Cardiology in the district hospital

REPORT OF A WORKING GROUP OF THE BRITISH CARDIAC SOCIETY

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1 Introduction and Membership of Working Group

1.1 In February 1985 the Council of the British Cardiac Society formed six working groups to consider the adequacy and needs of specific cardiac services. The aim of each working group was to assemble data and to formulate recommendations for subsequent ratification by the British Cardiac Society. It was envisaged that documents would eventually be made available to the Department of Health and Social Security, Department of Health and Social Security Northern Ireland Office, the Scottish Home and Health Department, the Royal Colleges, and regional and district medical officers.

1.2 "Cardiology in the district hospital" was selected as a theme for one working group. Another dealing with prevention of heart disease has recently been published, and others are in preparation.

1.3 The membership of the working group on cardiology in the district hospital was as follows: DA Chamberlain (convenor) (Brighton), cardiologist; C Davidson (Rochdale), cardiologist; D W Gau (Beaconsfield), general practitioner; M Joy (Chertsey), cardiologist; D Leaver (Roehampton), physician; J S Manners (Croydon), radiologist; J Christine Rodger (Airdrie), cardiologist; M G Thorne (Torquay), cardiologist.

2 The role of the district hospital cardiologist

2.1 Although the specialty of cardiology has been established in teaching hospitals for decades, the impetus for the growth of cardiology at a district level came with the development and expansion of coronary (now cardiac) care units in the 1960s. New possibilities for effective treatment have underscored this need.

2.2 The need for cardiologists at district hospitals has increased substantially in recent decades for several additional reasons. First, technological and pharmaceutical advances have made it possible to diagnose, and manage locally, patients who would formerly have received no treatment or would have been referred to regional centres. Secondly, the development of coronary artery surgery has established the need to assess patients before surgery and to follow them postoperatively, preferably locally rather than regionally. Thirdly, every district should now have a relatively large number (probably 150 to 300) of patients with pacemakers who require skilled supervision; most are elderly and cannot travel long distances. Finally, prevention, education, rehabilitation, and community care demand increasing attention.

2.3 The specialist role of the district cardiologist relates to the cardiac care unit, the cardiac diagnostic services, and the care of cardiac inpatients and outpatients. The pattern of referrals to a particular physician is governed by local factors including the...
attitudes of the physician himself and the prevailing standard of general practice. But one cardiologist cannot manage all patients in his district with ischaemic heart disease, valve disease, hypertension, and lipid disorders. Thus some patients are referred to physicians with other major interests. District cardiologists should be sensitive to the views and aspirations of these colleagues, who inevitably share to a degree the workload of cardiovascular disease. The cardiologist will, however, see the more difficult cases referred by colleagues in other specialties, especially those who require technical assessment.

2.4 The non-specialist role of the district hospital cardiologist should also be emphasised. A recent survey of general physicians including those with an interest in cardiology showed that their work pattern was similar to that of physicians in other specialties with responsibilities for emergency medical admissions and on-call duties. This is appropriate especially when a hospital has only a few physicians—which is the pattern in most districts.

2.5 This need to support and maintain the acute general medical service will influence the extent to which a physician can develop a specialty interest, particularly in smaller hospitals. Thus a range of specialisation is expected of the cardiologist. Physicians appointed with responsibility for cardiology in district hospitals must be fully trained in the specialty and should have served as senior registrars within a cardiac centre. Conversely, it is essential to include training in general medicine at senior registrar level.

3 Workload and facilities

3.1 In the United Kingdom almost as many patients die from diseases of the circulation as from all other causes put together. In 1984 the ICD codes 390–459 accounted for 317,000 (48%) of 655,000 deaths. The majority of these cardiovascular deaths are caused by heart disease, and there is much associated morbidity. Yet specialists in the subject are few. To redress this imbalance both the second and third reports of the Joint Cardiology Committee of the Royal College of Physicians of London and the Royal College of Surgeons of England made recommendations on district cardiology services. These reports appeared when approximately one quarter of all health districts in the United Kingdom had no physician trained in cardiology, there having been little progress in the five years between their publication dates.

