CLINICAL BUSINESS RULE COVER SHEET

Health
South Eastern Sydney
Local Health District

Prince of Wales Hospital and Community Health Services
The Royal Hospital for Women

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COMPLIANCE WITH THIS DOCUMENT IS MANDATORY

Feedback about this document can be sent to SESLHD-POWHPolicy@health.nsw.gov.au

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CLINICAL BUSINESS RULE

Prince of Wales Hospital and Community Health Services
The Royal Hospital for Women

Management of patients with acute stroke symptoms

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Management of patients with acute stroke symptoms

1. PURPOSE & SCOPE

The purpose of this business rule is to standardise and expedite the process for patients who have acute stroke symptoms to receive urgent and potentially lifesaving treatment. This business rule will outline clinician responsibilities and the most effective processes to permit efficient assessment, expedited time to treatment and safest transfer, both within and outside the facility.

The process for implementing treatment options for the management of acute ischaemic stroke requires a coordinated, multidisciplinary team approach to optimise patient outcomes. The two alternative but complementary treatment options include:

- Intravenous Tissue Plasminogen Activator (IV TPA)
- Rapid Interventional Neuroradiology (INR) (e.g. endovascular clot retrieval)

IV TPA followed by endovascular clot retrieval is currently the recommendation for a patient with a large vessel occlusion (LVO) where the patient is eligible[1].

2. RESPONSIBILITIES

Neurologists
Interventional Neuroradiologists
Interventional Neuroradiology Junior Medical Officer
Anaesthetists
Emergency Department clinicians
Neurology Registrars
Medical Registrars
Stroke Clinical Nurse Consultant/Nurse Practitioner (CNC/NP)
Bed Manager
Patient flow Manager
Medical Imaging clinicians
Ambulance service
Intensive Care Clinicians
Emergency Department ward clerk
POWP Medical Officers and Registered Nurses
RHW Medical Officers and Registered Nurses
POWH Medical Officers and Registered Nurses

3. DEFINITIONS/ABBREVIATIONS

AHM – After Hours Manager

ASU- Acute Stroke Unit

CT sequence- Computed Tomography: including CT non-contrast brain, CT Perfusion brain, Computed Tomography angiography (CTA) neck and head

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DA- Duty Anaesthetist

DSA- Digital Subtraction Angiogram

ED MO- Emergency Department Medical Officer

ECR (Endovascular clot retrieval) - Extraction of the intracranial thrombus/embolus using endovascular techniques by Interventional Neuroradiologists. The term endovascular clot retrieval is used in this Clinical Business Rule to encompass thrombectomy as well.

INR- Interventional Neuroradiology/ist

INR team – Interventional Neuroradiologist, JMO, DSA radiographer, DSA nurses (instrument, circulating, anaesthetic)

In hours- 8:30-17:00 Monday to Friday

Inclusion/exclusion criteria- Checklist to determine eligibility for IV TPA - See Appendix 1

IV TPA - Intravenous Recombinant Tissue Plasminogen Activator (AKA Alteplase/thrombolysis)

LOC- level of consciousness

LVO- large vessel occlusion, symptoms are one or more of: hemiparesis, aphasia, eye deviation, decreased LOC or brainstem signs

MID- Medical Imaging Department

MODIFIED RANKIN SCORE- scale for measuring the degree of dependence in the daily activities of individuals

NIHSS- National Institutes of Health Stroke Scale is an abbreviated neurological assessment scale used to determine stroke severity

Out of hours- 17:00-8:30 Monday to Friday, weekends and public holidays

POWP- Prince of Wales Private Hospital

RHW- Royal Hospital for Women

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Stroke team - Stroke Registrar and Stroke CNC/NP at a minimum (in hours only) with the support of the on call Neurologist and Neurology Fellow/Advanced Trainee. Out of hours the ED clinicians/Medical Registrars will perform the function of the Stroke team

TPA box/Acute stroke box- contains Alteplase policy, current clinical business rule, Alteplase and equipment to administer Alteplase, documentation requirements needed during assessment of acute stroke patient, including NIHSS forms and inclusion/exclusion criteria. There are one of these boxes in ED resuscitation bay and one on Parkes 3 East for inpatients.

STROKE SYMPTOMS- Stroke is an acute neurological disturbance characterised by a disruption to or cessation of blood to a part of the brain and it has a varied presentation, however the following are the most common symptoms. These can be one, or a combination, of the following:

- Facial weakness or asymmetry
- Limb weakness or sensory impairment
- Absence or impairment of speech
- Slurred speech
- Visual impairment
- Ataxia
- Impaired coordination

NB: Headache and confusion can also be a symptom of stroke but should be considered within the context of their presentation as there are many other causes for these symptoms.

Definition of NHMRC grades of recommendations

Grade of Recommendation	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

4. COMPETENCY/ASSESSMENT

Requirements:

NIHSS competency needs to be completed online every two years by all nurses performing the scale. Refer to:
http://nihss-english.trainingcampus.net/uas/modules/trees/windex.aspx

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Nurses do not need specific accreditation to administer IV TPA; however the following need to be available to treat:

- Emergency trolley
- Cardiac monitoring
- Two or more clinicians present who are authorised to administer intravenous medications

All RNs and ENs without notation must successfully complete the competency requirements in accordance with POW Clinical Business Rule- Medication Management [2] prior to the administration of medications.

5. CLINICAL BUSINESS RULE

5.1 Criteria for Endovascular clot retrieval

- >18 years (not an absolute contraindication)
- Ischaemic stroke with proven LVO on CTA
  - Internal carotid artery (ICA)
  - Middle Cerebral Artery (MCA) M1 segment and early M2 segment
  - Basilar artery
- Independent pre morbid function (modified Rankin score 0-2)
- Ability to start the procedure within 6 hours of stroke onset- discretion for basilar artery occlusion and selected anterior circulation patients beyond 6 hours
- IV TPA commenced if eligible
- Accessible to ECR – assessment by INR Consultant
- In selected other LVO after consultation between Neurologist and INR Consultant [3]

5.2 'Acute stroke' call

The POWH utilises an early warning system, called an 'acute stroke' call, to notify relevant staff of a patient who may potentially be a candidate for IV TPA and/or ECR.

In addition there is an ECR page that is activated by the INR team to alert relevant clinicians that a patient is being transferred for ECR.

IV TPA can be given within 4.5 hours of ictus and ECR can be done up to 6 hours from ictus. To cover both treatment options an 'acute stroke' call should be activated up to 6 hours from symptom onset or if time of symptom onset is uncertain [4].

An acute stroke call should also be activated for patients who have woken up with FAST positive symptoms, as the potential for ECR exists if imaging is favourable.

For in hours 'acute stroke' calls, as soon as it is known that the patient is not eligible for either acute stroke treatments, the Stroke team must activate an 'acute stroke stand

down' call, so all clinicians involved are aware that the potential is no longer present. As long as the potential continues the clinicians are to be prepared to act.

Prince of Wales Hospital (POWH) Emergency Department patients

An 'acute stroke' call can be activated by the Ambulance Service (by calling ED to notify them) or by the ED clinicians. The FAST (Face, Arms, Speech and Time) acronym/criteria are used by the Ambulance Service for pre-notification of stroke. ED clinicians can make the decision to activate an 'acute stroke' call if the Ambulance Service has not pre-notified ED of a potential stroke patient. This can be activated based on clinical symptoms of suspected stroke only and if these symptoms occurred within six (6) hours of presentation.

In hours

To activate the 'acute stroke' page from ED the staff member contacts switch on 2222 and requests activation by stating 'acute stroke' and the location of the patient. ED clinicians should make an 'acute stroke' call as soon as a potential patient is identified, as time is limited to receive acute stroke management. ED MO and/or Ambulance officer should remain with the patient to provide clinical handover to the stroke team.

After hours

After hours ED will activate the 'acute stroke' page. The ED will liaise with the on call Neurologist or delegate and marshal additional resources as needed; this will include the appropriate Medical Registrar on duty and/or on call Neurology/INR Consultant.

POWH Inpatient

POWH utilises a standardised rapid response system to facilitate early recognition and response to patients with signs of clinical deterioration. A Code Blue is a formalised system for obtaining urgent assistance when someone is deteriorating, and ensures that the required skills, knowledge and equipment are available as needed. If a clinician believes an inpatient has acute stroke symptoms they need to initiate a 'Code Blue' by dialling 2222 and asking for a 'Code Blue'. This applies 24 hours a day. The Code Blue team will determine if an 'acute stroke' call is appropriate.

The Royal Hospital for Women

An 'acute stroke' call can be activated from the RHW by their Code Blue team. Clinicians in the RHW are expected to call a Code Blue if a stroke is suspected and the Code Blue team will call POW ED, nurse in charge, on extension 28400 to inform of urgent transfer. The RHW Code Blue team will escort the patient to POW ED and provide clinical handover.

