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‘aut viam inveniam aut faciam’
Welcome to the department! The following handbook is designed to help you get the most out of your placement. We all hope you have an educational and enjoyable time with us.

**The Team**
There are 8 doctors in neurosurgery (5 FY2, 3 ST), 2 in neurology (1 FY2 and 1 CT1) and 2 in the Neurosciences Critical Care Unit (2 FY2).

**Illness**
If you are unable to attend work for whatever reason you must inform the team as soon as possible and keep us up to date with when you are expecting to return. Namely, you need to contact me via phone and email and medical staffing so we can keep our records up to date and arrange cover.

**Correspondence**
Email is the preferred method of correspondence currently due to its searchable trail. Please clearly mark the content of the email in the subject row.

All correspondence, leave requests and induction forms should be left in the rota co-ordinators pigeon hole in the neurosurgery secretaries office (first on the left in the NCCU corridor).

*Trepanated skull from the Iron age. the perimeter of the edges is rounded off suggesting significant survival after the procedure.*
The Rota

The neurosciences FY/ST (‘SHO’) rota is currently a 48 hours European Working Time Directive compliant rota.

The rota has been designed such that at least one doctor is always on a normal working day in neurology and NCCU and that in neurosurgery there are at least 4 FY doctors and 1 ST doctor on normal working days at all times.

Neurosurgery Ward Cover

Within neurosurgery the doctors are ‘ward based’ with one doctor covering each ward area. Recently neurosurgery has expanded to include J2 as part of the Major Trauma Centre development. Currently the specific ward areas are: A3 & outlying wards; A4 & Paediatrics; A5; and D6 & J2 A weekly list is published usually on the preceding week that allocates the doctors to each of the wards.

Neurosurgery Specialty Trainees

The neurosurgery ST’s can often provide an intermediate tier of advice for all wards and may be the first port of call for the FYs to discuss patients and to help with ward jobs if anyone is exceptionally busy. When more than one ST is working often one will be allocated to cover wards or clinics.

Brodmann areas as originally defined and numbered by the German anatomist Korbinian Brodmann based on the cytoarchitectural organization of neurons he observed in the cerebral cortex of many species using the Nissl stain published in 1909.
ON-CALL

Cover
All the doctors on the rota are equally involved in the on-call rota. When on-call you are responsible for all neurology and neurosurgery patients regardless of where they are in the hospital (although most will be based in A4, A5, D6, J2 and the paediatric wards). You are not expected to cover NCCU, except the single weekend 0800-1600 shift.

On occasion we will admit patients from our A&E. These can be clerked when they arrive on the wards. During the day this should be done by the ward doctor.

Very rarely you may be asked to see someone in A&E. The only admissions we see directly in A&E are patients with shunt problems, post-op complications within ~30 days, or proven cauda equina patients (however initially all query cauda equina patients will be seen and scanned by the A&E doctors). However, please do not go and see anyone at the request of the A&E team: politely decline and state all referrals must go through the registrar (see later for clarification on this). However, if the neurosurgery registrar asks you to see someone in A&E, that’s okay.

It is recognised that the neurology and NCCU doctors are often the only junior doctor on the team during the day. In this case they do not have to see neurosurgical cases in all but exceptional cases. However, if you are called to a ward emergency, you must attend (although normally the ward doctor should be there).

Referrals
The on-call FY/ST should not take referrals for new admissions from either A&E, switchboard or internal calls. Please just politely state you are only on-call for the wards and all referrals have to be vetted by the registrar. If they can’t get hold of the registrar ask them to call back if it isn’t urgent or keep waiting if it is urgent: the registrar will simply be dealing with urgent matters and will answer the calls in turn.

The reason for this is that our beds are in demand and we are strict in only admitting patients that will directly benefit from our care i.e. specific ward or surgical care that only we can deliver. Also many patients require further work-up or management prior to transfer.
**SHIFTs**

**Rota pattern**

Neurosurgery doctors have a week of short days allocated into each rota cycle. These can be changed in order to provide full day cover on the wards if required. For neurology and NCCU doctors these have been amalgamated into two normal working days. There is a rota template online at google drive.