3.2 The high morbidity and mortality of coronary disease do not of themselves justify an increase in staffing levels. This increase is justified because much can be done to prevent coronary disease, to alleviate the symptoms of this and other heart diseases, and to prevent premature death. A catalogue of treatments of proven efficacy is outside the scope of this report, but examples can be cited briefly of interventions capable of reducing mortality: infant surgery for congenital heart disease, coronary artery grafting for major subsets of patients with obstructive coronary disease, surgery for severe valve disease, emergency and permanent pacing for complete atrioventricular block, $\beta$ blockade for patients with acute infarction, and convalescent after infarction, thrombolytic treatment for acute infarction, and the judicious and selective use of drug treatment for malignant arrhythmias. Some of these treatments are provided by surgeons and cardiologists in regional centres, but for most patients referral in the first instance must come from the district. Other treatments and all referrals can appropriately be provided by general physicians; but the understandable failure of the non-specialist to exploit (in all branches of acute medicine) even established advances is well demonstrated by the remarkable paucity of patients with pacemakers in areas that are not well endowed with cardiological expertise. Moreover, the selection, direction, and interpretation of many of the preliminary screening investigations cannot readily be accomplished by physicians without appropriate training, and some procedures require specialised skills and experience to be used effectively and safely. These and other arguments have led both the Second and Third Joint Reports from the Royal College of Physicians of London and the Royal College of Surgeons of England to emphasise the importance of the development of cardiology within district hospitals.

3.3 In 1985 the Third Report of the Joint Cardiology Committee recommended that each district general hospital should have at least one physician specially trained in cardiology and that larger hospitals should have two. The latest biennial report on staffing and facilities in cardiology, published in 1986, suggested that there should be one such specialist for every 150,000 of the population, which is in line with advice offered by committees advising on thoracic medicine and gastroenterology. The same report showed that this target for staffing was not being achieved, and that 55 districts out of 210 in England and Wales had no physician with a special interest and training in cardiology. The working party considers that the burden of heart disease and the potential for successful treatment render such comparisons with other specialties misleading; even a ratio of one cardiologist for every 100,000 of the population is insufficient.
3.7 Exercise electrocardiography The modal number of investigations performed (60 responding hospitals) was in the range of 100–199 per 100,000 population per year (fig 2). This is unlikely to meet true requirements for assessment and diagnosis. The numbers are, however, increasing steeply. Based on the experience of active centres that have had facilities for several years, provision for 300 tests per 100,000 population per year seems a reasonable expectation.

3.8 Echocardiography The mode for echocardiography (50 responding hospitals) was in the range 100 to 199 studies per 100,000 population per year (fig 3). The numbers are similar to those for exercise testing and the same considerations apply, though the yearly increase is less steep. Based on this experience of active districts, provision for 200 to 250 echocardiograms per 100,000 population per year seems reasonable.

3.9 Ambulatory monitoring The mode for workload in dynamic electrocardiography was less than 100 investigations per year per 100,000 population (fig 4). The workload here too is increasing and the numbers in 1985 did not reflect future needs. There is an additional factor: many hospitals with recording facilities do not have equipment for analysis. Because this sometimes has to be arranged on a payment basis it artificially constrains the numbers of examinations. We believe, on the basis of our own experience, that about 200 examinations per 100,000 population per year may provide a reasonable district service.

3.10 Nuclear cardiology At present the clinical value of these techniques does not justify the expense of equipment dedicated solely to the specialty in most district hospitals. Therefore no data were collated.

