SCHEDULE 2 – THE SERVICES

A. Service Specifications

Service Specification No:	170109S
Service	Neurosurgery (Adults)
Commissioner Lead	*For local completion*
Provider Lead	*For local completion*

1. Scope

1.1 Prescribed Specialised Service

This service specification covers the provision of adult neurosurgery.

1.2 Description

Adult neurosurgery is provided within specialist neuroscience centres. This includes:

- All adult neurosurgery activity
- All adult interventional procedures within neuroradiology

1.3 How the Service is Differentiated from Services Falling within the Responsibilities of Other Commissioners

NHS England commissions all adult specialist neurosciences services provided by adult neurosciences or neurology centres, including services delivered on an outreach basis as part of a provider network. NHS England commissions:

- All neurosurgery activity (with the exception of non-specialised spinal surgery, as defined in the spinal surgery service specification and current Identification Rules)
- All interventional procedures within neuroradiology (also see service specification for interventional neuroradiology).

This service is commissioned by NHS England because:

- the number of individuals requiring the service is small;
- the cost of providing the services is high because of the specialist interventions involved;

- the number of doctors and other expert staff trained to deliver the service is small; and
- the cost of treating some patients is high, placing a potential financial risk on individual Clinical Commissioning Groups (CCGs).

2. Care Pathway and Clinical Dependencies

2.1 Care Pathway

All consultant spells attributed to consultants within Specialty Code 150 are considered specialised and form part of this service description with the exception of non-specialised spinal surgery and the exceptions listed in section 3.1.

The major areas of specialist adult neurosurgical activity are:

- Neuro-oncology surgery
- Neurovascular surgery
- Skull base surgery
- Spinal surgery
- Neuro-traumatology
- Hydrocephalus
- Central nervous system infections
- Functional neurosurgery including pain and epilepsy services

Elective Care

The basic neurosurgical elective care pathway is described below. Specific care pathways, for example in the management of complex epilepsy, may involve a series of additional pre-defined stages.

- Patients are referred by general practitioners, by triage services (for example the National Back and Radicular Pain pathway), secondary care consultants and other neuroscience centres for specialist and supra-regional services.
- A preliminary diagnosis is refined by specialist neuro-imaging, neurophysiological assessment and laboratory investigations.
- Where appropriate, a management plan is determined by the appropriate multi-disciplinary team in partnership with the patient and out-patient consultation and counselling is undertaken by the appropriate member/s of the multi-disciplinary team (MDT). For some patients a period of conservative management with clinical and radiological monitoring is indicated.
- Patients due to undergo elective surgery have a pre-admission medical and anaesthetic assessment. Additional investigations, as appropriate, are obtained.
- Surgery and post-operative care is undertaken in a dedicated neurosurgical environment with the appropriate technical support and equipment. Neuro high-dependency and intensive care beds will be available. Facilities for day-of-surgery admission and day-case surgery will be available.
- Early out-patient follow-up addresses the immediate impact and outcome of surgery.
- Subsequent out-patient care is determined by the patient's condition and progress and in line with patient preferences.

- Some patients will require long term specialist multi-disciplinary follow-up. Facilities must be available for both face-to-face and telephone/virtual clinic follow up supported by extended members of the clinical team.
- Low-volume procedures should be managed in accordance with Society of British Neurological Surgeons (SBNS) guidelines, concentrated within departments to the smallest number of surgeons possible to improve experience (often two).

Emergency Care

The majority of neurosurgical patients requiring emergency care present with cranio- spinal trauma, intracranial haemorrhage, raised intracranial pressure, hydrocephalus, compression of the cranio-spinal axis and sepsis.

They are typically admitted directly to emergency departments by the ambulance services. Following resuscitation and initial assessment, many of these patients will require immediate transfer to the neurosurgical unit for further investigation, urgent surgery and subsequent neuro-intensive care.

The prompt and safe transfer of ventilated and monitored patients by medical and nursing staff with appropriate expertise is an essential part of the emergency care pathway and must be fully resourced to avoid unnecessary mortality and morbidity.

Emergency patients are by the nature of their conditions more likely to require longer periods of intensive care and hospitalisation and more complex aftercare and rehabilitation. Timely transfer to facilities closer to home is an essential part of their re-integration into the community.

Please note that access to treatment will be guided by any applicable NHS England national clinical commissioning policies.