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**Normal day**
Monday-Friday 0800-1800

**Weekday on-call**
Monday - Friday 0800-2030

**Long weekend**
Saturday & Sunday 0800-2030

**Short weekend**
Saturday & Sunday 0800-1200

**NCCU weekend**
Saturday & Sunday 0800-1600

**Nights**
Mon-Fri or Fri-Mon 2000-0830
“I am Don Quixote, and my profession is Knight-Errantry. My laws – to un-blind the blind, spread goodness and avoid evil. I flee from the easy life, ambition and hypocrisy and look for the narrowest and most difficult path towards my own glory. Is that silly or unrealisitic?”

Registrar Handover

The night doctor on-call must attend the handover in the B-Spur lecture theatre at 0745 prompt. If the registrar is in theatre or otherwise occupied they must be prepared to lead the handover. All admissions overnight should be presented as well as any cases taken to theatre and ideally any acutely unwell patients on the ward (for example those that may need to have gone to NCCU).

Attendance at this handover is not mandatory for the day doctors as it starts before the shift commences at 8am. However if any of the day team wish to attend for either education or handover this is permitted.

A plan and jobs for ward patients are often discussed at this meeting. This may include referrals or scans. It is the job of the night doctor on-call to take notes and hand over to the day team at the FY/ST handover which follows on from this at 8am.

FY/ST Handover

At 8am the night doctor hands over to all the neurosurgery doctors in the SHO room. This is also when the day doctor on-call takes the bleep. Handover is mandatory for all the doctors on the wards that day. Ideally this should be a business handover and will be completed by 815 at which point the day team can start on the wards and the night doctor can leave promptly before 830.

Nigh shift handover

Handover for the night doctor stars at 8pm in the SHO room. The registrars and often the consultant on-call will be handing over in parallel in the registrar room. Feel free to come and join the registrar handover: as well as being educational you can discuss issues on the wards and learn of any expected admissions.

NCCU

Handover is at 0800 in the B-spur lecture theatre during weekdays and the NCCU coffee room at weekends and public holidays.

‘aut viam inveniam aut faciam’
LEAVE: ANNUAL & STUDY

‘aut viam inveniam aut faciam’

The time has been when the brains were out the man would die and there an end. But now they rise again
Macbeth, Act III Scene IV

Days Off
There are a number of days off during each 12 week rota cycle. You are not required to work these days although there is nothing preventing you attending theatre or clinics for educational purposes.

Annual Leave
Each doctor is allowed 9 days of annual leave per 4 month rotation (ergo 27 per year not including public holidays).

Staffing requirements inevitably restrict leave possibilities.

The rota has been produced with annual leave allocated in certain slots to help with planning.

All annual leave (and study leave ideally), at least provisionally, should be requested by the end of the first full week of the rotation. I realise this is early and it’s ok if you aren’t entirely sure when you would like your leave or if you wish to change it later on, but this is important to make sure everyone gets their allocated 9 days without stretching the rota too much particularly towards the end of the attachment.

Study Leave
Foundation doctors and Specialty Trainees are allowed up to 30 days of discretionary study leave which must be approved by the programme director and their educational supervisor.

If you think you might require the time off, request it early just in case. Even if you don’t subsequently require the time off it is easier to cancel then leave than try and squeeze it in at late notice. This is equally important for mandatory as well as optional courses/exams etc.

Forms
The rota co-ordinator will need to sign and photocopy the AL/SL for ALL the time you are away (including for the days on the rota that say AL).
Neurosciences Induction

Specific induction for neurosciences doctors is run on the first thursday of the attachment.

Attendance at local neurosciences induction is mandatory for all doctors - this will need to be signed off.

Please let me know if you have any feedback about induction - it is an intensive day and an evolving process so we are keen to have your ideas too.

