Safe Neurosurgery 2000

A report from the

Society of British Neurological Surgeons

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Summary of Recommendations

A number of the recommendations in the 1993 edition of Safe Neurosurgery remain un-met fully and need re-stating. Additional recommendations are necessary to bring standards of safety and quality to acceptable levels for the twenty-first century and to enable planning to be conducted that ensures the long term development of the specialty.

- Neurosurgical units should be situated within a multi-disciplinary Neurosciences centre and on a General Hospital site. Each unit must provide a full core neurosurgical service before any sub-specialities are developed.

- For maintenance of neurosurgical expertise and satisfactory training there must be an adequate volume and diversity of work and sufficient population to generate this. Whilst this must be reconciled with equity of access a 1million catchment population should be the minimum.

- Where amalgamation of units is proposed the criteria against which any decision is made should include equity of access and maintenance of local infrastructures.

- SBNS believes urgent consideration should be given to current proposals for head injury management.

  Action required by surgical Royal Colleges, the Society of British Neurological Surgeons (SBNS), the National Institute for Clinical Excellence (NICE), the British Association for Accident and Emergency Medicine and the Faculty of Accident and Emergency Medicine.

- All neurosurgical units must provide a full twenty-four hour consultant led service and be staffed accordingly, i.e. a minimum of 6 WTE consultant surgeons increasing with populations of more than 1.5million. By 2005 an additional 92.4 consultant surgeons should be in post. (Appendix 1)

  Action required by SBNS, surgical Royal Colleges, NHS Trusts and NHS Executive, i.e. those responsible for specialty strategic planning.

- Thirty neurosurgical beds and four dedicated neurosurgical intensive therapy beds per million population are needed to deliver safe practice. (Appendix 2)

  Action required by those responsible for specialty strategic planning.

- Every neurosurgical unit should have at least two fully resourced operating theatres; those serving a population of more than two million need three.

  Action required by specialty strategic planners.

- With the implementation of new training regimes and policies on reducing junior doctors hours, a unit serving a population of 1.5 million needs five intermediate grade neurosurgical staff, i.e. qualified, non consultant, staff working under supervision.
  Action required by specialty strategic planners.

- The process of strategic specialty planning should be encouraged to start at unit level in order to inform regional and national plans. Concerted effort must be made to ensure neurosurgery is regarded as a strategic planning priority and to bring units up to minimum standards of investment.
  Action required by clinical directors and specialty strategic planners.

- Urgent review of capital funding is needed to prevent major and unsafe reductions in service provision.
  Action required by NHS Trusts, NHS Executive and Government.

- As work plans are reviewed they must realistically reflect consultants commitments to all aspects of their work, including the requirement to reduce working hours.
  Action required by consultants, clinical directors and NHS Trusts or their equivalent.

- Neurosurgical units and SBNS should encourage the development of local and national manpower plans to ensure targets on service, staffing and training are co-ordinated and systematically reached. Such plans should cover a period of not less than ten years and provide a less specific outline for fifteen. (Appendix 3)
  Action required by SBNS and speciality strategic planners.

- A common staff appraisal system, concentrating on training and development should be designed by the surgical Royal Colleges, endorsed by SBNS and implemented.
  Initial action required by surgical Royal colleges.

- Continuing professional training and development (CME/CPD) should be explicitly encouraged and reflected in local budgets.
  Action required by clinical directors and chief executives.

- SBNS should commission a programme of work aimed at creating consistency in key activities and in these determine standards of performance:
  - the specification for team building
  - the specification for peer/team review and audit
  - assess the need for neurosurgical research and development protocols and design these if appropriate
  - draft explicit quality standards, based on agreed measures

- for beyond 2005 determine the most effective consultant, trainee and allied professional skill and grade mix.

  Action required by SBNS.

- Each neurosurgical unit should nominate a lead consultant to review clinical governance issues and to ensure sufficient mechanisms are in place to support this.

  Action required by SBNS and individual neurosurgical units.

- There should be agreement without delay on content and format of information and data bases to ensure consistent planning of services and measuring performance. Appropriate systems should then be designed and implemented urgently in collaboration with other users of the data but for data that is neurosurgically specific the SBNS takes responsibility.

  Action required by SBNS and speciality strategic planners.

- SBNS should, in respect of all the elements in this report, develop further its links with the surgical Royal Colleges, the General Medical Council, NICE, the Commission for Health Improvement, the Scottish Intercollegiate Guidelines Network (SIGN) and The Clinical Standards Board in Scotland to aim to get a collaborative approach to planning and scrutiny, including clinical governance, re-validation, discipline and individual development through mechanisms such as rapid response teams.

  Initiating action required by SBNS.

- The co-ordination of academic neurosurgery, service neurosurgery and research and development in respect of planning and financing needs to improved. Additionally, increased impetus should be given to implementing the priority recommendations of the Report of the Independent Task Force - "Clinical Academic Careers".

  Action required by the Committee of Vice-Chancellors and Principals and NHS strategic planners.

Chapter 1 - Introduction and Background.

1.1 Medical and surgical practitioners have been under increasing scrutiny
especially in the last ten years from the public, media, government, employers, pressure groups and professional bodies. In more recent
months this scrutiny, and the consequent demands for higher and defined standards, has become particularly intense following publication of the white paper "The New NHS: modern, dependable" in 1997, it's consequent circulars, especially those relating to clinical governance and re-validation, the establishment of bodies such as the Commission for Health Improvement and the National Institute for Clinical Excellence and, not least, policy documents published by surgical Royal Colleges, the General Medical Council and specialist associations.

1.2 Those involved in academic and clinical neurosurgery have worked hard to develop and maintain the high international reputation of neurosurgery in the United Kingdom and Ireland. Many of the standards achieved have been the result of rigorous self regulation and in the belief that the *primum mobile* of such self regulation is patient interest. It was to emphasise this philosophy and to set standards of quality and resource use that the first "Safe Neurosurgery" was published in 1993.
A significant number of the objectives outlined in the 1993 document have been achieved although shortfalls remain in many areas. Those objectives were based on contemporary demand and the fact that the clinical and organisational patterns of neurosurgery would change, but the superordinate objective of safety would continue to be immutable.

1.3 The speciality of neurosurgery needs some definition. It involves the clinical management of patients with potentially surgical remediable conditions of the central (intracranial and spinal) and peripheral nervous systems. Integral and consequential functions include training and education, research and development and, increasingly, working closely with a wide variety of other specialists. Neurosurgery is particularly subject to:

- high levels (80%) of emergency/urgent work
- rapid increases in, and changing nature of, workload
- especially in administrative and managerial responsibilities
- very rapid clinical and technological change
- accelerating organisational change
- major increases in public expectation in respect of safety,
- effectiveness and openness
- increasing sub-specialisation
- high medico-legal risk.

1.4 Public expectation is that every patient suffering from a neurosurgical emergency or a life threatening condition should be able to expect immediate admission to a properly equipped and fully staffed neurosurgical unit in order to undergo timely and safe treatment. Patients with urgent, but non-life threatening, neurosurgical conditions should be admitted within 48 hours of diagnosis. Patients with painful or disabling conditions that are not life threatening should be seen by a consultant neurosurgeon within two weeks and be admitted, if admission is necessary, to a neurosurgical unit within six weeks of their condition being diagnosed. It is wholly unacceptable in clinical and public policy terms for patients with, for example, disabling spinal conditions to be expected to wait a year or more for treatment.

1.5 There are more issues now that impact on neurosurgery than at any other time. Many of these are described in documents published by government, Department of Health, NHS Executive, The General Medical Council, surgical Royal Colleges and specialist associations. Almost every publication and proposed policy or system outlines the need for improved quality, effectiveness, safety and openness together with the necessity to be able to measure these. Most also recognise that the most effective way to make progress is to re-emphasise the fundamental responsibility of consultants, and all other medical practitioners, to self regulate albeit within an over-arching framework of formal scrutiny resulting in, for example, re-validation. Basic issues raised by the principle of self regulation are:

- how are standards set by the profession?
- how are these standards maintained and reviewed?
- how is meeting these standards ensured?
- what happens if they are not?

1.6 There are also concerns that have been a constant theme in neurosurgery and which are not addressed specifically or sufficiently in the current debates. These include:

- the increasing impact of litigation. Neurosurgery will continue to be a high risk speciality. For good defences to be argued the competence of consultants must be scrutinised and judged effectively. They need an adequately resourced environment which enables them to work safely. The standards and expected quality of their work must be explicit and open to scrutiny and their training and professional development need to keep them fit to practice.

