

## **ANS-BSCN RECOMMENDATIONS AND GUIDELINES FOR THE PRACTICE OF CLINICAL NEUROPHYSIOLOGY IN THE UNITED KINGDOM**

### **Terms of Reference**

The Association of Neurophysiological Scientists (ANS) and British Society for Clinical Neurophysiology (BSCN), as the Professional Bodies for Clinical Neurophysiology of the UK have a responsibility to provide robust and reliable advice on professional standards and workforce planning. This document has been drafted by the Clinical Neurophysiology Leadership Group (CNLG) comprising senior members of ANS and BSCN for discussion at a joint meeting of the councils of each organisation prior to tabling the council approved document at a joint general meeting of both organisations.

The purpose of this document is to review and update recommendations and guidelines for the provision of Clinical Neurophysiology Services in the United Kingdom. It should inform decision of commissioners and healthcare planners and guide service designs, the implementation of new services, and job planning.

### **Introduction**

#### ***Clinical Neurophysiology Service***

Neurophysiology is primarily a diagnostic speciality. It provides diagnostic and other services to a wide spectrum of the patient population across acute, mental health and community settings and direct access, including:

- Neurophysiology investigations of the central and peripheral nervous systems
- Provision of services to in-patients and out-patients in dedicated and non-dedicated environments.

Effective diagnostic services are essential to the provision of the 18-week referral to treatment target in England and Scotland, 26-weeks in Wales, 52-weeks in Northern Ireland. This is particularly problematic to small specialised support services such as clinical neurophysiology where investment has been suboptimal for some time. New and innovative ways of working will be key to achieving this goal.

[http://webarchive.nationalarchives.gov.uk/+/http://www.dh.gov.uk/en/Publicationsandstatistics/Bulletins/Chiefnursingofficerbulletin/Browsable/DH\\_5913479](http://webarchive.nationalarchives.gov.uk/+/http://www.dh.gov.uk/en/Publicationsandstatistics/Bulletins/Chiefnursingofficerbulletin/Browsable/DH_5913479)

National Institute for Health and Care Excellence (NICE) guidance, National Service Framework (NSF) for long-term conditions, and Department of Health 18-week pathways targets, require Neurophysiological intervention above and beyond current provision, which will be extremely challenging, given waiting lists already exceed guidelines in some regions, compounded by regional variation in service development and a lack of appropriately trained staff.

### **Basic Minimum Standards**

#### ***Range of services:***

- **Investigations**
- **Interventions**
- **Advisory services**
- **Education and training**

#### **Investigations:**

Clinical Neurophysiology involves the measurement of electrical activity from the central and peripheral nervous system. The range of investigations commonly performed can be divided into 3 distinct areas:

1. Electroencephalography (EEG)
2. Peripheral Neurophysiology (PN) including Nerve Conduction Studies (NCS) / Electromyography (EMG)
3. Evoked Potentials (EP)
4. Intraoperative monitoring

These are usually accessed in a dedicated, ideally purpose-built environment, but can be performed - when appropriate – remotely in other healthcare environments such as wards, theatres, ED, etc. Several investigations are performed in each area (see tables for examples). Performance of the investigations consists of several components – planning, equipment selection & preparation, patient preparation, performing the investigation, analysis and reporting.

Neurophysiological investigations are inherently time-consuming and complex. The time varies from 30-45 minutes, for the simplest screening test for carpal tunnel syndrome (CTS), to several days for long-term monitoring for each patient. When compared with other diagnostic disciplines the throughput therefore tends to appear lower. It is essential, therefore, to describe the case mix appropriately in any demand/capacity exercise.

<b>Electroencephalography (EEG)</b>		
<b>Type of Electroencephalogram</b>	<b>Inclusions / Exclusions / Examples</b>	<b>Time **</b>
Routine/Standard EEG	Inc. Paediatrics over 5 yrs.	75-90mins

Paediatric EEG	Under 5 (most) / Inc. baby sleep	120 -140 mins
Complex Outpatient EEG	e.g. prolonged EEG for event capture, or patients with complex needs requiring 2 staff members	120-240mins
Complex Inpatient EEG	e.g. Status Epilepticus, drug monitoring	120 – 240 mins
Portable EEG	On site	90 - 180 mins
Portable EEG	Off site (30mins or less travel time)	120 – 240 mins
Sleep EEG	Inc. sleep deprived, drug induced etc.	120-140 mins
Multiple Sleep Latency Test	4-5 opportunities to sleep throughout the day	480-600 mins
Polysomnography		6-7 hours
Ambulatory	Per 24-hour recording	120-180 mins
Cerebral Function Monitoring	24hrs +	60 mins (per 24 hours)
Home Video Telemetry (hVT)/Video Ambulatory	2-7 days	120-240 mins (per 24 hours)
VT for Epilepsy Surgery Work up	2-10 days	240-360 mins (per 24 hours monitoring)
Intraoperative Monitoring Procedures	e.g. Corticography, epilepsy surgery, endarterectomy etc.	120-720 mins Varies case by case
Magnetoencephalography (MEG)		Varies depending on local protocol
EEG functional Magnetic Resonance Imaging		Varies depending on local protocol
Dense Array EEG		Varies depending on local protocol
<b>** performing investigation, analysis factual report and – clinical interpretation</b>		

The International Federation of Clinical Neurophysiology (IFCN) in 2017 revised their glossary of terms for reporting EEG. The link to this is available below

[https://www.cnp-journal.com/article/S2467-981X\(17\)30021-5/fulltext](https://www.cnp-journal.com/article/S2467-981X(17)30021-5/fulltext)

In 2017 they defined the minimum number, position and nomenclature of scalp electrodes for standard recordings and discussed the yield of higher electrode numbers for special clinical questions. For further information see the link below:

<https://www.sciencedirect.com/science/article/pii/S1388245717304832>

Peripheral Neurophysiology (PN)		
Investigation Type	Description	Time **
Median/Ulnar NCS screening	Screening and interpretation	30-45 mins

Peripheral Nerves Upper/Lower Limbs	Screening	60-90 mins
NCS EMG	Simple	60 mins
NCS EMG	Complex e.g. Single Fibre	1.5-2.5 hours
Thermal Threshold		30-60 mins
<b>** performing investigation, analysis factual and clinical report</b>		