Forms

Assessment for DSA (angiogram) consent needs to be signed off and this will be done at induction

Assessment for accessing CSF devices (lumbar drains & EVDs) as well as administering intra-thecal antibiotics needs to be signed off. You will need supervision from a senior doctor the first time you do this: that person will then need to sign off the form to say you are competent in the procedure and you will need to return this form to me within the first 2 weeks of the attachment

All forms (DSA & CSF) and are available online through google drive.

Trust Induction

Addenbrooke’s runs an intensive day long trust induction. Normally medical staffing will inform you if you need to go. This is usually only for doctors that have not worked in the trust recently. There is also now EPIC induction.

Spetzler and Martin AVM classification with regard to risk of complications from treatment.

Spetzler RF, Martin NA. J Neurosurgery 1986;65 (4): 476-83
We pride ourselves on being a leading academic neurosurgical centre. As such, education is a strong theme in the department. You are strongly encouraged to attend the following teaching opportunities.

1. Neuroscience Foundation Teaching: Tuesday lunchtime from 1200 in the B-spur library, individual sessions TBC. This is bleep free. A registrar will be kept and used as part of your overall placement assessment. This will include NCCU and neurology doctors too.
2. Neurology Academic Sessions: Tuesday from 1300 in the B-spur lecture theatre (free lunch from 1230)
3. Morbidity & Mortality meetings. Approximately once per month there is an anaesthetic audit morning when theatres are closed. We use this for formal forum for presenting morbidity and mortality cases. This is an important event for the department and usually leads to lively discussion. Usually it is a Tuesday or Thursday morning at 1030 in the B-spur lecture theatre.
4. Neurosciences Academic Meetings: Thursday lunchtime from 1230-1330 (including a free lunch). A lively and varied program of invited speakers attends what is usually the academic highlight of the week. A registrar is kept. Attendance is bleep free.
5. Neurosurgery Registrar Teaching: Friday 0830-0930 in the B-spur library. This is an academically challenging program run by the registrars - heated debate is the norm!
6. Case presentation breakfast sessions: Friday 0730-0745 in the B-spur lecture theatre. The night doctor for the week will spend 15 minutes presenting an interesting case they have seen. These can be used for CBD/CEX assessments. Everyone will take their turn and a rota will be in the SHO room.
You should now have access to all the rota documents on google drive. To access this you need to have your email registered with a google drive account and your security settings set to allow the web page to run. To access the files either follow the link from the email I have sent you initially or log in to your own google drive account and look under shared documents. You can also access this via your smart phone.

If there are any concerns/omissions of leave etc then please let me know ASAP. The final responsibility for this I’m afraid lies with yourself so please check it carefully. On the other hand once you confirm it is ok I won’t change it without letting you know.

It is imperative that I have your correct email for this so you know what you are expected to be doing that week.

There are competency forms to be completed for CSF sampling/IT antibiotics and consent. Please bring the forms to me within the next two weeks so I can photocopy and file them.
WARD WORK FLOW

WARD ROUNDS

Grand rounds with consultants and the full team don’t happen every day necessarily.

Most ward rounds are business rounds led by the registrar and CNP. Due to the many conflicting commitments of the registrar the timing of these rounds is opportunistic and irregular. However, each patient should be seen by a registrar at least once per day.

For the most part ward rounds are usually done by the foundation doctor at the start of the day then ‘topped up’ as senior team members come round.

WORK PLANNING

Neurosurgery wards can be very busy but there are certain priorities that should be met. To aid planning it is suggested to do a very quick business round walking through the ward with the senior nurse from 0830-900. The aim of this is to:

- Identify sick patients
- Plan discharges
- Book scans

A thorough review of the notes and charts and clinical examination of all the patients isn’t necessary at this point in order to complete the above tasks. The high priority patients will of course be those that are unwell, post-operative patients, and new admissions. Hopefully after a few days on the same ward you should become familiar with the patients and staff so this takes less time. After you see what a weekend ward round is like led by the registrar this will give you an idea of how things should work.

Once these top 3 tasks for the early morning are in hand, you can spend the rest of the day going over the notes and reviewing patients in more detail.