3.11 Inpatient services and cardiac care units Current guidelines for regional health authorities indicate a norm of 0-6 beds per 1000 population to be shared with other acute medical specialties. Some beds for patients with heart disease must have monitoring facilities. The present Department of Health and Social Security “nucleus” concept is to have a combined intensive care unit/cardiac care unit of 12 beds in an “average” health district. Arguments for a combined intensive care unit/cardiac care unit are particularly flexibility of staffing and the availability of mechanical ventilation, but we strongly recommend separation of the two facilities within a combined unit. There should be at least three cardiac care unit beds per 100,000 population with adequate central monitoring and facilities for pressure monitoring. There should also be immediate access to emergency pacing within the cardiac care unit and an image intensifier should be available on site.

3.12 Outpatient services We have not conducted any detailed survey of outpatient services, but national figures for general medicine as a whole show rising outpatient attendances. Cardiologists can therefore expect an increasing demand for the
services outlined above; the increased workload can best be met by additional staff at consultant or sub-consultant level. In addition, the follow up of patients with pacemakers and after cardiac surgery that is currently undertaken in regional centres can often be dealt with more effectively at the patients' local district hospitals. The substantial workload from patients referred with hypertension and lipid disorders must usually be met in the district hospital by the cardiologist. The management of hyperlipidaemias is demanding increasing attention, and the workload in this sphere will certainly rise considerably over the next decade.

3.13 Pacemakers Britain lags well behind the United States and most European countries in rates of pacemaker implantation and should expect an annual new pacemaker implantation rate of 30 per 100 000 population.9 The numbers of implants that are required, the relative simplicity of the procedure, and the age of most patients to be treated all make it desirable for implantation to be undertaken locally. This should be encouraged provided the district cardiologist and his/her clinical staff have the necessary expertise, and provided adequate cover for pacemaker complications is available if for any reason the cardiologist is absent. Cover may be available from a second cardiologist in larger districts, or (by agreement) from another district or regional centre nearby. Complex systems should be implanted in district hospitals only by cardiologists with appropriate experience. Patients with complex devices should usually be followed up at the implanting centre, but all district hospitals should have equipment for routine checks of simple systems.

3.14 Referral for cardiac surgery The requirement for referral from a district hospital for cardiac surgery has recently been reviewed.19 Most districts can expect a steady increase in the need for coronary artery bypass grafts, but the requirements for surgery for valve disease will remain stable or increase more slowly. To ensure the best use of resources in the National Health Service a local district cardiologist should refer patients for invasive
4 Junior staff and technical assistance

4.1 In a district general hospital the cardiologist will be one of four or more physicians between whom junior medical staff rotate. As the treatment of heart disease is a substantial part of acute general medicine, junior staff will be dealing with cardiac problems daily. Though the cardiologist will have direct responsibility for junior staff for a limited period, he/she should ensure that standards in the speciality are safe and efficient at all times.

4.2 Training should aim at proficiency as follows: 

House physicians—cardiopulmonary resuscitation (both basic and advanced life support); clinical assessment of chest pain; diagnosis and treatment of heart failure; electrocardiographic recognition of ischaemia and infarction; diagnosis and management of common arrhythmias.

Senior house officers and registrars—a higher degree of skill for all topics listed above; modern management of myocardial infarction; temporary pacing; indications for and management of exercise testing (not reporting); indications for scintigraphy, echocardiography etc; follow up of patients after infarction and cardiac surgery, and the supervised management of an outpatient clinic.

The cardiologist should also be responsible—or share responsibility—for the training of nurses in resuscitation procedures. Nurses should be skilled in techniques of advanced life support especially defibrillation.

4.3 The cardiologist should be responsible for the provision of a manual on management of patients in the cardiac care unit. This should set out broad policies, provide guidelines for the management of common cardiac problems, and give the indications and instructions for the more complex procedures.

4.4 Regular teaching sessions should ideally include a regular (perhaps weekly) cardiac care unit meeting (to include senior CCU nurses and technicians) based on current clinical problems. Time should be devoted to topic teaching, research reports, and the subjects detailed under the training recommendations above.

