

# **NEUROLOGY IN THE UNITED KINGDOM**

**TOWARDS 2000 AND BEYOND**

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## **PREFACE**

In 1996 the Association of British Neurologists published an analysis of the future manpower needs for Neurology in the United Kingdom'. It was concluded that an acceptable neurological service will require one neurologist in every 100,000 of the population. To achieve this ratio the number of neurologists in the country will have to double from the present population value of approximately 1:200,000. Such an increase in consultant numbers will require a different style of organisation of neurology services in the country from that which exists at the moment.

The Association instructed the Services Committee to analyse the way in which neurological services could be organised in the future. A Working Group was charged with making the analysis and its deliberations were repeatedly reviewed by the Services Committee and the Council of the Association. Early drafts of this document were considered by representatives of a variety of organisations representing other neuroscience disciplines. The final draft was reviewed by the full membership of the Association of British Neurologists. At every stage of this process, the text and conclusions were modified to take account of the views and opinions expressed by those who had been consulted. Thus, the opinions contained within this document represent a distillation of the views of all United Kingdom Neurologists and a variety of other neuroscience specialists.

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## **SUMMARY**

- 1. The number of Consultant Neurologists in the United Kingdom needs to increase to provide adequate services for those patients with neurological disorders.**
- 2. A minimum of one whole time, equivalent Neurologist per 100,000 of the population will be required to provide a satisfactory service.**
- 3. Consultant Neurologists should be equally distributed throughout the United Kingdom, so as to provide an overall adequate level of care in all areas**
- 4. This can be best achieved by a Neurology Network, in which Neurologists work in District General Hospitals, in Neurology Centres, in Neurology and Neurosurgery Centres and in supraregional specialist centres. Individual Neurologists may be based in any of these, but will be affiliated to more than one.**
- 5. The Neurology Network in any one region will be tailored to local geography, to the organisation of District General Hospitals and to the location of the Neurology and Neurosurgery Centre.**

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# 1. INTRODUCTION

## *OUTLINE OF THE PROBLEM AND A SUMMARY OF THE SOLUTION*

The neurological service in the United Kingdom is unsatisfactory. There are too few Consultant Neurologists, out-patient waiting lists are often very long and far too many patients with significant neurological disease depend on care from doctors who are not trained neurologists. The Association of British Neurologists (ABN)<sup>1</sup> and the Neurological Alliance<sup>2</sup> (a confederation of organisations representing the views of patients with neurological disorders) share the view that the current situation is not satisfactory.

The remedy proposed by the Association of British Neurologists is that there should be a substantial increase in neurological manpower. At present the number of Consultant Neurologists in the population is approximately 1:200,000 and recent analysis has demonstrated that there should be one neurologist per 100,000'. Such an increase in consultant numbers will require co-ordinated planning at a national level. This document outlines the way in which future developments in neurology services could be organised in the United Kingdom.

At present much of the neurology service in this country is provided by consultants working at regional or sub-regional Neurology and Neurosurgery Centres. Approximately 75% of United Kingdom neurologists are centre-based and at some centres there can be as many as 15 neurologists. These centres are vitally important, for they ensure a high level of concentrated expertise and they provide a focus for research and for the development of new services, as well as for continuing medical education of consultants and training of future neurologists. Such centres have not been developed in every part of the country and, in the future, the number is likely to decrease rather than increase. It is unlikely that the predicted expansion in the number of neurologists could be accommodated exclusively in centres of this type.

Currently approximately 25% of Consultant Neurologists are based at District General Hospitals. However, there is increasing pressure from such hospitals and their purchasers that more locally provided neurology

services should be created. In parallel with this trend is an increasing pressure from patients with neurological disorders that their problems should be dealt with by neurologists rather than by District Hospital General Physicians<sup>2</sup>.

In this document we have taken account of all of these deficiencies and pressures. We propose a new style of service, which we call the Neurology Network, that will ensure that all patients in the country will have ready access to the neurology service. This Network will accommodate the considerable expansion in the number of Consultant Neurologists, yet it will be very sensitive to the needs of patients. There are six principles, which define the expectations of patients with significant neurological disease, that we feel should be satisfied by the new expanded service. At the end of the document we analyse how the new style system satisfies these six principles.

What we have not addressed in any detail are the financial arrangements which must be in place to ensure the viability of the Neurology Network. Instead, we have concentrated on the structure and organisation of the Network. We acknowledge that there are inevitable financial implications in the system which we propose, but the details of these must be worked out later when the individual components of this system of delivery of a neurology service are considered at a local level. To facilitate this process of local decision making, there must be a willingness at a national level to support the changes that are outlined herein.

## **2. PATIENTS WITH NEUROLOGICAL DISORDERS**

### *WHAT ARE NEUROLOGICAL DISORDERS?*

There is no simple definition of a neurological disorder. It is conventional to regard the following types of condition as being neurological:

- All structural disorders of the central nervous system (the brain and spinal cord)
- All structural disorders of the peripheral nervous system (the nerves in the face, trunk and limbs).
- Disorders involving muscle.
- Certain common conditions, which are not necessarily caused by structural disease (such as many varieties of headache).
- Other conditions (such as epilepsy, fainting and dizziness), which are often caused by disordered physiology, rather than abnormal anatomy.

It must be emphasised that not all patients, who have symptoms that can be classified as neurological, necessarily have significant neurological disease. Not all headaches are sinister, many episodes of loss of consciousness have a benign cause and there are other symptoms, which worry patients and doctors, but where no serious cause is found.

### ***THE NUMBER OF PATIENTS WITH NEUROLOGICAL DISORDERS AND WHO CARES FOR THEM?***

#### ○ **Family Doctors**

The vast majority of patients with neurological disorders are cared for exclusively by their family doctors. It has been calculated that in the United Kingdom, during the period 1981-1982, 9.5% of the population, or 5.7 million individuals, consulted their general practitioners annually because of a neurological symptom. Of these, 7% (400,000) were subsequently referred to hospital out-patient clinics for further advice<sup>4</sup>. It is

known that different family doctors refer at different rates' but, despite this variation, it is clear that between 88% and 96% of such patients, or approximately 5,300,000 individuals, were not referred and, therefore, were looked after by their family doctors.

### ○ **Hospital specialists**

During 1981, when the analysis described in the previous paragraph was made, neurologists saw 109,175 new out-patients<sup>6</sup>, so they only saw a quarter of the 400,000 patients with neurological symptoms who were referred to hospital. The destination of the others is not clear, but it is likely that many of them were sent to clinics run by specialists in disciplines other than neurology, such as General Physicians, Geriatricians, ENT surgeons, Paediatricians and others.