The ED clinicians will activate an 'acute stroke' call and will assess the patient and initiate treatment in accordance with the clinical business rule (if applicable). If the patient is not eligible for acute stroke treatment then they can be transferred back to the RHW at the discretion of the treating medical teams. If the patient receives acute stroke treatment they will be transferred to POW ICU/HDU for 24 hours. After this, the treating medical teams can decide on the best location for the patient.

Prince of Wales Private Hospital

An 'acute stroke' call can be activated from POWP by a member of the POWP Code Blue team. Clinicians in the POWP are expected to call a Code Blue if a stroke is suspected and a member of the Code Blue team will call POW ED, nurse in charge, on extension 28400 to inform of urgent transfer. The POWP Code Blue team will escort the patient to POW ED and provide clinical handover.

The ED clinicians will activate an 'acute stroke' call and will assess the patient and initiate treatment in accordance with the clinical business rule (if applicable). If the patient is not eligible for acute stroke treatment then they can be transferred back to the POWP at the discretion of the treating medical teams. If the patient receives acute stroke treatment they will be transferred to POW ICU/HDU for 24 hours, after this the treating medical teams can decide on the best location for the patient.

If the patient is in a POWP CTICU bed and it is deemed safer for the patient to be managed by CTICU staff, then the patient will be assessed and managed in the CTICU area and transferred directly to MID with stroke team/ Code Blue team, CTICU MO and CTICU nurse escort. The patient will need to be discharged from the POWP and admitted to the public hospital to facilitate imaging in the MID, in hours this will be done by calling the admissions office on extension 23410 and after hours contact ED clerical staff. Post imaging this process will need to be reversed if the patient is not being treated at POWH.

5.3 Staff who receive an 'acute stroke' call

Acute Complex and Community Care (ACCC) Nursing Co-Director
Intensive Care Unit Clinical Nursing Unit Manager (ICU CNUM)
Interventional Neuroradiologist
Interventional Neuroradiology JMO
Medical Imaging Nurse Manager /Medical imaging Clinical Nurse Consultant (CNC)/ CT Radiographer/DSA Suite
Patient Flow (Bed Manager)
Neurology Advanced Trainee (AT)/Fellow
Neuroscience Nursing Unit Manager (NUM)
Stroke CNC/NP
Stroke Nursing Unit Manager (NUM)

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Stroke Registrar
Stroke Clinical Nurse Educator

Note: Most of these staff will respond in hours only, which is 8:30 to 17:00 Monday to Friday. For ED admissions after hours, it is the responsibility of the ED MO to contact the Neurologist on call and/or INR Consultant on call. For inpatients after hours, it is the responsibility of the Code Blue team to contact the Neurologist on call and/or INR Consultant on call.

5.3.1 Roles and responsibilities- 'acute stroke' call in hours

ED Medical officers and Nurses

- Assess patients for stroke symptoms
- Triage patient accordingly
- Activate the 'acute stroke' page
- Perform necessary emergency care
- ED nurses should perform basic required medical care such as ECG/vital signs and neurological observations/monitoring and cannulation (with an 18-gauge cannula, in the right arm if possible, for CT and IV TPA purposes). NB another cannula will need to be inserted if IV TPA is given, as two cannulas are required
- The ED MO should provide clinical handover to the stroke team unless the Ambulance team is present
- The ED MO should order CT sequence and blood tests urgently (FBC, LFT, EUC, coagulation profile & cross match)

The ED nurse should stay with the patient at all times until the IV TPA is administered and the patient:

- is transferred to Intensive Care Unit (ICU)

AND/OR

- until the patient has been transferred to the DSA suite

OR

- has not been recommended treatment with either IV TPA or ECR

The Stroke team will remain with the patient until the IV TPA is started and no immediate reactions seen, they will then handover to ICU or ED.

Note: ED clinicians/Medical Registrar after hours also fulfil the role of the Stroke team outlined below.

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Stroke team

- Assess the patient in person as soon as possible
- Ascertain medical history
- Determine NIHSS
- Escort patient to MID
- Call and discuss patient with INR Consultant and/or Neurologist on call
- Stay with patient until treatment started or decision made not to recommend or treat with IV TPA or ECR
- If patient has been recommended for treatment and is being treated with IV TPA and/or ECR, the clinical NUM of ICU is to be notified and will arrange ICU bed as able
- Contact the DA if the patient is receiving ECR on extension 20500/20501
- For patients requiring a general anaesthetic, the Patient Flow Unit is to be notified that a recovery bed is required
- Activate an 'acute stroke stand down' call if the patient is not eligible for IV TPA and/or ECR, so all clinicians involved are aware that the potential is no longer present (in hours only)

Neurologist

Review the patient in person, if necessary; make the decision whether to recommend IV TPA and ensure informed consent is obtained, if able. If the Neurologist is called after hours about a patient and requests the CT sequence, then it is their responsibility to ensure the CT sequence is reviewed and appropriate treatment recommended and assist in facilitating the process.

INR Consultant

Ensure the imaging is reviewed in a timely manner to determine need for ECR and/or assist with the decision on whether to recommend and/or treat with IV TPA. Where ECR is required, bookings are to occur in accordance with POW Business Rule- Interventional Radiology and Interventional Neuroradiology session times and bookings. It is also the INR team's responsibility to complete the green sheet and eMR/Surginet request for the ECR procedure, if they are unable to they should liaise with the Stroke team to complete this. The INR Consultant is required to communicate the outcome of the ECR procedure with the Neurologist.

Medical Imaging Department (MID)

Ensure the CT sequence is done urgently and facilitate the imaging being reviewed by the appropriate clinician, to assist with treatment decisions. Assist with arranging urgent ECR if required.

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Acute, Complex and Chronic Care (ACCC) Co-Director/ICU Clinical NUM/Stroke NUM/Neurosciences NUM, Patient Flow Manager & Bed Manager

Notification only for bed flow purposes and to identify appropriate placement of patient in accordance with POW Admission Business Rule [5].

Code Blue team

Assess inpatients that have been identified as having acute stroke symptoms and in hours, alert the stroke team if stroke is suspected by calling 2222 and asking for an 'acute stroke' call and stating the location. Out of hours, the Code Blue team have all the responsibilities of the stroke team, in collaboration with the Neurologist/INR Consultant on call.

5.4 Patients admitted directly to the Emergency Department (in hours)

An 'acute stroke' call is activated as soon as possible for patients with stroke symptoms who could potentially receive IV TPA and/or ECR (Refer to SESLHDPR/236)[4] ideally following notification by the Ambulance Service and activation of an 'acute stroke' call by ED.

The call for potential IV TPA and/or ECR patients (i.e. those with a LVO) should be activated for up to 6 hours after the onset of stroke symptoms, once they have been assessed.

Emergency clinicians are responsible for obtaining patient given name, family name and DOB at time of pre-notification from Ambulance Officers, if available. This information should be provided to the ED Ward Clerk for patient registration to Stroke team at the time of the 'acute stroke' call. The Stroke team should use these details to identify patient history through the eMR system if they have previously been to POWH.

Assessment and essential management

The patient should be given an Australian Triage Category 2 priority at a minimum, placed in the Resuscitation Bay, if possible, and the established IV TPA protocol started, if appropriate [5]. The process is the same for potential ECR patients.

The Emergency staff should provide 1:1 care of the patient and assess and manage clinical conditions until the stroke team arrives.

The Stroke team are required to attend ED as soon as possible and perform neurological assessment on the patient using the NIHSS form. If the NIHSS is 4 or above the stroke team must also complete the following form, as soon as practicable:

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'Alteplase (Recombinant Tissue Plasminogen Activator) in Adult Acute Ischaemic Stroke – Management of' (i.e. Inclusion/Exclusion criteria).
This will aid in assessing eligibility for IV TPA and/or ECR.

The patient must have observations/assessments at a minimum [4]:

- 12 lead ECG
- Haemodynamic and neurological observations (BP, T, HR, RR, Sp02,GCS)
- Cardiac monitoring
- Urgent bloods (FBC, LFT, EUC, coagulation profile & cross match)
- Two cannulas inserted
- Urgent CT sequence ordered in eMR
- Blood glucose level

Any non-essential management can be given prior to CT provided it does not delay transfer to CT.

The Radiographers/Medical Imaging Registered Nurses are responsible for completing the Iodine containing Contrast Administration Checklist/Consent form with the patient (where possible) or person responsible.