4.5 Registrars in district general hospitals are often relatively junior. They should not be expected to perform tasks beyond their level of competence. General practitioners appointed to the hospital practitioner grade can provide valuable assistance with pacing and diagnostic techniques in outpatient departments. They can give a continuity that cannot be provided by other members of the junior staff. In
the absence of an experienced registrar rotating from a cardiac centre, the employment of an associate specialist or a specially trained general practitioner should be considered.

4.6 Recommendations about the level of technical staffing required in district general hospitals have not been made before. A minimum of seven technical staff is likely to be required to serve a population of about 250,000. Of these, at least four should be physiological measurement technicians working in cardiology.

The physiological measurement technicians are required for exercise electrocardiography, echocardiography, ambulatory monitoring (including tape analysis), bedside pressure monitoring, and the pacemaker follow up clinic, as well as a small commitment to routine electrocardiography. In general, however, electrocardiograms should be recorded by cardiographers.

4.7 The difficulties have recently been emphasised of maintaining standards in basic life support among senior medical staff and nurses, and of maintaining standards in advanced life support amongst senior medical staff. Deficiencies can best be avoided by the appointment of a resuscitation training officer who may well have had experience as a sister or charge nurse in a coronary care unit. This policy is strongly recommended.

5 Space and equipment

5.1 The cardiac department of a district general hospital should be the "base" for the cardiologist(s), for the physiological measurement technicians working in the specialty, and for the cardiographers. Thus space is required for administration, for technical work, and for storage of equipment. Noisy equipment—a treadmill for example—should be housed in a room specially designed for effort testing. Adequate provision has not always been made even in new departments and new hospitals; proper planning will avoid expensive correction of these deficiencies.

5.2 We believe that it is important to give details of the rooms that are needed within a modern cardiac department. We have also provided approximate areas for these rooms on the assumption (for simplicity) that the rooms will be of three sizes: 12 ft × 14 ft, 15 ft sq, and 20 ft sq. These measurements are intended as guidelines, but we emphasise that the areas for the technical work are not generous, and should be regarded as reasonable minimums. The measurements (see table) suggest the need for a total area approximately 3000 sq ft (1 sq ft = 9.29 × 10⁻²m).

Table  Floor space required by a cardiac department of a district general hospital

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>2 ECG cubicles, 1 dressing cubicle</td>
</tr>
<tr>
<td>2</td>
<td>Holter monitoring: analysis and other equipment</td>
</tr>
<tr>
<td>3</td>
<td>Exercise test room: needs treadmill, ECG console, bed</td>
</tr>
<tr>
<td>4</td>
<td>Echo room: echocardiograph, bed</td>
</tr>
<tr>
<td>5</td>
<td>Changing room for treadmill and for echo</td>
</tr>
<tr>
<td>6</td>
<td>Secretaries (2 or 3 people)</td>
</tr>
<tr>
<td>7</td>
<td>Electrocardiography: processing and filing</td>
</tr>
<tr>
<td>8</td>
<td>Consultant(s)</td>
</tr>
<tr>
<td>9</td>
<td>Waiting area</td>
</tr>
<tr>
<td>10</td>
<td>Staff rest room</td>
</tr>
<tr>
<td>11</td>
<td>Storage for electrocardiographs, disposables, etc.</td>
</tr>
<tr>
<td>3 small rooms</td>
<td>504 sq ft</td>
</tr>
<tr>
<td>1 small room</td>
<td>168 sq ft</td>
</tr>
<tr>
<td>Medium size room, sound proofing</td>
<td>225 sq ft</td>
</tr>
<tr>
<td>Medium size room</td>
<td>168 sq ft</td>
</tr>
<tr>
<td>Small room</td>
<td>168 sq ft</td>
</tr>
<tr>
<td>Small room</td>
<td>168 sq ft</td>
</tr>
<tr>
<td>Medium size room</td>
<td>225 sq ft</td>
</tr>
<tr>
<td>Medium size room(s)</td>
<td>225 sq ft (or 450)</td>
</tr>
<tr>
<td>Large room</td>
<td>400 sq ft</td>
</tr>
<tr>
<td>Medium size room</td>
<td>225 sq ft</td>
</tr>
<tr>
<td>Large room</td>
<td>400 sq ft</td>
</tr>
<tr>
<td>Total</td>
<td>2876 sq ft (or 3101 sq ft: see item No 8)</td>
</tr>
</tbody>
</table>
5.3 The standard electrocardiographs should have three channels and should produce records that do not require mounting. Single-channel equipment should be used only for emergency if standard three-channel electrocardiographs are not immediately available. All electrocardiographs should conform to the draft standards of the International Electro-technical Commission. Older models with inadequate specifications should be replaced. The minimum complement for smaller district hospitals is three multichannel recorders.