- increasing workload, especially of an administrative nature, is causing universal concern. The need for much of this is widely recognised but such developments reduce the capacity available for clinical practice and continuing training

- whilst it is one of the functions of the Society of British Neurological Surgeons (SBNS) to special plead for neurosurgical services it **recognises that resources are both scarce and finite and that their distribution is ultimately a matter for government and the market.** It follows that those groups, in order to make informed investment decisions, need sufficient data and advice. It is probable that future opportunities for offering and receiving advice will be adequate. However, the data presently easily available is not sufficient for effective strategic planning. Within the specialty of neurosurgery those providing the service feel it now falls to them to generate information to enable effective planning, scrutiny and governance to take place.

1.7 It is to start tackling these issues that SBNS determined that "Safe Neurosurgery 2000" should be published. It's purposes are to provide a commentary on progress since 1993, outline the present state of neurosurgery and to indicate the responses needed to maintain and improve standards and safety in the United Kingdom and Ireland.

Chapter 2 - Current state and Future Development.

2.1 Changes 1993 - 1999

"Safe Neurosurgery", published in 1993, provided a benchmark for development over the ensuing six years. Since then **there has been significant progress although many of the standards proposed have yet to be achieved.**

2.1.1 Nationally, workload has been rising by more than 3% per year over the six years to 1999. Current workload rates, per year, are:

Admissions per million population:	868
Operations per million population:	662
Admissions per neurosurgical bed:	37
Operations per theatre session, p.a.:	81
Admissions/Consultant WTE:	377
Operations/Consultant WTE:	279

2.1.2 The number of neurological operations performed is running at the rate of 49000 per year and by 2005 the rate will be more than 58000.
At present the case mix in terms of admissions is:

- operations on the brain, meninges of brain, pituitary and pineal glands	15%
- shunts and other ventricle procedures	6%
- operations on cranial and peripheral nerves	3%
- operations on spinal cord and spinal meninges	5%
- operations on cranium (excluding aneurysms)	2.5%
- vascular operations	10%
- operations on the spine	19%
- other operations	15.5%
- no operation performed	24%

Of the operations performed, 4050 were trauma cases and approximately 29000 were classified as emergency, urgent, life threatening or potentially so.

Figures vary significantly geographically. The most telling picture that emerges is that where resources, in terms of staff or facilities, are poorest there is an inevitable and almost exclusive concentration on trauma and emergency work at the expense of waiting list and even some urgent cases. An example of this is in spinal neurosurgery where in neurosurgical units with more than 3.5 surgeons per million population 300 or more spinal operations per million are performed per year. Where there are fewer than 2.5 surgeons per million population the annual average drops

dramatically to 180. As twenty-six units have fewer than 2.5 surgeons per million population it follows that a very substantial demand for spinal surgery is remaining unmet. Similar differences exist in most of the non emergency procedures which indicates a major inequity of access.

Where there is insufficient, or an imbalance of, staffing and facilities there is covert rationing, either by way of discharging patients too early, often dangerously so, or, more commonly, referrals not being made to neurosurgical units because referring doctors know that true demand far outstrips supply.

2.1.3 Growth in particular areas has been almost explosive in the same period:

- spinal surgery within neurosurgical units rose by 62% to 2075 spinal operations and is now the biggest operative group in the specialty operations to treat cerebral aneurysms rose by 34% with much of this increase brought about by better and earlier
- diagnosis
- surgical treatment of gliomas by craniotomy increased by 37%
- aided by the rising use of stereotaxy
- shunt surgery increased by 54% to 3400 cases per year with a more than proportionate rise in adults treated although all children now needing this procedure receive it in neurosurgical units. The number of shunt revisions has increased and will continue to do so as the surviving shunt population increases. The UK Shunt Registry provides an effective audit instrument for monitoring numbers and quality of service.

2.1.4 Technological change was equally rapid over the period especially in:

- computer assisted image directed neurosurgery often called neuro-navigation or frameless stereotaxy
- neuroendoscopy
- neurostimulation
- interventional neuroradiology, principally in neurovascular practice
- radiosurgery; using both the "gamma knife" and linear accelerator techniques.

It is generally impractical to apportion specific increases in output to particular or single changes in technology but the overwhelming body of opinion is that the increases that have occurred would not have done so to the degree experienced without technological improvements.

Moreover, technological improvement assists in earlier and more specific diagnosis and more targeted, higher quality treatment.

2.1.5 Training of neurosurgeons has radically changed in the period with the inception of the Calman system. Whilst this has not yet run its full cycle it has already reduced the service contribution of junior staff, which is further exacerbated by the working hours reduction programme. These factors increase consultant's commitments to service provision.

2.1.6 Numbers of consultants (whole time equivalent) including the service contribution of academic staff rose from 132.5 in 1993 to 166.1 in 1999. This represents significant progress but the number still falls short of the standards recommended in 1993 by 4.4 posts. Since then demands have increased and with them the need to revise safe levels. The population of the United Kingdom and Ireland is 62.5 million giving a population per surgeon (WTE) of 378,000. Broken down nationally the figures are:

- Scotland 1:284,600
- Eire 1:467,000
- N.Ireland 1:418,000
- Wales 1:418,000
- England 1:372,500

These figures compare with a European average of 1:125,000. There is little use made of Staff Grade surgeons; there are four, employed in England and Wales.

2.1.7 There are 37 neurosurgical units, a reduction of two since 1993 serving a population in 1999 of 62,500,000, a rise of one million in the last six years. The population served by each neurosurgical unit varies between 0.6million and 3.5million. The number of neurosurgical beds is 1467 and 111 neuro intensive therapy beds. These figures need to be put into the context that by 2005 the recommended bed numbers should be 2072 and 281 neuro intensive therapy beds. There are still 16 neurosurgical units with no dedicated intensive therapy beds. **Overall only 54% of neurosurgical units have reached the minimum consultant staffing level recommended in 1993, 20% reach the minimum number of beds and 14% have the recommended number of dedicated intensive therapy beds.** There are a number of organisational changes taking place, the most

noteworthy being the merger of the two neurosurgical units in Manchester and Salford amalgamating in 2000.

2.1.8 Organisationally neurosurgical units (or more generally, neuroscienceunits) have developed within NHS Trusts, or their equivalent, as clinical directorates to the point where all now have a managerial
structure closely tied in to their District General Hospital's administrative, managerial and clinical structures. This has assisted some degree of cohesion being achieved. However, in England in particular, with the national organisational changes in the early and mid 1990's strategic planning of specialist and supra regional services became very fragmented with little effective overall co-ordination of developments other than through local networking. It is only in 1999 that NHS Executive Regional Offices are beginning to develop strategic planning for specialist services.

2.2 Future demand and supply.

Both demand for, and supply of, neurosurgical services are influenced by changing population mix, changing techniques, technologies and developments in public policy. There is every reason to plan on the assumption that changes, similar to those in the last five years, will continue over the next five, albeit with some differences of emphasis.

2.2.1 The population of the United Kingdom and Ireland in 2005 will be 64million, an increase of 1.58%. Particular age groups will grow significantly more than this, for example the 75-84 population will grow by 4.4% and it is this group that places more than proportionate demands on neurosurgical services especially in respect of diagnosis and treatment of degenerative conditions.

2.2.2 Neurosurgery will continue to be emergency led with overall workload increasing by 3% each year. Significantly, the pressure on sub-specialties is likely to increase more than proportionately. The trends indicated above (2.1.3) for particular procedures are certain to continue in broadly the same way for the next five years. Additionally, there will be major plans to develop paediatric neurosurgery as a comprehensive sub-specialty and changes proposed by The Royal College of Surgeons of England in the management of head injuries will have a heavy impact on Accident and Emergency departments and neurosurgical units. In respect of neurosurgical units, head injuries needing neurosurgical involvement will rise from less than 5% to 10-15% by 2005 as other surgical specialties hand over responsibility. With the increased demand, particularly for emergency and urgent work in the last five years, there has been increasing concern that substantial numbers of patients are being discharged too early in

order to make room for new cases. Such events are invariably caused by insufficient beds or dedicated intensive therapy facilities. In short, almost all neurosurgical units are frequently working beyond their safe capacity.

2.2.3 **Neurosurgery will need to remain consultant led with every patient being the responsibility of a named consultant although this must not permit any delay in the development of clinical teams.** The General Medical Council makes it clear, and SBNS accepts wholeheartedly, that teams must be well led and team members should be well trained, willing to learn, open and honest about their own and others professional performance, willing to offer and accept support and advice and be committed to providing a high quality service. Consultants recognise the importance of continuing medical education or continuing professional development over their working life as one of the major tools to keep these, and other, standards met. These responsibilities extend to the training and supervision of trainees. **However, the Calman training system has generated two further concerns:**

- trainees gaining their Certificate of Completion of Surgical Training will be better trained than hitherto but there is concern that their experience will be less. Therefore, on appointment, the support given to a consultant will be crucial

- the tendency, already alluded to, whereby consultants perform procedures that previously would have been performed by the more experienced trainees albeit under supervision. The effect of this is to increase the consultant's clinical work and further reduce the experience of trainees.