### ○ **Neurologists**

The primary role of neurologists is in the diagnosis and treatment of patients with significant neurological disease. They spend a lot of their time in planning investigations, organising treatments and assessing prognosis. All neurologists also spend some time in assessing patients without significant neurological disease and in disentangling incorrect diagnoses of neurological disorders made by non-neurologists.

Even though neurologists do not see the majority of out-patients with neurological symptoms, they do see large numbers. In 1981, when the studies described already were done, there were 153 Consultant Neurologists in the United Kingdom, whereas in 1996 there were 300. The number continues to grow. Because there are now more neurologists, it is certain that the proportion of such patients that are referred to neurologists is greater than was the case in the early 1980s. However, there is no doubt that many patients with neurological disease are still referred to nonspecialist physicians, although some of these patients are subsequently seen by neurologists, either as referrals to out-patients or when opinions are asked from the neurologists on in-patients. Neurologists spend a lot of time giving ward opinions.

A considerable amount of data is available on the pattern of the outpatient work of neurologists. Some of this refers to individuals<sup>7,8</sup> and some to groups of neurologists<sup>9,10</sup>. The study done on the workload of 34

Consultant Neurologists, by the ABN Services Committee<sup>10</sup> in 1991, is representative of this type of data. The ABN study revealed that 16 conditions make up 74% of the out-patient workload of the average United Kingdom neurologist. Table 1 shows the rank order of these 16 conditions.:

**Table 1. Top 16 conditions seen in Neurology Out-patient clinics**

(i) epilepsy	(ix) Transit ischaemic attacks
(ii) headaches other than migraine	(x) Dizziness and giddiness
(iii) migraine	(xi) Parkinson's disease
(iv) cerebrovascular disease (not TIA)	(xii) Lumbosacral spinal disease
(v) multiple sclerosis (definite, probable and possible)	(xiii) Cranial nerve palsy
(vi) faints and blackouts	(xiv) Peripheral neuropathy
(vii) Cervical disc disease	(xv) Facial pain
(viii) Peripheral nerve palsies	(xvi) Dementia

### ○ Acute hospital admissions

In a hospital in Northern Ireland, in a 12 month period during 1983-1984, it was observed that 19% of all acute medical admissions were patients suffering from neurological conditions". Other studies have shown that this figure of approximately 20% is commonplace across the country<sup>12</sup>. Only 8% of the acute medical patients in the Northern Ireland study were subsequently referred for neurological or neurosurgical advice; thus, most of them were managed, not by neurologists, but by the Consultant General Physicians doing acute medical take.

**Table 2. 242 Patients with neurological conditions on general wards (out of a total of 1288) in a District Hospital <sup>12</sup>**

Neurological condition	Percentage	Neurological condition	Percentage
Stroke	50%	Head injuries	3%
Dementia	10%	Neuropathies	3%
Degenerative disorders	10%	Infections	3%
Epilepsy	7%	Myopathies	2%
Demyelination	4%	Others (including tumours)	8%

Details of one study of this topic<sup>12</sup> are given in Table 2, in which it is observed that in one hospital, 36% of in-patients on medical wards and 4% on surgical wards were suffering from a neurological disorder.

○ **Patients with chronic disabilities**

Neurological disorders often cause chronic disability and it has been estimated that 30% of disabled people living in residential institutions have a neurological condition<sup>13</sup>. The majority of disabled people do not live in institutions, but instead are cared for in the community. In a population of 250,000 it has been estimated that as many as 1,500 people have chronic disability and many of these are afflicted by neurological disorders<sup>14</sup>. In one survey of a population of 500,000 people<sup>15</sup> it was observed that 25% of the estimated 3,000 people aged between 16 and 64 years with chronic disability were suffering from a neurological disease. These data are illustrated by the analysis in Table 3 of the incidence and prevalence of certain neurological conditions<sup>16</sup>

**Table 3. Disability due to some neurological diseases for a population of 250,000<sup>14,16</sup>**

	<b>INCIDENCE</b>	<b>PREVALENCE Total Number of patients</b>	<b>Number with significant disability</b>
Epilepsy	175	3900	<b>1300</b>
Stroke	550	1500	<b>900</b>
Head injury	400	?	<b>750</b>
Parkinon's Disease	45	400	<b>342</b>
Spinal Injury	3	150	<b>150</b>
Multiple Sclerosis	10	250	<b>125</b>
Cerebral Tumour	40	113	<b>40</b>
Huntington's Disease	?	15	<b>15</b>
Motor Neurone Disease	5	15	<b>14</b>
Guillain-Barre Syndrome	3	60	<b>12</b>
Friedreich's Ataxia	?	5	<b>5</b>
Myasthenia Gravis	1	10	<b>?</b>

## ***HOW AND WHY SHOULD THIS PATTERN OF CARE BE CHANGED?***

The data given in the preceding paragraphs clearly indicate that the vast majority of patients with neurological disease are getting their care from general practitioners and other doctors who are not trained neurologists. Indeed, it is obvious that neurologists see only a very small fraction of the patients with neurological symptoms. It is highly likely that this is appropriate, for many of these patients have very minor disorders which do not demand the involvement of a trained specialist. However, some patients do need to see a specialist and these are the patients that are referred to out-patient clinics or who are sent into hospital as emergencies. Only a minority of these actually get to see a neurologist.

### **○ Comments from organisations representing patients**

At this point it is appropriate to establish whether this situation is acceptable to the patients themselves. The Neurological Alliance, which is a confederation of neurological charities, has expressed the view<sup>2</sup> that "the expertise of a neurologist is crucial at the time of diagnosis, and frequently post-diagnosis, for the monitoring of progression and treatment." The Alliance specifically emphasises the following when discussing the role of the neurologist:

- The need for timely and appropriate treatment and services.
- The need for continuity of care.

A recent survey of some of the organisations that are part of the Neurological Alliance<sup>17</sup> (replies were obtained from 20 of the 26 member societies) revealed the information that is contained within Table 4. It is very clear that the representatives of the majority of these organisations, which look after the interests of patients with different neurological diseases, believe that neurologists should be heavily involved in the care and management of the patients that they represent. Data do not exist to allow an analysis of what actually happens at the moment for each of these conditions, but it is highly probable that the level of involvement of neurologists in these several disorders is far less than the patient's organisations feel is ideal.