<b>Evoked Potentials (EP)</b>		
<b>Investigation Type</b>	<b>Type / Inclusion</b>	<b>Time **</b>
Visual Pattern ERG Flash ERG	This may include central and half fields	60-120 mins
Brainstem Auditory		60-90 mins
Somatosensory	Upper	45-60 mins
Somatosensory	Lower	45-60 mins
Central Motor		45 -60 mins
Dermatomal		45-60 mins
VEP	Flash/pattern	60-90 mins
Trans Magnetic Stimulation (TMS) Navigated Transcranial Magnetic Stimulation (nTMS)		45-90mins May be longer depending on protocol (e.g. language localisation)
Intra-Operative Monitoring, including SSEPs, TcMEPs, FREM, Pedical Screw Stimulation, Direct Nerve Stimulation	Spinal deformity correction Spinal tumours	240-720 mins
Intra-Operative Monitoring and Mapping	Supra / Infra tentorial brain tumours	300-720 mins
BSEP Operative Monitoring	Acoustic Neuromas, MVD	240-720 mins
<b>** performing investigation, analysis factual and clinical report</b>		

### Interventions and therapeutic involvement:

<b>EEG / EP / Peripheral Neurophysiology</b>		
<b>Type</b>	<b>Conditions</b>	<b>Time **</b>
Vagal Nerve Stimulation (Adjusting programming)	Epilepsy	90 mins
EMG Guided Botox	Muscular Problems	30-90 mins
Deep Brain Stimulation	Movement Disorder	480 mins
Motor Cortex Stimulation	Pain Relief	480 mins

<b>** performing investigation, analysis factual and clinical report</b>
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It should be noted that the timings for performing all investigations, analysis factual and clinical reporting are for guide purposes and actual timings will vary depending on complexity and co-operation of the patient.

### Advisory services:

<b>Advice may be given as follows to:</b>
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Patients and carers - advice about tests, consent, contraindications etc.
Self-help and charity groups
Referring physicians, with regard to the appropriateness of referrals, and clinical advice with regard to treatment
Other healthcare professionals, with regard to service development and multi-disciplinary working to enhance patient care
Other professional groups, regarding inter-disciplinary research
Senior management, on service planning and provision, e.g. equipment procurement, service redesign and service level agreements etc.

### Education and training for Health care Science staff:

<b>Apprenticeships</b>
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For latest information regarding apprenticeships see links below and also available in Appendix 4. Health Education and Improvement Wales Website: <a href="https://heiw.wales.nhs/hcs">https://heiw.wales.nhs/hcs</a>
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<b>Practitioner Training Programme (PTP)</b>
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PTP is the undergraduate training scheme. This involves a 3-year full time Degree in NeuroSensory Health Care Science, with practical experience placements in the workplace in Neurophysiology, Audiology and Visual Science.
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<b>Accredited Specialist Scientific Practice (ASSP)</b>
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Post-Graduate certificate in Neurophysiology This is designed to top up the PTP, to meet specific workforce needs in Nerve Conduction, as well as Paediatric and Intensive Care EEG.
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<b>Scientist Training Programme (STP)</b>
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<p>STP is the postgraduate training scheme. This involves a 3-year part-time Masters in NeuroSensory Health Care Science, alongside employment with a Neurophysiology Department.</p> <p>This can be accessed as a direct entry student, or home grown within the department. It also involves practical experience placements in Audiology and Visual Science, Pathology and Medical imaging, cardiac and respiratory.</p> <p>- The STP includes 3 components rather than 2. This part should be corrected to: "This involves a 3-year part-time Masters in Neurosensory Healthcare Science, alongside employment with a Neurophysiology Department and a portfolio of clinical competencies completed within the department and on rotations. This can be accessed as a direct entry student, or home grown within the department. It also involves practical experience rotations.</p>
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### Higher Specialist Scientist Training (HSST)

HSST curriculum delivers a mastery of higher scientific knowledge and clinical and scientific competence and has a requirement during the 5-year programme for the individual to contribute to innovation or improvement through service delivery, patient safety, care, public communication/outreach and quality management. It delivers both personal and professional development including high-level skills in leadership, management, teaching, and the values, attitudes and behaviours appropriate for higher professional practice in the NHS.

The HSST curricula have been developed through joint working with the Academy of Medical Royal Colleges and individual medical royal colleges, senior scientists and scientific professional bodies, employers and patients and its underpinning academic doctoral programme has been established through joint working with the Council for Healthcare Science in Higher Education and workforce commissioners.

For up to date information regarding Healthcare Science training see:

Association of Neurophysiological Scientists Website: <https://www.ansuk.org/careers/>  
 The National School of Healthcare Science: <https://www.nshcs.hee.nhs.uk/curricula>  
 The National School of Healthcare Science Apprenticeships: <https://nshcs.hee.nhs.uk/programmes/apprenticeships/>

### Medical Clinical Neurophysiology Training

Medical entry into Clinical Neurophysiology is via Specialist Training in Clinical Neurophysiology for doctors from ST3-ST6. To be considered, trainees need a degree in medicine, a minimum of 4 years postgraduate experience and passed MRCP(UK) or MRCS or MRCPCH or equivalent following which there is a 4 year teaching programme. More information can be found at <https://www.thefederation.uk/training/specialties/clinical-neurophysiology>

### Training and supervision of Practitioner and Scientist trainees is an integral part of most services. It involves:

Qualified trainers and assessors, who teach trainees to develop the required skills at both PTP and STP levels and also for apprenticeship levels 2-6.

Mentoring and development of newly qualified graduate practitioners/scientists

Postgraduate clinical training of advanced techniques to appropriately developed Practitioners and Scientists.

Delivery of education to other healthcare workers, e.g. nurses, medical staff and other health care professionals etc.

Participation in the delivery of education and training of specialist registrars within the field.

CPD - Continual Professional Development

### Improving Quality in Physiological Services (IQIPS)

The IQIPS scheme is a professionally-led assessment and accreditation scheme that is designed to help healthcare organisations ensure that patients receive consistently high quality services, tests, examinations and procedures delivered by competent staff working in safe environments. IQIPS Standards are developed and owned by professional bodies.