2.2.4 **Organisational developments will accelerate over the next five years.** Commitments in a variety of existing functions will increase and new organisational responsibilities will be taken on:

- the development of teams
- greater involvement in standard setting, devising quality measures, scrutiny, clinical governance and re-validation
- the need to produce data and information for these functions
- planning the development of neurosurgical services
- participating in appraisal programmes.

These responsibilities not only place additional demands on surgeons time, which could cut into clinical activity, but also require training -itself a time consuming process. Whilst the need to tackle these responsibilities and devote time to train in them is well accepted by SBNS, consultants will need support particularly from their employers.

2.2.5 **Neurosurgical units need to have a minimum catchment population, size and supporting environment to remain viable.** Some amalgamations have taken place in the last decade and one is planned for 2000. Future amalgamations are a matter for strategic planning but the basis for a viable neurosurgical unit will continue to be:

- population served, ensuring practicable and equitable, if not equal, access. Any neurosurgical unit serving a population of more than 1million should have sufficient workload to maintain expertise in all aspects of general neurosurgery including intracranial tumours, head injuries, spinal degenerative disease and cerebrovascular disease. More specialised neuro-surgical work would normally need a larger population or inter- and intra-unit specialisation and referral. Equity of access suggests a maximum surface journey time of two hours to a neurosurgical unit. This criterion indicates there may need to be a very small number of units serving populations less than 1million
- all general neurosurgical services, as outlined above, must be available in even the smallest unit. Similarly, all the appropriate diagnostic, support services and immediately required complementary specialties must be closely available. In all cases this will mean a neurosurgical service will be located in a neurosciences unit which in turn will be on, or close to, a large district general hospital site
- facilities for research and development must be available
- there must be sufficient trained staff, both medical and complementary professions, to be available to meet clinical and employment standards.

2.2.6 The fundamental ethics of medicine and surgery have not changed, nor are they likely to. They have, however, been re-stated by the General Medical Council in "Good Medical Practice" and "Maintaining Good Medical Practice". These re-emphasise that a practitioner acts unethically unless he:

- maintains his professional skill and knowledge and works within his professional competence. Hence the importance of continuing training and the re-validation processes
- develops and maintains a trust between him and his patients
- works constructively within teams and respects the skill and knowledge of colleagues
- takes appropriate action if he is aware of unprofessional behaviour or incompetence
- uses public funds with probity.

The process of re-validation will help focus on these issues and encourage the individual surgeon to become more openly accountable. It is accepted that unless he upholds these principles to the letter and the spirit at all times the privilege of self regulation will be lost.

2.2.7 **The demands of government and it's agencies, including the NHS, are set to increase greatly over the next five years and these will bring about improvements in patient care if constructively managed and resourced.** The most significant demands will stem from:

- the White Paper with its emphasis on quality, dependability and openness
- the generation of clinical guidelines, co-ordinated by the National Institute of Clinical Excellence (NICE) and the Scottish Intercollegiate Guidelines Network (SIGN). Many of these guidelines will be devised by clinicians, their specialist associations and the surgical Royal Colleges and, where appropriate, endorsed and published by NICE and SIGN. They will then be the standard against which performance will be judged
- clinical governance, which will bring about regular inspections of hospitals including neurosurgical units. These will be separate from site inspections by Specialist Advisory Committees, which will remain the principal mechanism for accrediting units for training purposes
- the introduction of re-validation of individual consultants in order to maintain their name on the specialist register of the GMC.
- the changes in the planning process for specialist services, which will be co-ordinated by regional offices of the NHS Executive - other than for single site national services. This development will fill a vacuum that has existed since 1993

2.2.8 **In a specialty that is characterised by both high risk and complex procedures, increased time and resource needs to be devoted to research and development.** Whilst much of the lead for this will come from teaching hospitals, every neurosurgical unit has a responsibility to conduct both academic and empirical research and development in fields of special and general interest. Capacity must be maintained in work plans and overall facilities to ensure R & D is encouraged and remains clinically and patient orientated.

2.2.9 Neurosurgery is a rapidly evolving discipline with many successful advances to its credit. Securely supported academic neurosurgical departments are needed to provide systematic training in research and development skills for the next generation

of neurosurgeons and to inculcate attitudes of self-criticism so essential to evidence based medicine. Some 15% of neurosurgeons have an academic component to their contracts but too many are single handed with, effectively, a couple of academic sessions. Recruitment to such posts is difficult.

The competing pressures on staff time for research, teaching and service is a problem for all academic medicine but is particularly acute for academic neurosurgery with its unpredictable clinical demands arising from the high proportion of emergency work. An academic department needs a minimum of three consultant Level appointments in order to organise teaching, training, and to manage safely a joint clinical service. This would provide a basis for viable efforts to create and direct research teams, bridge-build with other disciplines and compete successfully for external research and development funding. In all, at least six such fully funded academic departments are required. The funding and longer term financial and manpower planning of academic departments, research and development and service departments needs to integrated in a more cohesive way than hitherto to ensure each improves its contribution to the other.

2.2.10 A number of these developments accentuate the tension between increasing demands for clinical activity with improved quality and the need to devote more time and energy to administrative, scrutinising, auditing and other, necessary, organisational functions. **This tension, and other developments can only be effectively resolved through consensual planning, teamwork, co-operative management and it will necessitate re-configuration and redeployment of some functions as well as new investment to increase capacity to meet rising demand and expectation.**

Chapter 3 - Standards and their Delivery.

3.1 Quantitative standards are relatively easy to define and measure although in clinical matters the NHS has had considerable problems getting wide agreement on definition and building adequate information systems through which sound, and accepted, judgements on performance can be made.

With the establishment of clinical governance and a greater interest in accountability there will be a major movement towards achieving agreement on standards and on the information that is necessary to measure performance against them.

Qualitative standards, and the information needed to measure performance against them are a different matter. Most patients, providers and observers feel they can recognise good, bad or changing quality and most will demand improvements in it. Equally, however, most will have great difficulty in objectively , as opposed to anecdotally, describing quality.

3.2.1 Currently a number of quantitative standards are measurable in respect of resources invested although there may be rationalisations of logic and practice underlying these. Fundamentally, SBNS believes that quantity and quality are inextricably linked in terms of resources and output although it may be possible and desirable to measure them separately. It also believes that expertise sufficient to provide a safe and timely service to the numbers of patients who need it can only be created and maintained as a result of developing certain levels of competence in adequate numbers of staff who have an amenable environment in which to work. **In short, quality and safety need investment. Those responsible for planning and making investment decisions need to be well informed particularly by those providing the service.**

3.2.2 Quantitatively current standards are based on a number of principles:

- there should be a minimum population base for a viable neurosurgical unit
- that there are a minimum number of beds, dedicated neuro-intensive therapy beds, theatres, consultants, complementary staff and other support services for a safe and viable unit
- certain financial limits must be adhered to
- training facilities must, overall, be adequate to ensure continuity of service.

The performance of the unit is measured by reference to,

amongst other things, patient throughput and turnover, waiting lists, bed occupancy, theatre use, numbers of discharges and deaths, staff and materials usage.

These indicators can be used for the specialty as a whole, for individual consultants or broken down by diagnostic group or procedure.

3.2.3 **In 1993 SBNS urged the acceptance of certain minimum standards. These were based on the viable size to develop and maintain expertise, gain economies of scale, have equity of access for patients, have the presence of key specialist support services and recognise that the specialty has a heavy emergency driven workload.** The main standards set in 1993 were:

- it is not practicable for a neurosurgical unit to be viable if it serves a population of less than 1million. Only where equity of access is significantly compromised should less than 1million be accepted as a catchment area and only then if sufficient resources be invested in it to maintain the levels of skill required.
- sub-speciality interests, i.e. those beyond what a core service must provide, are only acceptable in a unit of sufficient size to maintain these and a full core service
- there should be a minimum of 30 beds per million population (adult and paediatric). Where paediatric neurosurgery takes place paediatric beds and other facilities must be separately designated as outlined in "Safe Paediatric Neurosurgery". Where paediatric neurosurgery is provided in a separate paediatric unit, e.g. Great Ormond Street and Birmingham Children's Hospital, such separation needs to be reflected in resource provision
- the standard for neurosurgical intensive therapy beds is 4 per million population
- a minimum of two operating theatres is needed or three where the population served is more than 2million
- to provide enough flexibility to cover all the variable demands of a work plan and based on a consultant performing 180-250 operations a year the number of surgeons needed was:

  4 for a population up to 1.5million
  5 for a population of 1.5 - 2million
  6 for a population of 2 - 2.5million
  7 for a population of 2.5 - 3million

the figure of 4 for the population of up to 1.5million was based on a maximum on-call commitment of 1 in 3 with internal cover. Maintenance of consultants skill is an important issue in the

context of numbers with each procedure requiring a critical mass in terms of operations performed per year in order to maintain competence and to train.