If the patient is not able to complete the Iodine Containing Contrast Administration Checklist/Consent form [6]:
• The treating Medical team must confirm with the Radiologist/Radiology Registrar the decision to proceed to obtain an urgent diagnosis
• Radiographer/RN must consult the requesting Medical Officer to complete and sign the relevant contrast checklist/consent form. This includes the requirement to check Powerchart to identify any previous reaction to contrast enhanced imaging. The decision to proceed without obtaining renal function testing results must be documented in the patient's health care record [7].
In hours the NIHSS, inclusion/exclusion criteria and CT sequence should be done by the Stroke team before the call is made to the Neurologist. The Neurologist should be called and notified of the acute stroke call at the earliest opportunity by the Stroke team.

Notification to INR team

The INR Consultant on duty will be notified of potential ECR patient via the hospital paging system. If the INR team do not attend the MID then they should be contacted through switch, if necessary.

Eligibility for IV TPA and/or ECR

Patients with NIHSS 4 or above and age > 18 years should be urgently assessed for eligibility to receive IV TPA and/or ECR.

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Suspected stroke patients with an NIHSS of less than 4 should still receive the urgent CT sequence if they have cardiovascular risk factors and/or the stroke team require imaging to assist with diagnosis. The Neurologist on call should be contacted to assist with decision making if the stroke team are unsure.

If a patient has an NIHSS score of < 4 and/or there are clear exclusion criteria for IV TPA and/or ECR then the stroke team can, at their discretion, order a CT non contrast only and initiate the 'acute stroke stand down' call (see Appendix 1) [8].

If the patient has an NIHSS score of 0 and/or there are clear exclusion criteria then the Stroke team, including the Stroke CNC/NP, can activate an 'acute stroke stand down' call and leave the ED team to assess the patient and commence a treatment plan.

As soon as it is known that the patient is not eligible for either acute stroke treatments, the Stroke team must activate an 'acute stroke stand down' call, so all clinicians involved are aware that the potential is no longer present. As long as the potential continues the clinicians are to be prepared to act. The Neurologist on call needs to be made aware of all potential stroke calls in a timely fashion.

Transfer to Medical Imaging Department

The patient must be transferred with continuous cardiac, pulse oximetry (SpO_2) and blood pressure monitoring available at all times[4]. The ED nurse allocated to the patient must escort the patient to, and remain with the patient in the MID with the Stroke team [9].

The TPA box (kept in ED in resuscitation bay 1) must be taken with patient, but the medication itself should only be prepared once the decision is made by the Neurologist to recommend it and the patient has consented, if able.

The imaging must be reviewed by a Radiologist, Neurologist, Radiology Registrar or INR Consultant as soon as possible and ideally whilst the patient is still in the MID [8].

If the decision has been made to treat with ECR, the patient is transferred directly to the DSA suite if the team are ready [8]. If there is a case in progress in the DSA suite, the patient should return to ED, with ED nurse and stroke team escort, until ED receive a call that the DSA suite is ready.

Decision making process for IV TPA alone

All patients who meet the inclusion & exclusion criteria will have IV TPA recommended and be treated with IV TPA when consent obtained, if able [10].

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If the patient is eligible for IV TPA, then the Neurologist on call should be notified directly and give the final approval to go ahead with IV TPA. It is at the Neurologists discretion whether they attend ED to assess the patient themselves or give the approval to the Stroke team over the phone. The patient will then be admitted under the Neurologist who gave the approval.

If the patient is not eligible for IV TPA, the Stroke team need to discuss with the Neurologist on call and the reason for not receiving treatment clearly documented in the Health Care Record.

Once the decision has been made to recommend IV TPA, the Stroke team is required to gain consent from the patient/person responsible if possible and document this in the Health Care Record/eMR in accordance with NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11]. Written consent is not mandatory for administration of IV TPA.

The Stroke CNC/NP and ED nurse need to ensure the requirements prior to administration of IV TPA have been attended to, as per SESLHD PR/236 'Alteplase (Recombinant Tissue Plasminogen Activator) in Adult Acute Ischaemic Stroke – Management of' [4].

Eligible patients may be treated in any location provided the following are available:

- Emergency trolley
- Cardiac monitoring
- Two or more clinicians present who are authorised to administer IV medications (See Section 4)

For patients in the MID, IV TPA bolus should be administered on the CT table (prior to commencement of CT perfusion and CT angiogram) if the following criteria have been met:

- patient is eligible for IV TPA
- consent obtained, where possible
- Neurologist has given approval for IV TPA
- CT non contrast shows no established infarct and no haemorrhage

Once the CT sequence is completed, the remaining dose can be administered.

The Stroke Registrar must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed Manager of transfer. If the bed is already available then the patient will be transferred directly to ICU. If the bed is not immediately available then the patient must return to resuscitation in ED until the bed is available. Bed availability should not delay IV TPA being administered.

The patient must stay in ICU/HDU for at least 24 hours and may not be transferred until a repeat CT Brain or MRI has been done and reviewed [8]. The patient will then go to the ASU if clinically stable. The Stroke team is responsible for documenting the NIHSS score 24 hours post IV TPA and/or ECR in the patient's Health Care Record.

Decision making and process for ECR alone

If the patient is not eligible for IV TPA the patient may still be considered for ECR [8].

The Stroke team should ensure the imaging is reviewed by a Radiologist, Neurologist Radiology Registrar or INR Consultant and if it shows an LVO then the Stroke Registrar must call the INR Consultant on call (if not present) to determine eligibility for ECR.

Once the decision has been made to treat the patient with ECR the MID Nurse Manager (or delegate) is to be informed by the INR Consultant or INR JMO, so they can assemble an INR team and prepare equipment.

The INR nursing team leader will inform the ED when the patient is to be transferred to the DSA suite. This should be completed as soon as possible to minimise treatment delay. The patient should stay in ED or be supervised in the CT waiting area until the DSA suite is ready.

The INR team or Stroke Registrar will notify the DA on extension 20500/20501 as soon as ECR eligibility has been confirmed. ECG, available blood results- including group and hold, and previous Health Care Records should be available for the DA when they review the patient.

The INR team must complete the green sheet and eMR/Surginet request for the ECR procedure.

ECR should be discussed with the patient or their person responsible, consent gained, and fasting time established if possible. In an emergency, where the patient is unable to give consent and the treatment is required immediately:
(i) to save the person's life; or
(ii) to prevent serious injury to a person's health; or
the procedure/treatment may be carried out in the absence of consent in accordance with the NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11] and documented in the patient's Health Care Record.

The Stroke Registrar must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer.

The Stroke team or INR JMO must request recovery bed post ECR.

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The INR Consultant must call the Neurologist at the end of the procedure to communicate the patient outcome and plan.

The patient must stay in ICU/HDU for at least 24 hours and may not be transferred until a repeat CT Brain or MRI has been done and reviewed. The patient will then go to the ASU if clinically stable. The Stroke team is responsible for documenting the NIHSS score 24 hours post IV TPA and/or ECR in the patient's Health Care Record.

Decision making and process for IV TPA followed by ECR

IV TPA followed by ECR is currently the recommendation for a patient with an LVO if the patient is eligible[1].

If the patient is eligible for IV TPA, then the Neurologist on call should be notified directly and give the final approval to go ahead with IV TPA; consent needs to be obtained where able. It is at the Neurologists discretion whether they attend ED to assess the patient themselves or give the approval to the Stroke team over the phone based on the clinical judgement and information provided. The patient will then be admitted under the Neurologist who gave the approval.

The Stroke team should ensure the imaging is reviewed by a Radiologist, Neurologist, Radiology Registrar or the INR consultant, if imaging shows an LVO then the Stroke Registrar must call the INR Consultant on call (if not present) to determine eligibility for ECR and then call the Neurologist on call to update them.

Where imaging shows an LVO and the patient is being treated with ECR and IV TPA, only the Neurologist can give approval for the IV TPA.

The INR team or Stroke Registrar will notify the DA on extension 20500/20501 as soon as ECR eligibility has been confirmed. ECG, available blood results- including group and hold, and previous Health Care Records should be available for the DA when they review the patient.

The MID Nurse Manager is to be informed so they can assemble the INR team and prepare the equipment and room for the procedure.

The INR team must complete the green sheet and eMR/Surginet request for the ECR procedure.

ECR should be discussed with the patient or their person responsible and informed, written consent be gained and fasting time ascertained if possible. In an emergency, where the patient is unable to give consent and the treatment is required immediately:
(i) to save the person's life; or
(ii) to prevent serious injury to a person's health; or

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the procedure/treatment may be carried out in the absence of consent in accordance with the NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11] and documented in the patient's Health Care Record.

A recovery bed must be requested post ECR by the Stroke team or INR team.

The Stroke Registrar must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer.

