

- 6.91 The approach to provision of IT and telephone infrastructure within the satellite unit may be conditioned by an existing system. However, where possible, a structured wiring system as described in Health Guidance Note 'Structured cabling for IT systems' should be provided. This will permit a unified approach to the provision of cabling for voice systems; data systems; CCTV; and alarm systems.
- 6.92 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 (no fewer than two per workstation);
 - whether wiring will be on a "flood" or "as required" basis, having due regard to the potential expansion of the satellite unit in the future;
 - whether any wireless computer networking will be required.
- 6.93 In addition to the monitoring of dialysis equipment and providing staff access to this data, the IT system should offer telemetry links to other

areas within the satellite unit and to other hospital services.

Bedhead services and entertainment systems

- 6.94 Allowance should be made for the introduction of television and radio systems in waiting areas, to create a relaxing atmosphere, in staff rest areas, and in locations where it would be beneficial in masking sound transfer.
- 6.95 Other services should be provided in accordance with Health Technical Memorandum 08-03 'Bedhead services' (in preparation; to replace Health Technical Memorandum 2015).

Pneumatic tube transport systems

- 6.96 If a new pneumatic tube system is to be installed, significant investigation needs to be undertaken to ensure that the system will meet the needs of the whole or that part of the hospital site. For further guidance on the design of pneumatic tube systems, see Health Technical Memorandum 2009 – 'Pneumatic air tube transport systems'.

Lifts

- 6.97 Lifts may be required in order to comply with the requirements of the DDA or Part M of the Building Regulations. For further guidance on the design of lift installations, see Health Technical Memorandum 2024 – 'Lifts'.

Controlled drugs storage

- 6.98 Controlled drugs cupboards should be fitted with a red lamp indicating when the cupboard is unlocked. A repeater lamp should be sited outside the doorway of the room in which the cupboard is located. If appropriate, a secondary repeater should be taken to a permanently staffed station.
- 6.99 The normal power supply for each cupboard should be backed up by a small integral battery to cover the short period between mains failure and the generator becoming available.
- 6.100 To assist in keeping their contents secure, controlled drugs cupboards should be fitted with a seven-lever mortice lock designed to meet BS 3621.

Sustainability and energy efficiency

- 6.101 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. The minimising of environmental impact by ensuring that energy is only used necessarily and efficiently is considered in this guidance with respect to:

- a. natural daylighting;
- b. natural ventilation;
- c. night set-back;
- d. building regulations;
- e. heat recovery;
- f. water conservation;
- g. minimising solar gain.

6.102 Efforts should be made to maximise the use of natural lighting. Passive solar design (PSD) should be employed to ensure that, as far as possible, the dialysis area and offices are located where they can benefit from natural daylight, while other areas, for example stores, WCs and utility rooms, are located towards the core of the facility.

6.103 Areas where glare may be a problem, for example rooms where VDUs are routinely used, should similarly be located away from direct natural daylight.

6.104 Natural ventilation of rooms should be employed wherever possible and appropriate. Design should incorporate measures for minimising solar heat gains, which, if controlled, will avoid the need for mechanical ventilation. Measures to minimise the need for cooling should include locating temperature-sensitive accommodation away from south-facing fascias, shading windows, and using reflecting glass where appropriate and cost-effective.

6.105 Energy-using systems including heating, ventilation, cooling and lighting should

be controlled to minimise consumption. Consideration may be given to utilising the thermal properties of the building when the facility is not in use, for example at night or weekends, where circumstances permit.

6.106 Energy recovery systems should be employed when possible, and particularly on ventilation systems.

6.107 For further guidance on energy efficiency, see Health Technical Memorandum 07-02: 'Encode – making energy work in healthcare'.

Commissioning and maintenance

6.108 It is important that, on completion of an installation and prior to hand-over, the performance of engineering services and equipment is fully commissioned to validate their function and achievement of performance.