5.4 A treadmill (preferably) or bicycle ergometer must be available for stress electrocardiography, with facilities adequate for obtaining 12 lead records during exercise. Ambulatory monitoring is an essential requirement for a district hospital with approximately four recorders per 100,000 population. Patient triggered devices have a role in the identification of tachycardias and require less technician time for analysis than 24 hour recordings. We recommend analysis within the district hospital both for rapid service and for better quality control. All district general hospitals should have cross sectional echocardiography and Doppler ultrasonography. Equipment for checking pacemakers is essential. Nuclear cardiology is useful but may be available only when the provision is shared with other specialties; portable equipment for emergency use is not justified.

5.5 Defibrillators must be immediately available to all wards and departments that receive patients who are at risk of cardiac arrest (operating theatres, x-ray departments, etc). Every ward used for the care of patients with acute coronary disease should have its own equipment. We strongly recommend standardisation of defibrillators, cardiac arrest carts or boxes, and emergency drugs to avoid delays in resuscitation that arise from lack of familiarity with equipment or its storage. Defibrillators must be regularly and frequently checked by competent staff.

6 Liaison with other departments

6.1 The district cardiologist(s) should be in administrative charge of the monitored cardiac care beds. Liaison with other physicians in the care of patients with heart disease was discussed in 2.4

6.2 Shared responsibility for treating heart disease implies a continual need for training in cardiology for all registrars and senior registrars in general medicine. Cardiologists should provide such training within district hospitals. This can readily be achieved by close liaison over on-call commitments as well as in formal teaching sessions.

6.3 Conversely, registrars and senior registrars in cardiology must maintain their skills in general medicine. This will be achieved by rotations within regional centres but principally by a sharing of on-call commitments within the district hospital where cardiac registrars will spend most of their time within the specialty.

6.4 Cardiologists may liaise with paediatricians in district hospitals, and joint clinics might be established for diagnosis and supervision of children with congenital heart disease. Regular visits from paediatric cardiologists are highly desirable. Close cooperation with the supraregional centre for neonatal or paediatric cardiology is essential.

6.5 In hospitals with separate cardiac and intensive care units the cardiologist should hold the cardiac care unit budget. In most district general hospitals, cardiac care forms a high proportion of the work in combined intensive/cardiac care units and the role of budget holder is likely to be adopted either by the cardiologist or by an anaesthetist.

6.6 The radiological needs of a department of cardiology in a district general hospital will vary and no set arrangement can be recommended. There should be close cooperation between cardiology and radiology and ideally one consultant radiologist would take a particular interest in cardiology. This is especially important for the new imaging techniques. In regional centres the cardiology workload justifies the provision of specific imaging facilities. But in the district general hospital some facilities must be shared.

6.7 We strongly recommend the provision of echocardiography and Doppler equipment under the exclusive control of the cardiologist. Where this cannot be achieved a machine capable of undertaking echocardiography, Doppler, and general ultrasound examinations may be an acceptable compromise: this can be shared with the radiology department probably on a time-share basis but with arrangements for immediate access for emergency use.