For further information on IQIPS including information regarding standards in Neurophysiology visit the UKAS website:

<https://www.ukas.com/services/accreditation-services/physiological-services-accreditation-iqips/>

## Access to services

Neurophysiology is a relatively small speciality. Service provision is primarily in secondary care, with some provision in mental health and community. Therefore, Neurophysiology services are not provided in all acute trusts many patients may be required to travel beyond their local area, and at times long distances, to access these services. Sources of referrals are usually from secondary or tertiary care, but direct access from primary care is accepted for some clinical pathways. Recent attempts to deliver diagnostics closer to the patient (community diagnostic centres) have the potential to improve geographical variation for some neurophysiological tests, but requires significant investment in staffing and IT infrastructure to accommodate. Tension exists between ease of access to services and the need to achieve financial balance. Each Intergrated care board (ICB) will need to develop plans to meet these often divergent requirements to suit their local population.

### Waiting Time Standards

Effective diagnostic services are essential to the provision of the 18-week referral to treatment target in England and Scotland, 26-weeks in Wales, 52-weeks in Northern Ireland. This is particularly problematic to this small discipline which has been underdeveloped for some time. New and innovative ways of working will be key to achieving this goal. It is suggested that diagnostics should be completed within 6 weeks of the referral date; this is defined from the raise date of the referral.

### Waiting Time Standards

To achieve this, it would be wise to anticipate a maximum wait of 6 weeks. Refer to the 18-week document for further information on the application of the 18-week rules:

[http://webarchive.nationalarchives.gov.uk/+www.dh.gov.uk/en/Publicationsandstatistics/Bulletins/Chiefnursingofficerbulletin/Browsable/DH\\_5913479](http://webarchive.nationalarchives.gov.uk/+www.dh.gov.uk/en/Publicationsandstatistics/Bulletins/Chiefnursingofficerbulletin/Browsable/DH_5913479)

## Referral pathways

There are several drivers currently impacting upon the patient pathways e.g. NICE guidance, National Service Frameworks (NSFs) and Delivering the 18-week Patient Pathway.



Examples of NICE guidance - CG 20 Epilepsy (Diagnosis of Epilepsy in Primary and Secondary Care) recommends initial diagnostics within 4 weeks

<https://www.nice.org.uk/guidance/ng217>

<https://www.nice.org.uk/guidance/qs211>

NSF for long-term conditions requires timely access to diagnostics for chronic conditions and, therefore, impacts upon a large proportion of the work carried out in Clinical Neurophysiology, with regards to subsequent management.

<http://webarchive.nationalarchives.gov.uk/20130605080705/http://longtermconditions.dh.gov.uk/?p=954>

### Equipment:

Minimum requirements are needed to provide quality neurophysiological diagnostics in healthcare. Manufacturer guidance should be sought prior to procuring systems but the below example may be considered when reviewing specifications.

EEG	
Number of channels	min 19 channels of EEG to cover standard 10-20 configuration (additional channels are required for more comprehensive cover)
Polygraphy Channels	min to cover ECG, EMG, Respiration, Eye movement
Sampling rate	min 512Hz
Sampling accuracy	min 16bit
Sensitivity range	2–2000uV
Frequency band	0.3–128Hz
CMRR	min 90dB
Synchronised video capture and storage	low-light capable; Adjustable zoom
Adequate storage space on a server	

EP	
Number of channels	dependant on modalities – see ANS/BSCN guidelines of practice
Sampling rate	High
Sampling accuracy	min 16bit
Sensitivity range	100nV–2mV
Frequency band	0.1–5000Hz
CMRR	min 90dB
Stimulators	Visual: chequerboard Auditory: click Somatosensory: Constant current electrical ERG: Ganzfeld Central motor: Magstim



	Thermal threshold: Peltier thermode
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EMG/NCS	
Number of channels	min 1
Sampling rate	very high
Sampling accuracy	min 16bit
Sensitivity range	2uV–20mV
Frequency band	10–10000Hz
CMRR	min 90dB
Stimulators	Constant current electrical

### Department Size (Accommodation):

The recommendations for 'best practice' in this document have been compiled as consensus opinion after wide consultation with interested parties. Any published evidence base is provided where available.

This document is limited mainly to facilities where Clinical Neurophysiology investigations are performed. There are many factors that may influence the size and space required in a Clinical Neurophysiology department. These include type of hospital (e.g. District General Hospital, tertiary centre), patient throughput and range of services offered. This section will aim to make recommendations on what space is required for a Clinical Neurophysiology department to provide a professional and efficient service, taking into account environmental and health & safety issues. This does not mean that existing services are not fit for purpose if they do not comply with these recommendations.

### Environmental

There are a number of environmental conditions that need to be met for patients, staff and equipment to operate effectively in the Clinical Neurophysiology. Door openings need to be wide enough to allow persons with mobility impairments to pass through, especially wheelchair users, and those attending from other hospitals/centres on a trolley/bed. Ideally, doors should be able to open both ways to maximise access and minimise the risk of a patient becoming trapped behind a door.

Health and Safety at Work Act (1974)
States general duties which employers have towards employees and members of the public, and employees have to themselves and to each other
Main requirement of the Act is that employers carry out regular risk assessments
Where applicable, any significant findings are recorded and appropriate actions taken

Health and Safety Guidance
Cables from diagnostic equipment should not be trailing across the floor
Extension leads should not be used under any circumstances if used should be approved by Trust
Computer workstations should be big enough to allow the user to arrange the screen, keyboard and documents in a flexible way
It is recommended that staff have regular eye tests due to the increasing use of VDU equipment
Workstation chairs should be available to allow the user to work comfortably and be fully adjustable

Workstation chairs should also be wipeable, without any tears for infection control purposes
Appropriately located sharps bins, in close proximity to user to avoid unnecessary movement minimising risk

Advice on any health and safety issues can usually be sought by Trust Health and Safety Departments.

#### **Fire Safety**

Fire Practice Note 105 provides guidance on the standards of fire safety for hospital laboratory facilities

Department/building design and construction should ensure that patients, visitors and staff can move away from a fire to a place of temporary safety on the same level, from where further escape is possible to a place of safety outside the building. This is called progressive horizontal evacuation.

Departments where beds and patient trolleys are being moved, the width of the circulation spaces required for these activities should be adequate for escape purposes

All electrical equipment should undergo annual electrical safety testing, and recorded appropriately

The Chief Executive has overall responsibility for fire safety in all premises used by the Trust. Advice regarding fire safety issues can usually be addressed by the Trust Fire Safety Prevention Officer. All staff have duties and responsibilities in fire safety.

Further information regarding Fire Safety and Precautions should be available from your Trust Fire Safety Prevention Officer.

#### **Buildings Act 1984 Buildings Regulations 2000**

Deal with building control in new and altered premises.