**Table 4. Responses from 20 of the organisations that make up the Neurological Alliance -concerning the perceived need for care specifically from a neurologist to members of each organization.<sup>17</sup>**

Organisation	Approximate National population of patients	Percentage of patients who need to see a Neurologist	How often they may need to see a Neurologist
Alzheimer's Disease Society	630,000	25%	Occasional
British Epilepsy Association	420,000	100%	Occasional - as required
National Society for Epilepsy		75%	Varies - frequent 60%
Guillain-Barre Group	1,500/ ear	100%	Frequently- as required
Head Injuries Association	84,000 disabled	Uncertain	Uncertain
Multiple Sclerosis Society	Ca. 85,000	100%	Occasional - as required
Motor Neurone Disease Association.	6,000	100%	Frequent: 3 monthly
Parkinson's Disease Association.	125,000	100%	Regular under 65 years
Action for Dysphasic Adults	? 100,000	75%	Occasional - as required
Ataxia Telangiectasia Society	uncertain	100%	Annual
CMT (Hereditary neuropathy)	1,200	100%	Occasional 80%
Dystonia Society	38,000	100%	Frequently - as required
Huntington's Disease Association	8,400	100%	6 monthly or more
Muscular Dystrophy Group	20,000	100%	Annual or more often
ME Association	uncertain	25-50%	Occasional - as required
National ME support Association.	uncertain	>25%	Frequently - as required
Neurofibromatosis Association	1,200	>25%	Annual or more often
Progressive Supranuclear Palsy	Ca. 1,000	100%	Frequently - as required
Scope (Spastics Society)	uncertain	100%	Occasional - as required
Tuberous Sclerosis Society	<b>9'100</b>	75%+	50% 6 monthly

### ○ Out-patient care

It is evident, from the available data, that there are too few Consultant Neurologists in the United Kingdom. 'The Association of British Neurologists addressed this issue in another publication', when it proposed that a substantial increase in the number of neurologists is required. Such an increase would allow a far greater number of patients, than is currently possible, to obtain out-patient advice from a trained neurologist.

## ○ **Acute neurological problems and emergencies**

There is no clear consensus on what constitutes an acute neurological condition. Whilst the ideal for patients with acute neurological problems might be admission to a neurological unit, it is unlikely in the foreseeable future that this will be possible. Acute admissions require special staffing arrangements and adequate beds. Only a few neurological units in the United Kingdom currently admit all neurological emergencies. In the immediate future most neurological emergencies will continue to be looked after by an admitting physician, probably in an admissions ward. We believe that such patients should have available to them the services of a neurologist for consultation within 24 hours and, in some instances, transfer to a neurology unit if that is appropriate.

Variation in the provision of care for neurological emergencies will continue to depend on such factors as:

- Patterns of patient referral.
- Availability of neurology beds.
- Availability of neurology staff.
- Local organisation of acute medical services.
- Availability of specialised neurological intensive care and high dependency facilities

## ○ **Do neurologists provide better care?**

So far, evidence has been presented to show that a considerable proportion of patients with neurological problems are cared for by physicians who are not neurologists. This leads to the question: is there evidence that care given by a Consultant Neurologist is better than care given by other specialists?

Very few formal studies have been done to address this issue. Before citing those studies that exist, however, it should be said that it is self-evident that a specialist in a particular group of conditions is likely to be much more skilled at diagnosing, treating and managing those disorders than a non-specialist. To make this case more forcibly, it is evident to all clinical neurologists that those of our neurological colleagues who specialise within neurology in such conditions as movement disorders,

epilepsy or myasthenia gravis (to give just a few examples) are much better at managing those disorders than the neurologist without such a special interest. By analogy, a fully trained neurologist is likely to be better at managing general neurological disorders than a physician who has a special interest in another branch of medicine altogether, such as diabetes, cardiology or some other specialism.

One study<sup>18</sup> has compared the out-patient management of patients with neurological disease given by Consultant Neurologists and General Physicians. It was established that the neurologist saw fewer patients for follow-up, there were fewer uncertain diagnoses and, if patients were admitted, they stayed in hospital for a shorter time. The neurologists did not do as many tests and they prescribed fewer drugs. All of these observations suggest that management by the neurologist was more efficient and more economical.

In another study<sup>19</sup> the value of in-patient consultations on patients with neurological disorders under the care of General Physicians was evaluated and it was concluded that the neurologists contributed useful advice on diagnosis or management in 43% of patients seen. This result suggests that management of the patients would have been more efficient if they had been under the care of the neurologist in the first place.

Neurologists have been heavily involved in recent years in setting standards for investigation and treatment of transient ischaemic attacks (TIAs) and stroke and this expertise is revealed by the lead that certain neurologists have taken in organising the UK TIA Aspirin and European Carotid Surgery trails. The Association of British Neurologists has produced a series of recommendations for the management of patients with TIM and stroke<sup>20</sup> and the Royal College of Physicians has recommended<sup>21</sup> that those responsible for stroke services should have had experience in neurology.

In the field of epilepsy, the Joint Epilepsy Council of Great Britain and Ireland recommends<sup>22</sup> that all patients with epilepsy should be seen by an appropriate expert who, for the majority of patients, will be a neurologist.

## ***CONCLUSION***

At present there is a national shortage of neurologists. Not all patients with significant neurological problems, who require specialist advice, actually get to see a neurologist, so they may be receiving suboptimal care. In the future, patients with neurological problems are likely to demand referral to specialist neurologists. Enhancement of the neurological services in the United Kingdom will allow a far greater proportion of patients with neurological disorders to see a specialist in neurology.

This document outlines a series of principles for changing neurological services in order to enhance their accessibility and efficiency. In this country there are many reasons for suggesting these principles and some have been outlined above. Other important reasons include:

- New developments are influencing specialist neurological practice in a number of different areas, including developments in epilepsy, Parkinson's disease, multiple sclerosis, neurodegenerative disorders, neurogenetic disorders, cerebrovascular disorders, neuromuscular disorders and neuroimaging.
- It must be acknowledged that there are now very few physicians who are true generalists. Almost all physicians have special interests in specific branches of medicine. No general physicians specifically sub-specialise in neurology and few receive specialist training in neurology prior to Consultant appointment. We anticipate that the new system of training of registrars in the Unified Training Grade will increase the difficulty for trainees in other disciplines to obtain adequate training in clinical neurology. We anticipate that in the future the average General Physician's expertise in neurology will be insufficient to provide an adequate level of care for patients with neurological disease and it is inevitable that this will lead to a greater number of patients being referred to neurologists.

### **3. FUTURE DEVELOPMENTS OF THE CLINICAL NEUROLOGY SERVICE**

#### ***GENERAL PRINCIPLES***

We consider that the following six principles should be adhered to when future developments in neurological services are considered. These principles are based upon the belief that all patients with neurological problems should have easy access to a high quality service that is appropriate to their needs and they should not be made to accept a substandard service for geographical or economic reasons.

