1. Introduction and Who Guideline applies to

This guideline was initially developed for the East Midlands Major Trauma Network (EMMTN).

It describes key steps in the initial management of adult head injury patients presenting to the regional Trauma Units (TU) who fulfil the NICE CG176 indications for CT imaging of the head. [1] It also includes the indications for immediate transfer to the Major Trauma Centre (MTC), and for obtaining rapid neurosurgical advice at Nottingham University Hospitals (NUH) via the online system Referapatient.

NB - The following patient groups are outside the scope of this document:

- Those in whom the need for MTC transfer has already been clearly established
- Those who due to advanced frailty [2] are deemed not to benefit from CT by an experienced ED doctor or ANP as part of a shared decision-making process involving patient and family

Patients with a living will should be managed in keeping with the specific wishes expressed.

This guideline applies to all UHL staff involved in the initial management of adult patients presenting to the Leicester Royal Infirmary (LRI) Emergency Department (ED) with head injuries. It may also be useful for the management of adults experiencing an inpatient fall. [7,8]

2. Guideline Standards and Procedures

2.1 ED management should follow the algorithm shown in Appendix A (page 3).

2.2 Patient selection for a CT head should follow the NICE CG 176 algorithm shown in Appendix B (page 4).

2.3 Patients who require a CT head scan should have regular neurological observations as per UHL Guideline for the Escalation of Deteriorating Glasgow Coma Score (GCS). [3]

2.4 Patients who might benefit from treatment with intravenous tranexamic acid as per the results of the CRASH-3 trial [4] should be selected using the 'Tranexamic acid (TXA) in adult trauma LRI ED prescribing aid' (which can also be found in the Adult ED Trauma Booklet). [5]

2.5 Referrals to the neurosurgical team at NUH using Referapatient should be made as shown in the online referral form completion guide for head injuries in adults shown in Appendix C (page 5).

3. Education and Training

No additional skills are required to follow this guideline. Awareness will be raised through the relevant members of the Major Trauma Governance Group (MTGG).

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Head injured adult patients with an ISS >15 not transferred to the MTC for whom no appropriate advice was sought	ISS >15 audit	UHL clinical lead for major trauma	6-monthy	To MTGG and EMMTN clinical steering group
Proportion of referrals via Referapatient that do not receive a response within 1h	Report generated from Referapatient	UHL clinical lead for major trauma	3-monthy	To MTGG and EMMTN clinical steering group

5. Supporting References

1. NICE (2014) Head injury: Triage, assessment, investigation and early management of head injury in children, young people and adults. CG176. London: National Institute for Health and Care Excellence.
2. RockwoodK et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.
3. UHL Guideline for the Escalation of Deteriorating Glasgow Coma Score (GCS) (Trust reference B15/2012).
4. CRASH-3 trial collaborators. Effects of tranexamic acid on death, disability, vascular occlusive events and other morbidities in patients with acute traumatic brain injury (CRASH-3): a randomised, placebo-controlled trial. Lancet 2019;394:1713-1723.
5. Tranexamic acid (TXA) in adult trauma LRI ED prescribing aid (Trust reference C46/2020).
6. Spahn, D.R., Bouillon, B., Cerny, V. et al. The European guideline on management of major bleeding and coagulopathy following trauma: fifth edition. CritCare 2019;23:98.
7. ESM CMG Guideline for Head Injury following Inpatient Falls (Trust reference B8/2010).
8. UHL Policy on Falls Management for Adult Inpatients (Trust reference B15/2014).