Ensure health and safety of people using building by providing functional requirements for building design and construction

The requirements of the Building Regulations are contained in a series of documents called “Approved Documents”, covering many areas, including fire safety, soundproofing, ventilation and access and facilities for disabled people.

Further details can be obtained from the following website

[www.communities.gov.uk/planningandbuilding/buildingregulations](http://www.communities.gov.uk/planningandbuilding/buildingregulations)

#### **Health Technical Memorandum 03-01: Specialised ventilation for healthcare premises**

HTM-03 compliance comprehensive advice and guidance on the legal requirements, design implications, maintenance and operation of specialised ventilation in healthcare premises providing acute care. Further information at: <https://www.england.nhs.uk/publication/specialised-ventilation-for-healthcare-buildings/>

#### **Space requirements**

Clinical Neurophysiology departments should be fit for purpose self-contained units (with the exception of video-telemetry), with provision for patient reception, adequate clinical investigation rooms and analysis areas.

Individual rooms located on a variety of wards or corridors are not only wholly inadequate, but unsafe, preventing the provision of a high quality, efficient and patient-focused service.
Departments should be sited away from areas such as lift bays and Radiology departments, to ensure minimal contamination from electrical sources.
Clinical Neurophysiology departments must establish working practices that effectively deliver patient confidentiality, which is required by law, ethics and policy. Especially important in departments where multiple patients may undergo investigations simultaneously.
Measures should be in place to ensure patient privacy and confidentiality is respected and maintained.
Patient records should be stored in a manner which ensures confidentiality and inhibits accessibility by members of the public.
Electronic records, whether on diagnostic equipment or hospital databases, should only be accessible by authorised and appropriate personnel in line with GDPR

### Space Requirements

Size and space requirements required for Clinical Neurophysiology departments will vary, according to many factors, including type of hospital, patient throughput and range of services offered.
Workplace health, safety & welfare regulations suggest clinical rooms should have enough free space to move about with ease.
The volume of rooms, when empty, divided by the number of people working in them, should be at least 11 cubic metres. All or part of a room over 3.0 metres high should be counted as 3.0m.
Eleven cubic metres per person is a minimum and maybe insufficient, depending on the layout, contents and nature of work being performed. Moreover, rooms should be large enough to allow resuscitation procedures to be performed and for a stretcher or trolley to enter the room.

### Table of rooms/areas required

#### Clinical Areas\*

EEG recording room(s)
EEG sleep recording room(s)
Video-telemetry room(s)
Evoked Potential room(s)
EMG/NCS room(s)
Review/Reporting room
Adult waiting area/reception area
Children waiting area/reception area (child safe and age appropriate)
Dirty Utility room (e.g. disposal of clinical waste/laundry etc.)
Office Space(s)
Toilets/access to toilets
Staff Restroom
Staff Changing Area/Locker rooms
Showering facilities
Training/CPD Area
Store room or appropriate storage/stationary area
Patient-related consumables store
Clean Utility room ( e.g. separate room for electrode cleaning/sterilising – essential to separate from patient areas for appropriate infection control)

*\*Clinical areas required will depend on the level of Service Provision.*

### **See Appendix 1: Suggested layout for an EEG room**

#### **List of other factors for rooms**

In addition to having sufficient space for patients and staff, Clinical Neurophysiology departments need to have sufficient space for the following:

<b>EEG recording room</b>
Double doors, to allow admission of beds
Doors able to open both ways
Sinks, for cleaning equipment and for hand washing
Waste disposal
Storage space (e.g. clinical consumables)
EEG recording equipment
Oxygen and suction, resuscitation equipment
Preparation chair
Additional chairs for relatives/carers**
Beds/couch with cot sides
Preparation area/trolley
Windows with appropriate blinds, including blackout facilities for EP room (to enable multi use)
Adequate/adjustable lighting
Adjustable temperature/ventilation settings
Non slip/easy-clean flooring
Sufficient electrical outlets, appropriately sited and on the same phase
Emergency/panic alarm
Networking facilities
Electrical screening
Video/Audio camera facilities
Sufficient size to enable simultaneous video full field view and close up of patients whether located on bed or in chair (see diagram)
Security measures for patients and equipment

*\*\*The presence of friends, relatives or carers is often helpful in achieving a successful outcome when undertaking this investigation, particularly when dealing with children, the elderly, those with mental/behavioural disabilities, or for patients whose first language is not English.*

#### **EEG Sleep recording room(s)**

Sleep recording rooms should have an environment conducive to sleep. They should contain all the requirements identified for EEG recording room(s), but should have the additional:

<b>EEG sleep recording room</b>
Separate sleep monitoring room to house the recording equipment
Glass partition between both rooms
Sound-proofing

### **See Appendix 2: Suggested layout for a sleep recording room**

<b>Video-telemetry room</b>
This should, ideally be sited on a Neurology ward and include:

Double doors to allow admission of beds
Doors able to open both ways
Sinks, for cleaning patient and hand washing
Video-telemetry recording equipment, housed in lockable cupboard
Oxygen and suction, resuscitation equipment
Preparation chair
Additional chairs for relatives/carers
Bed with cot sides
Window
Adequate/adjustable lighting
Adjustable temperature/ventilation settings
Non slip/easy-clean flooring
Sufficient electrical outlets with UPS
Emergency/panic alarm
Networking facilities
Electrical screening
Video/Audio camera facilities
Security measures for patients and equipment
Additional monitor at nurses station and in the department
En-suite facilities
TV

Evoked Potential room
Double doors to allow admission of beds
Doors able to open both ways
Sinks, for cleaning equipment and for hand washing
Waste disposal
Storage space (e.g. clinical consumables)
EP recording equipment, including VDUs / Stimulators
Equipment/facility to test Visual Acuity
Oxygen and suction, resuscitation equipment
Preparation chair
Additional chairs for relatives/carers
Beds/couch with cot sides
Preparation area/trolley
Windows with appropriate blinds
Adequate/adjustable lighting
Adjustable temperature/ventilation settings
Non slip/easy-clean flooring
Sufficient electrical outlets
Emergency/panic alarm
Networking facilities
Electrical screening
Security measures for patients and equipment
Height measuring equipment
Curtain screening for patient privacy whilst undressing

### EMG/NCS room(s)

Should contain all the requirements identified for EP recording room(s), but with appropriate recording equipment.

**See Appendix 3: Suggested layout for an NCS/EMG room**

**Review/Reporting room**

Clinical Neurophysiology diagnostic equipment usually uses computers to display text, graphics and numbers.