Acceptance Criteria

Neurosurgical units must provide a full range of emergency services to meet the immediate needs of their catchment populations in line with the published policies on the NHS England website and where necessary, networked with other centres to provide availability.

Neurosurgical units will also provide a range of elective services to meet the immediate needs of their catchment populations. This can be delivered as part of a regionally networked agreement with other centres to ensure equitable access and availability.

Units will adopt relevant, nationally agreed guidelines for the acceptance of patients. Acceptance protocols based on clinical and radiological criteria may be agreed locally.

Referrals will be accepted from primary, secondary and tertiary care, according to the national and local protocols.

The protocols will be set out in a Directory of Services that will highlight the unit's specialised services and will include details of how to refer to a specific service.

Exclusion Criteria

Children are not covered by this specification. The following services for adults are excluded from this specification:

- discharges or transfers with a diagnosis of head injury and a hospital stay under 48 hours;
- peripheral nerve surgery for carpal tunnel syndrome, ulnar nerve entrapment, radial nerve entrapment, tarsal tunnel syndrome or common peroneal nerve entrapment.

2.2 Interdependence with Other Services

The following services must be available to support the management of neurosurgical patients:

Co-located services (to be provided on the same site):

- neurology
- neuro-anaesthetics
- neuro-critical care and high dependency care
- neuropathology
- neuroradiology
- neurophysiology

Interdependent Services (required during the spell of care, but not necessarily co-located with neurosurgery):

- oncology
- pain management
- otolaryngology
- maxillofacial surgery
- endocrinology
- plastic surgery
- orthopaedic surgery
- neuropsychology
- neuropsychiatry
- general medicine and surgery
- cardiology and renal medicine
- ophthalmology
- vascular services

Related Services (possibly required during stages of the patient's care):

- neurorehabilitation
- palliative care
- spinal cord injury rehabilitation centre
- dietetics
- GP lead pain management services
- physiotherapy

Service specifications that are relevant to the Adult Neurosurgery specification are:

1. Neurointerventional services for acute ischaemic and haemorrhagic stroke https://www.england.nhs.uk/publication/service-specification-neurointerventional-services-for-acute-ischaemic-haemorrhagic-stroke/

2. Paediatric neurosurgery https://www.england.nhs.uk/wp-content/uploads/2018/09/Paediatric-neurosciences_Neurosurgery.pdf

3. Complex disability and Brain Injury & Complex Rehabilitation https://www.england.nhs.uk/wp-content/uploads/2018/08/Specialist-rehabilitation-for-patients-with-highly-complex-needs-all-ages.pdf

4. Stereotactic Radiosurgery and Stereotactic Radiotherapy (intracranial) (all ages) https://www.england.nhs.uk/wp-content/uploads/2018/08/Stereotactic-radiosurgery-radiotherapy-intracranial-all-ages.pdf

5. Spinal Cord Injury https://www.england.nhs.uk/wp-content/uploads/2018/08/Spinal-cord-injuries-all-ages.pdf

6. Complex Spinal Surgery https://www.england.nhs.uk/wp-content/uploads/2018/08/Complex-spinal-surgery-all-ages.pdf

7. Specialised services for pain management (adults) https://www.england.nhs.uk/wp-content/uploads/2018/08/Specialised-services-for-pain-management-adult.pdf

Neurointerventional Services for Acute Ischaemic & Haemorrhagic Stroke

Neurointerventional services are an essential aspect of the management of many neurosurgical patients.

Paediatric Neurosurgery

Adult neurosurgery is closely associated with paediatric neurosurgery, particularly in the transitional care of adolescents and young adults and in the shared multi-disciplinary care of children with complex pathologies requiring the expertise of clinicians throughout the range of adult and paediatric clinical neurosciences services. Adult neurosurgeons in units with no paediatric neurosurgery must remain competent in providing basic emergency paediatric neurosurgical care.

Complex Disability and Brain Injury & Complex Rehabilitation

Neurological rehabilitation is an essential aspect of the management of many neurosurgical patients, particularly following cranio-spinal trauma.

Brain and Central Nervous System Tumours and Stereotactic Radiosurgery/Radiotherapy

Neuro-oncology is a major component of adult neurosurgery involving close collaboration between neurosurgeons, oncologists and radiation physicists to deliver radiotherapy, chemotherapy and stereotactic radiosurgery/radiotherapy.