*The six Principles, given below, apply to all patients with significant neurological disorders.*

- 1. There should be equal access, without excessive delays, to uniformly high quality care managed by a fully trained Consultant Neurologist.**
- 2. The services should be sensitive and patient centred.**
- 3. All District General Hospitals should have a service from one or more Consultant Neurologists.**
- 4. All patients should have access to specialised neurological investigations and, where necessary, to in-patient treatment under the care of a Consultant Neurologist.**
- 5. All patients with a significant neurological disorder, and their families and carers, should expect clear and up to date information concerning the illness and the available management strategies, so that they can make informed decisions concerning treatment options.**
- 6. All Consultant Neurologists should be actively involved in continuing education and be part of a network which enables their patients to have easy access to specialised services and investigations.**

## **CONSULTANT AND TRAINEE NEUROLOGISTS**

In early 1996 there were almost 300 Consultant Neurologists in the United Kingdom, a population ratio of 1:200,000. The Association of British Neurologists has published its view that a far greater number is required'. The following is a summary of its conclusions on this topic:

- There is a national shortage of Consultant Neurologists.
- A considerable increase in numbers is required.
- The number of Consultant Neurologists that are actually required in the United Kingdom has been calculated. The calculations take account of the following:
  - The time that Consultant Neurologists have available for out-patient work.
  - The number of patients that can be seen in that time.
  - Existing data on the distribution of patients with different conditions in the out-patient practices of Consultant Neurologists.
  - The epidemiology of certain neurological diseases.
- The number of Consultant Neurologists that is required is approximately 1:100,000.
- If this expansion in consultant numbers is to be realised within a reasonable timescale, then there has to be an expansion in the number of trainees in neurology.
  - In the near future there will be 158 trainees in the United Kingdom if funding is made available. If there is no further expansion in these numbers, then the target of 1:100,000 will not be achieved until the year 2014.
  - An increase of one extra trainee per year will allow the national ratio of 1:100,000 to be achieved in the year 2010.
  - With two extra trainees per year the target will be reached in the year 2008.
  - This increase in the number of trainees will enlarge the available manpower for staffing the components of the Neurology Network.

## ***A NETWORK OF NEUROLOGY DEPARTMENTS***

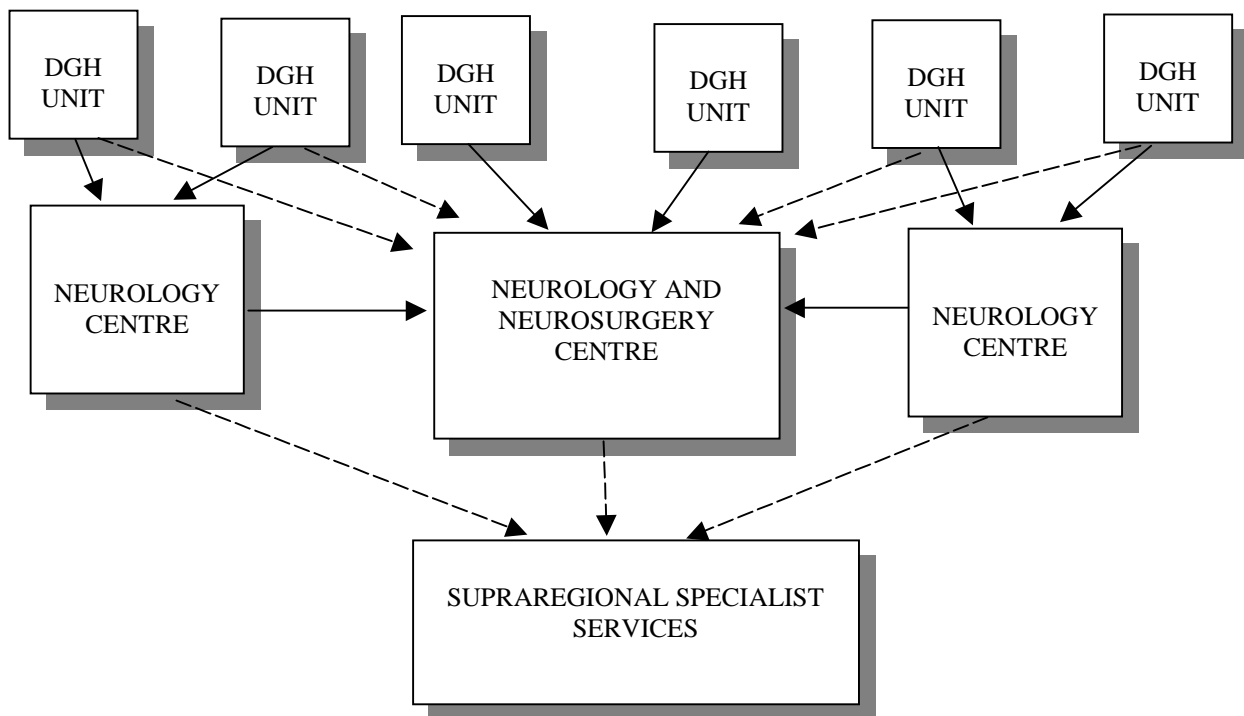
Patients with neurological disorders have certain needs and within the new service these must be satisfied.

*These needs are for:*

- 1. A general neurological diagnostic service**
- 2. Services for acute neurological problems**
- 3. Access to a sophisticated network of sub-specialist diagnostic and treatment services.**
- 4. Services that provide long term care and, when necessary, rehabilitation.**

In order that the necessary services are readily available to the whole population, there must be an equitable spread of Consultant Neurologists and appropriate diagnostic and other facilities throughout the country. General Practitioners should be able to refer a patient to the neurology service without difficulty and with a reasonable expectation that the patient will be seen quickly. To ensure all General Practitioners in the country have access to a local Consultant Neurologist it will be necessary for a considerable number of new Consultant Neurologist posts to be created. It will also be necessary for there to be some degree of central planning, so that an appropriate number of Consultant Neurologists are appointed in all parts of the country.

A Network of Neurology Units throughout the country will ensure that all patients will have ready access to increasingly specialised levels of expertise. The Neurology Network will be based to some degree on existing services, and will form the basis for improvements in others. In preparing the following descriptions of the individual components of the Neurology Network, a wide range of documents have been consulted. Various publications are available on neurology services in District General Hospitals and Regional Neuroscience Centres, some produced by the Association of British Neurologists<sup>23,24,25,26</sup> and some by the Royal College of Physicians<sup>21,22</sup>.