6. Key Words

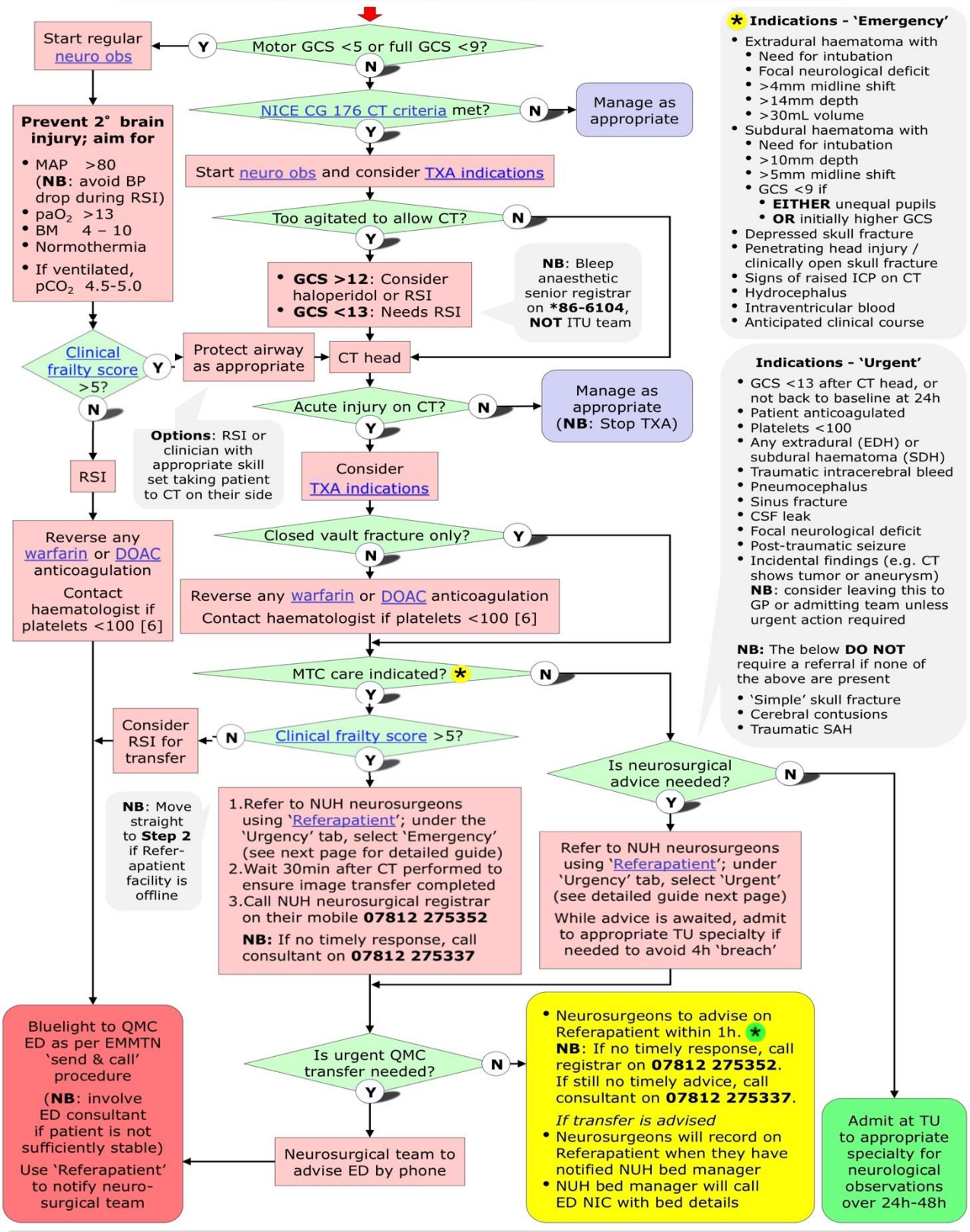
Major trauma, head injury, traumatic brain injury, TBI, NICE, GCS, Glasgow Coma Scale, Major Trauma Centre, MTC, frail, frailty, extradural, subdural, subarachnoid, RSI, rapid sequence intubation, adult, referapatient, neurosurgeon, neurosurgery, Queen's Medical Centre, QMC, Nottingham University Hospital, NUH, EMMTN, East Midlands Major Trauma Network, hydrocephalus, pneumocephalus, fracture, tranexamic, TXA, CRASH-3, platelets

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) Martin Wiese, Emergency Physician and UHL Clinical Lead for Major Trauma	**Executive Lead** Andrew Furlong, Medical Director
Details of Changes made during review: • Appendix A – prompt added to contact haematologist and seek urgent neurosurgical advice if patient with acute head injury on CT has a platelet count less than 100 x 10^9/L • Note added to the scope that the guideline may also be useful for the management of adults experiencing an inpatient fall, pointing to the relevant references	