‘aut viam inveniam aut faciam’

Thomas Willis (1621-1675). First depiction of the anastamoses in the cerebral circulation. Cerebri Anatome, 1664
Investigations

Pre-specified guidelines are available from NICE online to help guide what tests are required. Standard investigations usually include routine bloods and clotting (PT/APTT), a blood transfusion sample, and an ECG. Physician assistants are available to help with bloods and ECGs.

Anaesthetic support

There isn’t formal anaesthetic support available yet (but plans are in progress). If you have a patient that you think has significant co-morbidity and would warrant a pre-op anaesthetic assessment in more details try to liaise through the CNP or team registrar. Usually it will be possible to identify the regular anaesthetist for that consultant on that day.

General tips

- For patients undergoing spinal surgery it is always important to ask if the symptoms are still present because the natural history is for disc disease to improve.
- In general any form of anti-coagulation or anti-platelets will need to be stopped. However, each consultant has their own preferences and there are very important exceptions. Therefore, this is something you really need to run past the team.
- For most brain tumour surgery patients usually have steroids at least 48 hours prior to surgery. If this isn’t done please flag it up to the team. Patients should be on high dose steroids too long either.
- A thorough neurological examination is very important needless to say. It is impossible to determine if a deficit is new post-op if it isn’t documented properly pre-op!
- Finally, remember that a thorough, detailed and legible clerking will make completing an accurate discharge summary far easier.

'Lars Leksell, Professor of Neurosurgery in the Karolinska unit in Stockholm, and inventor of the stereotactic frame that bares his name and stereotactic radiosurgery.'
Basic Information

A basic rule is that discharge summaries should do exactly what it says - summarise the care of the patient during their stay as a standalone document. Also, it has a role with coding and tariffs, that is how much we earn depends on how accurate the information is on this document. A few issues keep recurring including:

- Document all co-morbidities (see online documents for the list)
- Document all complications
- Document a brief history and examination and reason for their admission
- Shared care should include
- Follow up should be clearly specified in order for the secretaries to arrange this - please check with team if you have any doubts

Operation notes are almost always available on EPIC and are a fantastic knowledge resource if you have any questions. Also, using the clerking booklet fully to start with will make the subsequent discharge much easier.

2 before 10

The trust in early 2013 has set a target for each ward to have 2 discharges completed before 10am in each ward area. Please help us to try and achieve this target. Examples include:

- Any patient after spinal surgery
- Most patients after a VP shunt
- Post carotid endarterectomy
- Brain tumour patients that are well and just awaiting a scan before discharge (usually day 2-3)
- Pituitary patients awaiting blood tests (usually day 2-3)

I would suggest making some time at the end of the day to plan out these discharges and make a start on them which should buy you some time the following morning.
**Steroids**

Dexamethasone for brain tumours is one of the most effective drugs in neurosurgery in terms of symptomatic improvement and making surgery more tolerable. However, there is a huge side effect profile that requires care to manage. The main tips are:

1. Always wind down steroids when possible and don’t keep people on maximum doses for a prolonged period
2. Never send patients home without a clear weaning plan
3. Conversely, never wind patients down too quickly or stop suddenly
4. Always consider gastric protection and DVT prophylaxis and keep a close eye on blood sugars (which may require therapy in itself)

**Antibiotics**

Prescribing of antibiotics is a target that is monitored on a trust wide basis. Infections in neurosurgery can be difficult to manage therefore always discuss specific cases with the microbiology registrar for advice. if prolonged antiotics are indicated a PICC service is offered in Addenbrookes. finally, always remember to monitor routine bloods regularly during the treatment course.

Specific metrics are:

1. Indication
2. Stop dates
3. Conversion from IV to PO

**Anti-convulsants**

Traditionally phenytoin has been the drug of choice in neurosurgery. However, it is a complicated drug to manage. Levels should be measured weekly to allow for dose adjustments but in reality are measured more often. Side effects are frequent and can be serious. Take time to read the section in the BNF on how to manage the drug effectively. Thankfully, keepra/levetiracetam is becoming the most common first line anticonvulsant.
One of the first operating microscopes (OPMi) in 1952, the application of which to neurosurgery was pioneered by Gazi Yasargil.