**Figure 1. The Neurology Network**

**An attempt to show the relationships between Neurology Departments. This is a hierarchy, in which the expertise available to patients becomes more complex as they move from the DGH through to more specialised centres.**

The Neurology Network is illustrated above in Figure 1. In a given geographical area there are three levels at which neurology services are given, to which must be added a fourth level, which represents national or supraregional specialist services:

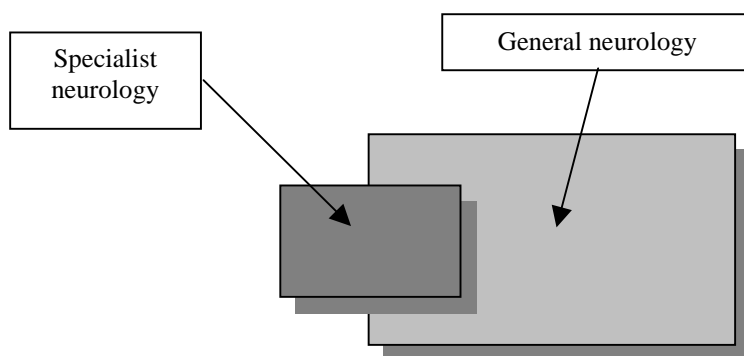
- **DGH Neurology Unit** - this is the simplest service.
- **Neurology Centre** - a specialised neurology unit without neurosurgery

- **Neurology and Neurosurgery Centre** - similar to the current regional and sub-regional Neuroscience Centres
- **Supra-regional and National specialist services** - these include the National Hospital for Neurology and Neurosurgery in London and the various specialist services for specific neurological disorders that are located in different parts of the country. The bulk of the text that is to follow is concerned with regional, rather than national organisation, although the existence of these supraregional specialist services must not be left out of the larger picture.

It is reasonable to propose that slightly different styles of neurology will be practised at the different places where Consultant Neurologists work. The simplest service is at the DGH, a more complex service is available at Neurology Centres and the most complex is at the Neurology and Neurosurgery Centre.

## ***THE INDIVIDUAL COMPONENTS OF THE NEUROLOGY NETWORK***

### ○ **District General Hospital (DGH) Neurology Unit**



**Figure 2. The services at a DGH Neurology Unit**

### ***A neurology service in every DGH***

General neurology services should be provided in all DGHs. These hospitals serve local communities. In most instances, the majority of the population lives fairly near to the hospital. The average DGH serves a

population of about 250,000, although there is a considerable variation in different parts of the country. It is the policy of the Association of British Neurologists<sup>23</sup> and the Royal College of Physicians<sup>28</sup> that each DGH should have its own specified Consultant Neurologist, or the whole time equivalent from two or more neurologists, who will provide a comprehensive service to the area served by the hospital. At the present time, some (but not all) DGHs can identify their own neurologist. Many are served by a consultant based either at the regional Neurology and Neurosurgery Centre or at a neighbouring DGH. Often the sessional commitment is inadequate. A minority of DGHs have a neurologist who has his or her base within the DGH, although in some parts of the country this service is more common than in others. When the number of Consultant Neurologists in the country reaches 1:100,000, each DGH serving 250,000 people would be expected to have 2.5 neurologists (or the equivalent), which would make it realistic for there to be one or more Consultant Neurologists attached to every DGH.

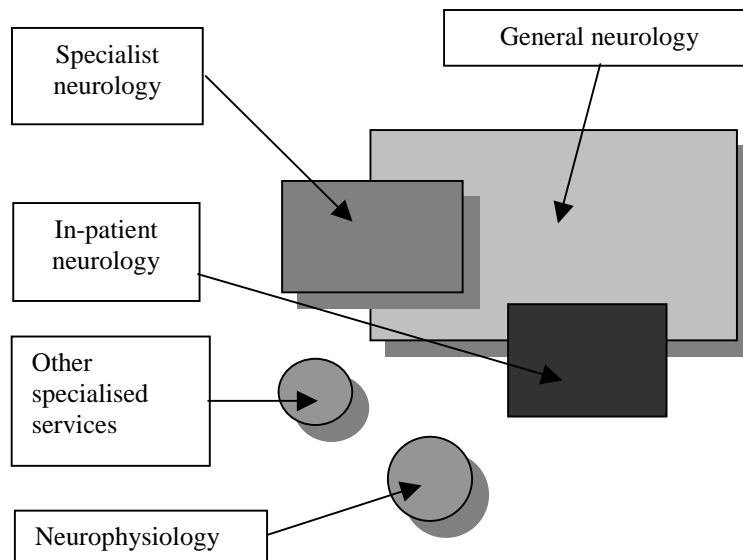
### *General and specialist services*

The primary purpose of the neurological service at the DGH should be to provide an easily accessible general neurological service to the local population. In addition, some speciality clinics, for epilepsy, cerebrovascular disease or movement disorders could be provided by the local Consultant Neurologists or by a visiting colleague.

### *Services to be provided at a DGH*

The precise organisation of the neurology service in such hospitals will vary from place to place. In some a full service, with in-patient and out-patient facilities will be provided, whereas in others the service will be mainly an out-patient and ward consultation service, with the in-patients being at a nearby Neurology Centre or at the Neurology and Neurosurgery Centre. All DGHs should have access to CT scanning, but the location of other investigations, such as MRI scanning and clinical neurophysiology, will vary. It would be appropriate for all trainees in neurology to have a period of attachment to a DGH Neurology Unit, in order to gain experience of the type of work done in such hospitals.

### ○ Neurology Centre



**Figure 3. The services at a Neurology Centre**

#### *Centres for Neurology without neurosurgery*

Neurology Centres, without neurosurgery, already exist in Leicester, Norwich and other places, where there is a considerable local population, and the Neurology and Neurosurgery Centre is some distance away. In the Neurology Centre a group of Consultant Neurologists will investigate and treat neurological disorders, but there will be no neurosurgeons in the same hospital. The Centre could be located at a DGH or at a teaching hospital. The concept is illustrated in Figure 1 and the links with several local DGHs are emphasised.

#### *A Neurology Centre for a defined population*

In many areas it will be most logical for one local hospital to be designated as a Neurology Centre and for that Centre to serve surrounding DGHs and, therefore, the surrounding population. The number of Consultant Neurologists that are attached to such a Centre will vary, but it is likely that a core of at least five consultants will be needed to ensure viability. Thus, the minimum population to be served by such a Neurology Centre will be about 500,000. In some areas Neurology Centres may have a greater number of Consultant Neurologists on the staff and such Centres will serve larger populations. Neurology Centres should always be sited within the population that they are serving.