6.109 The final acceptable performance details should be recorded and, together with full manufacturers' details, should be made available to users and the maintenance organisation before the facilities are handed over.

6.110 Once the facilities are operational, the overall performance should again be further performance-tested when full operational conditions are achieved. This will check that the interface between systems has not been compromised and that the systems operate to the designed criteria.

6.111 Risk management, operational procedures and contingency plans should be fully evaluated with staff to ensure that, in the event of an emergency, procedures can be put in place to maximise the safety of patients, staff and visitors. Opportunities should be taken to practise these procedures when it is safe to do so, in order that staff remain fully conversant with what is required of them and can fully appreciate the issues involved.

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 DH (see 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).
- 7.3 The attention of the project team is drawn to the 'Capital Investment Manual' (Business Case Guide) (see 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.
- 7.4 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 that the satellite dialysis unit will require when incorporated into an acute general hospital, where the common use of services will be available. Costs are based on a typical 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 schedules of accommodation for this document are held on the schedule of accommodation database on the DH Estates and Facilities Knowledge and Information Portal.
- 7.11 The schedules show example notional whole department accommodation. The examples are not to be taken as ideal provision for any particular project. The examples included are as follows:
- satellite dialysis: 12 dialysis stations;
 - satellite dialysis: 18 dialysis stations;
 - satellite dialysis: 24 dialysis stations;

Dimensions and areas

- 7.12 The critical dimensions of an area are determined by the spatial requirements of any activities to be carried out within it.
- 7.13 Space requirements for various generic activities appear in Health Building Note 00-02 – 'Sanitary spaces' (forthcoming), Health Building Note 00-03 – 'Clinical and clinical support spaces'

(forthcoming) and 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. 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.