If the patient is having IV TPA followed by ECR then the IV TPA should be started immediately, in any location, provided the following are available:

- Emergency trolley
- Cardiac monitoring
- Two or more clinicians present who are authorised to administer intravenous medications

For patients in the MID, IV TPA bolus should be administered on the CT table (prior to commencement of CT perfusion and CT angiogram) if the following criteria have been met:

- patient is eligible for IV TPA
- consent obtained, where possible
- Neurologist has recommended IV TPA
- CT non contrast shows no established infarct and no haemorrhage

Once the CT sequence is completed, the remaining dose can be administered.

The patient should be transferred from CT directly to the DSA suite, if possible and then to recovery at the completion of the procedure. If the DSA suite is not immediately ready then the patient must return to ED until or be supervised in the CT waiting area until the DSA suite is ready.
The INR Consultant must call the Neurologist at the end of the procedure to communicate the patient outcome and plan.

The patient must stay in ICU/HDU for 24 hours and until a repeat CT Brain or MRI is done, the patient will then go to the ASU. An NIHSS score must be done 24 hours post ECR and this information kept by the Stroke CNC/NP.

5.5 Patients admitted directly to the Emergency Department (out of hours)

Note: IV TPA is available 24 hours a day 7 days a week; however, the process varies as the Stroke team is not available out of hours.

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ECR cases after hours will be considered and to determine if the procedure can go ahead. The process is to occur in accordance with POW Clinical Business Rule- INR Sessions times and bookings [12].

Identification

All patients who present to ED within six (6) hours of onset of stroke symptoms should be assessed for eligibility for IV TPA and ECR. After hours, there is no stroke team and therefore the ED clinicians/Medical Registrars will manage the patient. An 'acute stroke' call is to be activated by clinicians in ED so that MID are aware of the need for urgent imaging, the Medical Registrar on call knows to attend ED and the afterhours bed manager is informed there is a potential patient.

Assessment and essential management

The patient should be given an Australian Triage Category 2 priority at a minimum, placed in the Resuscitation Bay, if possible, and the established IV TPA protocol started, if appropriate [4]. The process is the same for potential ECR patients. The TPA box in ED has all necessary paperwork and documentation required to be able to assess for IV TPA and/or ECR.

The Emergency staff should provide/facilitate 1:1 care of the patient and assess and manage the clinical condition.

The ED MO/Medical Registrar should perform a neurological assessment on the patient using the NIHSS form and if the score is 4 or above, then they must also complete the following form: 'Alteplase (Recombinant Tissue Plasminogen Activator) in Adult Acute Ischaemic Stroke – Management of' [10]. This will aid in assessing eligibility for IV TPA and/or ECR.

The patient must have observations/assessments at a minimum:

- 12 lead ECG
- Haemodynamic and neurological observations (BP, T, HR, RR, Sp02,GCS)
- cardiac monitoring,
- urgent bloods (FBC, LFT, EUC, coagulation profile & cross match)
- two cannulas inserted
- Urgent CT sequence ordered in eMR
- Blood glucose level done

Any non-essential management can be given prior to CT provided it does not delay transfer to MID.

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Notification

Out of hours, the Neurologist on call should be called as soon as the patient is identified as a potential IV TPA and/or ECR patient to allow them time to attend the ED, if deemed necessary.

Once the decision has been made to recommend IV TPA, the Neurologist is to obtain consent from the patient or person responsible, if possible, and document this in the Health Care Record/eMR in accordance with NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11]. Written consent is not mandatory for administration of IV TPA.
If an LVO is suspected or is evident on the CT sequence, then the INR Consultant on call should also be notified as soon as possible. If the patient has presented out of regular hours for ECR, the above process needs to be followed by the INR Consultant to determine if the case can go ahead.

Once the CT sequence is ordered on eMR the MID must be called by an ED clinician to notify them of the urgency of the booking.

It is the responsibility of the Neurologist on call to ensure the imaging is reviewed and treatment is arranged if appropriate. It is the responsibility of the ED MO/Medical Registrar to assist with this process by keeping the Neurologist informed.

As soon as it is known that the patient is not eligible for IV TPA and/or ECR the ED MO/Medical Registrar will then determine appropriate clinical management. The ED MO/Medical Registrar who assessed the patient for IV TPA and/or ECR is to document that this assessment occurred and why the patient did not receive treatment in eMR. An ‘acute stroke stand down’ page is not required out of hours.

Eligibility for IV TPA and/or ECR

Patients with an NIHSS 4 should be urgently assessed for eligibility to receive IV TPA and/or ECR.

Patients with acute stroke symptoms and an NIHSS of less than 4 should still receive the urgent CT sequence if they have cardiovascular risk factors and/or the ED MO/Medical Registrar requires imaging to assist diagnosis/treatment. Where unsure, the ED MO/Medical Registrar is to contact the Neurologist on call to determine if imaging is required.

If a patient has an NIHSS score of < 4 and/or there is a clear exclusion criteria for the IV TPA then the ED MO/Medical Registrar may order a CT non contrast only if clinically indicated (see Appendix 1) (D) [8]. If the patient is not eligible for IV TPA, the reason for not receiving treatment should be clearly documented in the Health Care Record. The case should be discussed with the Neurologist on call if there is any uncertainty,

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Transfer to Medical imaging Department

The patient must be transferred with continuous cardiac, BP & pulse oximetry (SpO_2) monitoring in situ [4]. The ED nurse allocated to the patient must escort the patient to the MID with an ED MO, this can be a Junior Medical Officer.

The ED MO is responsible for completing the Iodine Containing Contrast Administration Checklist/Consent- with the patient (where possible) or person responsible.

If the patient is not able to complete the Iodine Containing Contrast Administration Checklist/Consent form:

- The treating Medical team must confirm with the Radiologist/Radiology registrar the decision to proceed to obtain an urgent diagnosis
- The Radiographer/RN must consult the requesting Medical Officer to complete and sign the relevant contrast checklist/consent form. This includes the requirement to check Powerchart to identify any previous reaction to contrast enhanced imaging. In time critical emergencies the CT should not be delayed in order to obtain renal function testing results prior to the procedure [7 p 14]. The decision to proceed without obtaining renal function testing results must be documented in the patient's health care record [7].

The imaging must be reviewed by a Radiologist, Neurologist, Radiology Registrar or INR consultant as soon as possible and the result discussed with the ED MO/Medical Registrar. The Neurologist on call must be phoned again to be updated with all relevant information if not present.

The patient must be transferred back to ED, escorted by ED MO and the ED nurse allocated to the patient and IV TPA given in the resuscitation bay, if recommended, by the Neurologist on call and consent obtained, if able.

Decision making for IV TPA alone

The patient will receive IV TPA alone if they are eligible for IV TPA, and it is recommended, and they are ineligible for ECR or an LVO is not present. The INR Consultant on call or Neurologist on call will determine the treatment options based on imaging results

A Neurologist is the only person who can make the decision to administer IV TPA. Once the decision has been made to recommend IV TPA, the Neurologist is required to obtain consent from the patient/person responsible if possible and document this in the Health Care Record/eMR in accordance with NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11]. Written consent is not mandatory for administration of IV TPA.

If the patient is not eligible for IV TPA the patient management plan is to be discussed with the Neurologist on call and the reason why the patient is not receiving treatment with IV TPA documented in Health Care Record/eMR.

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The ED clinicians/Medical Registrar need to ensure the requirements prior to IV TPA have been done, in accordance with SESLHD PR/236- Alteplase (Recombinant Tissue Plasminogen Activator in Adult Acute Ischaemic Stroke- Management of [4] and start the infusion immediately in the ED resuscitation bay.

ED clinicians need to liaise with ICU and if the bed is already available the patient will transfer directly to ICU. If the bed is not immediately available then the patient must stay in the ED resuscitation bay until the bed is available. The IV TPA should not be delayed if the bed is not yet available.

The patient must stay in ICU/HDU for 24 hours and until a repeat CT Brain or MRI is done, the patient will then go to the ASU. An NIHSS score must be done 24 hours post IV TPA and this information kept by the Stroke CNC/NP.

Decision making for ECR alone

If the patient does not meet the criteria for IV TPA the patient may still be considered for ECR [8].

The ED MO/Medical Registrar should discuss the case with the Neurologist and INR Consultant on call if imaging shows an LVO.

If the patient has presented out of regular hours for ECR, the process is to occur in accordance with POW Clinical Business Rule- INR Sessions times and bookings [12].

The INR Consultant on call or ED MO/Medical Registrar is required to contact the DA on ext 20500/20501 as soon as ECR eligibility has been confirmed. ECG, available blood results- including group and hold, and previous Health Care Records should be available for the DA when they review the patient.

Once the decision has been made to treat the patient with ECR the INR nursing team leader will inform ED when the patient is to be transferred to the DSA suite. This should be done as soon as possible to minimise treatment delay. The patient is to be managed in the ED resuscitation bay, if possible, until transfer to DSA.

