

The Renal Association

Provision of Services
for
Adult Patients with Renal
Disease
in the
United Kingdom

This document has been prepared by a Working Group of the Renal Association Subcommittee on Provision of Treatment for Chronic Renal Failure, on behalf of the Royal College of Physicians of London and The Renal Association.

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THE REMIT AND PURPOSE OF THE DOCUMENT

The recent epidemiological studies conducted by the Renal Association have shown that there is a need to provide renal replacement therapy for 75-80 new adult patients per million population each year and that this need is not being met^{1,2}. Moreover the current rate at which new patients are being accepted for renal replacement treatment (60.7 pmp in 1990) means that the stock of patients continuing to require treatment will grow for a number of years until a steady state is reached. See Appendix 1 for comparison with other European countries in 1990. This suggests that an increase in the total number of patients of at least 30% can be anticipated.

By comparison with European countries, the UK has a grave shortage of both specialist renal physicians and renal units^{3,4,5}. The Renal Association therefore detailed a working party to prepare a paper describing the current and predicted workload entailed in providing renal services for **adults** in the UK, the resource and manpower implications of this workload, and to make recommendations on the efficient use of these.

The purpose of this document is therefore:

1. to ensure that resources are provided to reach the targets implicit in these predictions, and to assist with planning for the improvement of facilities to attain these targets;
2. to assist the "providers" of renal services in their negotiations with Regional and District Health Authorities, representing "purchasers";
3. to provide data for the calculation of costs and the assessment of the quality of the service delivered.

We have not discussed the provision of renal services for children, which will be covered in a document prepared by the British Association for Paediatric Nephrology. Nor have we examined the cost of treatment, which will be covered by a separate working group.

INTRODUCTION

The contribution of nephrology to medical practice is not widely understood. This paper describes the current position and suggests ways in which the discipline should develop.

During a recent prospective British study, it emerged that the point prevalence of acute and chronic renal impairment (creatinine $>150 \mu\text{mol/l}$, implying a 50% reduction in renal function) is approximately two thousand adults pmp⁶. Many of these patients would benefit from the advice of a nephrologist.

At least 300 new patients pmp per year should be carefully assessed for, and many will ultimately require, renal replacement treatment. About one third to one half of these patients will be in end stage renal failure, and will yield approximately 80 pmp per year who are less than 80 years of age, who would benefit from renal replacement therapy.

Six hundred pmp patients have established milder chronic renal impairment. Many of these have no symptoms, but their reduced renal function may be associated with hypertension and will aggravate intercurrent conditions. For example, renal impairment may compromise maternal health during pregnancy; there may be treatable systemic illness, especially among the elderly, or urinary tract infection superimposed on previous renal impairment. Immunological, infective and hypertensive renal damage all occur and compromise health, but these are relatively uncommon problems which may present coincidentally, or be recognised too late, so that unless there is a readily available nephrologist, preventable morbidity or mortality may occur.

Approximately 50 patients per million per year develop acute renal failure requiring dialysis, and 150 patients per million population develop acute renal impairment (defined as a rise in serum creatinine to greater than $500 \mu\text{mol/l}$ with a subsequent sustained fall) requiring the services of a nephrologist.

Nephrologists work closely with urologists and other surgical colleagues, obstetricians, and physicians in other medical subspecialties, in particular diabetologists, rheumatologists and intensive care specialists. However, **specific** medical renal entities are not usually managed by general physicians and, because few of the conditions treated are self-limiting, follow up of the patients is long term. In comparison to malignancy and cardiovascular disease, renal disease is relatively rare, denying experience to most general physicians and family practitioners. This means that unless specialist nephrology opinions are easily accessible, patients receive less expert treatment. The importance of a good basic medical nephrological service is that it may reduce the need for expensive renal replacement treatment and the morbidity associated with acute exacerbations of renal impairment, and provide conservative treatment to avoid complications of renal failure.

Definition:

The services required by patients with renal disease include:

- (i) the diagnosis and management of medical renal disease;
- (ii) provision of dialysis treatment and renal transplantation for those with end stage renal failure;
- (iii) temporary renal support of those with acute renal failure.

SPECIFIC RENAL SERVICES

1) End stage renal failure (ESRF)

Approximately 80 per million adults develop ESRF requiring renal replacement each year^{1,2}, but only 60/million [See Appendices 1 and 2] enter renal replacement programmes, - a discrepancy explained in part by the inaccessibility of renal services, selection for referral by other medical practitioners, and inadequate resources. Planning should be for 80/million/year, which is the rate already established in other European countries.

The patient with ESRF can only be kept alive by either dialysis or transplantation, otherwise death will occur within 3 to 6 months despite all conservative measures. Although the majority of ESRF patients are suitable for renal transplantation, 45% rely on dialysis temporarily or indefinitely (see Appendix 3). This applies especially to the older age group (>65 years) in which complicating medical conditions and shortage of cadaveric kidneys may preclude or limit transplantation. The increased requirements for renal replacement treatment, implicit in the predicted referral rate of 80 pmp per year, will not be met by renal transplantation alone. Not only is there a limit to the number of organs which will be available but the additional patients that will be referred will almost all fall into the older age group.