Communication spaces

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

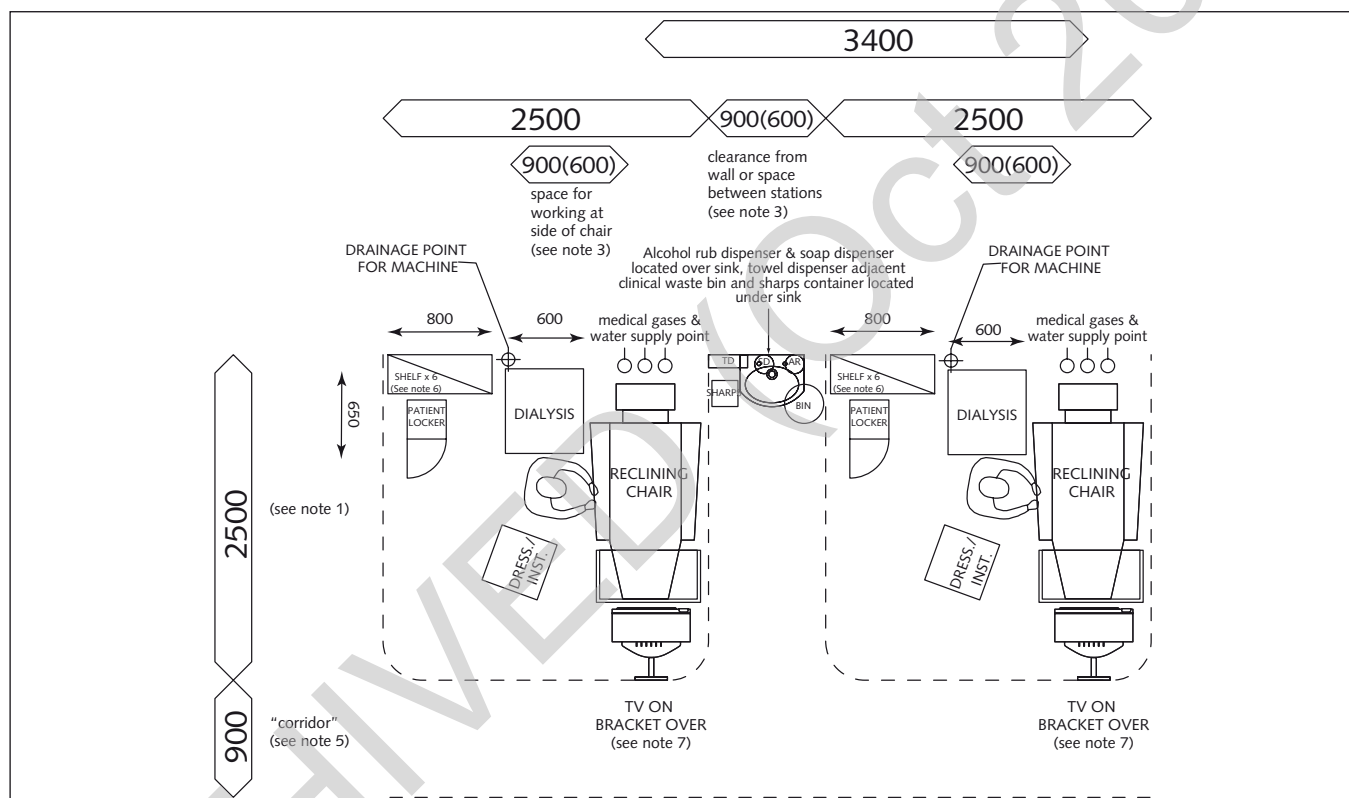
- 7.20 The following engineering services are included in the cost allowances (see [Chapter 6](#) and Activity DataBase for further information). Primary engineering services are assumed to be conveniently available at the boundary of the department.
- 7.21 Mechanical services:
- Heating – low-pressure hot water system.
 - Ventilation – mechanical supply and extraction to meet clinical and functional requirements, and other areas requiring mechanical ventilation such as WCs and showers (excludes ventilation plant, such as air handling units or extract fans).
 - 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, medical air (400 kPa) and vacuum.
- 7.22 Electrical services:
- Departmental distribution boards.
 - General lighting, as required by task.
 - Emergency luminaires, as appropriate.
 - Socket-outlets and other power outlets for fixed and portable equipment.
 - Supplementary equipotential earth bonding.
 - Uninterruptible power supply (UPS) and equipment.
 - Fire, security, and controlled drug cupboard alarm systems.
 - Telephone internal cabling distribution and outlets (excludes handsets).
 - TV/radio wireways.
 - Data wireways.
 - Building management system.
- 7.23 Equipment (Group 1):
- Controlled drugs cupboards.
 - Water boiler in staff room and pantry.
 - Dishwasher.

Appendix 1 – Ergonomic drawings

(Dimensions in all drawings are given in millimetres unless otherwise indicated)