**Display Screen Regulations 1992**

Dependent upon the amount of use, the Health and Safety (Display Screen Equipment) Regulations 1992 may apply, and give outlines of what employers and employees should do to comply

Regulations require employers to minimise the risk of VDU work, by ensuring that workplaces and jobs are well designed for their intended purposes

**Workstations**

Workstations should be considered when performing risk assessments. Poorly designed workstations may result in aches and pains in the hands, wrists, arms, neck, shoulders and back, especially after long periods of uninterrupted work

Such problems can often be avoided by good workstation design and good working practices

A Display Screen Equipment checklist is available:

<http://www.docs.csq.ed.ac.uk/Safety/ra/DSE.pdf>, which helps to identify and address various risk factors (e.g. display screens, keyboards, furniture and work environment).

Further information regarding workstation design should be available from IT Departments or Occupational Health Departments.

**Workforce:**

The Workforce of a Neurophysiology department will normally consist of medical, scientific, support and administrative/clerical staff. The skill-mix and grading of staff will be dependent on the clinical workload.

To deliver the highest possible standards of care specialised clinical leadership is recommended with a head of service role occupied by an individual trained in clinical neurophysiology.

The RCP recommends that one Consultant Clinical Neurophysiologist is required to serve a population of approximately 300,000.

**Medical Consultant Clinical Neurophysiologist****Consultant work programme for Clinical Neurophysiology**

Activity	Workload (Patients per PA)	Programmed Activities (PAs)
<b>Direct Clinical Care</b>		
Outpatient EMG Clinics	4-6 (depending on complexity)	2-5
Inpatient EMG	3-4 studies in the department, fewer if on ward	Up to 1
Supervision and Reporting of HCS NCS clinics	8-10 (4-5 per HCS clinic)	0-2
Reporting routine EEG	10-15 (depending on complexity)	1-3
Performing and reporting specialised tests e.g.	1-5	0-3 (may be more in specialist centres)

video-telemetry or visual electrophysiology		
Intra-operative procedures, e.g. evoked potential monitoring, intracranial recording/functional mapping	0.5-1	0-4
Multidisciplinary team meetings		Up to 2
Total number of direct clinical care PAs		7.5 on average, (7 in Wales)
<b>Supporting professional activities (SPAs)</b>		
CPD/appraisal/revalidation		1.5
Teaching/training		0-1
Service development, clinical governance, audit		0-1
Research		0-1
		2.5 on average
Other NHS duties		By local agreement
External duties e.g. for deaneries, royal colleges, Department of Health		By local agreement

*Consultant work programme for Clinical Neurophysiology (Kennett and Kandler 2013)*

For further information see:

Royal College of Physicians website - <https://www.rcplondon.ac.uk/>

RCP Medical Care - <https://www.rcplondon.ac.uk/projects/outputs/medical-care-0>

Below is a list of the roles and HCS Career Pathway Levels for scientific and support staff (Please note this is the career framework level and not Agenda for Change (AfC) banding):

<b>Role / Applications</b>		
<b>Level</b>	<b>Role Title</b>	<b>Work Activities</b>
<b>2/3</b>	Assistant & Senior Assistant practitioner	Assist with limited range of Neurophysiological procedures under the auspices of registered practitioner e.g. stock control, clinic room prep Chaperone, prepare patient for EMG, limb temperature adjustment, undressing etc.
<b>4</b>	Associate practitioner	Plan, prepare, perform and factually report on EEGs within a defined patient group and environment
<b>5</b>	Registered practitioner	Plan, prepare, perform and factually report on EEGs, CTS and routine VEPs within a defined range
<b>6</b>	Specialist practitioner	As above, plus 2-3 more advanced techniques. For example complex EPs, ambulatory monitoring peripheral nerve conduction studies



		Teaching/training
<b>7</b>	Advanced Practitioner/Team leader	As specialist practitioner, plus 2-3 additional advanced techniques, and/or team leader responsibility Research & Development and/or clinical audit
<b>8</b>	Professional Service Manager or Consultant Practitioner/Consultant Scientist	For professional service manager - As advanced practitioner, plus managerial responsibility for provision of service. Consultant Scientist – HSST or equivalent Consultant practitioner – as advanced practitioner, plus responsibility for independent clinical interpretation of investigations and/or leadership of R&D projects; advice to other professional
<b>9</b>	Consultant Director	As consultant practitioner, plus strategic accountability for the planning and provision of services across a district/area/region. Responsibility for resources, staffing etc.

For more details Healthcare Science National Profiles:

<https://www.nhsemployers.org/articles/national-job-profiles>

Registration: Healthcare scientists working in neurophysiology are not required to be registered to practice by law. Routes to voluntary registration [Registration - The Academy For Healthcare Science \(ahcs.ac.uk\)](#) are available for practitioners, and those working at master's level or above can register as a Clinical Scientist with HCPC. The CNLG/ANS/BSCN all recommend staff working within the profession as qualified healthcare scientists are registered. In NHS Wales, additional guidance is in place regarding professional registration of Consultant Scientists ([Consultant Clinical Scientists in NHS Wales](#)). Policies are also under development in all NHS Wales health boards regarding professional registration being essential for the whole healthcare science workforce, where available.

The profiles define the job titles and work activities for the Healthcare Science staff of a Neurophysiology department. Consultant work programmes will vary, according to hospital size and the specialist services provided, and the job plan will have to take into account local needs.

Viability and variety of service provision
There needs to be a reasonable critical mass of staff and workload to sustain a viable service. When considering this the following factors need to be considered:
Continual provision of high quality service delivered in a timely manner, including reporting (e.g. urgent same-day; routine 10 working days)
Appropriate CPD, audit and clinical governance (some of which should be external to trust, regional or national)

Cost effective provision of service, in terms of use of resources - appropriately utilised staff, equipment and facilities. The current potential for multi providers could have a destabilising effect on service provision, unless managed effectively by the purchasers
Recruitment, retention and training of appropriate staff
Appropriate model of high quality service to meet the needs of the local population:
i. Poly clinics
ii. Hub and spoke models
iii. Single DGH provision
iv. ICB provision
v. Tertiary provision
vi. Independent sector provision

### Clinical Governance:

### INFECTION CONTROL:

Infection control practices for staff should be documented. Communication is critical in reinforcing infection control practices. It is important that patient care staff notify other staff about potential or actual infection risk situations. The process should be covered by a previously agreed protocol.