Adult with head injury in TU: Initial management, neurosurgical referral & MTC transfer

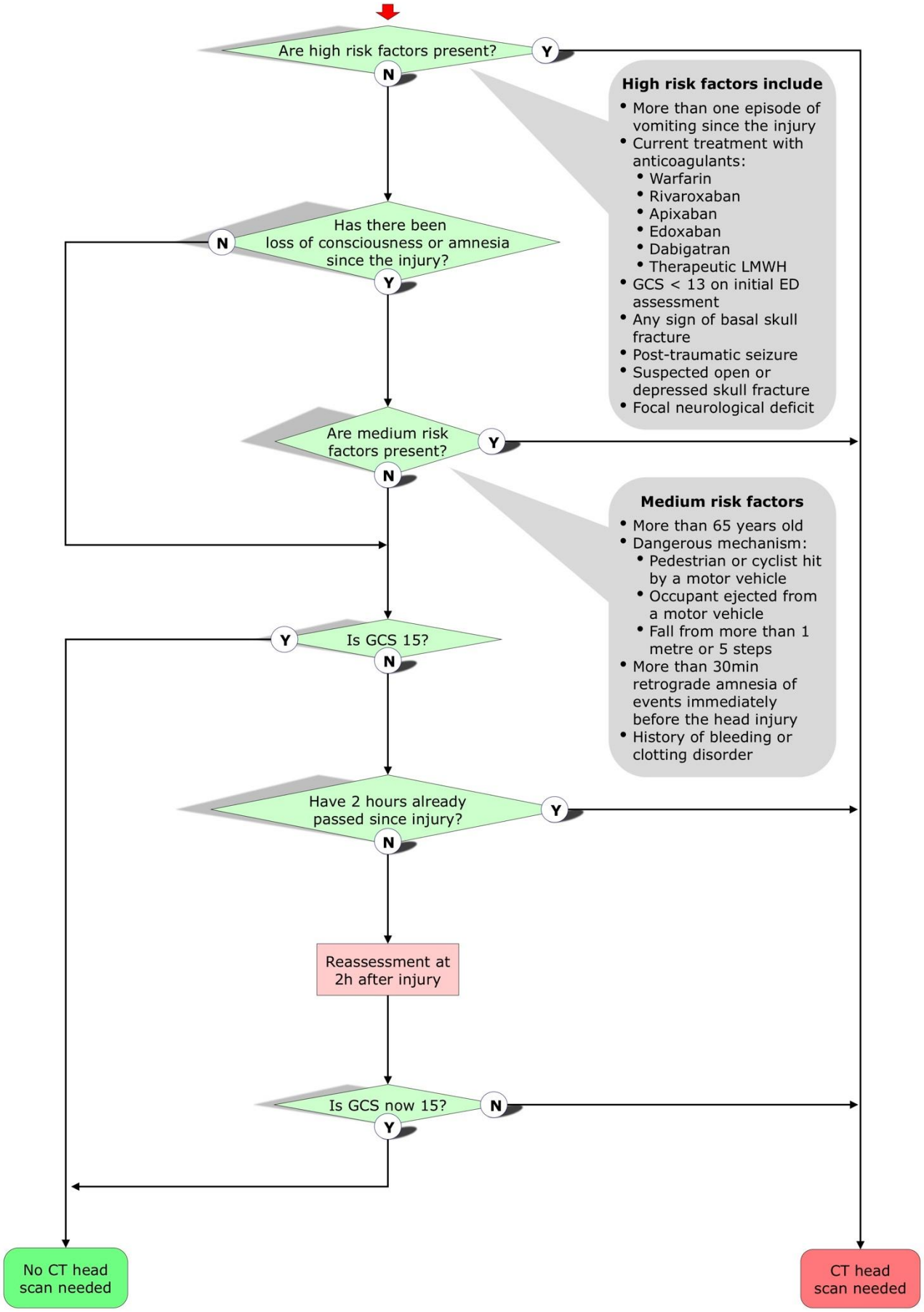
***NB** - The following patient groups are outside the scope of this document:*
- *Those in whom the need for MTC transfer has already been clearly established*
- *Those who due to advanced frailty are deemed not to benefit from CT by an experienced ED doctor or ANP as part of a shared decision-making process involving patient and family*