The INR Consultant on call should discuss ECR with the patient or person responsible, obtain written consent and determine fasting time if possible. In an emergency, where the patient is unable to give consent and the treatment is required immediately:
(i) to save the person's life; or
(ii) to prevent serious injury to a person's health; or
the procedure/treatment may be carried out in the absence of consent in accordance with the NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11] and documented in the patient's Health Care Record.

A recovery bed must be requested post ECR by the INR consultant on call, if necessary.

The ED MO must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer.

The INR Consultant must call the on call Neurologist at the end of the procedure to communicate the patient outcome and plan.
The patient must stay in ICU/HDU for 24 hours and until a repeat CT Brain is done, the patient will then go to the ASU if clinically stable. The Stroke team is responsible for documenting the NIHSS score 24 hours post IV TPA and/or ECR in the patient's Health Care Record.

Decision making and process for IV TPA followed by ECR

IV TPA followed by ECR is currently the recommendation for a patient with an LVO if the patient is eligible[7].

The Neurologist on call should be notified directly and give the final approval to go ahead with IV TPA. A Neurologist is the only person who can make the decision to administer IV TPA. Once the decision has been made to recommend IV TPA, the Neurologist is to obtain consent form the patient/ person responsible if possible and document this in the Health Care Record/eMR in accordance with NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11]. Written consent is not mandatory for the administration of IV TPA.

The ED MO/Medical Registrar should discuss the case with the Neurologist and INR Consultant on call if imaging shows an LVO.

The INR Consultant on call, ED MO or Medical Registrar is required to contact the DA on ext 20500/20501 as soon as ECR eligibility has been confirmed. ECG, available blood results- including group and hold, and previous Health Care Records should be available for the DA when they review the patient.

The INR Consultant on call should discuss ECR with patient or the person responsible, written consent obtained and fasting time ascertained if possible. In an emergency, where the patient is unable to give consent and the treatment is required immediately:
(i) to save the person's life; or
(ii) to prevent serious injury to a person's health; or
the procedure/treatment may be carried out in the absence of consent in accordance with the NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11] and documented in the patient's health care record.

A recovery bed must be requested post ECR by the INR consultant, if necessary.

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The ED MO/Medical Registrar must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer.

If the patient is having IV TPA followed by ECR then IV TPA should be started immediately, in any location, provided the following are available:

- Arrest trolley
- Cardiac monitoring
- Two or more clinicians present who are authorised to administer IV medications

The patient should be transferred directly from CT to the DSA suite, if possible and then to recovery at the completion of the procedure. If the DSA suite is not immediately ready then the patient must return to the resuscitation bay in ED or be supervised in the CT waiting area until the DSA suite is ready. The INR nursing team leader will contact ED when the DSA suite is ready. The patient must be escorted and supervised by an ED MO/Medical Registrar and ED nurse.

The INR Consultant must call the Neurologist at the end of the procedure to communicate the patient outcome and plan.

The patient must stay in ICU/HDU for 24 hours and until a repeat CT Brain is done, the patient will then go to the ASU if clinically stable. The Stroke team is responsible for documenting the NIHSS score 24 hours post IV TPA and/or ECR in the patient's Health Care Record.

5.6 Inpatients who have acute stroke symptoms (in hours)

Inpatients that have any acute stroke symptoms of less than six (6) hours duration should be assessed for eligibility for IV TPA and/or ECR. Inpatients who are admitted to a ward bed should have a Code Blue called and the Code Blue team should activate an 'acute stroke' call if a stroke is suspected once the patient is assessed. The Code Blue team should assess airway, breathing and circulation however the stroke team should lead the acute stroke process and perform all other relevant assessments. The Code Blue team must stay with the patient until the Stroke team no longer require their assistance.

The process of assessing for treatment eligibility is the same as for those admitted to ED in hours (see Section 5.4).

As soon as it is known that the patient is not eligible for either acute stroke treatments the Stroke team must activate an 'acute stroke stand down' call, so all clinicians involved are aware that the potential is no longer present.

There is an acute stroke box with necessary paperwork and the IV TPA in the ASU, Parkes 3 East.

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If the patient is having IV TPA then this should be started immediately by the stroke team, in any location, provided the following are available:

- Arrest trolley
- Cardiac monitoring
- Two or more clinicians present who are authorised to administer IV medications

For patients in the MID, IV TPA bolus may be administered on the CT table (prior to commencement of CT perfusion and CT angiogram) if the following criteria have been met:

- patient is eligible for IV TPA
- consent obtained, where possible
- Neurologist has recommended IV TPA
- CT non contrast shows no established infarct and no haemorrhage

Once the CT sequence is completed the remaining dose can be administered.

A Neurologist is the only person who can make the decision to administer IV TPA. Once the decision has been made to recommend IV TPA, the Stroke team is required to obtain consent from the patient/ person responsible, if possible and document this in the Health Care Record/eMR. Written consent is not mandatory for administration of IV TPA .

The Stroke team must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer. If the bed is already available the patient will transfer directly to ICU. If the bed is not immediately available then the patient should be treated in MID by the Stroke team. The Stroke team must remain with the patient until they are transferred to ICU.

5.7 Inpatients who have acute stroke symptoms (out of hours)

Inpatients that have any acute stroke symptoms of less than six (6) hours duration, should have a Code Blue called and be assessed for eligibility for IV TPA or ECR, by the Code Blue team leader.

The process of assessing for treatment eligibility is the same for those admitted to ED after hours (see Section 5.5) however the Code Blue team leader will determine this and perform all functions of the ED MO/Medical Registrar in this situation (see 5.3.1). If the patient is to be treated with IV TPA they will need to be transferred to ICU urgently. The patient cannot be treated until they are in the ICU environment. The Code Blue team leader is required to call the ICU admitting officer (Fellow or Consultant on-call) to facilitate this transfer.

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5.8 Patients being transferred from another hospital for ECR (in hours)

NB: Patients who are eligible for IV TPA and ECR should have IV TPA started at the referring hospital where the hospital provides IV TPA treatment. If IV TPA is not administered at the referring hospital then the patient is to be assessed for IV TPA eligibility using the same process as patients admitted directly to ED in hours (see 5.4).

See Appendix 2- Criteria for Transfer of Ischaemic Stroke Patients to POW for ECR.

Once a patient is identified as having an LVO the referring team's Consultant must contact the on call INR Consultant via POWH switch to discuss the patient. The INR Consultant can accept the patient and agree to transfer.

The Neurologist from the referring hospital is also required to contact the on-call Neurologist.

The INR team will activate a page with the details of the patient transferring for ECR to nominated staff. The INR team will inform MID Nurse Manager of a pending ECR case and inform them of the estimated time of patient arrival, so that plans can be made to assemble the team, prepare the room and ECR and anaesthetic equipment.

Accommodation of ECR cases during normal business hours will occur based on the INR Business Rule. See POW Clinical Business Rule- INR Sessions times and bookings [12].

The referring team will be notified by the INR Consultant/Neurologist that, the referring Neurologist is to accept the patient for transfer back to the originating hospital post treatment, if the patient is stable to be transferred and specialist services are no longer required [13].

The INR nursing team leader will arrange for transfer to the DSA suite from ED when able The INR team must also call the DA to arrange a review.

The INR team is to arrange with the referring clinician to fax patient information as soon as possible, so the ED ward clerk can begin the admission process. The ED bookings clerk is to be notified so the admission process can be started with information from the referring hospital. As a minimum, this should include the patient's:

- Name and Surname
- Date of birth
- Address
- Medicare number
- Telephone number
- Referring clinician

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Other useful information includes patients:

- Next of kin/person responsible details and telephone number
- GP name and telephone number
- Private health insurance status

Patient labels, front sheet and, if relevant, prior Health Care Records need to be ready for when the patient arrives.

ECG, available blood results- including cross match, and prior Health Care Records should be available for the DA when they review the patient.

A recovery bed must be requested for post ECR by the INR team, if necessary.

The INR team must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer.

The patient must go to the ED first for assessment of airway, breathing and circulation by ED staff. The patient will not move from ED until the DSA suite is ready to accept them. If the DSA suite is ready then the patient will be assessed by the ED Registrar, at a minimum, for airway, breathing and circulation and the patient sent straight from the ambulance bay to the DSA suite without getting off the Ambulance stretcher. The Nurse in charge in ED should liaise with the DSA suite team on ext 23928 to determine if the room is ready. The patient should be escorted by an ED clinician, member of the stroke team or INR team, at a minimum

If the patient arrives via helicopter the DA or ICU Registrar, at a minimum, will meet the patient. The patient should be taken directly to the DSA suite.

Clinical Handover is to occur in accordance with ISBAR framework at the time of patient transfer/transfer of care [14].
Patient identification is to occur in accordance with POW Clinical Business Rule- Patient Identification prior to care, therapy or service [15]. Patient identification must occur before any treatment / intervention is initiated except if a life threatening or emergency situation exists [15].