The aim of the service should be the provision of the most appropriate renal replacement treatment to all those who would benefit from it (ie able to maintain independent or supported existence outside hospital), within a reasonable distance of their homes.

2) Severe Acute Renal Failure

Estimated number = 50/pmp/year

Severe acute renal failure may be defined as a sudden and potentially reversible reduction in renal function, from which, if renal replacement treatment is not provided, the patient will die. The mortality of severe acute renal failure is about 50% and the duration of renal support is from 1-6 weeks. These patients have prolonged expensive hospital admissions. There are many causes of acute renal failure, but these can be broadly divided into:

- (i) those associated with septic, cardiogenic or hypovolaemic shock.
- (ii) those where there is intrinsic damage to the kidney or
- (iii) obstruction to urine flow.

Patients with acute renal failure are usually severely ill, with failure of more than one organ system. They therefore need high quality medical and nursing care in specialised units and renal replacement is by haemodialysis, haemofiltration or peritoneal dialysis. A significant number of patients with acute renal failure will require treatment in an intensive care unit, in addition to those patients already in intensive care for other reasons, who develop acute renal failure. These patients require either frequent intermittent haemodialysis or a continuous treatment, e.g. continuous arteriovenous haemofiltration (CAVH) or continuous arteriovenous haemodialysis (CAVD). Detail is provided in Appendix 4.

THE TREATMENT FACILITIES REQUIRED:

1. Hospital based haemodialysis unit
2. Renal and Transplant wards
3. Facilities for establishing and maintaining patients on home haemodialysis
4. A Continuous Ambulatory Peritoneal Dialysis (CAPD) programme
5. 'Satellite' maintenance haemodialysis units (geographically separate units providing nurse supervised treatment, and/or minimal care maintenance dialysis units (geographically separate units in which patients undertake their own treatment with minimal assistance)
6. A renal transplant programme
7. Access to Intensive Care Unit facilities

ESTIMATES OF PATIENT NUMBERS [WING 1990]

1. Medical Renal Disease

The estimated number of new referrals for a nephrology opinion exceeds 250/million population annually. The number of patients (excluding those on dialysis or with a transplant) attending renal clinics is 400-800/million. This will depend on the local expertise and availability of general physicians trained in nephrology.

2. ESRF (See Appendices 1 and 2)

The acceptance rate for new patients in the United Kingdom in 1990 was 60.7/million population, but varied from 30 - 80/million between regions.

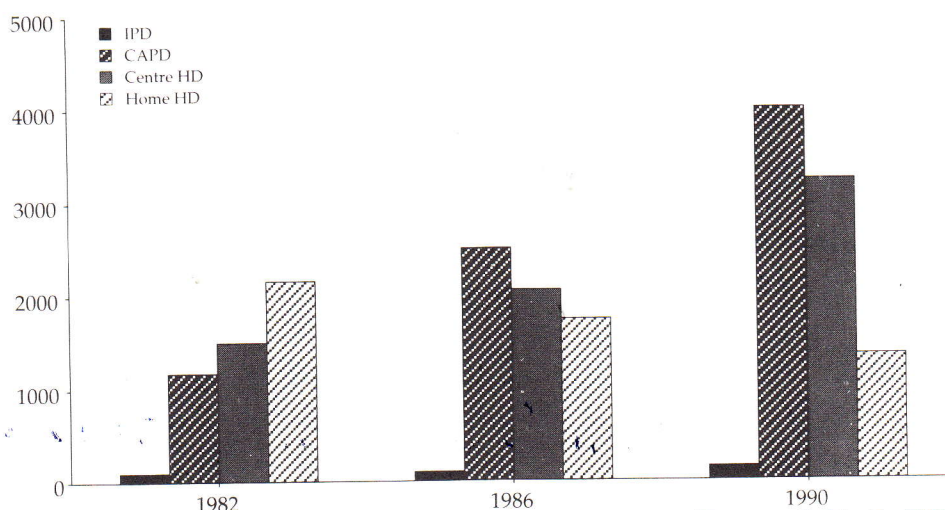
The estimates of patients receiving "renal replacement therapy" in the United Kingdom as at 31.12.90 were as follows:

Hospital haemodialysis	56.2/million
Home haemodialysis	23.5/million
Peritoneal dialysis	74.3/million
Renal transplant	176.7/million
TOTAL	330.7/million

For regional breakdown see Appendix 3.