Spinal Services

Neurosurgical units make a substantial contribution to the provision of spinal services, often working closely with orthopaedic surgeons in regional centres. Changes in service provision nationally have resulted in neurosurgical units undertaking increasing amounts of secondary spinal care in addition to specialist tertiary care.

Pain Management

Specific pain management services should be available and accessible for all neurosurgery patients.

Adult Critical Care

Critical care is provided in neuro critical and high dependency care beds provided for the neurosurgery service and the service specification for adult critical care (currently in development) should be read alongside this specification.

3. Population Covered and Population Needs

3.1 Population Covered by This Specification

Children are not covered by this service specification.

The service outlined in this specification is for patients ordinarily resident in England*; or otherwise the commissioning responsibility of the NHS in England (as defined in "Who Pays? Establishing the Responsible Commissioner" and other Department of Health guidance relating to patients entitled to NHS care or exempt from charges)

* Note: for the purposes of commissioning health services, this EXCLUDES patients who, whilst resident in England, are registered with a General Practitioner (GP) practice in Wales, but INCLUDES patients resident in Wales who are registered with a GP practice in England

The service applies to all adults receiving treatment for conditions of the central and peripheral nervous systems as outlined within this specification.

3.2 Population Needs

National Context

Neurosurgery concerns the operative and non-operative management of patients with disorders of the central and peripheral nervous systems. The specialty developed initially through the treatment of patients with cranial trauma and intracranial mass lesions. Subsequent advances in microsurgical techniques, non-invasive imaging, neuro-anaesthesia, intensive care, image-guided surgery, and the

introduction of sophisticated radio-oncological and interventional treatments have substantially enhanced and widened the scope of effective neurosurgical treatments.

England is served by a network of 24 neurosurgical units covering populations of between 1.0 and 3.5 million. These neurosurgical units are an integral part of regional clinical neuroscience centres and the majority form an essential component of their local major trauma centre. Most larger centres offer a comprehensive range of adult services. Rare and complex disorders may be managed at a supra-regional level by units with specialist expertise.

Neurosurgical activity has been increasing steadily at annual growth rates of 2-5%. In-patient hospital spells are reaching 1400/million population in larger units and operative caseload is typically 1000 cases/million population.

Although paediatric neurosurgery is commissioned separately from adult neurosurgery, there exist important clinical, training and infrastructure links between the two neurosurgical services. Moreover, strong links are necessary to achieve smooth patient transition from paediatric to adult services. Almost all neurosurgical consultants are involved in the delivery of emergency services and must therefore be competent to manage a wide range of adult conditions and to provide basic emergency paediatric care.

Local Context

Clinical, professional and operational relationships have been built up over many years between the regional neurosurgical units and their referring district general hospitals and other specialist hospitals. These relationships underpin high quality, effective clinical pathways for many acute neurosurgical conditions.

Emergency and urgent activity accounts for approximately 50% of the caseload of a neurosurgical unit.

Specialist elective care is provided by neurosurgeons with special interest training, working in multi-disciplinary teams with colleagues in the clinical neurosciences, neuro-oncology, endocrinology and surgical disciplines including otolaryngology, maxillofacial, plastic and orthopaedic surgery.

Over the last 20 years, neurosurgical units have taken an increasing role in the delivery of spinal services, both traditionally as a complex and emergency tertiary service and in some regions as the major provider of elective secondary care spinal services, such that spinal surgery accounts for up to 50% of the in-patient activity of some units (the commissioning arrangements for spinal surgery are fully covered in the spinal surgery service specification).

3.3 Evidence Base and National Guidance

This specification has been developed on the basis of clinical consensus based upon current national guidelines from NICE and professional bodies including the Society of British Neurological Surgeons (SBNS) and Royal College of Physicians.

A comprehensive set of standards for neurosurgery was published in 2002 by the SBNS and the Regional Specialised Services Commissioning Group. The standards enable commissioners to assess service delivery and promote consistency between centres.

'Standards for Patients requiring Neurosurgical Care': accessed at http://www.sbns.org.uk/index.php/policies-and-publications/

The document contains 68 general standards of which 11 are considered core.