3.2.4 **Whilst there has been significant progress in terms of defining standards, achieving some of those recommended in 1993 and monitoring performance against them has not yet been sufficiently realised. The progress that has been made is largely due to the fact that "Safe Neurosurgery 1993" set explicit standards that were felt to be realistic as well as setting a set of safe benchmarks based on the needs of the time.**

3.3 Increasing demands.

3.3.1 Significant changes have taken place since 1993 in population, technology, public policy and expectation, techniques, the development of sub-specialties and in training, organisational and employment regimes. The fundamental principle of practising safely and to the benefit of the patient remains. Changes in the factors which impact on this make it essential to revise the standards of performance and therefore the investment needed, the ways in which plans are drawn up, the ways by which performance is judged and by whom.

3.3.2 Population is increasing by about 1.4% every five years with a sharper increase in the 75 - 84 age group (4.4%). Even in crude terms this indicates a workload increase of more than 1.5% from 2000 to 2005.

3.3.3 Clinical increases in workload, e.g. changes and increases in sub-specialties and the proposed changes in the management of head injuries, illustrated in chapter 2 will continue to rise by approximately 3% per year although the consequences of changing head injury policy in the next 2-3 years may be significantly greater than this. Once a standardised baseline is in place some of this increase will be coped with through improved organisation and economies of scale, at least over the next five years.

3.3.4 Policy and practice changes increase the workload particularly on staff. The commitments to training, management, planning and audit are all increasing more than proportionately to clinical workload. Changes in employment policies, especially those relating to reduced working hours, both national and those instigated by the European Union, have yet to make their total impact.

3.3.5 These policies and developing responsibilities cannot be adequately coped with unless the resource consequences are recognised and investment planned accordingly.

The year on year increase in real investment in staff will need to be between 3% and 4% and 2% for other variable overheads once minimum safe standards have been achieved. An analysis of resource plans is at Appendices 1 and 2.

Chapter 4 - Methods of Assessment.

4.1.1 Measurement of performance by 2005 must be by, amongst other means, the use of conventional statistics, but rationalised in their format and collection. In respect of neurosurgical performance SBNS, in line with its responsibility to promote self-regulation is developing a detailed data specification with the aim of avoiding duplication of effort and cost. The reliability of such data will depend on surgeons taking responsibility for it's initial generation, contemporaneously with the clinical work it relates to.

4.1.2 In the first instance performance against quantifiable standards can be measured, and any excess or shortfall published.

Both resources (inputs) and outputs can be measured and in audit terms the relative costs and benefits described. Measures commonly used have been:

Inputs	Outputs
Staff -WTE/Sessions	Outpatients - numbers
Finance	In patients - numbers
Beds	In patient days
NITU beds	Numbers of operations
Operating theatres	Turnover interval
Buildings	Deaths and discharges
Support services	Morbidity
Support specialties	Patient turnover

and there have been numerous ways of collecting the data that relates to these headings, classified by sub-specialty, consultant, unit and region. Measurements of quality as an output have tended to be sporadic except within neurosurgical units where processes for such reviews have been based on peer review, team review, comparative audit and measurement of cost per QALY (quality adjusted life year). The collection of data, particularly quality orientated data, has too frequently been done in a somewhat haphazard way and rarely set against stated standards. It has, therefore, been difficult to plan objectively.

4.1.3 Peer review through both local clinical teams and external audit will form a second method of measurement. The further development of clinical teams in neurosurgical units is crucial to ensure effective audit and review of clinical practice. Peer review will also be a key tool in assisting the processes of re-validation and clinical governance. Teams and units as a whole should formally review performance regularly against all the appropriate indicators, the minimum indicators being:

- finance and costs
- case numbers - by operative group/procedure
- bed, theatre and NITU use
- equipment and materials use
- deaths
- all other outcomes by operative group/procedure
- complications, infection rates and re-admissions
- complaints
- reviews by other groups, e.g. SAC, Commission for Health Improvement

4.1.4 Thirdly, the fact that neurosurgeons operate a policy of fully informed consent, which includes indicating degrees of risk, demonstrates that a professional and clinical prediction of individual outcomes is a practical proposition. It follows that judgements of performance can be made on the basis of auditing actual outcomes individually and generically against predicted outcomes. Clearly, in many neurosurgical procedures this can only be done over time, sometimes three or even more years. Provision must be made for explaining unforeseen/unforeseeable complications. However, such a process will in due course provide compelling evidence of achieved levels of quality.

4.1.5 Reviews of cost effectiveness will provide a fourth measure of performance with the prime objective of measuring quality of life as a result of neurosurgical intervention. These reviews should be conducted regularly to inform decisions on investment and, where appropriate, case mix. The concept of measuring cost against QALY is a most useful one focussing as it does on, not only cost, but the patient and their long term health and quality of life. The few cost per QALY reviews that have been conducted indicate that neurosurgical interventions are effective both in terms of the cost of avoiding death and the high number of years of good quality life salvaged. Such reviews are rarely undertaken now because they are seen as costly but regular reviews, particularly as data quality improves, would form an effective financial audit as well as focussing on clinical practice more intently.

4.1.6 Fifthly, appropriate cases should be followed through over at least three years so that judgements may be made on clinical effectiveness. The outcome, both short and long term, for each patient should be recorded using scales indicating the degree of recovery, and any residual deficits and disabilities. Research into developing more relevant scales should be undertaken under the aegis of SBNS and when complete will provide effective quality measures.

4.1.7 Comparative audit will provide another measurement tool. This will indicate performance of a unit or individual in managing particular conditions and is currently under development. A major subarachnoid haemorrage comparative audit, starting in 1999 will be useful in itself but will also indicate the format and process for comparative audits of many neurosurgical conditions which will then inform neurosurgeons, the re-validation process and clinical governance.

4.1.8 Financial reviews of units will continue to take place on an annual basis as part of the budget setting and review process that all NHS Trusts and their equivalents undertake. It is for neurosurgical units to manage their own budgets prudently and this should take place within teams and clinical directorates that encompass neurosurgery.

4.1.9 Whilst the processes of clinical governance and re-validation will be separate, both will depend on being informed by the operational level. The standards to be achieved and the processes for assessing performance will ultimately be set by NICE, the Commission for Health Improvement, SIGN, The Clinical Standards Board for Scotland and the GMC. It is clear that the best outcomes will result from co-operative effort from the inception of these processes. Acceptance that the fundamental local method of clinical governance will be based on self regulation emphasises the role neurosurgeons must play in informing the regional and national bodies that have responsibilities for planning and scrutiny.

4.1.10 The Chief Executive locally will be responsible for overall clinical standards and performance. It follows that either he will determine unilaterally how he will discharge that responsibility or, more constructively, using self regulation and other neurosurgical unit based processes, rely on unit reviews and reports to provide him with sufficient data do so.

4.1.11 Poorly performing consultants are rare. The specialty tends to develop a surgeon who is highly critical of his own performance and that of the team in which he works. This self criticism has been instrumental in maintaining professional standards and has served the specialty well. Nevertheless, where there is evidence of under performance, sub standard care or incompetence by a unit or an individual consultant, or concern that such might be the case, timely action must take place, otherwise the trust placed in self regulation will be destroyed. It will not be acceptable to wait for the process of clinical governance, re-validation or even local annual reviews to take place to resolve extant concerns. These processes have their place but delayed investigation and remedial action will justifiably bring a neurosurgical unit into disrepute.

Where the regular local, team reviews and audits indicate a problem that cannot, or should not, be resolved internally there are mechanisms prescribed by NHS Trusts, the surgical Royal Colleges and the GMC that should be used. SBNS endorses the mechanisms and their proposed constitutions being set up by the Royal Colleges and the GMC and is committed to providing appropriate members in the event that a rapid response team needs to be set up or specialist knowledge or advice are required. SBNS will also urge its members to participate actively in any remedial action or re-education that may be needed.

4.1.12 Key elements in developing and maintaining expertise throughout the working life of a consultant are continuing medical education and continuing professional development (CME/CPD). Such education and development should be needs focussed in that they should be undertaken to develop the skills that are necessary for the unit as well as the individual consultant. CME/CPD will be among the factors taken into account in re-validating a consultant and thus maintaining his name on the specialist register. Whilst it is for the consultant to ensure his life long learning is appropriate he should seek support in identifying his educational and development needs and in getting them satisfied.