Patients with a living will should be managed in keeping with the specific wishes expressed



* **NB**: To avoid unexpected management updates getting missed, any changes to the initial advice provided on Referapatient will also be conveyed by a phone call rather than online only

Appendix B. NICE algorithm – selection for CT head scan. Back to 1st page



Appendix C. Online referral form completion guide for head injuries in adults. Back to 1st page

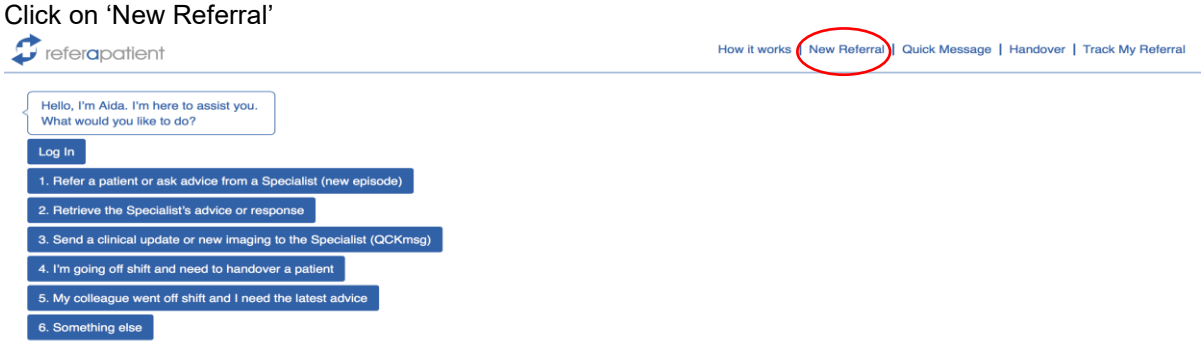
How to start

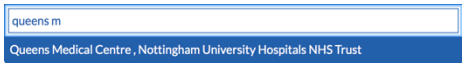
- Go to https://www.referapatient.org/Home/Index. If you are a first-time user, you may wish to click on 'How it works' at the top (go through the flowchart; the video is less useful).

  (NB: There is no need to create an account, but login details will be sent to you automatically after your first use of the system. A text with a verification code will also be sent to your mobile, which you will need to activate your account.

  One advantage of activating your account is that you can then be given access to the LRI ED Referapatient 'Referrals From My Department' view, which allows you to see details of all recent referrals from our ED (not only your own). Request access by email to Martin Wiese.)

- Click on 'New Referral'



- Type 'queens m'  then hit 'Return'

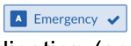
- Type 'neuros'  then hit 'Return'

- Click on 

- Click on  or just hit 'Return'

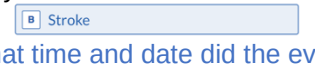
  NB: Hitting 'Return' will usually move you to the next field, but it might also enter a default (e.g. the NHS number '0000000000', and  in the gender field) so be careful!
  The system will prompt you if fields are mandatory, including right at the end.

Notes on specific fields

7. → Medical record number
   Copy & paste your patient's S number.
10. → Contact details of supervising clinician
    Only name is required (either consultant in charge, consultant in ER or consultant on-call overnight); ignore the rest of the suggested details
11. → Patient address
    Enter ED location, e.g. 'LRI ED – Majors' or 'LRI EDU', extension not required
12. → Urgency
    Not all referrals from the ED are an emergency. Select  only for patients who are transferred to QMC without scan and those with an 'Emergency' indication (see Appendix A – box with yellow asterisk ). Otherwise, select  .

14. → Which referral pathway is most relevant?
    Select  .

15. → Working diagnosis
    Hit 'Return' to select the default  .