Reclining chair

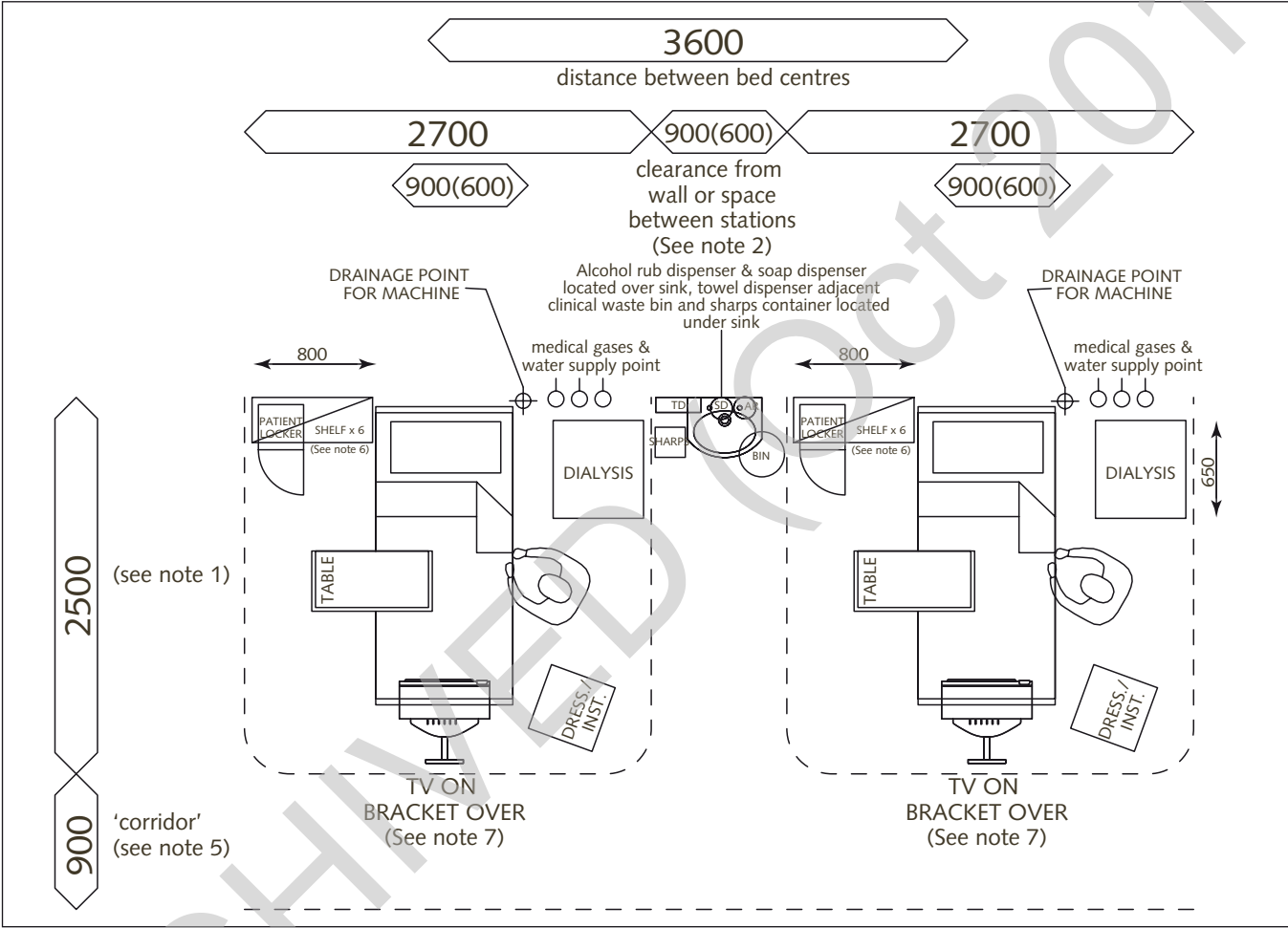
<p>Activities</p> <p>Facilities for maintenance dialysis. Space required for the dialysis chair in the sitting and reclined positions and for nurse(s) to carry out procedures. The patient uses the same chair and dialysis machine on each visit to reduce the risk of cross-infection. Facilities for storage of frequently used items, waste disposal and for patients to carry out seated activities whilst undergoing dialysis, including watching television.</p> <p>Component user data sheet, not to scale</p>	<p>Satellite Dialysis</p> <p>Individual dialysis stations</p> <p>Users</p> <p>Patient and one or two nurses</p>
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<p>2500(2300)</p> <p>Preferred Minimum <i>Restricted minimum</i> (not recommended for general use, see explanatory notes)</p> <p>Notes</p> <ol style="list-style-type: none"> 1. Sufficient space must be allowed for the dialysis chair to be fully reclined. 2. The layout of some stations should be mirrored so that patients can be attached to the dialysis machine by either arm. 3. Where the layout of the station results in a Dialysis chair being close to a wall, a clearance of 900 mm 	<p>preferred or 600 mm minimum should be allowed between wall and chair to allow a nurse to assist at the side of the chair. If an adjacent station is mirrored this working space should be allowed between chairs and this may help to reduce the risk of cross-contamination. A wash-hand basin could be sited in this space.</p> <ol style="list-style-type: none"> 4. Wash-hand basin(s) can be shared between stations and must be proximate to all. 5. A minimum of a 900 mm wide "corridor" should be provided between the rows of dialysis stations to permit the movement of staff, patients and equipment. 	<ol style="list-style-type: none"> 6. Storage shelves should not be fixed lower than 700 mm or higher than 1400 mm above the floor so that items can be reached easily. 7. Televisions can be suspended from the ceiling or wall. Clearance of 2000 mm should be allowed between underside of unit and floor. Alternatively TVs can be on a mobile unit; trailing wires must not be a danger. 8. The facility to write patient notes or input them into a computer should be provided, possibly in the form of a shared staff base.
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Bed