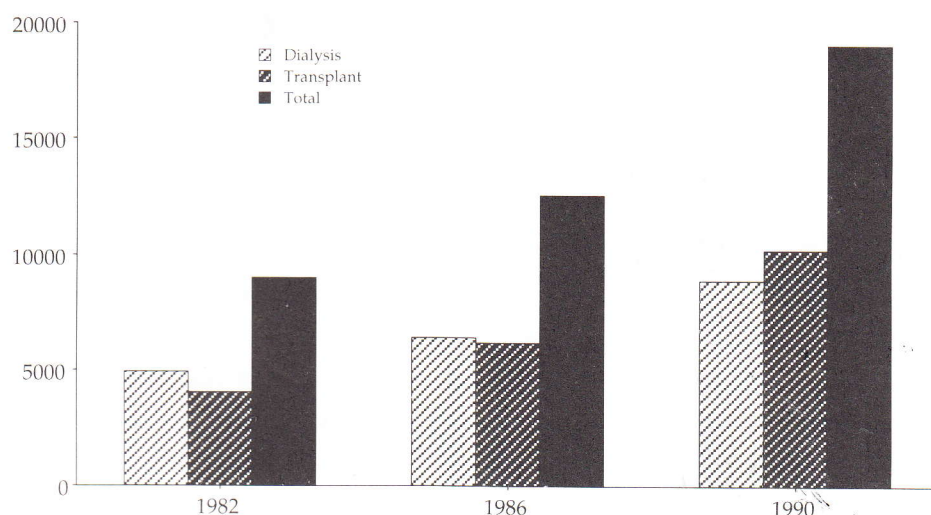
The predictions are that the number and proportion of hospital haemodialysis and CAPD patients will increase relative to home haemodialysis (see Figure 1a). The number of patients maintained with a functioning renal transplant will increase slowly for the foreseeable future (see Figure 1b). There is, however, a growing need for extra dialysis facilities to accommodate the patients who cannot be transplanted and the treatment of those patients whose renal transplants fail. Despite an improvement in graft survival at least 5% of the stock of renal transplant recipients will return to dialysis each year. Since the UK ESRF population has yet to reach steady state, extra dialysis places will be required for these patients as well as those for whom transplantation is not an option.

Figure 1a
Patient Stock by Dialysis Modality United Kingdom 1982 - 1990



Data supplied by the EDTA Registry

Figure 1b
Patient Stock by Treatment Modality United Kingdom 1982 - 1990



Data supplied by the EDTA Registry

The planning for provision of treatment in the UK must take account of predicted growth in the **total** number of patients that will require treatment. Comparison with other European countries, eg Germany (Appendix 1), shows that this increase could be as much as 50%. It should be emphasised that the demand for treatment of ESRF is very difficult to resist and it is unacceptable for nephrologists to be expected to control it for economic reasons. Without dialysis the patients will die and so nephrologists are obliged to offer treatment to all those referred who are suitable for treatment, and who, after its nature has been explained, choose to receive it. Generally the quality of life of patients on ESRF programmes is satisfactory, in that almost all lead independent or supported lives outside hospital. Moreover, growing public awareness of the treatment options available means that patients will expect and indeed should have the right to choose the modality that suits them best. Hitherto, access to hospital haemodialysis has been rationed to those in whom all other options have failed. If choice is to be offered, the greatest increased requirement will be for hospital based haemodialysis facilities.

POLICIES FOR THE ORGANISATION OF SERVICES

Facilities for managing patients with renal disease need to be co-ordinated within a given geographical area with a population of at least one million people. Such regional arrangements must be consistent with the responsibility of each district to purchase or provide the care required for its residents and must also take account of economies of scale as well as the geographical constraints placed on treatment.

1. Autonomous Regional Units

These will usually be one or more large units in the region, often but not always based in a teaching hospital and acting as a tertiary referral centre. Such units will offer the full range of diagnostic and therapeutic services and will be responsible for **renal transplantation** and **home haemodialysis**. Occasionally either or both of these may be concentrated on one of the major units. Where possible, duplication of services should be avoided. Such units should have adequate facilities for research into renal disease and the training of nephrologists.

2. Subregional Units⁷.

These will be based in selected District General Hospitals and provide standard renal services excluding, in most cases, renal transplantation and home haemodialysis, and provide for patients from a wider area than the district itself. They should be staffed by two general physicians trained in nephrology. A well-defined structure for liaison with the Regional Units must be established to provide for renal transplantation and home haemodialysis.

3. 'Satellite' Dialysis Units

These are maintenance dialysis treatment facilities only, functioning as out-stations of the regional or subregional units. They are staffed by nurses who undertake the treatment of patients. Such units require access to (but not on-site) medical cover. The patients should not be at high medical risk (ie similar to home dialysis patients). However, geographical considerations may influence the case mix and lead to a requirement for a locally available physician. The unit should be of a viable size so that the buildings, plant and nursing staff are used most economically (estimate: 6-12 stations, 2-3 shifts /day, 6 days/week).

4. Minimal Care Units

The requirement for these will depend on the availability of the three units described above. They are designed to provide haemodialysis facilities with the minimum of patient supervision. Ideally they should have no staff other than a housekeeper, for the patients should set up the machines and dialyse with the help of a family member or friend. This facility is required for the fit, independent patient who cannot be transplanted but whose social and domestic circumstances preclude home haemodialysis. In practice such patients are rare.