Contribution to and compliance with national audits and guidelines include:

- National Neurosurgery Audit Program
- Trauma Audit and Research Network (TARN)
- UK Shunt Registry
- British Spine Registry
- Subspecialty national audits e.g. Vestibular Schwannoma Audit
- Compliance with national access and time to treatment targets
- PHE National Surgical site infections audit

4. Outcomes and Applicable Quality Standards

4.1 Quality Statement – Aim of Service

The aims of neurosurgical services are to improve the quality of life of neurosurgical patients by:

- reducing the morbidity and mortality associated with neurosurgical conditions;
- minimising pain and disability and optimising functional recovery for patients.

To achieve this aim, neurosurgical patients should receive the highest levels of patient-centred, multi-disciplinary care in the most appropriate environment.

Service Objectives

This service specification and commissioning guidance should ensure that the following minimum standards and core objectives are met:

Resources

All necessary resources will be available to allow for the assessment, admission, investigation, treatment, on-going care and rehabilitation of neurosurgical patients to agreed national standards and within timescales appropriate to the patient's clinical need.

Access to emergency treatment for the neurosurgical unit's catchment population will be available at all times.

Neurosurgical services will be consultant-led and, when appropriate, consultant-provided by consultants with the requisite general and specialist training.

Other staff who contributing to the delivery of services including non-consultant-grade clinical staff, such as medical staff, nurses and allied health professionals (AHPs) are essential to support neurosurgical services.

Neurosurgical units must be staffed by nursing and AHPs who have undergone specific training in clinical neurosciences and neurosurgery to a recognised, approved and regulated standard. In

addition, neurosurgical wards and critical care units must be staffed with the appropriate number and skill mix to provide safe standards of care (Safe Staffing Benchmark BANN 2018).

To support an effective and efficient neurosurgical service, a robust career pathway for neurosurgical nurses must be in place. This will clearly define knowledge and expertise required at each level of the pathway (Nursing Workforce HSC 2018).

Advanced nurse practitioners who fulfil the criteria and have undertaken the requisite education and training will support the sub-specialist teams in neurosurgery (Nursing and Midwifery Council (1994), www.rcn.org.uk.credentialing).

AHPs involved in the care of neuroscience patients must have undergone specific training and education in line with their respective professional bodies.

Units must have sufficient numbers of consultant staff to run on-call rotas (covering cranial and spinal surgery either together or separately) at no more frequent than 1:6 (Standards for Patients requiring Neurosurgical Care, SBNS). There must be sufficient numbers to allow provision of sub-specialised care according to national guidelines.

Units should have a bed capacity to consistently allow admission and management of the emergency and elective workload for its regional population, avoiding out-of-region transfers of emergency cases and maintaining Referral to Treatment (RTT) and cancer waiting time targets within current NHS England standards and minimising day-of-surgery cancellations for elective surgery.

The number of theatres will depend on catchment population and workload and should be sufficient to allow immediate access for emergency care 24/7, achievement of cancer wait times and RTT within current standards.

All units require a minimum of two fully resourced dedicated neurosurgical operating theatres, including immediate access to a dedicated emergency neurosurgical theatre (National Confidential Enquiry into Patient Outcome and Death (NCEPOD). Support and theatre staff will have specific neurosurgical training.

Service Delivery

Multi-professional teams will work together across disciplines and locations to achieve the optimal decision making, treatment and clinical outcomes for patients. Sub-specialist working within neurosurgery will reduce low-volume practices and achieve optimal outcomes, efficiency and safety.

Care will be provided in accordance with agreed national guidelines.

Delivery and development of each aspect of the neurosurgical service will be co-ordinated by named personnel to ensure that standards are met.

Services will be designed and developed around the needs of individual patients.

Neuro-Oncology Services

Neuro-oncology services must be delivered in accordance with NICE Improving Outcomes Guidance and will be subject to peer review.

The neurosurgical service must be fully supported by, amongst others, neuro-oncologists, neuroradiologists, neuropathologists and clinical nurse specialists in the care of neuro-oncology patients.

Neuroradiology

All neurosurgical units must have 24 hours access to a specialist neuroradiological opinion. Services must comply with the service specification for Neurointerventional Services for Acute Ischaemic & Haemorrhagic Stroke.

Additionally, all neurosurgical units must have access to:

- Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) scan image-guidance
- Fixed frame stereotaxy
- Intra-operative MRI, or ultrasound imaging

All neurosurgical units providing a neurovascular service must have a multi-disciplinary neurovascular team including vascular neurosurgeons and interventional neuroradiologists (INR) to allow rapid investigation and management of emergency cases according to national recommendations. The service must have access to high quality, bi-planar digital subtraction angiography and back-up facilities within the trust must be available in the event of equipment failure, as detailed in the Neurointerventional Services specification.