POWH patient identification bands must be placed on the patient as soon as practicable after their arrival and should be in place before patient care is commenced [13].
Note: Use of MRN from the preceding facility must not be used. A third core identifier is to be used (e.g. address) to confirm patient identification.

If the patient is potentially eligible for IV TPA and they have not yet been assessed, the Stroke team will go through the established process to determine if they are eligible.

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If the patients is transferred for ECR and no longer requires the procedure on arrival, the bed manager should be contacted by the stroke team or INR Consultant to allocate a suitable bed for the patient.

ECR should be discussed with patient and written, informed consent obtained and fasting time ascertained if possible. In an emergency, where the patient is unable to give consent and the treatment is required immediately:
(i) to save the person's life; or
(ii) to prevent serious injury to a person's health; or
the procedure/treatment may be carried out in the absence of consent in accordance with the NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11] and documented in the patient's Health Care Record.

Post ECR the patient will be transferred to recovery and/or ICU.

The INR Consultant must call the Neurologist at the end of the procedure to communicate the patient outcome and plan.

The patient must stay in ICU/HDU for 24 hours and until a repeat CT brain is done [5]. If the patient is stable then the patient will be transferred back to the referring hospital. If no bed is available, the patient will go to the ASU at POW whilst awaiting transfer back to referring hospital as soon as practicable.

The Stroke team is responsible for documenting the NIHSS score 24 hours post IV TPA and/or ECR in the patient's Health Care Record.

5.9 Patients being transferred from another hospital for ECR (out of hours)

Note: Patients who are eligible for IV TPA and ECR should have IV TPA started at the referring hospital if this hospital provides IV TPA treatment. If IV TPA is not offered at the referring hospital then the patient is to be assessed for IV TPA eligibility using the same process as patients presenting directly to ED out of hours (see 5.4)

See Appendix 2 Criteria for Transfer of Ischaemic Stroke Patients to POW for ECR.

Note: Refer to POW Business Rule- INR Session Times and Bookings[12] for ECR bookings.

Once a patient is identified as having an LVO the referring team's Consultant must contact the on call INR Consultant via POWH switch to discuss the patient. The INR Consultant can accept the patient and agree to transfer. For cases anticipated to commence after 1900 hours, approval is required from the SESLHD Chief Executive or delegate- POW/SSEH General Manager.

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The Neurologist from the referring hospital is required to contact the on-call Neurologist to discuss the patient.

INR Nursing Team Leader to be contacted by the After Hours Nurse Manager as soon as possible. At a minimum the INR nursing team leader should be advised of the patient's age, gender and estimated time of arrival.

The referring team will be notified by the INR Consultant that, as a rule of transfer, the referring Neurologist must accept the patient back at 24 hour post treatment and/or once the patient is stable to be transferred [13].

The INR Consultant must call the ED to make them aware of the transfer and to expedite admission of the patient.

The INR team is to arrange with the referring clinician to fax patient information as soon as possible, so the ED ward clerk can begin the admission process. The Admitting ED officer is to liaise with the Nurse in charge to notify of the incoming INR patient, estimated time of arrival and confirm stickers, front sheet and, if relevant, the prior Health Care Records have been ordered for when the patient arrives.

The INR team must make a bed request to ICU admitting Officer (Fellow or Consultant on-call), who will inform the bed manager of the transfer.

The ED bookings clerk is to be notified ASAP so the admission process can be started with information from the referring hospital. As a minimum, this should include the patient's:

- Name and Surname
- Date of birth
- Address
- Medicare number
- Telephone number
- Referring clinician

Other useful information includes the patient's:

- Next of kin/person responsible details and telephone number
- GP name and telephone number
- Private health insurance status

The patient must go to the ED first for assessment of airway, breathing and circulation by ED staff. The patient will not move from ED until the DSA suite is ready to accept them. If the DSA suite is ready then the patient will be assessed by the ED Registrar, at a minimum, for airway, breathing and circulation and the patient sent straight from the

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ambulance bay to the DSA suite without getting off the Ambulance stretcher. The Nurse in charge in ED should liaise with the DSA suite team on ext 23928 to determine if the room is ready. The patient should be escorted by an ED clinician or member of the INR team.

If the patients is transferred for ECR and no longer requires the procedure on arrival, the bed manager should be contacted by the INR Consultant to allocate a suitable bed for the patient.

The INR Consultant on call should discuss ECR with patient or the person responsible and written obtained and fasting time if possible. In an emergency, where the patient is unable to give consent and the treatment is required immediately:
(i) to save the person's life; or
(ii) to prevent serious injury to a person's health; or
the procedure/treatment may be carried out in the absence of consent in accordance with the NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information [11] and documented in the patient's health care record.

Post ECR the patient will be transferred to ICU.

The INR Consultant must call the Neurologist at the end of the procedure to communicate the patient outcome and plan.

The patient must stay in ICU/HDU for 24 hours and until a repeat CT brain is done [5]. If the patient is stable then the patient will be transferred back to the referring hospital. If no bed is available the patient will go to the ASU at POW whilst awaiting transfer back to referring hospital as soon as practicable.

The Stroke team is responsible for documenting the NIHSS score 24 hours post IV TPA and/or ECR in the patient's Health Care Record.

6. DOCUMENTATION

Patient Health Care Record
Electronic Medical Record
SESLHD Clinical Form- Administration of Recombinant Tissue Plasminogen Activator (Alteplase) for the Treatment Of Acute Ischaemic Stroke.

7. COMPLIANCE EVALUATION

IIMs, morbidity and mortality meetings, NSF annual audits, Neurology and INR meetings

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8. RELATED POLICIES/PROCEDURES/GUIDELINES/BUSINESS RULES

Number	Policy/Procedure/Guideline/Business Rule
2	POW Clinical Business Rule. Medication Management. January 2016.
5	POW Clinical Business Rule. Admission Business Rule. February 2016.
4	SESLHD PR/236. 'Alteplase (Recombinant Tissue Plasminogen Activator) in Adult Acute Ischaemic Stroke – Management of' November 2015.
6	POW Clinical Business Rule. Administration of Intravenous iodine-containing contrast in the Medical Imaging Department. February 2015.
9	POW Clinical Business Rule. Internal Hospital Transfer. July 2014.
10	SESLHD Clinical Form. Administration Of Recombinant Tissue Plasminogen Activator (Alteplase) For The Treatment Of Acute Ischaemic Stroke. 2013
11	NSW Ministry of Health PD2005_406- Consent to Medical Treatment- Patient Information. December 2004.
12	POW Clinical Business Rule- INR Sessions times and bookings (under review). January 2017.
13	NSW Ministry of Health. (PD2011_031). Inter-facility Transfer Process for Adult Patients Requiring Specialist Care. 2011
14	SESLHDPR/303. Clinical Handover: Implementation of ISBAR Framework and Key Standard Principles. April 2015.
15	POWH Clinical Business Rule. Patient Identification prior to care, therapy or service. April 2015

9. EXTERNAL REFERENCES

Number	Reference
1	(Berkhemer, O. A., Fransen, P. S., Beumer, D., van den Berg, L. A., Lingsma, H. F., Yoo, A. J., ... & Koudstaal, P. J. (2015). A randomized trial of intraarterial treatment for acute ischemic stroke. *New England Journal of Medicine*, *372*(1), 11-20.
3	State of Victoria, Department of Health and Human Services (2016). Endovascular clot retrieval for acute stroke. Melbourne, VIC.
7	The Royal Australian and New Zealand College of Radiologists. Iodinated Contrast Media Guideline. Sydney: RANZCR; 2016. Available from: http://www.ranzcr.edu.au/documents-download/document-library-2/document-library-3/573-ranzcr-guidelines-for-iodinated-contrast-administration-2009-edition

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8	Consensus statement of POW Neurologist/INR Medical Officers. March 2015.

10. REVISION & APPROVAL HISTORY

Date	Revision No.	Author and Approval
October 2016	0	A. Bailey- Nurse Practitioner Stroke in consultation with Jason Wenderoth and Alessandro Zagami.
January 2017	0	Interim approval received from P. Bolton- Director of Clinical Services (Medical) and H. Walker-Director of Nursing and Clinical Services.
April 2017	0	Approved by POW/SSEH Policy and Procedure Review Committee for distribution.
May 2017	1	Updated Section 5.2 to include requirement for an Acute Stroke call for patients who wake up with FAST positive symptoms. Approved by POW/SSEH Policy and Procedure Review Committee for distribution.
April 2018	1	Natalie Murphy - Fixed Hyperlinks
February 2019	1	Updated SESLHD hyperlinks Natalie Murphy NM Policy, Procedure and Practice.
February 2019	1	Updated: Changed Emergency number from '777' to '2222' throughout the document, to align with SESLHD standardisation of the Emergency Number across facilities. Natalie Murphy NM Policy, Procedure and Practice.