**VENOUS THROMBOEMBOLISM**

This is one of the most important targets the hospital had to reach. The ward clerks are reminded about it on HISS and we have to ensure it is completed before we can send for any patients to theatre. In most cases LMWH will be withheld pre-operatively. After surgery instructions should be on the operation note. Please do not start LMWH routinely by yourself - always check with the registrar first. Also, when removing, lumbar or subdural or ventricular drains, it is important to withhold that days dose. If a patient is not prescribed LMWH a careful explanation should be recorded in the medical notes.

**DEMENTIA SCREENING**

The trust has taken an initiative to try and accurately identify those patients who are at risk of dementia. There is a specific form to be used for this. Normally the ward clerks are the best people in identifying those that need the form completed as there is a specific box on EPIC just like for VTE. If time is tight or the assessment requires a collateral history you can ask the CNPs for help too.
ACOUSTIC NEUROMAS

‘Bill’s Bar’, a key neuro-anatomical landmark. Named after William House, Otologist based in Los Angeles, that pioneered the application of the operating microscope to acoustic neuroma surgery in 1962

General Tips

- Usually pack out in 72 hours (rarely 2 week in ENT clinic) normally documented in OP notes.
- FU 6/52 in RMAC/RJMA clinic
- FU 12/52 in ENT clinic.
- DVLA – no restriction if Translab approach but not to drive till seen by medics in clinic.
- May require Ophthalmology review if develops facial weakness & incomplete eye closure.
NEUROSURGERY HANDBOOK

PITUITARY SURGERY

Harvey Cushing, often considered the father of neurosurgery and one of the great pioneers at the starts of the last century, performing a trans-labial trans-sphenoidal approach to the pituitary gland as illustrated by Max Brodel at John Hopkins in Boston circa 1912

General tips
✦ FU 6 – 8 week with Endocrine (endocrine arrange it)
✦ On discharge advise to GP to do bloods in 3-4 days
✦ FU 1 month in Skull base clinic (generally seen by ENT)
✦ Nasal douching 1 week post op TDS for 6-8 weeks (Neilmed sinus rinse from boots, hospital doesn’t supply)
✦ MR atl 3 months
✦ FU in RJMA 4/12
✦ Ophthalmology: FU if presented with visual symptoms
✦ DVLA: although no restriction (with endonasal apporoach) but still advisable to let DVLA know.
✦ Sometimes they come back from theatre with nasal catheter which mostly comes out 2-3 days.
✦ CSF leak is common in both group of patients and that’s what they need to be aware

Blood Tests
✦ Need daily U&Es, urine Osmo at 6am so that the results are back by midday for endocrine review.
✦ Some patients need BD bloods as per Endo advice which is generally 6am & 3pm (this is from Endo)
✦ Please use the flow chart from google drive and file in the notes
The Wade-Dahl-Till (WDT) valve is a cerebral shunt valve developed in 1962 by hydraulic engineer Stanley Wade, author Roald Dahl, and neurosurgeon Kenneth Till.

POST-OP

A check CTH is required after a VP shunt from most consultants (but do check). The indication is to check for haemorrhage, confirm satisfactory ventricular catheter position, and get a baseline configuration of the ventricles.

Patients that have shunt assist devices sited need a check shunt series XR to gauge the position of the hardware as a baseline and ensure the device is sited satisfactorily.

Most patients will go home on the same day after a shunt assist or the day after with a VP shunt: try to plan out discharges in advance.

All patients must inform the DVLA after a new ventricular shunt or revision of the ventricular catheter. They must not drive in the meantime while waiting to hear back.

PRE-OP

The main concern when clerking patients is to ensure they do not have a low grade infection.

Include inflammatory markers on the bloods if you have any doubt and consider a CSU or CXR.

Patients for pleural or atrial shunts should have a pre-op CXR to confirm the anatomy.