4.1.13 These needs can be identified in a number of ways including, on a regular annual basis, appraisal. There is both pressure to implement appraisal for consultants and an apprehension amongst some as to how it might be used and by whom. It can only work in a worthwhile way if it is seen as a tool to identify training, educational and development needs of a consultant against the backcloth of the work he is required to do now and in the longer term. It is never appropriate to use appraisal as a disciplinary or quasi-disciplinary tool. Appraisal used in this way would fail as disciplinary issues must be dealt with immediately and not wait for the appraisal process and also the credibility of appraisal as a developmental tool would be corrupted. For similar reasons the contents of an appraisal should not be used as part of clinical governance or re-validation. Although appraisal is a managerial tool its benefits, if used to identify development needs, will accrue to the consultant and the unit. To ensure that an appraisal system is appropriate to clinical need, and consistent nationally, the surgical Royal Colleges should be asked to design such a system.

4.1.14 The specific educational and training events and processes that will be necessary will be the responsibility of the consultant, his team, directorate and employer to organise and resource. The main resources are time, in which to participate in training, and finance.

In a specialty developing as rapidly as neurosurgery a minimum of two dedicated weeks a year plus the equivalent of at least one session a month will be needed for CME/CPD. This time element should be built into individual work plans and, given that CME/CPD will be mandatory, sufficient budgetary provision, including flexibility within and between budgets, must be made to reflect this.

4.1.15 Junior staff training standards and processes are well defined within the Calman regime. This regime has contributed to the trend for neurosurgery increasingly to become a consultant delivered service with a significantly reduced service commitment from trainees. This, by definition, is resulting in an increase in the commitment of consultants especially in the clinical component of their work plan. Over time the manpower consequences of this will be considerable; adding at least 20-25% to consultant level working time in the next decade.

Chapter 5 - Organisational Issues.

5.1.1 Organisational development in health services has been at least as rapid as clinical change in the last decade. The next five years will see further refinements in managerial and professional accountability and consequently in the organisational structures developed to support these:

- the clinical directorate and clinical team models will mature further as a line structure. As such they will be the key groupings for operational planning, management, training, standard setting and performance scrutiny
- Chief Executives will design systems for planning and control in order to discharge their accountability for clinical performance
- government policies, particularly in respect of clinical governance and re-validation, are aimed at improving quality and clearly identifying accountability for performance
- after a period when little effective strategic service planning took place for specialist regional and supra-regional services the NHS Executive is starting to re-institute planning on this basis
- the longer term effects of changes in the training and development of consultants and trainees will become manifest
- sub-specialisation and interaction with other specialties will continue to develop and this will need improved communications and networking aimed at ensuring a seamless service to the patient.

5.1.2 Despite early tensions the clinical directorate model is serving the NHS well, largely because it defines responsibilities and places much of the authority for running clinical services at the day to day operational level. These tenets are consistent with self regulation. It is in the interests of clinical services and individual clinicians to develop their roles in that system. All professional bodies and the GMC in particular view fully developed clinical teams as the key operational tool, working under the aegis of the clinical directorate and ultimately the employer - usually in the person of the Medical Director or Chief Executive.

Each neurosurgical unit will develop clinical teams in their own way but certain criteria must be met:

- teams must be well led with clear lines of responsibility
- activities must be directed towards patient need and attention paid to their needs and wishes
- teams should be multi-disciplinary

- they must be supportive of all members who must be willing to learn
- they will have understood purpose, values and standards
- teams must be able to demonstrate their performance and consistency
- teams must be acceptable to, and trusted by, patients, staff, colleagues and the employer.

The managerial and clinical lines of accountability have moved much closer to each other in the last decade and with Chief Executives being given responsibility for clinical performance they are now almost as one. This not only helps create a unity of purpose but means that organisationally a clinical service will be more integrated into the wider mechanisms for planning, information, standard setting and performance monitoring.

5.1.3 Planning the developments that are needed to achieve accepted standards has been a haphazard exercise for specialist services. With the NHS Executive regional offices taking a lead on this rather more co-ordination will come about. However, there is an increasing number of specialist services (47 at present and rising) and not all of these can be planned strategically at once. At present neurosurgery is not seen as a planning priority at national level and there are no plans to make it so although being an emergency service a higher priority is warranted and in the mind of the public, fully justified. Priorities are determined to a large extent on whether the capacity of a specialist service is sufficient to meet demand. Neurosurgery has consistently demonstrated that demand exceeds supply but equally consistently has managed to maintain a service that is perceived by patients and other observers as high quality. **SBNS believes that in a high risk specialty working to meet a demand that is constantly beyond the resources available to meet it is in the medium and long term intrinsically dangerous. SBNS believes it is irresponsible and unconstructive to "shroud wave" so it will itself work, and encourage its members to do likewise, within local, regional and national organisations to ensure recognition that safe standards can only be achieved for increasing demand to a limited extent through efficiency reviews. Because of the low start point and also the scale of change and growth in demand adequate new investment is needed. This is especially important in respect of the increases necessary in manpower as the lead time from planning to effective implementation can be 10 - 15 years.**

5.1.4 Clinical governance will be the overall mechanism by which performance against standards is scrutinised. At the centre, the Commission for Health Improvement for England and Wales and The Clinical Standards Board in Scotland will co-ordinate activity

but already all Health Authorities, Boards and NHS Trusts have established clear accountability and working arrangements for clinical governance. Within a district general hospital it is clear that clinical governance can only be effective if it is an inclusive process, i.e. it involves all the key groups, especially those which are going to have judgements made on their performance. Neurosurgical units, therefore, will need to review their internal team and directorate arrangements to ensure that all their processes and systems, e.g. to do with lines of responsibility and information, can assist in the clinical governance function. These changes must be designed to be consistent with operational needs and hospital-wide systems.

To make progress in these areas neurosurgical units should:

- nominate a lead consultant to review clinical governance issues
- conduct a review of strengths, weaknesses and problems in relation to current performance and quality
- assess the information needed to conform to clinical governance and aim to make this consistent with operational needs
- determine whether there are deficits in key mechanisms, e.g. risk management, clinical audit
- establish links with the Commission for Health Improvement and the National Institute for Clinical Excellence, SIGN and The Clinical Standards Board for Scotland.

5.1.5 Governments are taking a central role in determining quality standards using clinical guidelines. Whilst expert opinion suggests such guidelines will not generally carry weight in legal terms (unlike a body of expert opinion) they will carry considerable management, planning and political authority.

The National Institute for Clinical Excellence (NICE) has been established to be responsible for the development and endorsement of these guidelines on a programmed basis. In Scotland the Scottish Intercollegiate Guidelines Network was established in 1993 by the Royal Colleges to support the development of evidence based guidelines.

A number of specialist associations, not least SBNS, are devising qualitative and quantitative standards, the clinical elements of which could form the basis of standards endorsed by NICE and SIGN. These would then be the standard against which the Commission for Health Improvement (England and Wales) and The Clinical Standards Board (Scotland) would form their judgements. It is already recognised that the most effective place for such

standards to be authored is the clinical, operational level, i.e. the neurosurgical unit. It follows that units and SBNS should:

- formulate standards of clinical practice, research and development and indicate the resources needed to meet these
- review these on a regular basis
- develop links locally with employers and nationally, through the surgical Royal Colleges, with NICE and SIGN so that clinical and operational contributions can be made to the national framework.

5.1.6 Whilst clinical governance will be the process for scrutinising performance of units the competence of individual surgeons will be monitored through the GMC's re-validation process. It is likely that there will be the potential for three stages:

- gathering, submission and assessment of evidence and recommendation for re-validation
- visit to assess the consultant. This assessment visit will take place for a defined proportion of all those eligible for re-validation and for all those in whom the evidence submitted gives cause for concern
- detailed assessment; where the initial assessment does not demonstrate that the consultant clearly meets the requirements for re-validation a more structured intensive visit will be made to assess what action is needed for re- validation to take place.

The first of these levels in particular will need to obtain data from the neurosurgical unit's information system which, if sufficiently developed, will reduce the effort needed to the point where little organisational change is necessary.

Only when a more structured visit determines that significant re-training or other developmental work needs to be pursued should any organisational change be considered. Even in this event, however, if clinical teams are working well, re-training and development should take place in that environment.

5.1.7 The closer supervision of trainees as well as the need for increased numbers of trainees and consultant surgeons both have an impact on the organisation especially in respect of communications within and between teams and the wider unit. The structure to support trainees should be reviewed every two years to make sure it is sufficient for the trainees and that consultant workload and patient services are not prejudiced.

5.1.8 Continuing medical education and continuing professional development (CME/CPD) pose two organisational challenges. Firstly there is the issue of finance. The minimum standard has already been defined (in 4.1.14, above) and in a local employment setting within a neurosciences directorate it should not be a problem to earmark an appropriate amount per consultant per year nor to create sufficient budgetary flexibility beyond this figure. The second challenge is to create enough capacity or time for the consultant to maintain his development on a continuing and planned basis. his is a more difficult challenge to meet unless there is a clear policy that this commitment is built into the consultant's work plan and that his training is co-ordinated constructively with that of all his colleagues through the team and directorate.