5. Renal Transplantation⁸

An effective renal transplantation service is essential for the proper conduct of a programme for renal replacement therapy.

The optimum size of a Renal Transplant Unit is one which serves a population of between one and three million, although geographical considerations may sometimes dictate a Unit of smaller size. The estimated need at present is thought to be around 55 renal transplants per million population per annum (including second and subsequent grafts). This figure will rise in the future. A Renal Transplant Unit should either be part of, or closely integrated with, a Regional Renal Unit, with combined supervision by surgeons and physicians. Good communication with the Dialysis Units in its catchment area is essential, and with this, some devolution of follow-up supervision to these Dialysis Units can take place.

The availability of cadaver organs is essential for an efficient transplant service and a well organised organ procurement programme is an absolute requirement. This needs adequate surgical staffing, a transplant coordinator establishment and good liaison with Intensive Care Units and the regional Neurosurgical Unit.

STAFFING IMPLICATIONS

MANPOWER IN NEPHROLOGY

1. MEDICAL

a) Consultant

Our recommendation of three whole time equivalent (WTE) physicians per million population provides one such renal physician for every twenty five patients new to the ESRF programme annually⁴. This is a reasonable index of overall workload which will include the management of renal disease, the assessment and management of pre-endstage renal failure and of acute renal problems. The stock of patients generated by 25 new patients annually will be some 75 on dialysis and up to 125 following transplantation, together with 50 patients requiring assessment and management before end stage renal failure has been reached. This stock far exceeds comparative international figures. For example, in North America there is one nephrologist for a stock of every 6 patients, whereas in Western Europe there is one nephrologist for every 30 patients on an ESRF programme.

The workload generated by transplantation will vary, being heavier in those centres conducting transplantation than those in which patients are followed up after transplantation elsewhere.

Time is required for teaching and research. Renal physicians, particularly in District General Hospitals, provide a significant service in general internal medicine and this must be taken into account.

Typically the Consultant contract for a renal physician would contain a commitment to:

- ❖ patient care (wards, renal unit and outpatients, investigative interventions) - 5 sessions
- ❖ administration (contact with general practitioners and other colleagues regarding ward, outpatient and renal unit patients) - 2 sessions
- ❖ management (of renal unit and of the stock of patients with nursing, technical and other support services) - 2 sessions
- ❖ audit and teaching - 1 session
- ❖ study and research - 1 session

No time is included here for travelling.

Where there is a considerable commitment to internal medicine the workload must be adjusted. In units with academic and undergraduate and postgraduate teaching responsibilities, the sessional balance will also need adjustment. There is evidence that the time available for research has declined in recent years as the increased service demand has been met without a proportionate increase in staff. This trend must be reversed.

Units with a transplantation service should provide for one whole time equivalent physician for every 100 transplants performed each year to cover the assessment, inpatient and outpatient duties which will be entailed.

A recent survey conducted by the Royal College of Physicians Committee on Renal Disease and the Renal Association⁴, revealed a present total of only 65 WTE nephrologists (see Appendix 5). A request for 3 WTE nephrologists per million of population indicates a need for a minimum of 150 WTE nephrologists in the UK, or 330 actual posts. International comparisons show that even the latter figure would imply a shortage of nephrologists in the UK, e.g. there are four times as many nephrologists per million of population in France, and six times as many in Italy.

b) Junior medical staff

- (i) Senior Registrar to provide for replacement of consultants.
- (ii) Registrars
- (iii) Senior and Junior House Officers

The training programme for senior registrars will frequently include a component of general internal medicine (GIM). During the nephrology component of training the senior registrar will need to acquire a sound practical and theoretical knowledge of the management of acute renal failure, chronic renal failure by various dialysis techniques, renal transplantation, hypertension and general nephrological conditions. The Joint Planning Advisory Committee anticipates that following General Professional Training, candidates would acquire consultant status after 6 years of which 2 years will be at registrar level and 4 at senior registrar level. In addition, a period of research lasting 2-3 years leading to a postgraduate qualification would be highly desirable. During the period of clinical training, 20-25% of the senior registrar's time should be protected from clinical duties to allow continued research and postgraduate education. The periods allocated to GIM, research and specialty training should be modified according to whether the candidate wishes to be (i) a general physician with an interest in nephrology, (ii) a specialist fulltime nephrologist or (iii) an academic nephrologist.

Rotas

Consultants will generally operate a rota to provide advice to a trainee registrar/senior registrar on ideally a 1:4 rota. The resident doctor, whether an SHO or JHO should be attached to the renal ward itself and also be on a rota no more onerous than 1:4.

These rotas should take account of the NHS Management Executive instructions.^{9,10} Because of the specialist nature of nephrology, cross cover by junior staff is not acceptable. Where such arrangements are unavoidable e.g. in district general hospitals, the doctors covering renal patients must receive specific training in the management of renal emergencies.