6.8 Nuclear cardiology and general nuclear imaging require similar facilities, and many district general hospitals do not possess these at present. A joint approach by cardiologists and radiologists for shared facilities strengthens the case for purchase of equipment which cannot be regarded as mandatory for cardiology alone. Local arrangements to determine the roles of the cardiologist and radiologist in the conduct of cardiac nuclear imaging will depend on the skills and experience of the consultant staff in the district.

6.9 The contribution of digital subtraction angiography in cardiology is expected to increase; it is also likely that the radiology departments of district general hospitals will have such equipment in due course. Those cardiology departments with facilities for cardiac catheterisation and angiography may
acquire their own equipment but we expect that this will not apply to most district general hospitals. We therefore recommend a joint service based on the radiology department.

6.10 The clinical value of magnetic resonance imaging in cardiology is yet to be established and the high capital and revenue costs make it unlikely that it will be available in the district general hospital for some time. A joint service based on the radiology department may be appropriate in due course.

7 Liaison of the department of cardiology with general practitioners and with the community

7.1 A close working relationship is expected between hospital based physicians and general practitioners. But this is of special importance in cardiology because many clinical problems are urgent.

7.2 While waiting lists for outpatient referrals are inevitable, most cardiologists will wish to make available rapid access (usually same day) appointments for urgent cases. An open house admission policy for patients with acute myocardial infarction is ideal though this can pose considerable logistic problems for the hospital. Whenever possible, arrangements should permit the direct admission to the cardiac care unit of patients with known or suspected myocardial infarction to avoid delays in accident and emergency departments.

7.3 Routine access to electrocardiography in the hospital is unnecessary. An electrocardiogram divorced from a clinical opinion may provide misleading information. Many general practices have an electrocardiograph: when they do cardiologists may see advantages in discussing training with general practitioner colleagues. Open access to echo-cardiographic and stress testing facilities is undesirable because non-specialist staff may not appreciate the limitations of these investigations.

7.4 Extended training of ambulance men is now approved by the Department of Health and Social Security and is becoming widespread. Cardiologists will wish to liaise with general practitioners to train ambulance staff to deal with cardiac emergencies, to set local standards, and to liaise between the ambulance service, the accident and emergency department, and the cardiac care unit.

7.5 The cardiologist should keep himself informed of the statistics on cardiovascular mortality in his district and take an interest in prevention in cardiology. Dietetic policies within hospitals and schools, antismoking propaganda, and liaison with the local media can influence lifestyle within the community. He/she should aim to cooperate in these spheres with community physicians and departments of health education.

7.6 Rehabilitation programmes can be valuable for patients after myocardial infarction, after cardiac surgery, and for others after debilitating illness. Such programmes can best be managed by a team made up of physiotherapists, an occupational therapist, and a nurse counsellor. The team should be advised or led by the cardiologist, perhaps with active participation of interested general practitioners.

8 Liaison with regional centres

8.1 Cardiologists in district hospitals may be geographically remote from academic cardiology. They should keep up to date with the aid of journals and meetings; however, greater confidence in new developments follows from direct involvement with them. This can best be achieved by attachment to a regional centre on a regular sessional basis. Two sessions (one day) per week may be ideal.

8.2 An attachment has the added advantage of producing better continuity of care for patients transferred between the district general hospital and the regional centre. A close liaison, with mutual knowledge of clinical practices and abilities, makes for optimal use of resources and minimises misunderstandings.

8.3 The district cardiologist may wish to maintain skills in invasive cardiology by participating in catheter sessions. This can be advantageous provided the arrangement fits in with the work pattern of the catheter laboratory. Liaison must also be close enough to ensure that problems developing during catheterisation can be covered adequately when the district cardiologist leaves the centre. The degree of participation in investigative cardiology within the centre is a matter for mutual agreement and firm recommendations cannot be made except that the number of investigations performed must be adequate to maintain skills, and new procedures should not be undertaken unless sound training can be given.