#### *General and specialised services*

The service at the Neurology Centre will be more specialised than that found at a DGH. All Consultant Neurologists from affiliated DGHs will work at the Centre as a part of their provision of general neurology services to the local population. In addition, some or all of the consultants

at the Neurology Centre will provide sub-specialty services to the whole population of the local area. Examples of such sub-specialist services include clinics and other facilities for patients with cerebrovascular disease, epilepsy, headaches, multiple sclerosis and Parkinson's Disease. Thus, the Neurology Centre will provide a greater range and depth of expertise in sub-specialities of neurology than could be expected from a single Consultant Neurologist.

### *Staffing structure*

The medical staffing required at a Neurology Centre will include the Consultant Neurologists and neurological junior staff. There should be daily availability of expert neuroradiology and this service should conform to the recommendations of the British Society of Neuroradiologists<sup>29</sup>, which states that there should be the equivalent of one neuroradiologist for 500,000 population. There should also be one or two whole time equivalent Consultant Neurophysiologists, this suggestion being in line with the views of the Association of British Clinical Neurophysiologists<sup>30</sup>, which has recommended that there be 3 consultants in this discipline per million population. A Consultant in Neurological Rehabilitation should be based at the Neurology Centre, who will organise the long-term care of patients with chronic disability. In addition there must be a team of therapists and other staff, which should match the suggestions made previously by the Association of British Neurologists when it considered the Job Plans of Consultant Neurologists<sup>25</sup>

### *Specialised investigations*

The Neurology Centre will be where sophisticated investigations are carried out. There will be a neurophysiology service at each Centre, providing electromyography, nerve conduction and evoked potential studies, and an imaging service consisting of CT and MRI scanning, as well as other sophisticated neuroradiological investigations.

### *Facilities and implications concerning staffing*

There will be in-patient beds at the Neurology Centre, staffed by neurologically trained nurses, to permit the Consultant Neurologists to provide an elective in-patient investigation and treatment service. In such Centres it would also be expected that there would be an acute neurology service, although to provide such a service requires that there will be sufficient numbers of Consultant Neurologists, neurology trainees and other junior medical staff to allow the service to be effective and to run the

whole time. A high quality service will also require sufficient numbers of nurses, physiotherapists, occupational therapists, speech therapists, medical social workers, psychologists and others, all of whom will be dedicated to working in the Neurology Department and who will ensure that the service is of the highest quality. It is highly likely that sufficient numbers of such staff are already in post in the average hospital where the Neurology Centre is to be created, so all that will be required is a redeployment of some of these staff to the Neurology Centre.

### ***Beds and offices***

The physical facilities that are required to make the concept viable, include enough beds for in-patients, adequate space for offices for consultants and secretaries and rooms for consultations.

### ***Contracts and finances***

The Neurology Centre will be contracted to provide neurology services to surrounding DGHs and it will be necessary for robust arrangements to be in place to ensure that the contracts generate enough income to cover the costs of the Centre. To ensure the efficient use of these specialist facilities, equally robust arrangements must be made to facilitate the early discharge of patients to their local DGH or to other institutions nearer to their homes.

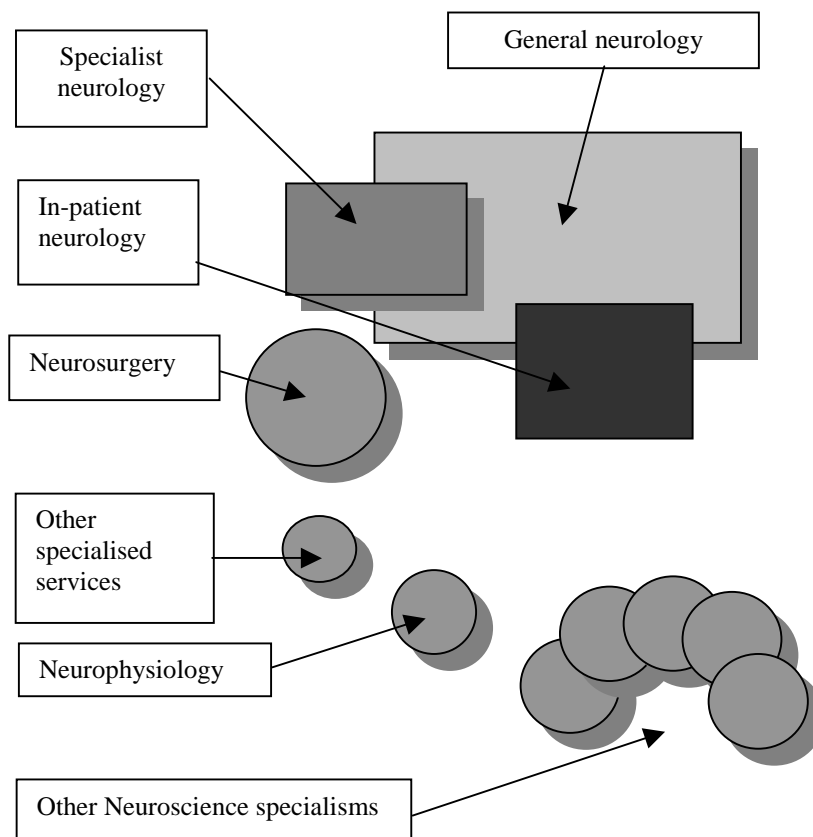
### ***Relationship with Neurology and Neurosurgery Centre***

The Neurology Centre will also have a close relationship with the Regional Neurology and Neurosurgery Centre. Patients who require more sophisticated help than can be provided at the Neurology Centre will be transferred to the Neurology and Neurosurgery Centre and the Consultant Neurologists will visit these Centres on a regular basis. In fact, there will be a two-way traffic of staff from the two types of Centre. There could be reciprocal visits from consultants from the Neurology and Neurosurgery Centre to the Neurology Centre. Regular programmed visits by Consultant Neurosurgeons and possibly by other consultants, would enable patients to obtain expert advice without having to travel even further from home.

### ***Training and education***

The Neurology Centre and the Neurology and Neurosurgery Centre will share the training of specialist registrars in Neurology. Regular educational and audit meetings would be held at the Neurology Centre.

## ○ Neurology and Neurosurgery centers



**Figure 4. The services provided at the Neurology and Neurosurgery Centre, with particular emphasis on Neurology.**

### *Teaching, research and specialised services*

The title "Neurology and Neurosurgery Centre" is the term that we prefer for those centres that are currently called Regional or sub-regional Neuroscience Centres. This will be the most sophisticated component of the Neurology Network in a given geographical area. In general the Neurology and Neurosurgery Centres will be based in teaching hospitals and they will contain University Departments of Neurology and Neurosurgery. There, the Consultant Neurologists will have important roles in teaching and research, as well as their roles in providing general and specialist clinical services.