(c) Permanent non-Consultant Staff

Associate Specialists, Hospital Practitioners or Clinical Assistants have been employed successfully in some units. Such staff, by providing continuity of care, are a valuable asset to a service for patients with a chronic illness such as renal failure.

2. NURSING (see Appendix 6)

The major resource implication for the provision of treatment of renal disease is the staffing of renal units by specialist nurses. We provide here estimates of the requirements. Routine dialysis will have to be shared with specifically trained "artificial kidney assistants" to allow highly trained nurses to concentrate on more specialised tasks. This practice has been successfully incorporated by many regional and subregional units in the UK.

The areas requiring nursing staff are as follows:

- | | |
|--------------------------------|-------------|
| (i) Renal Ward | (iv) CAPD |
| (ii) Transplant Ward | (v) Clinics |
| (iii) Dialysis | (vi) ITU |
| a) Acute | |
| b) Maintenance | |
| c) Home haemodialysis training | |
| d) Isolation unit | |

3. OTHER

(i) Technical

Trained staff are required for the maintenance and repair of dialysis equipment. A variety of sophisticated devices is employed and renal unit technicians require considerable knowledge of engineering and electronics.

Each unit needs sufficient staff to provide for a 6 day working week and out of hours cover for emergencies.

(ii) Dietetic

We provide below estimates of annual requirements for dietetic counselling. It is necessary to add time for teaching, record keeping, preparing explanatory and training documents, in-service training and communication with kitchen staff. Thus for a typical renal unit with approximately 200 patients on dialysis, and seeing 70 new patients per year, about 4000 hours are required in all. This is equivalent to two dieticians (Senior 1) with assistance from a dietician Senior 2. For large units, especially those with responsibility for teaching juniors and for a full transplantation service, these grades may need adjusting.

New patient first year	12	hours per patient
Pre-dialysis after first year	6	hours per patient
Home dialysis, haemo or CAPD	3	hours per patient
Maintenance haemodialysis	6	hours per patient
Ill in-patients	52	hours per bed/year
Nephrology clinic	6	hours per patient on a renal diet

(iii) Social Work

Estimates of social work cover for renal patients have been undertaken by the British Association of Social Work and by the North Western RHA⁹. Both independently concluded that one WTE social worker was needed per 100 **standard risk** patients on

dialysis. This assumed that the workload would include the pre-dialysis and transplanted patients associated with a stock of 100 dialysis patients. **High-risk** patients, ie frail elderly, diabetic, blind and those with mental illness or severe social problems, require additional social work time. Such high-risk patients now form about half of the dialysis population. Taking this into consideration, a unit with 200 dialysis patients and 600 associated transplant and pre-dialysis patients should have 3 WTE social workers. These should be appointed at Level 3, due to the complex nature of the work. **All** patients needing renal replacement therapy should be referred, not only to ensure that special renal DSS benefits are claimed, but also to assess need for support and counselling of both patient and relatives. Most renal unit social workers also undertake the supervision of students, and have teaching commitments on post-qualification nursing courses. An increasing number of social workers are now employed by their units rather than by the local authority due to the regional nature of the work.

(iv) Business Manager

A business manager, with responsibility for budget and stock control and to develop contracts is required. This role may be combined with that of home dialysis administrator. In larger units the manager may have responsibilities for personnel and other departmental administration.

(v) Secretarial

One WTE secretarial post should be provided per consultant. In addition extra renal unit secretaries will be required for general clinical typing work (viz summaries and outpatient clinics). There should be one such post for each approximately one hundred dialysis patients managed by the unit.

(vi) Computing

Each renal unit needs a computer manager and staff available to input data. The needs for the latter will depend on the degree of automation of the system and the duties of the secretaries.

(vii) Transplant co-ordinators

At least 2 per transplant unit. See page 11.

BUILDINGS AND EQUIPMENT

1. Haemodialysis facilities and water purification plants, generators, stores, dialysis machines.
2. Wards and supporting beds (See below)

3. Outpatient facilities

It is difficult to be precise about the requirements. Estimates from a renal unit serving 1.0 million, which has figures for nephrology clinic attendances, are given here.

i)	Dialysis clinics	Total patients	= 170
		Attendances	= 40/week

ii)	General nephrology	Attendances	= 105/week
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- iii) Transplantation (Estimates from a different regional transplant programme serving 2.5 million)

Total patients with functioning graft = 200/million

New transplants/year = 80

Attendances = 115/week

For this workload, clinics should be staffed so that each doctor sees 10-15 patients/clinic.

4. Offices

Single occupant offices are required for those staff regularly conducting interviews: consultants, senior registrar, business managers, social workers and senior nurse managers.

BED REQUIREMENTS

These estimates cannot be exact and are based on a typical unit's figures. However, since the growth in demand for renal services will be from the elderly population the need for beds will be greater than these figures imply. Others have suggested that 40 beds/million for all renal services would be more appropriate.