The requirements of local regulations need to be taken into consideration in drawing up the code, and departmental practices should be drawn up in consultation with the local infection control team.

The documentation should form part of an induction process, and on-going training should be provided to staff to enable them to understand and adopt the requirements detailed.

Infection Control
Prevent contact and airborne transmission of infection
Ensure adequate cleaning of electrodes, equipment and hand hygiene
Minimise risk of airborne transmission by ensuring adequate room cleaning, good ventilation (HTM-03 compliant), appropriate handling of patients
Minimise risk of hospital acquired infection
Minimise risk to certain patient groups, or those cared for in specialised areas, who may be at increased risk. These include neonates and those who may be immunocompromised by disease or drug therapy

Similarly, patients in high dependency units (HDU), e.g. special care baby units, intensive therapy units, etc., are vulnerable because of the severity of their illness and the requirement for multiple invasive procedures and monitoring.

Recognition of these factors is an essential pre-requisite in minimising infection transmission.

The document makes recommendations for dealing with all of these risks, including the high risk groups such as Creutzfeldt-Jakob disease (CJD), Gerstmann-Straussler-Scheinker (GSS), Human Immunodeficiency Virus (HIV), and Acquired Immune Deficiency Syndrome (AIDS).

There are also specific recommendations dealing with Methicillin Resistant Staphylococcus aureas (MRSA) and botulinum toxin.

### Recommendations

Standard precautions (as defined by NHMRC 1996 Infection Control in the Health Care Setting) are work practices required for the basic level of infection control. They include good hygiene practices, particularly: washing and drying hands before and after patient contact; the use of protective barriers, which may include gloves, gowns, plastic aprons, masks, eye shields or goggles; appropriate handling of sharps and other contaminated or infectious waste; and the use of aseptic techniques.

### Cleaning and care of electrodes and other equipment:

All departments must have local infection control policies which specifically address the use, cleaning and sterilisation of equipment. These must be embedded within standard operating procedures (SOP)

It is preferable that disposable consumables (e.g. EMG needles, EEG / NCS, Dtl electrodes) should be used at all times (seek advice from local infection control departments)

Where this is not implemented, it is essential that all reusable electrodes are sterilised to an agreed protocol. **NB:** this includes NCS pads

Other potentially reusable patient contact equipment e.g. tape measures, NCS/EMG connecting leads, combs etc. all need to be cleaned / sterilised.

Other patient contact equipment and furniture e.g. head boxes, chairs, beds, trolleys, must also be cleaned/sterilised as appropriate.

### Evidence based practice

Practice must be underpinned by SOP and protocols. These should be evidence based, bench-marked where possible, and be reviewed as part of a continuous audit cycle.

Below is a link to the clinical governance page in the members area of ANS website . This may be a useful resource when considering changing practice.

<https://www.ansuk.org/members/clinical-governance/>

### Research, innovation and development

Clinical Neurophysiology departments should be encouraged to be involved in all of these areas:

Audits should be undertaken on a regular basis, with a view to improving patient outcomes and/or experience.

Research is strongly encouraged and, where undertaken, must be adequately costed and resourced. This includes the provision of additional personnel to either

carry out the research or to back-fill the research work being carried out by existing post holder(s). Primary research proposals should be sufficiently robust to attract sponsorship and overcome the complex ethical process.
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It is recognised that not all departments can be involved with primary research for many reasons. However, a minimum requirement of any service is the expectation of continual assessment of service provision against national standards, benchmarked statements of best practice, and making changes that benefit and improve patient care.
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Innovation may occur as a result of audit or research, but can also be driven externally e.g. government targets, new technology etc.
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Development of new services or extending service provision should take place to meet the needs of the local population. This should be done through the presentation of a strong business case, utilising best practice or by emulating centres of excellence in other areas.
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## Data Storage

NHS Digital merged with NHS England on 1 February 2023. NHS Digital's responsibilities for designing and operating national data infrastructure and digital systems will continue with NHS England. The safe and secure collection, analysis and dissemination of data from health and adult social care services in England and in some cases, Wales, Scotland and Northern Ireland.

All data must be stored according to, Information Commissioner's Office and NHS Guidelines and in accordance to the law of the country that the department is in.

Web page

<https://www.england.nhs.uk/about/protecting-and-safely-using-data-in-the-new-nhs-england/>

## Summary

This document aims to assist in the planning, redesign and maintenance of clinical neurophysiology services in the NHS. It provides suggested models of service provision in terms of range of services, staffing, equipment and accommodation.

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**ABCN document 1989** – Clinical Neurophysiology Services

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NICE Guidelines for Epilepsy -  
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[http://webcache.googleusercontent.com/search?q=cache:LKfTz0fbOswJ:www.bscn.org.uk/data/files/Links/Neurophysiology\\_goodpractice\\_230807.pdf+&cd=1&hl=en&ct=clnk&gl=uk](http://webcache.googleusercontent.com/search?q=cache:LKfTz0fbOswJ:www.bscn.org.uk/data/files/Links/Neurophysiology_goodpractice_230807.pdf+&cd=1&hl=en&ct=clnk&gl=uk)

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## Websites

Association of Neurophysiological Scientists (ANS) [www.ansuk.org](http://www.ansuk.org)

British Society of Clinical Neurophysiology (BSCN) [www.bscn.org.uk](http://www.bscn.org.uk)

Building Regulations

[www.communities.gov.uk/planningandbuilding/buildingregulations](http://www.communities.gov.uk/planningandbuilding/buildingregulations)

General Medical Council (GMC) website <https://www.gmc-uk.org/education/index.asp>

Improving Quality in Physiological Sciences (IQIPS)

<https://www.ukas.com/services/accreditation-services/physiological-services-accreditation-iqips/>

Joint Royal Colleges Postgraduate Training Board

<https://www.thefederation.uk/training/specialties/clinical-neurophysiology>

National Institute for Health and Care Excellence (NICE) <http://www.nice.org.uk>

The National School of Healthcare Science: <https://www.nshcs.hee.nhs.uk/curricula>

The National School of Healthcare Science Apprenticeships:

<https://www.nshcs.hee.nhs.uk/news/item/361-new-healthcare-science-apprenticeship-programme>

International Organisation of Societies for Electrophysiological Technology (OSET)

[www.oset.org](http://www.oset.org)

Royal College of Physicians <http://www.rcplondon.ac.uk>

## Acknowledgements

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It has since been reviewed by Stuart Lodwick before review through CNLG.