5.1.9 The basic structure sufficient to meet the challenges up to 2005 is in place in most neurosurgical units. Continuing review conducted within the unit and directorate is essential to ensure the structure serves the aims of the unit and the demands placed on it by other bodies; this will prevent clinical and managerial improvements being compromised by a rigid structure.

Chapter 6 - Resourcing Neurosurgery.

The previous chapters have outlined the present position of neurosurgery and the issues that it now faces in maintaining and improving standards as well as meeting the quantitative demands that will be placed upon it up to 2005 and beyond.

To meet these challenges neurosurgical units, like any other organisation, must adapt and draw up clear plans that, when implemented, will achieve the objectives of coping with increased workload and improving quality and safety. **To a limited extent some improvements can be made by re-organising structures and re-configuring resources. Equally, however, there is a point at which development needs investment. The standards outlined, both implicitly and explicitly, in "Safe Neurosurgery 2000" can only be effectively met through investment.**

6.1 Organisational Changes.

6.1.1 Internally inspired organisational change should not normally need a net increase in resource, in fact, neurosurgical units should strive locally to reduce overheads to re-deploy resources to direct patient care functions.

6.1.2 Externally initiated change, however, can frequently mean the only way of maintaining workload and standards is through increased investment. The implementation of the Calman training regime was an example of this as was the inception of the clinical directorate system. Increased activity necessitated by clinical governance, the need to spend time clearly defining standards and monitoring them and, to a lesser extent, managing the re-validation process will all have a consequence for staff numbers.

6.1.3 With the NHS Executive regional offices about to place significant emphasis on strategic speciality planning neurosurgical units and teams within them must assist in this process to ensure that plans are realistic and patient orientated. Whilst it is clear that units and patients should benefit in the longer term it is self evident that for such planning to be effective operational staff will need to invest time and energy in the strategic planning process.

6.1.4 If amalgamations of units take place they will bring about some economies of scale but the basis of any amalgamation should be to improve quality and maintain equity of access.

6.1.5 All these organisational activities are accepted by SBNS as crucial for the benefit of the service but most have resource implications. These are mainly in respect of staff and are incorporated in section 6.3.

6.2 **Capital.**

6.2.1 Safe neurosurgery is not possible without adequate buildings, plant and equipment. **Many neurosurgical units are housed in modern buildings with an adequate capital infra-structure but there remain a number where this is not the case and this creates inefficiencies and potential reductions in health and safety for staff and patients.** Re-building normally has to take place in the context of re-development of the hospital in which the unit is placed or as a result of strategic planning of units and associated specialties. Plant and equipment however need to be amortised over the appropriate period to ensure that investment is available when scheduled. Relevant depreciation policies tend to be the exception rather than the rule so it is important that SBNS encourages it's members to urge the creation of such policies in unit where they do not exist.

Agreed policies on depreciation and replacement of expensive equipment, especially that providing a single unit national service, e.g. stereotactic radio-surgery, are crucial. Otherwise, unilateral, arbitrary and relatively local decisions may be made on key, nationally used services to the detriment of clinical standards and maintenance of highly concentrated expertise.

6.2.2 One of the most worrying features facing the maintenance and development of neurosurgery at least in the UK is the rapidly diminishing availability of capital. Whilst governments claim to have recognised this the proposed solution in the shape of Private Finance Initiatives (PFIs) would in the medium and long term reduce the safety and efficacy of neurosurgery very significantly. Experience shows that where PFI projects have been planned in detail the proportion of an NHS Trust's income spent on capital charges doubles, leading to substantial reductions in revenue available to maintain clinical services. Additionally, facilities, e.g. beds, planned for in PFI projects are up to 30% less than levels existing in 1995/6. This at a stage when increases are needed to cope with real demand.

In short, fewer beds, operating theatres and staff will be available to deal with increasing demand when existing resources are already demonstrably insufficient. If neurosurgery is subjected to PFI or similar capital resourcing it will be unable, over the next 5-10 years, to meet even the emergency demands placed upon it with devastating clinical, medico-legal and public relations consequences.

6.2.3 The way in which neurosurgery is delivered, together with the changes and increases that are in train, means that the target set in 1993 of 30 beds per million population has to be viewed as the minimum safe standard in 2000. Many units run at close to 100% bed occupancy, which causes particular problems in respect of emergency admissions and can bring about discharges that are premature and potentially unsafe. 85% bed occupancy is a broadly recognised level if significant risks are to be avoided.

In 1999 only five out of 37 units meet this standard and some struggle to work at levels of less than 15 beds:1million. It is impractical to expect such units to be able to offer equity of access and have sufficient case load and case mix to maintain safe levels of practice, especially as even core neurosurgery becomes more specialised and complex.

6.2.4 **Because of the increasing complexity of much neurosurgical work 4 dedicated neurosurgical intensive therapy unit (NITU) beds per million population are now regarded as the safe minimum standard and should be met by 2005 in all NITUs. This standard does not include beds sometimes referred to as "high care";** such beds, which make a significant contribution at ward level, do not have the staffing, facilities or support structure to care for patients who need intensive care of the injured brain in addition to cardio-respiratory support. Only with this level of NITU beds can many immediately post operative or emergency patients be sufficiently and safely stabilised or recovered for transfer to ward beds.

6.2.5 **The safe standard for the number of operating theatres remains as it did in 1993. The same logics apply in 1999 although increased workload means more intensive theatre use.** The standard of:

2 operating theatres for a unit serving up to 2 million
3 operating theatres for a unit serving more than 2 million

should remain the minimum until 2005 when it will need to be reviewed.

6.2.6 Other capital facilities that must be available within, or immediately adjacent to, a neurosurgical unit are:

neuro-radiology	interventional radiology
neuro-anaesthetics	neuro-physiology
neuro-rehabilitation	neuro-oncology
neuro-pathology	neurology

and close to, i.e. on the same site as:

accident and emergency	facio-maxillary
orthopaedics	plastic surgery
neuro-otology	neuro-psychology
neuro-ophthalmology	endocrinology

Few of these support services are resourced to the levels recommended by those working within them and without adequate support the safe practice of neurosurgery is compromised.

The detailed configuration of, and links between, these services is for local joint planning to determine but no neurosurgical unit should operate without their availability as and to the standard recommended by the relevant specialist association.

6.3 **Staff.**

Fundamentally, the quality and safety of neurosurgery depend on the staff delivering the service. Without sufficient well trained staff the standards of service, qualitatively and numerically will not be met. The neurosurgical team is multi-disciplinary and any manpower planning will need to reflect this.

6.3.1 Medical staffing has two main components - consultant level and trainee/junior level; each of which has elements of worked time and on-call. The minimum on-call team for a unit serving a population of 1.5 million is one consultant, one intermediate surgeon/trainee and one resident house officer or inexperienced senior house officer.

"Safe Neurosurgery 1993" underestimated the impact of the Calman training regime and the pressure to reduce working hours on consultant workload. At present few consultants work less than 55 hours per week and most average 60. The Calman regime has increased the clinical and supervisory pressures on consultants, adding to the intensity as well as the amount of work they have to deal with. **It is essential to recognise the safety consequences of these changing working patterns and to reconcile them with the employment policies in respect of working time that are in the pipeline.** In terms of clinical workload, the current average of operations performed per consultant per year is 279, with a range of 171-454. **Overwhelming professional opinion indicates that the ideal number of cases a consultant should have is 180-250 per year;** the actual number depending on case mix and sub-specialty. This allows for expertise to be maintained and for sufficient capacity to supervise trainees and junior staff, conduct

research and participate in the administration, management and training, in which he is expected to be involved. The annually reviewed work plan is where these functions must be defined and local needs taken into account. In these work plans 4-5 sessions should be fixed but sufficient capacity must be earmarked for all functions, namely:

- outpatient sessions
- inpatient/ward work
- operating
- research and development
- teaching/training/supervision
- CPD/CME
- management/administration

otherwise any one of the core components may be compromised. Some clinical work no longer performed by junior staff has been absorbed by additional consultant posts. A significant proportion of the increase required is based on the demands to sub-specialise, e.g. in paediatric neurosurgery and spinal neurosurgery, which bring with them the requirement to have a minimum of two consultants practising that sub-specialty in a unit. Long term, i.e. 2005, no consultant should work more than an average of 48 hours per week. SBNS recognise that it will be difficult to achieve this target, and to create sufficient capacity for all other demands, but progress towards it, and improving performance can only be made by reaching the following consultant staffing levels for neurosurgical units by 2005:

- population served up to 1.5million - 6 WTE neurosurgeons
- population served up to 2.0million - 7 WTE neurosurgeons
- population served up to 2.5million - 8 WTE neurosurgeons
- population served up to 3.0million - 9 WTE neurosurgeons

The calculations for each neurosurgical unit are at Appendices 1 & 2.