    NB: If you need to refer patients with spontaneous SAH or intracranial haemorrhage, select  first – further options will then appear.

16. → What time and date did the event or symptoms occur?
    The input field will only appear after the first digit of the day is typed in (e.g. 8 for the 8th of the month). The rest of the field will then autocomplete to the current date and time so you will have to correct the time to the actual time of onset.

Fields 17 to 27 are self-explanatory

28. ➔ Anticoagulants
    Clicking ' OK ✔ ' instead of hitting 'Return' is required here after making your selection.
29. ➔ List of all medications
    Unless the patient is taking steroids for a brain tumour, list drug names only.
30. ➔ Neurological examination
    Describe any focal neurological signs – e.g. specific limb weakness or cranial nerve deficits. Otherwise, state 'no focal neurological signs'.
31. ➔ Radiology
    Cut and paste report if already available. Leave blank if acute traumatic abnormality is obvious and report not yet available. You can always send it later (see below for details).
32. ➔ Upload an image or document file
    Ignore.
33. ➔ What specific question(s) do you want answered?
    Questions will usually include
    - Should patient be transferred to QMC:
      - If yes, where to – i.e. ED, neurosurgical ward, ITU or theatres?
      - If no - how long should patient be observed at LRI?
    - What interventions at LRI might be required (e.g. pneumovax injection)
    - For patients on anticoagulant, for how long should this be paused?
    - Is there any need for further scans and / or neurosurgical follow-up
36. ➔ What is your bleep/ phone number?
    Type **0116252** followed by the extension of the phone nearest to you.
38. ➔ What is your email address?
    Use your UHL email address only.
39. ➔ What is your email clinical supervisor's email address?
    This should be the email address of the consultant named in Field 10. Click here for the full list.
40. ➔ Which Hospital or service provider are you referring from?
    Type 'leicester r' 

    and hit 'Return'.
41. ➔ Your Speciality or Service at that Hospital?
    Select 'Accident & Emergency/Emergency Medicine' then click 

After you've hit 

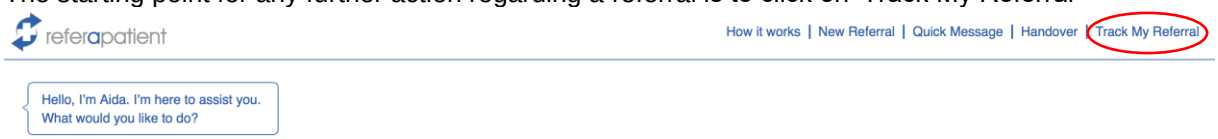
, the system will display several messages from AIDA. One of them is the referral 'ID key' 

, which will also be emailed to you. Copy & paste it into the NerveCentre 'ED progress notes' field, adding the comment 'Referred to QMC neurosurgeons'.

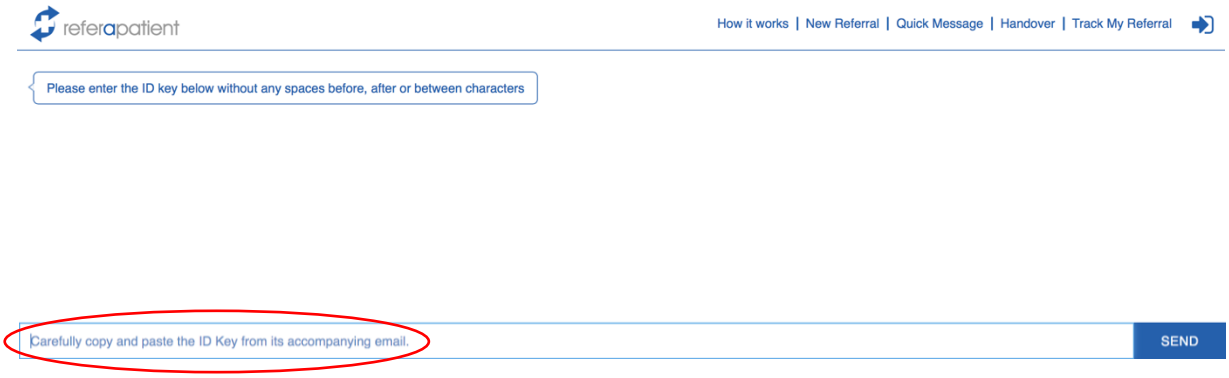
NB: You can also follow the steps above on your personal smartphone. This might sometimes even be faster (try to dictate text using the microphone button on your smartphone keyboard), although you would not be able to copy & paste imaging reports and other information like you can from a UHL workstation.