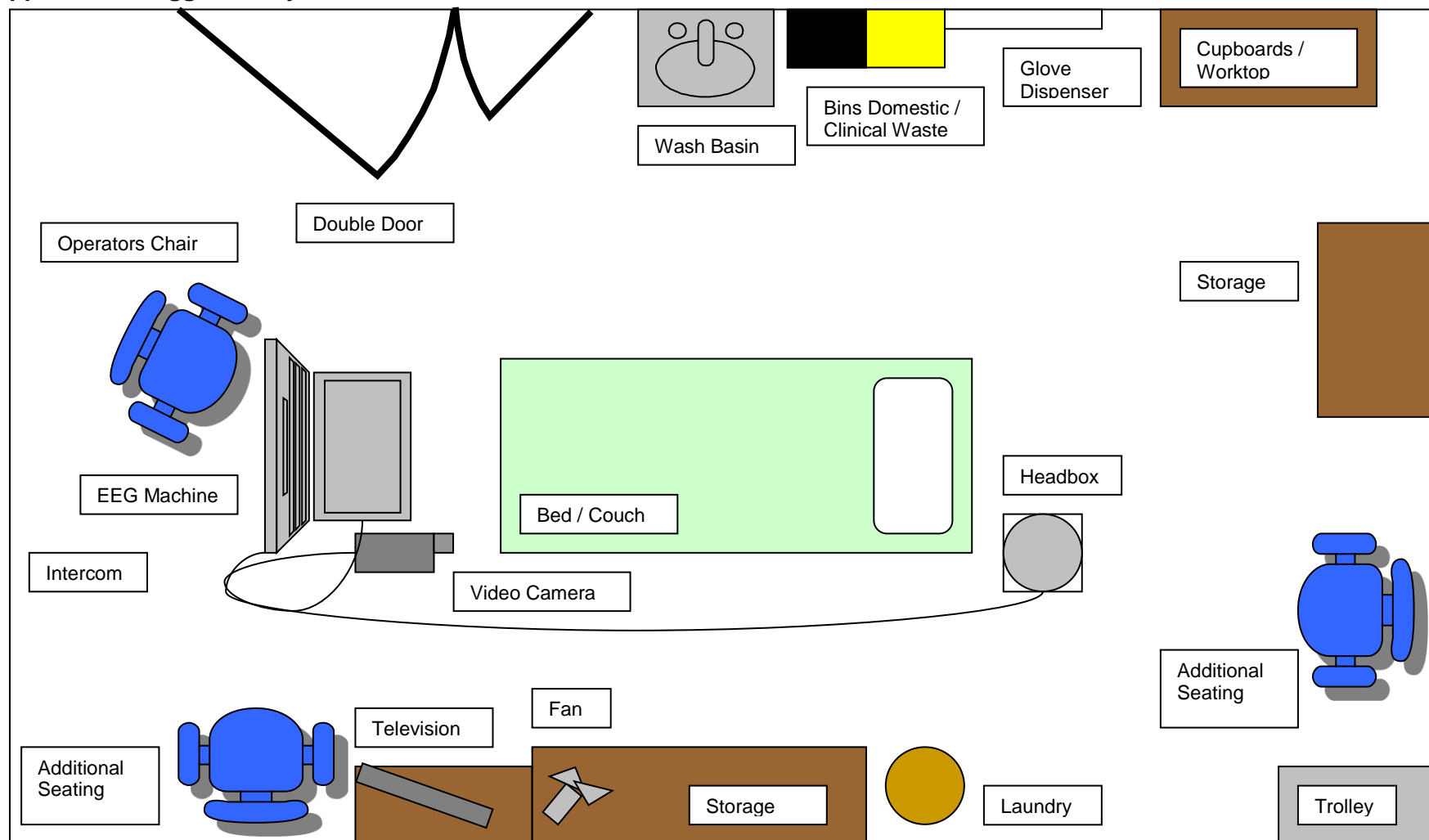
Thank you to Dr Rosalind Kandler, Dr Nick Kane and Dr Adrian Fowle for proof reading and recommendations

Thanks are also due to ANS Council members who kindly read and commented on the document

This document has been redesigned and reviewed by the Clinical Neurophysiology leadership group July 2024. Thank you to all involved.