Neurophysiology

All neurosurgical units must have access to neurophysiology services including cerebral function, cranial nerve and spinal cord monitoring, 24-hour video electroencephalography (EEG), nerve conduction, and electromyography (EMG) studies.

Neurocritical Care

Neurosurgical units must be provided with adequate level 3 neurosurgical intensive care beds and level 2 high dependency unit (HDU) to allow immediate admission of all emergency cases requiring intensive care from its own catchment population and to support complex high-risk elective surgery, avoiding cancellations. These beds must be staffed by consultant neuro-intensivists and intensive care unit (ICU) nurses with specific training and expertise in the care of critically-ill neurosurgical patients.

Communication

There will be effective communication between all those responsible for the patient's care, the patient and where appropriate their family and other carers. The principles of shared decision making will be employed.

Patients will be provided with a full range of condition-specific information in appropriate formats suited to the communication needs of the patient

An online or web-based referral system must be in place to allow for more efficient and safer management of new emergency referrals and to provide a robust, auditable record of advice and care and to allow monitoring of delays in admission.

Neurosurgical units must have immediate and direct web-based access to critical diagnostic imaging in all referring units.

A consultant neurosurgeon will be available in every unit 24 hours a day for advice. The consultant will be provided with remote virtual private networks (VPN) access to all necessary imaging.

Continuing Care and Rehabilitation

Robust mechanisms for the repatriation of patients to their local secondary and primary care setting must be agreed as part of a regional framework to achieve the efficient and responsive working of the neurosurgical unit. Early liaison with social care services should take place to ensure care packages, where needed, are in place at the time of discharge. Ideally repatriation to referring hospitals should take place within 48 hours.

Neurosurgical patients should have timely access to a full range of inpatient and outpatient specialist neurorehabilitation services.

Quality Improvement

Every neurosurgical unit will have a nominated lead for clinical governance, audit and quality improvement.

Neurosurgical units will be provided with the necessary administrative and informatics support to take part in all local and national audits and quality improvement initiatives.

The performance of units, including measures of effectiveness of care, compliance with guidelines and prevention of avoidable morbidity and mortality will be audited, benchmarked against national norms and the results used to promote service development and improvements.

Units are mandated to engage with the National Neurosurgical Audit Programme (NNAP) and any current SBNS nationally approved registries. Currently these include:

- British spine registry
- Vestibular schwannoma registry
- Stereotactic radiosurgery/radiotherapy dashboard
- Shunt registry

Education and Training

There will be a programme of continuing education for all personnel within the neurosurgical unit to achieve a full understanding of, and compliance with local protocols, patient care pathways and national guidelines, to ensure competence and to maintain a uniformly high standard of care.

There will be a parallel programme of education in relevant aspects of neurosurgical care for primary care and emergency services that will support effective referral pathways.

Training programmes will deliver the necessary level of competence to all medical, nursing and AHP staff in training grades.

The service will engage in neurosurgical research and development.

NHS Outcomes Framework Domains

Domain 1	**Preventing people from dying prematurely**	
Domain 2	**Enhancing quality of life for people with long-term conditions**	
Domain 3	**Helping people to recover from episodes of ill-health or following injury**	
Domain 4	**Ensuring people have a positive experience of care**	
Domain 5	**Treating and caring for people in safe environment and protecting them from avoidable harm**	

4.2 Indicators Include:

Number	Indicator	Data Source	Outcome Framework Domain	CQC Key question
Clinical Outcomes				
101	Percentage of all transferred subarachnoid haemorrhage patients transferred to Neurosurgical Centre within 24 hours of initial admission.	SSQD	1,2	effective
102	Percentage of Aneurysmal SAH intervention within 48 hours of admission to the Neurosurgical Centre.	SSQD	1,2	effective
103	Percentage of Shunt procedures captured in UK Shunt registry.	SSQD	1,2	effective
104	Percentage of patients undergoing elective vestibular schwannoma resection recorded in the National vestibular schwannoma audit.	SSQD	1,2	effective
105	Percentage of neurosurgical consultants validating audit data for their elective mortality rates (consultant outcome publication).	SSQD	1,2	effective