- | | | |
|----|---|--------------------|
| 1) | New ESRF patients | |
| | Assume 3 weeks ip stay for each | |
| | At 80 new patients pmp = 240 bed weeks | = 5 beds |
| 2) | Stock patients | |
| | Assume 2 weeks ip stay / year | |
| | At 200 patients pmp = 400 bed weeks | = 8 beds |
| | Plus 2 CAPD training beds | = 2 beds |
| 3) | Acute Renal Failure (excluding ITU) | |
| | Assume 3 weeks ip stay / year | |
| | At 50 acutes pmp = 150 bed weeks | = 3 beds |
| 4) | Assessment of new renal medical cases other than ESRF | = 3 beds |
| 5) | Transplantation | |
| | Assume 50 pmp new cases / year 2 weeks ip stay | = 2 beds |
| | Assume stock 200 pmp 1 week ip stay | = 4 beds |
| | TOTAL | 27 beds pmp |

ISOLATION FACILITIES

Although established practice in renal units is intended to prevent the spread of viral and other infections from or to staff and patients, the risks are such that isolation of certain patients is advisable.

This applies particularly to patients identified as carrying the Hepatitis B virus or HIV but also to those with methicillin-resistant *Staphylococcus aureus* (MRSA). Separate facilities must be available for their renal replacement therapy. Depending on geographical and other considerations, regional or supraregional facilities may be provided for such patients. Alternately, units should have an isolation dialysis facility as part of the renal unit or within the hospital itself.

Appropriate and regular viral testing of patients and staff, education and monitoring of safe practices remain essential in renal units. Hepatitis B immunisation should be readily available for all staff working in high-risk areas. Patients judged to be at risk of contracting Hepatitis B (e.g. by travel) should be offered immunisation.

SUPPORTING SERVICES

A regional or subregional unit providing renal services requires access to a number of supporting services:

1) OTHER MEDICAL AND SURGICAL SPECIALITIES

- Urology
- ITU - One third of ARF patients will have been referred from the ITU. Such patients require dialysis or a continuous renal replacement treatment supervised by a nephrologist. The problems associated with the management of ESRF are such that many patients develop complications requiring intensive care.
- Vascular access and general surgery in renal patients.
A surgeon with an interest in renal failure is an important member of an ESRF programme team. Surgery in renal failure requires special precautions, and many procedures such as vascular access, peritoneal dialysis catheter insertion, parathyroidectomy, should only be performed by a clinician with special expertise.

2) LABORATORY

- | | | |
|---|---|--|
| - Biochemistry | } | <i>(These should be on site to provide an easily accessible service)</i> |
| - Haematology | | |
| - Blood transfusion | | |
| - Immunology | - Provision of specialist service related to immunologically mediated renal disease | |
| - Virology | - Provision of screening for CMV, HepB HIV and rapid diagnosis of viral disease in immunosuppressed patients. | |
| - Microbiology | | |
| - Pathology (especially histopathology) | | |
| The interpretation of renal biopsies is highly specialised and involves access to immunofluorescence and electron microscopy. This should be undertaken by a histopathologist with a special interest in renal disease. | | |
| - Tissue typing | | |
| A successful renal transplant programme requires a high quality tissue typing service. This laboratory will be responsible for HLA typing the recipients and donors, and performing cross matches. With an increase in the number of highly sensitised patients, they will have to monitor the degree of sensitisation and advise on the chances of success of transplantation. | | |

3) RADIOLOGY AND NUCLEAR MEDICINE

The radiology department of a Regional unit should have a consultant with a special

interest in nephro- and uro-radiology. Investigations that should be available include: intravenous urography, ultrasound and CT scanning, dynamic isotope scanning, imaging assistance for renal biopsy.

The radiological consultant should have special expertise in "invasive" techniques such as percutaneous nephrostomy, ureteric stenting, angiography and balloon dilatation of arterial stenoses.

4) PHARMACY AND DRUG BUDGET

A pharmacist should be detailed to advise the renal unit on the use of drugs in renal disease and purchasing policies. Patients with renal disease require long term treatment with expensive drugs. Adequate provision should be made in planning budgets for purchase of the following:

- 1) **Antihypertensive** drugs including agents such as ACE inhibitors
- 2) **CAPD fluids**
- 3) **Cyclosporin A** for renal transplant recipients. CyA is taken indefinitely and so the budget will have to expand to accommodate a growing stock of transplant recipients.
- 4) **Recombinant erythropoietin** (Epoetin) for anaemic patients. Approximately half of the patients on dialysis are severely anaemic ($Hb < 8.0$ gm/dl) and would benefit from Epoetin treatment. The cost of this varies between £2000 and £6000 per patient per annum. Relatively few patients (<10%) with chronic renal failure who are not on dialysis are sufficiently anaemic to justify this treatment, but allowance must be made for them.
- 5) Inpatients, especially those with acute renal failure require a number of expensive drugs including antibiotics and parenteral nutrition.

We recommend: (i) that drug budgets be geared to the number of patients receiving each modality of treatment and that they take account of agreed guidelines for clinically indicated, prudent and economic prescribing and (ii) that prescription should be by the doctor taking responsibility for treatment of that element of the patient's illness. We cannot discourage the practice of transferring prescribing to general practitioners to prevent overspending cash-limited hospital budgets until recommendation (i) is implemented.