6.3.2 The creation, through the Calman Report, of a unified training grade has led to training programmes to ensure that trainees experience the width and depth of training required. From the 37 neurosurgical units 19 training programmes have been established. Most offer rotations involving two to four units; five stand alone. The new training regime offers stability for the trainees and a more structured approach to their training.

It is important that trainers identify problem trainees and give them support and if necessary place them in targeted training, intensified supervision or repeat experience. Failure at this point will mean termination of their contract. If trainers fail to act in a timely way trainees not suited to neurosurgery could gain the Certificate of Completion of Surgical Training and progress to being a consultant neurosurgeon.

An additional feature imposing pressure on trainee staffing is that in 1999 no junior doctor should be contracted for more than 72 hours per week and should not work more than 56 hours with protected study time. In the last six years there has been an increase of 17% in specialist registrar numbers - in 1999 there were 96 established training posts - which has covered only some of the changes required by Calman.

At present units are reaching saturation level for providing trainees with sufficient supervision and experience. Therefore, further expansion in trainee numbers would mean either extending their training period or reducing standards. The trainee and junior medical staffing levels need to be calculated in synchrony with overall manpower requirements to ensure a realistic and practical long term balance is maintained.

However, to meet the national standards of a 72 hour contract and the requirements of the EU Working time Directive at least an additional 15% trainee posts must be created by 2012.

6.3.3 The standard in respect of medical cover is that a unit serving a population of up to 1.5million should have two junior doctors (House Officer or Senior House Officer) available from 9.00am to 5.00pm Monday to Friday and one available at all other times. To provide this level of cover and satisfy current employment rules five intermediate grade doctors committed to neurosurgical training are required. Four resident staff at House Officer or inexperienced SHO level are required where there is cross specialty cover, or five where there is not. Each neurosurgical unit should manpower plan on this basis.

6.3.4 As the service becomes more consultant delivered, and to protect the already reduced amount of clinical work trainees are exposed to, SBNS recommends further increases in staff grade or non career grade posts are strictly limited to units where there is no alternative other than reduced standards or safety.

6.3.5 A further imbalance between trainee and consultant numbers might also be created unless changes in both levels are planned in synchrony, taking all factors that affect each level and the relationship between them into account.

6.3.6 **In some instances units serving small populations, e.g. less than 1.25million, will need to have their viability examined and amalgamations considered.** Such examinations will need considerable time to undertake and take account of a number of potentially conflicting policies:

- policies concerning equity of access
- the need for there to be sufficient surgeons to enable polices on cover and working time to be implemented
- sufficient case-load and case-mix to maintain competence
- sufficient support services and specialties at hand
- enough throughput to maintain economies of scale.

6.3.7 Whilst SBNS is primarily concerned with supporting neurosurgeons providing a safe neurosurgical service it is self evident that this cannot be done without support from various skilled staff groups. The need for specified numbers of staff with defined skills must also be planned for.

Whilst it is the responsibility of employers and each of the professions allied to medicine to determine staffing levels and training needed within those professions, **SBNS is concerned that professional and technical staffing in general, and trained nursing levels in particular, are well below safe levels.** Within nursing this looks like remaining the case unless the deleterious effects of Project 2000 in respect of high wastage rates and low levels of practical experience at completion of Project 2000 training are addressed. It is recognised that the responsibility for doing this rests primarily with employers and professional groups such as The British Association of Neuro-science Nurses but SBNS recommends co-ordinated manpower planning at both unit level and beyond.

Collaborative planning should start in the clinical directorate and progress to the employer level. However, at both stages, a surgical contribution will be essential and in many cases such developments will be initiated by the surgical arm of the directorate. Manpower planning of this sort must not only plan for numbers and skill mix (and changes in skill mix between different professional groups) but also for training and development and the sort of working environment in which staff will be working. Because of the lead time involved, particularly in securing investment and in training time any such manpower plan should cover a period of no less than ten years in detail and fifteen in outline.

6.4 Personnel and employment policies.

6.4.1 Other than for changes in organisation and working time the need to plan developments in personnel and employment practice is crucial to improving quality of service in the medium and long term. Any changes in staff numbers or skill-mix must be co-ordinated with any changes in facilities, whether capital, revenue, or organisational and vice-versa.

6.4.2 Local employers do not have total freedom to determine all their personnel policies. Recruitment policies and practice, for example, are significantly influenced by national standards to the point where recruiting to particular posts may not be permitted unless an employer or unit reaches certain standards. This type of policy already exists in respect of validating neurosurgical units for higher surgical training, and its extension to other posts is a logical sequel aimed at safeguarding standards.

As long as such policies are implemented prudently and with a little flexibility the SBNS believes they will help the process of improving safety and quality.

6.4.3 The NHS Executive makes it clear that an effective local human resource strategy is needed to help deliver improvements to the service, which in turn will be scrutinised through clinical governance. Each local employer will, for example, aim to have training and development plans germane to clinical governance in place by April 2000. Operational staff must contribute to these plans to ensure they support local operational activity as well as the clinical governance process.

6.4.4 Such plans, however, form only part of the picture.
Two levels, at least, of manpower planning are necessary. The first is the plan at local level, i.e. neurosurgical unit, clinical directorate or employer. This level of plan will indicate the overall staffing needs for the next 10-15 years for the unit and will be based on current and changing demands, policies, standards and practice and incorporate those factors outlined in 6.3.1-7(above) as well as other policy and organisational changes needed to implement the plans.

The second is the macro level. This level of manpower planning should be conducted nationally, or at least regionally in broadly the same form, but with a greater emphasis on costing and design of mechanisms to deliver the necessary training. The national or regional level of manpower planning is essential to ensure national co-ordination of developments in a service as specialised as neurosurgery. An outline format for a manpower plan is shown at Appendix 3.

Chapter 7 - Conclusions.

7.1 Health services in general and neurosurgery in particular are undergoing unprecedented scrutiny and pressure to improve standards of quality, accountability and openness whilst keeping pace with rapidly increasing and changing workload. External policy changes as much as growing workload have created the need for organisational development and increased investment and the degree of these indicates neurosurgery should be regarded as a national strategic planning priority.

Cost efficiency needs to be pursued to free up some resource for re-deployment where this is feasible, but equally new investment is essential if the developments in workload, safety, quality and reductions in litigation are to be achieved

7.2 To reach standards of quality and safety expected by government and public the profession itself must be the main contributor to devising quality standards, scrutinising processes, resource proposals and organisational change. It must also approach these tasks in a collaborative or team way with other professional groups, the GMC, surgical Royal Colleges, NICE, the Commission for Health Improvement, SIGN, the Clinical Standards Board in Scotland, employers and the NHS Executive.

7.3 The neurosurgical service is increasingly consultant delivered - not merely consultant led - which adds significantly to their work rate and substantially changes clinical and training regimes.

7.4 Whilst certain principles remain constant, e.g. that of self-regulation, policies and standards change. "Safe Neurosurgery 1993" set a benchmark which has greatly assisted progress. "Safe Neurosurgery 2000" tries to reflect this progress and indicate where future attention should be focussed.

7.5 Detailed recommendations and required actions appear in the Summary of Recommendations.

APPENDIX 1

Recommended consultant staffing levels by neurosurgical unit.

Unit	**Population served** (millions)†	**Target for 2005** (WTE)	**Current staff** (WTE)	**Shortfall** (WTE)
Cambridge	2.4	8.0	4.3	3.7
Liverpool	3.0+	9.5	9.5	0
Newcastle	2.4	8.0	5.5	2.5
Middlesbro’	1.0	6.0	5.0	1.0
Preston	1.8	7.0	3.5	3.5
M/c & Salford	3.0+	9.0	8.0	1.0
Oxford	3.0+	9.0	5.0	4.0
Bristol	2.2	8.0	5.5	2.5
Plymouth	1.5	6.0	3.0	3.0
Sheffield (inc radiosurgery)	2.2	8.0	5.0	3.0
Nottingham	3.0+	9.0	7.0	2.0
B’ham - QEH	3.5①	9.0	6.5	2.5
B’ham Childrens	5.5*②	3.0	2.0	1.0
Stoke	1.3①②	6.0	4.0	2.0
Coventry	1.3①②	6.0	3.0	3.0
Southampton	2.8	9.0	6.3	2.7
Hull	1.3	6.0	4.0	2.0
Leeds	2.5	8.0	6.0	2.0
Belfast	1.6	7.0	4.0	3.0
Cardiff	1.5	6.0	3.8	2.2
Swansea	1.2	6.0	3.0	3.0
Glasgow	2.7	8.0	6.5	1.5
Edinburgh	1.3	6.0	4.5	1.5

Aberdeen	0.8	6.0	3.0	3.0
Dundee	0.6	6.0	3.0	3.0
Dublin	2.5	8.0	6.0	2.0
Cork	1.0	6.0	2.0	4.0
Charing X	1.7	7.0	4.3	2.7
Royal Free	1.9	7.0	3.0	4.0
Royal London	1.7	7.0	4.0	3.0
Oldchurch	2.0	7.0	4.0	3.0
King's	3.0	9.0	6.5	2.5
Hayw'ds H'th	1.25	6.0	4.0	2.0
AMH	3.0	9.0	4.5	4.5
Queen Sq.	2.3	8.0	4.0	4.0
GOS	2.4*	5.0	2.9	2.1
Totals	68.25†	258.5	166.1	92.4

† Population figures are based on claimed catchment areas and cross boundary flows and do not include the 1.58% growth to 64million.