Follow-on actions

- You will receive a text (and automated call!) to your mobile once the neurosurgeons have read your referral, and a further one when they have responded. **NB**: To ensure that the right clinician receives those alerts after you have left your shift (and that you are now left in peace), you can use the system to hand over to a named colleague (see below for details).
- The starting point for any further action regarding a referral is to click on 'Track My Referral'

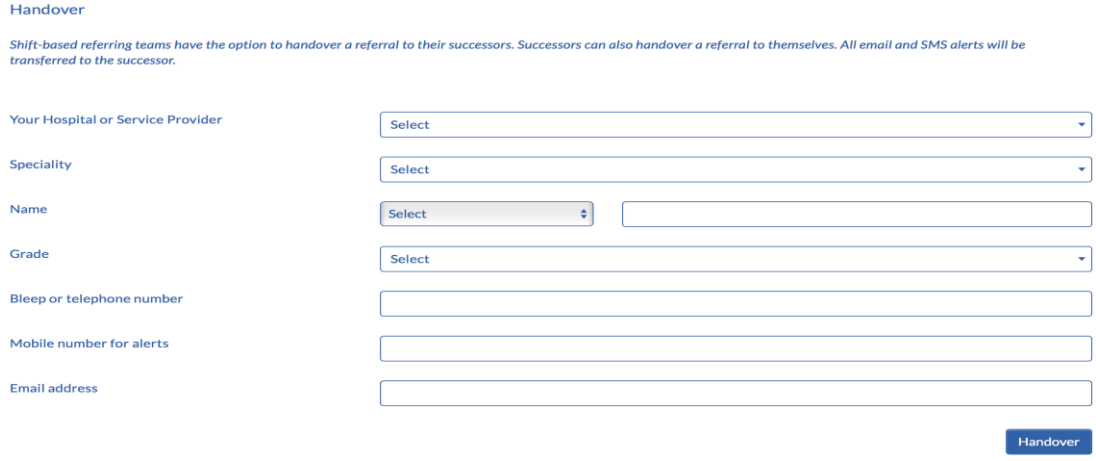


- Copy & paste ID key from NerveCentre (or your email) into the field at the bottom of the page

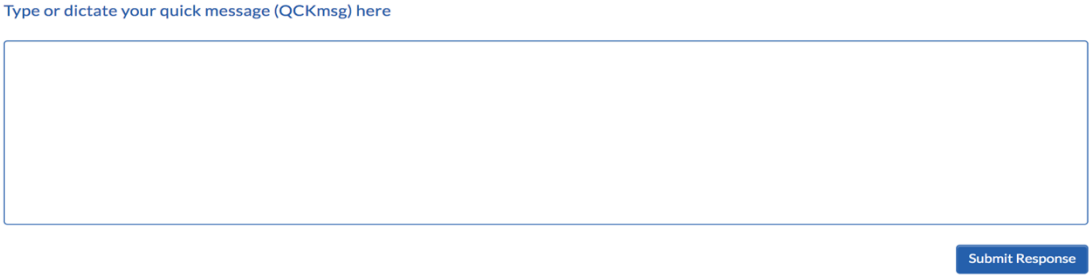


- Hit 'SEND'. The system will retrieve your referral and present you with several options (the important ones are highlighted and explained below):

Click this to **hand over** and enter the necessary information on the next screen.



Click this to **send** additional questions or information (e.g. imaging reports) to the specialist; enter the necessary information into the single box on the next screen



Click this to **print** the document – there's a Print PDF button at the bottom of the referral. **NB**: Should **ALWAYS** be done once neurosurgical advice received. File referral in patient's record.