5) THEATRES

Renal patients undergo a large number of minor and major surgical procedures apart from renal transplantation. These include vascular access and insertion of peritoneal dialysis catheters. There is a need for dedicated theatre lists and specialist anaesthetic expertise.

6) COMPUTING, DATA COLLECTION AND AUDIT

Computers and computing staff are now essential for the administration of a renal service. The collection of data is required not only for contracting and budgetary purposes but also for the proper conduct of medical audit. It is likely that data on all renal patients required for co-ordination of transplantation and European registration will be entered into a single National Registry. To be effective this will have to be a direct computer link. The management of such computer systems ensuring the safety and confidentiality of data require a dedicated computer manager assisted by clerical staff.

SUMMARY AND CONCLUSIONS

There is a need to continue the expansion and development of renal services in the UK to provide for the treatment of patients with renal disease, the true incidence of which has now been established.

This expansion has important manpower and planning implications.

The provision of renal services requires close collaboration within the hospital, between hospitals and with outside agencies. The Renal Services for a Region should be as integrated as possible to ensure the efficient use of resources. Planning should be at a regional level to avoid small independent units attempting to provide a comprehensive service.

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APPENDIX 1.

Number of patients pmp starting renal replacement treatment each year in European Countries and TOTAL on renal replacement treatment pmp at end of 1990.

	1982	1988	1990	Total
Austria	38.1	95.2	101.1	439
Belgium	39.6	85.2	95.3	533
Israel	58.2	80.0	114.0	492
Fed Rep Germany	44.0	77.0	78.2	563
Netherlands	27.4	65.3	68.5	477
Sweden	41.3	64.3	65.8	443
Switzerland	44.5	61.8	75.1	488
Greece	18.8	59.2	75.3	395
Spain	32.7	57.1	75.3	492
France	30.9	56.3	55.5	491
United Kingdom	19.9	55.1	60.7	331
Italy*	33.8	54.7	47.8*	483*
Norway	37.3	52.7	65.0	342
Denmark	26.9	52.5	41.5	355
Ireland	19.4	33.8	41.6	245

* incomplete data

Source EDTA Registry

APPENDIX 2.

Regional acceptance rates for new patients for renal replacement therapy per million population.

Region	Acceptance rate per million population	
	1984	1990
Northern	40.6	75.8
Yorkshire	34.2	53.9
Trent	40.4	66.0
E Anglia	40.5	48.6
NW Thames	30.6	61.7
NE Thames	30.3	78.4
SE Thames	47.5	78.6
SW Thames	25.3	30.6
Wessex	27.9	49.3
Oxford	37.5	53.2
S Western	32.6	52.4
W Midlands	26.3	58.8
Mersey	31.3	45.4
N Western	31.5	59.5
Wales	34.3	80.6
Scotland	38.2	61.4
N Ireland	20.0	61.2
Isle of Man	33.3	30.0
UK TOTAL	33.8	60.7

Source: EDTA Registry

APPENDIX 3.

Number of patients pmp on each modality for regions of UK as at 31.12.90

Region	Hospital HD	Home HD	IPD	CAPD	CCPD	Graft	TOTAL
Northern	91.3	8.4	6.8	51.0	5.2	183.9	346.5
Yorkshire	71.4	18.9	0.0	48.3	3.3	131.1	273.1
Trent	61.7	35.3	1.3	84.3	3.4	148.3	334.3
E Anglia	61.0	25.2	1.9	43.8	0.0	219.0	351.0
NW Thames	47.1	19.1	1.4	69.0	1.7	176.0	314.0
NE Thames	58.7	31.1	1.8	104.0	0.0	280.3	475.8
SE Thames	54.1	29.7	1.4	88.4	5.4	330.0	509.0
SW Thames	4.3	9.7	0.0	40.7	0.0	70.0	124.7
Wessex	39.0	5.5	0.0	51.0	0.0	145.5	241.0
Oxford	52.4	28.0	1.6	44.4	0.0	210.8	337.2
S Western	40.3	44.8	0.6	72.1	0.9	168.8	327.6
W Midlands	58.6	21.7	0.4	100.4	4.4	34.6	220.2
Mersey	70.8	16.7	4.2	38.5	0.4	176.2	300.4
N Western	48.3	30.5	2.5	76.0	1.7	224.7	383.7
Wales	63.1	28.6	5.9	82.8	1.7	148.6	330.7
Scotland	68.4	23.5	8.0	75.3	3.5	203.1	382.0
N Ireland	55.0	0.0	4.4	45.0	0.0	220.6	325.0
I. of Man	80.0	0.0	0.0	10.0	0.0	0.0	90.0
UK TOTAL	56.2	23.5	2.4	69.7	2.2	176.7	330.7
(%)	(17.0)	(7.1)	(0.7)	(21.1)	(0.7)	(53.4)	(100)

Source: EDTA Registry

HD = Haemodialysis
 IPD = Intermittent peritoneal dialysis
 CAPD = Continuous ambulatory peritoneal dialysis
 CCPD = Continuous cycling peritoneal dialysis

APPENDIX 4.