### *Relationships with other disciplines*

The staffing of such Neurology and Neurosurgery Centres is more complex than for the Neurology Centres described in the previous paragraphs. Here the Consultant Neurologists will work with a wide variety of colleagues in other neuroscience disciplines, including Consultant Neurosurgeons, Neuropathologists, Neuroradiologists, Neurophysiologists and Neuropsychologists. It is likely that there will also be specialists in paediatric neurology, which is a discipline that has a special

relationship with the neurological services designed for adults. This relationship has been reviewed by the Royal College of Physicians<sup>28</sup>. There will also be specialists in neuroimmunology, neurogenetics and neurorehabilitation. These Centres provide comprehensive services across a wide range of neuroscience disciplines. Many Neurology and Neurosurgery Centres exist already and the Society of British Neurological Surgeons has already dealt with this topic very comprehensively in their document "Safe Neurosurgery"<sup>3</sup>. It is unlikely that the number of such centres will increase in the future and it is even possible that a small number of existing centre will close or will amalgamate with neighbouring centres.

### *The role of the neurologist at a Neurology and Neurosurgery Centre*

The Consultant Neurologists working in Neurology and Neurosurgery Centres, will fulfil several clinical roles and this must be recognised, so that appropriate regional or national funding can be provided:

- Firstly, they will provide a general neurology service to the hospital and to the population that live in the area around the Centre.
- Secondly, they will provide a neurological service to the surrounding DGHs, in the same way that their colleagues at Neurology Centres provide this service.
- Thirdly, they will provide care for both in-patients and, by way of consultations, for specialist problems referred by neighbouring Neurology Centres or DGHs.
- Fourthly, they will be a source of advice on neurological matters to other neuroscience specialists at the Centre.
- And finally, they may provide sub-specialty services at a national or international level.

### *Training and education*

The Neurology and Neurosurgery Centre will be the most important component of the network of Centres for the training of junior neurologists and it will also be the Centre for post-graduate education for consultants in all the neuroscience disciplines. All Consultant Neurologists in the region (or sub-region, depending upon how the Neurology and Neurosurgery Centres are distributed geographically) will have access to the facilities of the Centre, which they will visit on a regular basis.

### ***Research and development***

Research constitutes an important component of the work of all neurologists. It is anticipated that research will be done by neurology staff at all levels of the Neurology Network, but it is likely that a significant amount of the clinical and laboratory research activities for a particular region will be done at the Neurology and Neurosurgery Centre. The reason for this is that such Centres will be based at teaching hospitals and will contain University Departments of Neurology. This relationship will facilitate access to other medical and basic science disciplines within the University. It is anticipated that the Network will be able to support multicentre clinical research, so that neurologists throughout the region served by the various centres will be able to co-operate in research projects.

### ***Specialised services***

The Neurology and Neurosurgery Centre will provide specialist services for patients with neurological disorders, which are not available at the Neurology Centre. This will include Neurosurgery, Interventional Neuroradiology, Neuropathology and other specialised investigations and services. The Neurology and Neurosurgery Centre will aim to provide a comprehensive range of sub-specialist out-patient and in-patient services, for patients suffering from conditions such as cerebrovascular disease, epilepsy, movement disorders, neuromuscular disease and neuroophthalmology.

### ***Numbers of neurologists at such a centre***

The number of Consultant Neurologists based at a Neurology and Neurosurgery Centre will depend on local geography. In-patient cover in the Neurology and Neurosurgery Centre is likely to be provided on a rotational basis by the consultants based at the Centre. Many of those affiliated to the Centre will be based, not at the Neurology and Neurosurgery Centre, but at surrounding Neurology Centres or DGHs. They will visit the Neurology and Neurosurgery Centre to discuss patient management, for Continuing Medical Education (CME), to participate in undergraduate or postgraduate education and, in some instances, to conduct research. Some Consultant Neurologists from Neurology Centres or DGHs may also provide specialist out-patient clinics at the Neurology and Neurosurgery Centre. These links between the DGH Neurology Units, Neurology Centres and the Neurology and Neurosurgery Centres are important for all of the reasons given already, but also to ensure that no

neurologist becomes professionally isolated. The amount of time that a neurologist spends at the Neurology and Neurosurgery Centre or at the Neurology Centre and/or the DGH Neurology Unit, to which he or she is attached has been defined in the document that deals with Job Plans for Consultant Neurologists, published previously by the Association of British Neurologists<sup>25</sup>. In essence, neurologists based outside should spend at least two sessions a week at the Neurology and Neurosurgery Centre and those based at the Centre should spend at least two sessions each week at either a Neurology Centre or at a DGH Neurology Unit. This movement of consultants in and out of the Neurology and Neurosurgery Centre on a weekly basis is seen as an integral component of the Neurology Network.

### ○ **Supraregional and National Specialist Services**

Although this document is largely concerned with the provision of care at a Regional level, the Neurology Network also includes supraregional and National services. These are based within certain Neurology Centres or Neurology and Neurosurgery Centres and at the National Hospital for Neurology and Neurosurgery in London. They provide care and management for patients with particularly complicated or rare disorders. Examples include neurogenetic services, as well as services for patients with unusual movement disorders, certain muscle or peripheral nerve diseases and such specialist therapeutic services as epilepsy surgery. These supraregional specialist services provide expertise and resources that may not be available in every region. Access to such centres should be possible for all patients who require this level of expert care.

These centres also have additional functions as important resources for research and teaching and as sources of advanced training for neurologists who have already completed their period of compulsory specialist training.

## **4. THE INTRODUCTION AND CONSEQUENCES OF THIS NEW SYSTEM**

### ***ACCOMMODATING THE INCREASING NUMBER OF NEUROLOGISTS***

The large increase in the number of consultant neurology appointments during the last five years has been accommodated in a number of ways and the framework ,for future expansion is already in place.

#### **○ Neurology and Neurosurgery Centres**

Many of the new appointments have been to Neurology and Neurosurgery Centres, which already provide the base for the majority of Consultant Neurologists in the United Kingdom. It is likely that further increases in numbers at such Centres will occur in the future. However, the ideal number of Consultant Neurologists that can be accommodated satisfactorily in any one Centre is uncertain, although it is clear that eventually, for a given Centre, a saturation point will be reached.

#### **○ District General Hospitals and Neurology Centres**

In the future many of the new appointments of Consultant Neurologists will be made to Neurology Centres and DGHs. There has already been a significant expansion of the numbers of neurologists based at DGHs (Gloucester, Bath, Norwich and Poole as examples). It is policy of the ABN that neurologists should not work in isolation, so most DGH Neurology Units now have more than one consultant. Further expansion is essential, both in existing DGHs that serve large populations and in DGHs that do not have an in-house neurology service. The emergence of other neuroscience specialities within such hospitals and the increasing complexity of the services that are provided there, will lead to some of the DGHs becoming what we have called Neurology Centres.