106	Percentage of elective surgery patients treated on the day of admission (excluding day cases).	SSQD	1,2	effective
107	Neurosurgical shunt implant six month surgical site infection (SSI) rate.	SSQD	1,2	effective
108	Neurosurgical cranioplasty implant six month surgical site infection (SSI) rate.	SSQD	1,2	effective
109	Spinal cord stimulation implant six month surgical site infection (SSI) rate.	SSQD	1,2	effective
110	Neurosurgical deep brain stimulation implant surgical site infection (SSI) rate.	SSQD	1,2	effective
111	Thoraco-lumbar spinal instrumentation implant six month surgical site infection (SSI) rate.	SSQD	1,2	effective
112	% patients transferred to another centre due to lack of resources - staff and beds	Provider	1,3	effective
Patient Experience				
201	Patient are provided with information	Self-declaration	4	caring
202	The service is acting on patient feedback	Self-declaration	4	caring and responsive
203	The service is collecting PROMS	Self-declaration	4	caring and responsive
Structure and Process				
001	There is a multi-disciplinary specialist team	Self-declaration.	1,2,5	effective safe
002	There is multi-disciplinary decision making prior to definitive treatment	Self-declaration.	1,2,5	effective, safe

003	There are 24/7 rotas in place	Self-declaration.	1,2,5	effective, safe
004	There is a competency based training programme	Self-declaration.	1,2,5	effective, safe
005	There is a seven-day clinical standards policy	Self declaration	1,2,5,	effective, safe
006	There are specified day case beds for day case surgery	Self declaration	1,2,5,	effective, safe
007	There are clinical guidelines in place	Self-declaration	1,2,5	effective, safe
008	There are patient pathways in place	Self-declaration	1,2,5	effective, safe
009	Data collection	Self-declaration	1,2,5	effective, safe, responsive

Detailed definitions of indicators, setting out how they will be measured, is included in schedule 6.

4.3 Commissioned providers are required to participate in annual quality assurance and collect and submit data to support the assessment of compliance with the service specification as set out in Schedule 4A-C

4.4 Applicable CQUIN goals are set out in Schedule 4D

5. Applicable Service Standards

5.1 Applicable Obligatory National Standards

A substantial body of National Institute for Health and Clinical Excellence (NICE) guidance relates to neurosurgery (www.nice.org.uk):

- TA159 spinal cord stimulation for chronic pain of neuropathic or ischaemic origin TA 23: Brain cancer (temozolomide)
- TA121: Glioma (newly diagnosed and high grade) – carmustine implants and temozolomide
- TA279 percutaneous vertebroplasty and percutaneous balloon kyphoplasty for treating osteoporotic vertebral fractures

Contribution to and compliance with national audits and guidelines including:

- NICE Guidelines
- NICE Improving Outcomes Guidance (IOG)

- NCEPOD recommendations
- NCEPOD Subarachnoid Haemorrhage Study

5.2 Other Applicable National Standards to be met by Commissioned Providers

- Medical Technologies Guidance (MTG) 10: Pipeline embolisation device for the treatment of complex intracranial aneurysms
- Clinical Guidelines 56: Head Injury
- CG75: Metastatic spinal cord compression
- CG137: Epilepsy
- IOG: Brain/Central Nervous System (CNS) Brain tumours
- Interventional Procedures Guidance 12: Percutaneous vertebroplasty
- IPG19: Deep brain stimulation for Parkinson's disease
- IPG32: Endoscopic transsphenoidal pituitary adenoma resection
- IPG65: Subthalamotomy for Parkinson's disease
- IPG68: Lumbar subcutaneous shunt
- IPG80: Selective peripheral denervation of cervical dystonia
- IPG84: Supraorbital minicraniotomy for intracranial aneurysm
  IPG85: Stereotactic radiosurgery for trigeminal neuralgia using the gamma knife
- IPG105: Coil embolisation of unruptured intracranial aneurysms
- IPG106: Coil embolisation of ruptured intracranial aneurysms
- IPG108: Auditory brainstem implants
- IPG146: Direct C1 lateral mass screw for cervical spine stabilisation
- IPG166: Balloon kyphoplasty for vertebral compression fractures
- IPG188: Deep brain stimulation for tremor and dystonia (excluding Parkinson's disease)
- IPG223: Therapeutic percutaneous image-guide aspiration of spinal cysts
- IPG263: Lumbar infusion test for the investigation of normal pressure hydrocephalus
- IPG278: Functional electrical stimulation for drop foot of central neurological origin
- IPG285: Ultrasound guided regional nerve block
- IPG290: Photodynamic therapy for brain tumours
- IPG319: Percutaneous intradiscal electrothermal therapy for low back pain
- IPG348: Extracranial to intracranial bypass for intracranial atherosclerosis
- IPG370: Percutaneous closure of patent foramen ovale for recurrent migraine
- IPG381: Deep brain stimulation for intractable trigeminal autonomic cephalalgias
- IPG416: Deep brain stimulation for refractory epilepsy
- IPG420: Percutaneous venoplasty for chronic cerebrospinal venous insufficiency for multiple sclerosis
- IPG 452 Occipital nerve stimulation for intractable chronic migraine.
- IPG 451 Peripheral nerve-field stimulation for chronic low back pain