ACUTE RENAL FAILURE

Approximately 50 patients per million population per year develop acute renal failure requiring dialysis, and 150 patients per million population develop acute renal impairment requiring the services of a nephrologist, but not dialysis treatment.

The facilities required to treat these patients depend on the severity of their clinical state. In general these patients can be divided into two categories:

i) Patients with multiple organ failure (including acute renal failure)

These patients are usually ventilated and looked after on the Intensive Care Unit. The current treatments of choice are continuous arteriovenous haemofiltration (CAVH) - haemodialysis (CAVHD) and continuous veno-venous haemofiltration (CVVH) - haemodialysis (CVVHD).

The following facilities are required:

a) Equipment:

CVVH and CVVHD require an appropriately monitored pump system.

b) Manpower:

Nursing. At least one experienced nurse throughout the 24 hour period is required to run and monitor the haemofiltration and another nurse may be required to look after other aspects of care if the patient is particularly unstable. In many ICU's these treatments are performed by appropriately trained ICU personnel overseen by the Renal Unit.

Medical. In general these patients are looked after by a multidisciplinary team of doctors which includes a nephrologist. Even if the underlying problem is not primarily renal, it is important that this team includes or has access to a nephrologist to provide specialist input and also to manage the patient after discharge from the ICU, as some of these survivors will be dialysis dependent for days or weeks.

ii) Patients with acute renal failure alone.

These patients are usually managed on a renal ward.

The following facilities are required:

a) Equipment: Standard haemodialysis equipment with facilities for bicarbonate dialysis should be available. Often these patients are ill and do not tolerate transfer to the dialysis unit, which may be some distance from the ward. It is therefore important that they can be dialysed in their beds on the ward. Appropriate water-ports and drainage facilities for dialysis should be available on the renal ward.

b) Manpower:

Nursing. The dialysis should be performed by nurses familiar with the treatment of patients with acute renal failure who may be unstable on dialysis. Their general care should be performed or at least supervised by renal nurses.

Medical. These patients should be looked after by a nephrological team (not primarily general physicians).

Other facilities.

Facilities for urgent renal biopsy with full histopathological analysis, angiography, angioplasty and plasma exchange should be readily available for the diagnosis and treatment of patients with acute renal failure. Access to laboratories capable of rapidly detecting anti-neutrophil cytoplasmic antibodies and anti-GBM antibodies should also be available.

APPENDIX 5.

MANPOWER REQUIREMENTS IN RENAL DISEASE

	Present Position	Projected requirements to cope with annual acceptance for ESRF replacement therapy 80 new patients pmp per year
CONSULTANTS	110 (65 WTE)	330 (150 WTE)
VACANCIES/YEAR	4*	12
SENIOR REGISTRARS	34	56
VACANCIES/YEAR	8	13
RESEARCH REGISTRARS	39	42
CLINICAL REGISTRARS	57	62
ENTRANTS/YEAR	28	31

* Does not include newly created posts.

APPENDIX 6.

Nurse Staffing - Renal Services

1. Renal and Transplant Wards

a) Renal Ward

It is estimated that there is a need for one WTE nurse per bed on a renal ward to provide adequate nursing of high dependency patients and those on acute peritoneal dialysis. Thus for a 25 bed ward there is a need for 25 WTE nurses. This number should allow cover for annual and other leave.

b) Transplant Ward

Estimates vary from one nurse on duty for each transplant recipient for the first 48 hours post operative (demanding 5.8 WTE per bed), to one nurse for every two transplant recipients. After 48 hours the requirement is less and should be similar to the renal ward.

2. Acute dialysis

Provide one nurse on duty at any time for each bed in use ie 5.8 WTE per bed.

3. Home dialysis training and support (6 days per week.)

To provide 1.5 WTE nurses : 2 beds at any one time

a) Opening 8.00 am - 8.00 pm 3.6 WTE : 2 beds

b) Opening 24 hours 7.1 WTE : 2 beds

4. Supervised maintenance dialysis (6 days per week)

To provide one nurse on duty at any time for every 2.5 stations, (minimum 4 stations).

a) Opening 8.00 am - 8.00 pm 2.4 WTE : 2 stations

b) Opening 24 hours 4.8 WTE : 2 stations

5. Isolation Unit/Peripheral Hospital (Emergency Situation)

Provide one nurse on duty at any time for each bed in use, ie 5.8 WTE. Staff on call.

6. CAPD - training unit and home support

a) Home support in community 1 WTE per 50 home based patients
(8.00 am - 5.00 pm) (1 shift)

b) Hospital support 1 nurse : 2 beds for each shift
(7 days/week 7.00 am - 9.30 pm)

c) 24 hour service The night shift would require one nurse on at any time.