8.4 The service provided by a single cardiologist physician within a district hospital will be difficult to maintain during holiday or sickness absences. The regional centre (or a neighbouring district hospital) may be able to provide cover for special problems such as pacemaker complications or unusual problems in diagnosis or treatment. Circumstances will dictate whether patients travel to the centre or a physician from the centre travels to the district hospital.

8.5 We strongly recommend the formation of regional cardiology committees to form regional pol-
Cardiology in the district hospital

Cardiology in the district hospital services, establish priorities, advise on purchase of equipment, and promote cooperation between neighbouring districts. Membership should include all cardiologists within the region, and representatives from the cardiac surgeons. The committees should be recognised and serviced by regional authorities. The costs are negligible when offset against the improvement in service that can be achieved.

8.6 Research projects can sometimes be shared between the regional centre and a district hospital. Registrars on a two year rotation may also be able to work on an MD thesis during this time, taking advantage of patient load in the district and the technology in the regional centre. Such arrangements should be encouraged.

9 Summary of priorities and recommendations for the development of cardiovascular services within district hospitals in the United Kingdom

Although cardiology is a long established medical specialty in the United Kingdom, the provision of cardiac facilities in district hospitals is uneven and often inadequate. There are still health districts in England and Wales that do not have a physician trained in the specialty, and frequently those that are in post are faced with a workload so heavy that they are unable to provide all the services that are recognised as essential. The fact that in Europe as a whole there are 10 times the number of cardiologists per caput as in the United Kingdom underlies this deficiency.

The working group has examined the role of the cardiologist in a district general hospital, the workload and the requirements of supporting medical staff, technical assistance and equipment, in the light of information gathered from 60 districts, and has outlined the relationships that such a cardiologist may be expected to have with other departments, regional centres, general practitioners, and the community.

The group finds that a full district service for a population of 250,000 requires two physicians trained in cardiology. As an interim objective we recommend that priority should be given to the appointment of cardiologists to those 55 districts still without one. Consideration should also be given to the employment in a hospital practitioner grade of general practitioners on a sessional basis to help provide continuity of care and assistance with specialised investigations and treatment.

We recommend that a minimum of seven technicians of varying grades be provided for a catchment area of 250,000 to cover the workload of a district cardiac service.

Adequate space for cardiology must be provided within a district general hospital for administration, technical work (some of which will be noisy requiring specially designed rooms), and storage. Plans for new hospitals must include provision for cardiac departments and not—as has occurred even in the recent past—only electrocardiography. Approximately 3000 square feet are required.

The basic equipment for a district hospital cardiac service should include at least three multichannel electrocardiographs and at least one single channel machine for out of hours use; an exercise electrocardiographic system—preferably treadmill and with a dedicated 12 lead recording system; a dedicated cross sectional Doppler echocardiographic system; and a semiautomatic system for the analysis of 24 hour ambulatory electrocardiograms. Myocardial scintigraphy, magnetic resonance imaging, and digital subtraction angiography cannot be regarded as essential but may with benefit be shared with departments of radiology and nuclear medicine.

There is a wide divergence in the numbers of special investigations at present being performed per 100,000 population per annum; the more active centres undertake three or four times more investigations than those with a more modest output. The average unit should expect, for every 100,000 population, at least 5000 electrocardiograms, 300 exercise electrocardiograms, 300 echocardiograms, and 250 ambulatory recordings each year.

Until the basic objectives outlined above are achieved in the United Kingdom adequate cardiological care will be unavailable to a sizeable minority of the population and overall services in the country will remain well behind those of Western Europe.

10 References

7 Second Report of a Joint Cardiology Committee of the Royal College of Physicians of London and the Royal
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