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Appendix 1: Inclusion/Exclusion Criteria [3]

1. **Complete the Inclusion / Exclusion Criteria Checklist:**		
Inclusion Criteria (Must be Positive)	**Yes**	**No**
Clinically definite **ischaemic stroke** causing measurable neurological deficit (NIHSS ≥ 4)		
Onset of ischaemic stroke symptoms **less than 4.5 hours** prior to treatment commencement		
Age ≥ 18 years		
Exclusion Criteria (Must be Negative)	**Yes**	**No**
HISTORY		
Uncertainty regarding time of stroke onset (e.g. awaking from sleep)		
Previous intracranial haemorrhage		
Known intracranial arteriovenous malformation, aneurysm, or neoplasm		
Major surgery in previous 14 days		
Major trauma, stroke or myocardial infarction in previous 3 months		
Gastrointestinal or urinary tract haemorrhage in previous 21 days		
Arterial puncture at a non-compressible site in the previous 7 days		
Hereditary or acquired bleeding diathesis		
Therapeutic Anticoagulation – via oral, intravenous and subcutaneous routes (excluding antiplatelet agents)		
Pregnancy		
CLINICAL		
Minor or rapidly improving stroke symptoms		
Symptoms suggestive of subarachnoid haemorrhage, even with normal CT scan		
Presumed septic embolus		
Seizure at onset or any time pre-treatment		
Coma or severe obtundation with fixed eye deviation and complete hemiplegia		
Uncontrolled hypertension: Systolic BP > 185mmHg or Diastolic BP > 110 mmHg on repeated measures, despite acute treatment		
LABORATORY and CT FINDINGS		
Prothrombin time > 15 seconds or **INR≥ 1.7**		
APTT > 35 seconds in patients treated with heparin during preceding 48 hours		
Platelet Count < 100 x 10^9/L		
Blood glucose < 2.8 mmol/L or > 22.2 mmol/L		
Evidence of intracranial bleeding on CT scan		
Potential Exclusion Criteria (Discretion of Treating Neurologist/Stroke Physician)	**Yes**	**No**
Age > 80 years		
Severe neurological deficit with NIHSS score > 22		
CT demonstrating early ischaemia (parenchymal hypodensity &/or effacement of Sulci) in >1/3 of Middle Cerebral Artery territory (Re-check time of stroke onset)		
For POTENTIAL patient eligibility, ALL Inclusion Criteria must answer YES and ALL Exclusion Criteria must answer NO.		

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Appendix 2- Criteria for Transfer of Ischaemic Stroke Patients to POW for Endovascular clot retrieval

<table>
<tr><th>Criteria prior to transfer</th><th>Action taken</th></tr>
<tr><td>1. Patient selection</td><td rowspan="2"></td></tr>
<tr><td>• Patients presenting with suspected ischaemic stroke at <6 hours post symptom onset, with or without contraindications for IV rt-PA should be considered for transfer to POW for endovascular clot retrieval.
• Patient selection for transfer is based on
➢ Presence of large vessel occlusion (ICA, M1, M2, VA, BA)
➢ Duration of symptoms <6h or good collateral flow on CT and/or large penumbra on CT perfusion study
➢ Reasonably independent premorbid function (mRs 0-2)
The POW team needs at least 30-60 minutes to set up and prepare for endovascular clot retrieval, so early notification and preparation for transfer is imperative</td></tr>
<tr><td>2. Immediate Priorities in the Peripheral Hospital (after basic resuscitation)</td><td></td></tr>
<tr><td>(a) Immediate transfer to local CT scanner for
i. Non-contrast CT brain to exclude haemorrhage
ii. CT angiogram from aortic arch through neck and circle of Willis
iii. CT perfusion (if available)
Avoid multiple transfers to CT for each – get them all done in one visit</td><td></td></tr>
<tr><td>(b) If CTA shows a large vessel occlusion (see above):
➢ Immediately contact the on call Interventional Neuroradiologist (INR) at POW on (02) 9382 1111. This will be either Dr Jason Wenderoth (0412 992 278) or Dr Andrew Cheung (0416 120 268)
➢ If the findings on CT/CTA/CTP are unclear or uncertain, contact the on call INR for clarification.</td><td></td></tr>
<tr><td>(c) Initiate usual medical management of stroke, including rt-PA if indicated–
do not wait to see if rt-PA is working before planning transfer</td><td></td></tr>
<tr><td>(d) Notify Medical Retrieval Unit and plan for emergency “lights and sirens” transfer to POW under the INR on call. Give the retrieval team leader the mobile number of the INR on call for communication purposes and ETA.</td><td></td></tr>
<tr><td>(e) Do not wait for rt-PA to run through or to work before transferring patient – infusion may finish en route to POW.</td><td></td></tr>
<tr><td>(f) Fax the following patient information to POW Emergency Department on (02) 93823699
i. Patient full name, address and DOB
ii. Patient Medicare Number
iii. Patient LMO name and address
iv. Patient next of kin and home and mobile phone numbers</td><td></td></tr>
</table>

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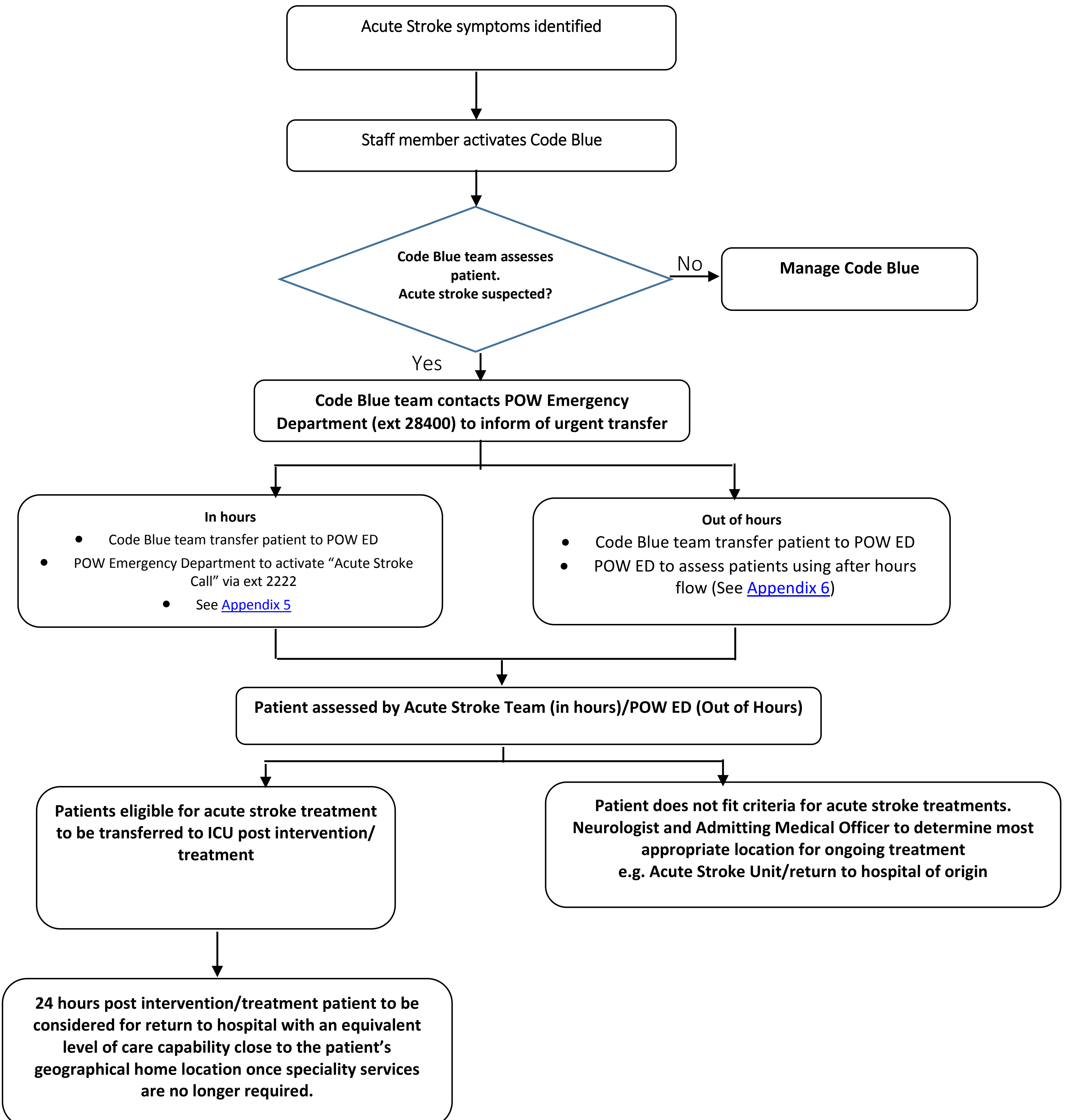
Appendix 3- Patients with Acute Stroke Symptoms-PRINCE OF WALES PRIVATE/ ROYAL HOSPITAL FOR WOMEN