Activities	Satellite Dialysis
Facilities for maintenance dialysis. Space required for the dialysis chair bed and for nurse(s) to carry out procedures. The patient uses the same chair and dialysis machine on each visit to reduce the risk of cross-infection. Facilities for storage of frequently used items, waste disposal and for patients to carry out seated activities whilst undergoing dialysis, including watching television.	Individual dialysis stations
Component user data sheet, not to scale	Users
	Patient and one or two nurses



2500(2300)	should be allowed between wall and bed to allow a nurse to assist at the side of the bed. If an adjacent station is mirrored this working space should be allowed between beds and this may help to reduce the risk of cross-contamination. A wash-hand basin could be sited in this space.	6. Storage shelves should not be fixed lower than 700 mm or higher than 1400 mm above the floor so that items can be reached easily.
Preferred Minimum <i>Restricted minimum</i> (not recommended for general use, see explanatory notes)	4. Wash-hand basin(s) can be shared between stations and must be proximate to all.	7. Televisions can be suspended from the ceiling or wall. Clearance of 2000 mm should be allowed between underside of unit and floor. Alternatively TVs can be on a mobile unit; trailing wires must not be a danger.
Notes	5. A minimum of a 900 mm wide "corridor" should be provided between the rows of dialysis stations to permit the movement of staff, patients and equipment.	8. The facility to write patient notes or input them into a computer should be provided, possibly in the form of a shared staff base.
1. The layout of some stations should be mirrored so that patients can be attached to the dialysis machine by either arm.		
2. Where the layout of the station results in a dialysis bed being close to a wall, a clearance of 900 mm preferred or 600 mm minimum		

Appendix 2 – Glossary

Fistula: A surgically enlarged vein (usually located in the wrist or elbow) that provides access to the bloodstream for haemodialysis.

Haemodialysis: This is dialysis via an artificial kidney. The patient's blood is treated by the transfer of electrolytes and other dissolved substances across a semi-permeable membrane. Permanent access to the patient's circulation is necessary, and three dialysis sessions per week are usually required, each lasting four to five hours.

Haemofiltration: A technique similar to haemodialysis where waste products are removed from the patient's blood using convective solute transfer through a high hydraulic permeable membrane.

Haemodiafiltration: This is simultaneous haemodialysis and haemofiltration.

Peritoneal dialysis: This is normally carried out as continuous ambulatory peritoneal dialysis (CAPD) and involves a sterile "washing" fluid being introduced into

and withdrawn from the peritoneal cavity. The technique takes 30 to 40 minutes and is generally repeated three to four times a day.

Automated peritoneal dialysis involves the use of a machine, to which the patient is attached (usually overnight), to perform peritoneal dialysis.

Reverse osmosis: A technique for the purification of water. Impurities are separated from water molecules using a semi-permeable membrane under pressure.

Type II diabetes: Type II diabetes makes up about 90% of all cases of diabetes. It usually occurs in adulthood. The pancreas does not make enough insulin to keep blood glucose levels normal. Type II diabetes is becoming more common due to the ageing population, increasing obesity levels, and widespread failure to exercise. Without proper management, long-term health risks such as kidney failure can occur.

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