SHUNT INFECTIONS

Shunt infections are serious - discuss the plan in detail with the registrar and microbiologist involved at the earliest opportunity. Patients will need routine monitoring of their inflammatory markers and routine bloods including FBC, U&E, LFT at least 3 times per week.

Intra-thecal antibiotics may be indicated: always check with the registrar and microbiologist. Follow the protocol. The first time you do this you will need to be supervised but then should be able to get your competencies signed off.
CAROTID ENDARTERECTOMY

Anti-platelet agents should usually be continued throughout surgery. All patients will be on at least aspirin (unless allergic) and some on clopidogrel too.

Anti-coagulation (warfarin) should be stopped and the INR confirmed to be within the normal range pre-op.

Patients are often vasculopathic and have significant co-morbidity. A careful pre-op work-up is required.

Many patients present with a TIA or a stroke and may have subtle neurological signs that should be documented pre-op.

Complications are rare but can include: neck haematoma (serious - may require evacuation as an emergency), infection, vagal nerve injury, hypoglossal nerve injury, marginal mandibular nerve injury, stroke, haemorrhagic re-perfusion, seizures, and general medical complications (pneumonia, VTE, MI).

Most patients will go home the next day after a satisfactory review. Try to have the discharge planned when possible. Patients should also have a single dose of prophylactic LMWH too.

EC-IC BYPASS

Continue all pre-operative anti-platelet agents.

Post-operatively check anti-platelet requirements with the team.

Dopplers of the graft are performed daily until discharge.

Avoid any pressure over the graft (this runs down the side of the jaw and temporal region): don’t even put on glasses or oxygen masks over this.
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1. the work must be used solely to illustrate a point;
2. the use of the work must not be for commercial purposes;
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We have gone to great lengths to provide detailed and accurate references. Unfortunately, selected images are from old departmental teaching resources, and the original sources are unable to be traced. However, we belief under the “fair dealing” exception stated above, this is still legal. If you have any queries or objections please do contact us as soon as possible and we will be act appropriately.

Page 1: Diamond skull

Page 2: Dia de los muertes
https://spanishdialects-11b.wikispaces.com/Day+of+the+Dead+in+Mexico

Page 3: Trepaned skull
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Page 4: Brodmann areas
http://spot.colorado.edu/~dubin/talks/brodmann/brodmann.html

Page 5: Hemingway stamp
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Page 6: Picasso skull cubism
https://www.pinterest.com/pin/8655424261329759/

Page 7: Picasso Don Quixote

Page 8: MacBeth
http://hayoscarwilde.com/art-baltazar-macbeth/

Page 9: AVM
Spetzler RF, Martin NA. J Neurosurgery 1986;65 (4): 476-83
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Page 10: Salpetriere
André Brouillet - Photo prise dans un couloir de l’université Paris V
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L’auteur est mort en 1914, son œuvre est dans le domaine public
http://i09.io/5670064/how-your-brain-sees-your-body-meet-the-cortical-homunculus

Page 11: Homunculus
http://i09.io/5670064/how-your-brain-sees-your-body-meet-the-cortical-homunculus

Page 12: Circle of Willis
Cerebri Anatome, 1664

Page 13: Leksef

Page 14: A photograph from Dott’s work at Bangour General (Emergency Medical Service) Hospital.
http://thea.blogspot.co.uk/2012/09/cataloguing-neurosurgical-case-notes-of.html

Page 15: connectome

Page 16: operating microscope
Original publication unidentified.

Page 17: Barrow
http://erkutlu.blogspot.co.uk/2012/11/surgical-approaches-for-resection-of.html
Original publication believed to by Barrow Quarterly, but currently not available to confirm. Please see url above.

Page 18: Pituitary surgery
Surgical Experiences with Pituitary Disorder by Max Brödel. Original illustration #75 in the Walters Collection of the Max Brödel Archives, Department of Art as Applied to Medicine, The Johns Hopkins University School of Medicine, Baltimore, Maryland , USA.

Page 19: Wade-Dahl-Till Shunt

Page 20: Gugliemi coils
http://www.radnet.ucla.edu/radweb/sections/endovascular/news/detachableCoils.jsp

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