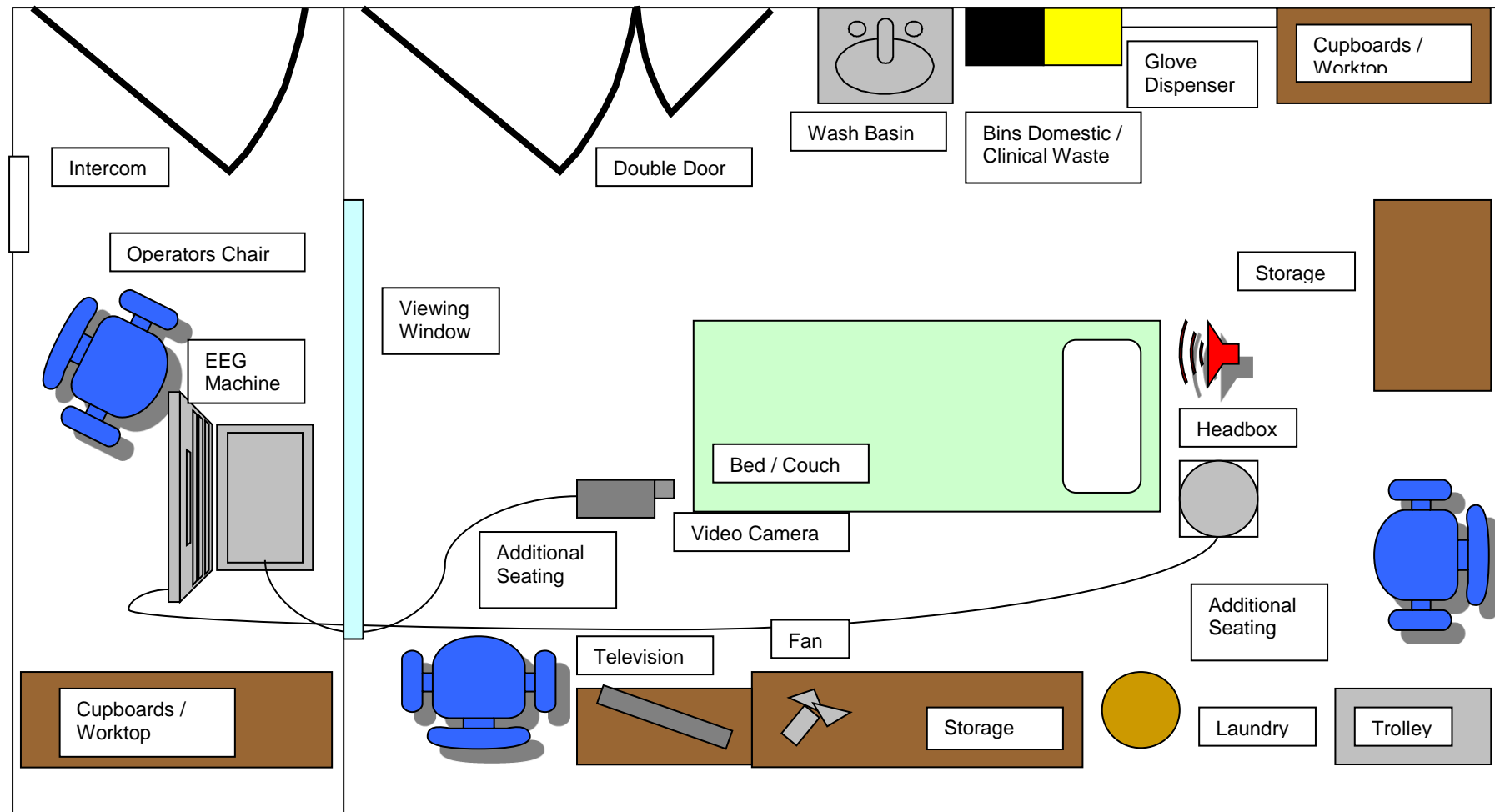


## Appendix 1: Suggested layout for an EEG room



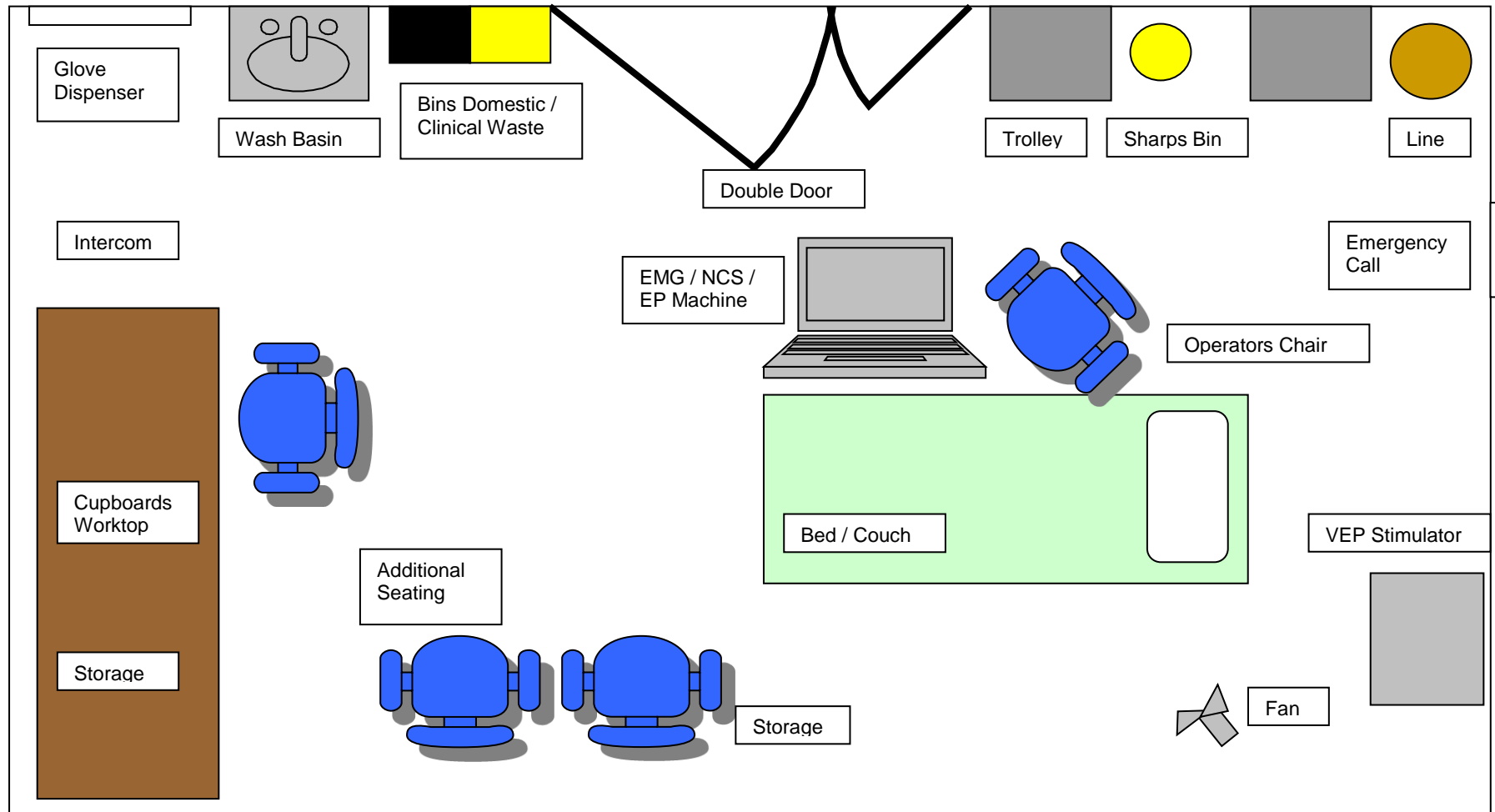
3.5m by 4 – 4.5m Approximate sizes

## Appendix 2: Suggested layout for a Sleep Study room



3.5m by 6m Approximate size

### Appendix 3: Suggested layout for an NCS/EMG room



5 – 6m 3.5m Approximate size

## **Appendix 4: Training and Education**

For up to date information regarding Healthcare Science training see:

Association of Neurophysiological Scientists Website: <https://www.ansuk.org/careers/>

The National School of Healthcare Science: <https://www.nshcs.hee.nhs.uk/curricula>

The National School of Healthcare Science Apprenticeships:

<https://nshcs.hee.nhs.uk/programmes/apprenticeships/>