## ○ **The framework for the Neurology Network**

The basic framework of the Neurology Network, namely the DGH Neurology Units, potential Neurology Centres, the Neurology and Neurosurgery Centres and the supraregional specialist services, is already in place and all that is needed in the future is a willingness to make more appointments (aiming for the 1:100,000 target) and a central policy which ensures that deficiencies are remedied in areas where there are too few neurologists and where the services are still sub-optimal.

### ***DEVELOPING THE NEUROLOGY NETWORK***

Development will take place differently in different places. Currently the pattern of distribution of neurological services varies widely from region to region, in much the same way that services within hospitals vary. These differences will be reflected in the type of Neurology Network that will emerge in different areas in the future. The critical consideration is not so much that the Network should be the same everywhere, but that it should exist, in one form or another, in every part of the country.

- In some regions the pattern will emerge of the combination of DGH Neurology Units, Neurology Centres and Neurology and Neurosurgery Centres that has been discussed already.
- In others the Network may simply consist of a combination of DGH Neurology Units and the Neurology and Neurosurgery Centre.
- In some areas, DGH neurology services will be provided by a consultant based in the DGH.
- In others the service may be from one or more neurologists visiting from the local Neurology Centre or the Neurology and Neurosurgery Centre.

## **HOW THESE SUGGESTIONS WILL SATISFY THE PRINCIPLES OUTLINED EARLIER**

The Principles, which should govern the design of a neurology service, were listed on page 12 of this document. The following is an analysis how the new Neurology Network satisfies those principles. The principles apply to all patients with significant neurological disorders.

1. There should be equal access, without excessive delays, to uniformly high quality care managed by a fully trained Consultant Neurologist.

*The spread of a far greater number of Consultant Neurologists throughout the country, with every DGH having a Consultant Neurologist who has links to a Neurology Centre or a Neurology and Neurosurgery Centre, will make a quality service accessible to all patients. Furthermore, the increased availability of neurological advice for family doctors should reduce the demand for hospital referral of patients with disorders which can be managed in primary care.*

2. The services should be sensitive and patient centred.

*This concept is built into the design of the Neurology Network. It is intended that the service will be well staffed, both by Consultant Neurologists and by other staff. These staff will have access to the facilities required to give the best services possible to the patients.*

3. All District General Hospitals should have a service from one or more Consultant Neurologists.

*The considerable increase in the numbers of Consultant Neurologists will make a service available near to the patient's home.*

4. All patients should have access to specialised neurological investigations and, where necessary, to in-patient treatment under the care of a Consultant Neurologist.

*Investigation and inpatient treatment may be available at the DGH, where the local neurologist can supervise management. Dedicated neurology beds should be provided at the Neurology Centre. Patients with very complex or rare disorders will be transferred to the Neurology and Neurosurgery Centre or to a supraregional specialist service. To avoid bed blockage it should be organised that patients should be transferred back to their local hospitals as soon as feasible.*

- 5. All patients with significant neurological disorders and their families and carers should expect clear and up to date information concerning the illness and the various management strategies, so that they can make informed decisions concerning treatment options.**

*The greater involvement of trained specialist neurologists in the care of patients with neurological disorders will ensure that this principle becomes practice.*

- 6. All Consultant Neurologists should be actively involved in continuing education and be part of a network which enables their patients to have easy access to specialised services and investigations.**

*The Neurology Network is designed to provide such a service and to replace the present patchy and under-resourced provision of neurology services.*

## ***HOW THESE SUGGESTIONS WILL SATISFY THE NEEDS THAT DIFFERENT PATIENTS HAVE OF A NEUROLOGY SERVICE***

Different patients with neurological disorders have different needs. These were defined on page 14 and the following is an analysis of how the new system of a Neurology Network will satisfy these requirements.

### **1. A general neurological diagnostic service**

*The service for the diagnosis of neurological conditions will be robust. All patients will have access to a general neurological service at their local hospital and, through the Neurology Network, they will have easy access to the most sophisticated of investigations if these should be required.*

### **2. Services for acute neurological problems**

*The provision of an acute neurology service at the local Neurology Centre will make available to all patients who need it a service which is run by Consultant Neurologists.*

### **3. Access to a sophisticated network of specialised diagnostic and treatment services**

*The Neurology Network is designed specifically to make available to all patients a highly sophisticated system for diagnosis and treatment.*

### **4. Services providing long term care and, when necessary, rehabilitation**

*At each Neurology Centre there will be a Consultant with an interest in Neurological Rehabilitation, who will be able to address the long term needs of patients with chronic disability.*

## ***IMPLICATIONS CONCERNING TRAINING***

The arrangements for provision of junior neurology staff within the neurology network are difficult to predict, and will depend on:

- Numbers of junior staff.
- Size of units
- Numbers of consultants.

### ○ **First line staff**

Not all Neurologists who care for in-patients are currently assisted by dedicated neurological trainees. Neurology Centres and Neurology and Neurosurgery Centres should have dedicated Senior House Officers and House Officers (often on some form of rotation). DGH Neurology Units may have to share staff with other units, which would provide necessary training for General Physicians.

### ○ **Second line staff (specialist registrars)**

#### ***Neurology specialist registrars***

Neurology Specialist Registrars will be based at Neurology Centres or Neurology and Neurosurgery Centres and may rotate to DGH Neurology Units. The majority of their training will be in the Neurology and Neurosurgery Centre or the Neurology Centre, because of the need to rotate through other neuroscience specialities. The extent of the attachment to the DGH Neurology Unit will vary depending on the training facilities available, but all specialist Registrars should have out-patient clinic experience in DGH Neurology Units. Audit meetings, other postgraduate meetings and the majority of the formal teaching programme is likely to occur at the Neurology and Neurosurgery Centre.

All Neurology Centres and Neurology and Neurosurgery Centres should have at least one neurology specialist registrar. Not all DGH Neurology units, even those with in-patient facilities, will have such staff and second line cover may need to be provided by either consultants or medical specialist registrars.

All training rotations will need to ensure that specialist registrars spend some time in the Neurology and Neurosurgery Centre, the Neurology Centre and the DGH Neurology Units.

***Medical specialist registrars.***

General Medical Specialist Registrars are less likely to spend time training in neurology following the introduction of the new Specialist Registrar training scheme. For those DGH Neurology Units with inpatient facilities, but without Neurology Specialist Registrars, rotations with the general medical specialities will enable general medical specialist registrars to obtain experience in neurology.

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