5.3 Other Applicable Local Standards

Core Standards

As referenced in section 3.3 of this specifcation, the SBNS Standards for Patients requiring Neurosurgical Care' contains 68 general standards of which 11 are considered core:

1	Each patient's perceptions, expectations, and needs will be addressed to maximise the benefit from neurosurgical care.
2	Patients will be cared for in an appropriate environment and account taken of their special needs, which will vary according to their clinical condition.
3	The neurosurgical needs of the population will be met by adequately resourced Neurosurgical Units and Multi-disciplinary Neuroscience Centres.
4	A specialist multi-disciplinary team will be constantly available to meet the needs of the population served.
5	Sufficient staff and facilities will exist for patients to gain admission and to remain in a neurosurgery unit for as long as clinically necessary.
6	Sufficient staff and facilities will exist for both emergency and routine theatre care.
7	The neuro-critical care service will be designed and developed around the needs of the patient as an individual.
8	Adequate neuro-critical care resources will be available to allow assessment, admission, investigation and treatment to agreed standards at times appropriate to the patient's need.
9	There will be an audit process assessing outcome, to include effectiveness of care, compliance with guidelines and avoidable distress, disability and death.
10	Sufficient staff and facilities will be available for post-acute neurosurgery episodes of care.
11	Patients will receive specialist neurosurgical follow-up for as long as necessary.

6. Designated Providers (if applicable)

Barking, Havering and Redbridge University Hospitals NHS Trust

Barts and the London NHS Trust

Brighton and Sussex University Hospitals NHS Trust

Cambridge University Hospitals NHS Foundation Trust

Hull and East Yorkshire Hospitals NHS Trust

Imperial College Healthcare NHS Trust

King's College Hospital NHS Foundation Trust

Lancashire Teaching Hospitals NHS Foundation Trust

Leeds Teaching Hospitals NHS Trust

North Bristol NHS Trust

Nottingham University Hospitals NHS Trust

Oxford Radcliffe Hospitals NHS Trust

Plymouth Hospitals NHS Trust

Salford Royal NHS Foundation Trust

Sheffield Teaching Hospitals NHS Foundation Trust

South Tees Hospitals NHS Foundation Trust

Southampton University Hospitals NHS Trust

St George's Healthcare NHS Trust

The Newcastle Upon Tyne Hospitals NHS Foundation Trust

The Walton Centre NHS Foundation Trust

University College London Hospitals NHS Foundation Trust

University Hospital Birmingham NHS Foundation Trust

University Hospital of North Staffordshire (now North Midlands) NHS Trust

University Hospitals Coventry and Warwickshire NHS Trust

7. Abbreviation and Acronyms Explained

The following abbreviations and acronyms have been used in this document:

AHP – Allied Health Professionals

BANN - British Association of Neuroscience Nurses

CNS – central nervous system

CT - computed tomography

EEG - electroencephalogram

EMG – electromyography (an electrodiagnostic medicine technique for evaluating and recording the electrical activity produced by skeletal muscles.)

HDU – high dependency unit

ICU – intensive care unit

MDT – multi-disciplinary team

MRI - magnetic resonance imaging

MTG – medical technology group

NCEPOD - National Confidential Enquiry into Patient Outcome and Death

PHE – Public Health England

RTT – referral to treatment times

SBNS – Society of British Neurological Surgeons

TA – Technical advice

TARN – Trauma audit and research network

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