* Tertiary referrals - not included in total. In general paediatric resource levels are subsumed in overall neurosurgical unit figures. The exceptions are Great Ormond Street and Birmingham Children's Hospitals which have stand alone paediatric neurosurgical departments so are calculated separately.

① Adult population of Birmingham is 2.8million. Those of Stoke and Coventry are 1.03 million each.

② Birmingham Children's Hospital serves a total population (adult and children) of 5.5million drawn from Birmingham, Coventry and some from Stoke. Child population is approximately 1.12million.

APPENDIX 2

Recommended bed and NITU bed numbers by 2005 - by Unit.

Unit	Beds-target	Beds - 1999	Short-fall	NITU beds - target	NITU beds - 1999	Short-fall
Cambridge	72	52	20	10	8	2
Liverpool	90	71	19	13	7	6
Newcastle	72	78	0†	10	0	10
Middlesbro'	30	35	0†	4	0	4
Preston	54	32	22	8	0	8
M/c & Salford	90	69	21	12	4	8
Oxford	90	36	54	12	5	7
Bristol	66	52	14	9	0	9
Plymouth	45	19	26	6	7	0
Sheffield (inc radiosurgery)	66	51	15	9	0	9
Nottingham	90	36	54	12	0	12
B'ham - QEH	85	60	25	12	6	6
B'ham Childrens	20	15	5	4	0	4
Stoke	32	30	2	5	0	5
Coventry	32	24	8	5	2	3
Southampton	84	53	31	12	6	6
Hull	32	33	0†	5	4	1
Leeds	75	54	21	10	6	4
Belfast	48	40	8	6	0	6
Cardiff	45	33	12	6	0	6
Swansea	36	35	1	5	8	0
Glasgow	81	69	12	11	8	3
Edinburgh	39	48	0†	5	0	5

Aberdeen	24	29	0†	3	1	2
Dundee	24	20	4	3	4	0
Dublin	75	69	6	10	9	1
Cork	30	18	12	4	0	4
Charing X	51	29	22	7	0	7
Royal Free	57	28	29	8	0	8
Royal London	57	47	10	8	0	8
Oldchurch	60	37	23	8	3	5
King's	90	53	37	12	3	9
Hayw'ds H'th	38	25	13	5	3	2
AMH	90	36	54	12	8	4
Queen Sq.	72	39	33	10	9	1
Great Ormond St.	30	12	18	0*	0	0
Totals	2072	1467	631	281	111	175

* There are no dedicated NITU beds. There is access to 20 paediatric ITU beds.

† Units at or above their target should remain at their present levels until 2005 when they should be reviewed.

APPENDIX 3

Recommended manpower planning format.

The manpower planning format SBNS commends to neuro-surgical units, directorates, employers and beyond contains data and text. A comprehensive manpower plan needs to ensure objective data, issues and rational predictions are taken into account. Medium to long term manpower planning must be service based, rather than specific profession based, and as such will encompass all staff groups. Profession specific plans can then be extracted for programming and implementation. Shorter term, it may be necessary to plan on a more pragmatic basis in order to rectify significant shortcomings.

There are four key sections to a manpower plan:

1. Baseline.

This will include sections on:

(i) current staffing levels, skill mix (a profile of training and experience, skills and grade mix), turnover and stability rates, sickness and other absence rates, age profile and retirement rates,
(ii) the physical resources available, e.g. buildings, beds, theatres, equipment,
(iii) the output/workload derived from these resources, together with a commentary on existing and potential efficiency,
(iv) a commentary on current policies, e.g. recruitment, training and development, staff facilities, remuneration,
(v) costs.

2. Issues.

An analysis of:

(i) growth of workload or output over the planning period,
(ii) demographic changes, labour market, recruitment and retention problems,
(iii) policy changes and their effects, e.g. working hours, changes in training regimes, changes in standards, changes in public policy,
(iv) technological and procedural change.

3. The future plan.
An analysis of necessary developments:

(i) numeric changes by staff group, skill mix, grade mix,
(ii) barriers to achieving changing levels,
(ii) policy changes that are needed to overcome barriers:

- organisational/structural change
- recruitment/retention polices
- skill mix/substitution polices
- automation/technological change
- pay and benefits polices
- staff faculties
- working environment
- polices to control/limit workload

All the necessary changes to be analysed over a ten year period in some detail year on year, and in broad outline over a further five years.

4. Analysis of costs.

This to reflect costs and benefits in line with the above classifications.

References and Bibliography.

The Royal College Surgeons of England, The Royal College of Physicians of London and The British Medical Association. *Provision of Acute Hospital Services.* London; RCS, June 1998

The Society of British Neurological Surgeons. *Safe Neurosurgery, The Maintenance and Development of High Standards.* London; SBNS, 1993

AT Moore, JK Eastment, in Conjunction with the Department of Neurosurgery, Addenbrooke'S NHS Trust and Professor JD Pickard. *A Description of Neurosurgical Services in Anglia.* Cambridge; ACET, March 1999

Senate of Surgery. *Consultant Surgical Practice and Training in the UK.* London; RCS, June *1997*

Department of Health. *The New NHS; Modern, Dependable.* London; HMSO Cmnd 3807, December 1997

Department of Health. *A First Class Service - Quality in the New NHS.* London; HHSO, June 1998

Department of Health. *Working Time Regulations, Implementation in the NHS.* London; HSC 1998/204, 1998

Department of Health. Hospital Doctors Training for the Future. The Report of the Working Group on Specialist Medical Training - The Calman Report. London, MISC (93)31 April 1993

Edward L Hannan, PhD. *The Relation between Volume and Outcome in Health Care.* Massachusetts; The New England Journal of Medicine, May 1999

Brian Hurwitz. *Legal and Political Considerations of Clinical Practice Guidelines.* London; British Medical Journal, March 1999

The Royal College of Surgeons of England. *Report of the Working Party on the Management of Patients with Head Injuries.* London; RCS, June 1999

The Royal College of Anaesthetists and The Association of AnaesthetiStS of Great
Britain and Ireland. *Good Practice - A Guide for Departments of Anaesthesia.* London, 1998

The General Medical Council. *Maintaining Good Medical Practice* and *Good Medical Practice.* London; GMC, July1998

Office for National Statistics. *Population Trends* and *Population Projections - 1996-2036.* London; ONS, Spring 1999

Academy of Royal Colleges. *Proposals for Re-validation. Consultation Document.* London; February 1999

BD White and N Buxton. *Safe Neurosurgery. How are we doing three years on?* London; British Journal of Neurosurgery, 1998

The Society of British Neurological Surgeons. *Safe Paediatric Neurosurgery.* SBNS, 1998.

NHS Executive. *Clinical Governance: Quality in the New NHS.* Leeds; NHSE, 1998.

Declan Gaffney et al, *NHS capital and the private finance initiative:* a series of four articles. London; British Medical Journal, 3rd . – 24th July 1999.

Pickard JD, *Threats to academic neurosurgery in the United Kingdom: a personal view.* London; Journal Neurol Neurosurg Psychiat 56:1143-1148, 1993.

Richards R, *Clinical academic careers: report of an independent task force.* London; Committee of Vice-Chancellors and Principals, 1997.

Joint Medical Advisory Committee, HEFCE, *Report on good practice in NHS/Academic links.* Bristol; Higher Education Funding Council, 1999.

The Committee of Vice-Chancellors and Principals, *Report of Independent Task Force - Clinical Academic Careers.* London; CVCP, June 1997.

Ed. Garfield J and Earl C, *Medical Negligence - The Cranium, Spine and Nervous System.* Oxford; Blackwells Science, 1999.

Adrian Bagust, Michael Place, John W. Postnett, *Dynamics of bed use in accommodating emergency admissions: stochastic simulation model.* London; British Medical Journal, 17 July 1999.

Much information was obtained from unpublished documents, correspondence and meetings with neurosurgeons, health officials and officers of professional and regulatory bodies, all of whose help was of great assistance in producing this report.