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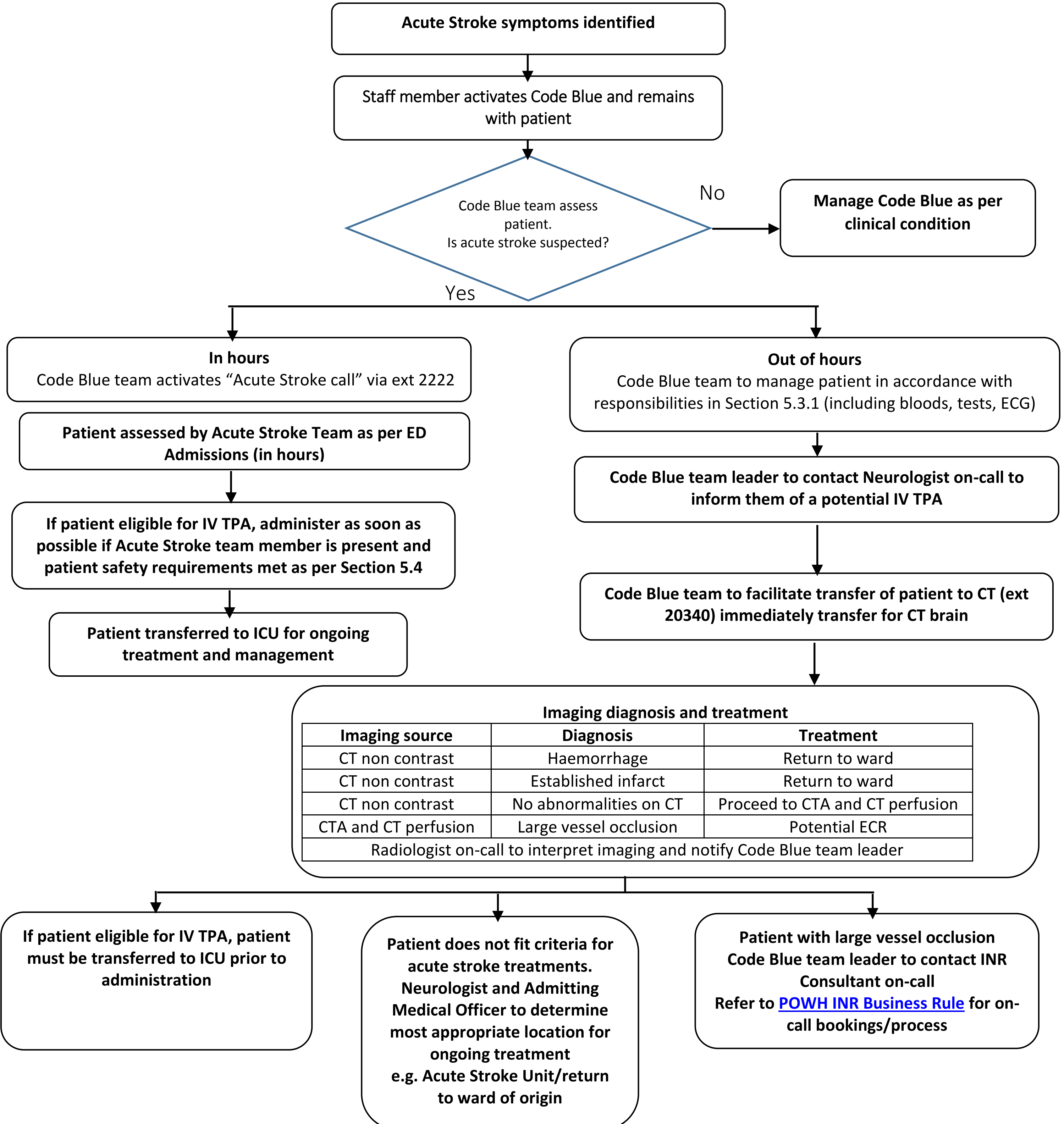
Management of patients with acute stroke symptoms

Appendix 4- Patients with Acute Stroke Symptoms- POWH inpatients



Imaging source	Diagnosis	Treatment
CT non contrast	Haemorrhage	Return to ward
CT non contrast	Established infarct	Return to ward
CT non contrast	No abnormalities on CT	Proceed to CTA and CT perfusion
CTA and CT perfusion	Large vessel occlusion	Potential ECR
Radiologist on-call to interpret imaging and notify Code Blue team leader		

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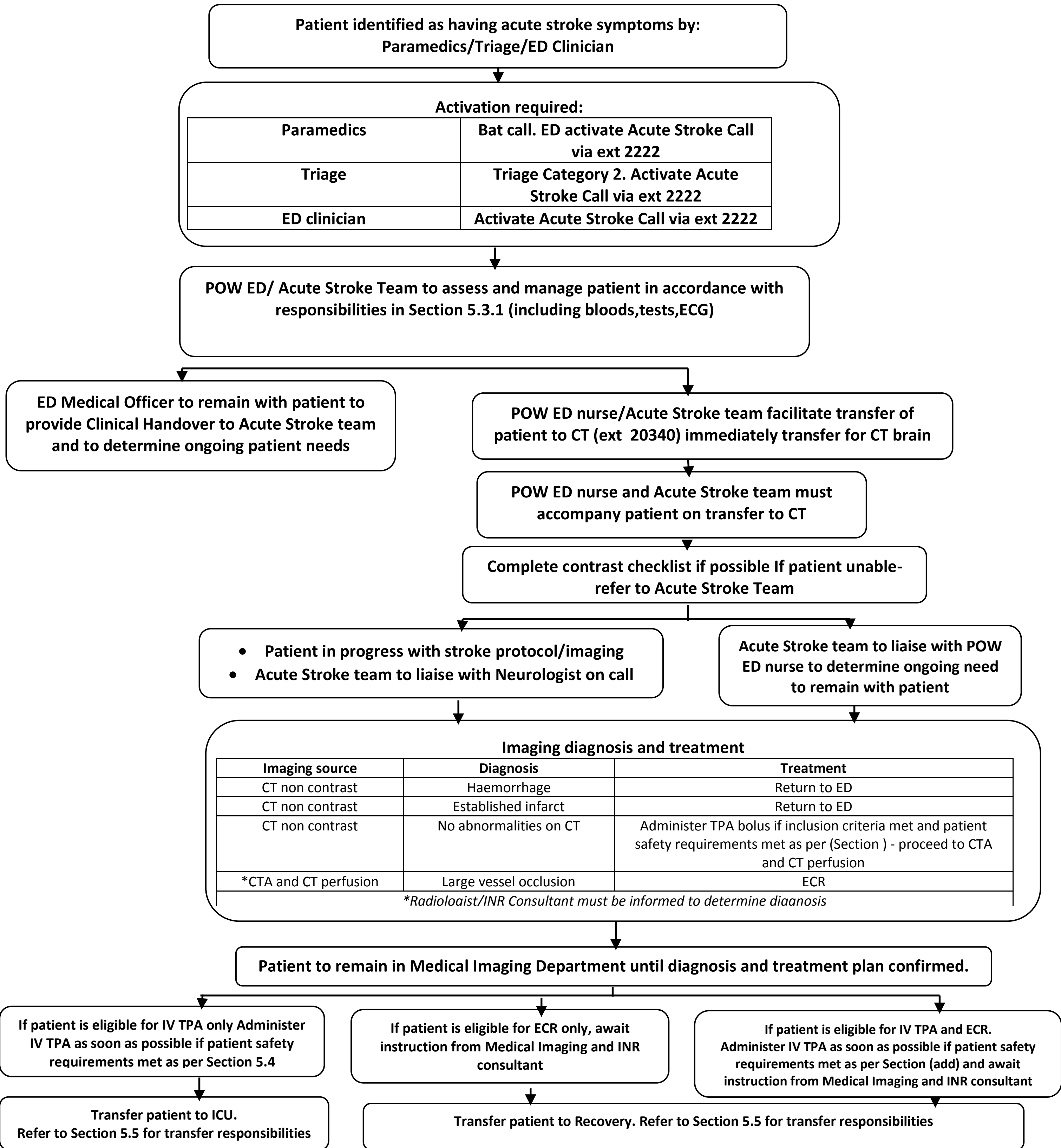
Appendix 5- Patients with Acute Stroke symptoms- POWH Emergency Department- In hours (0800-1700 hours)



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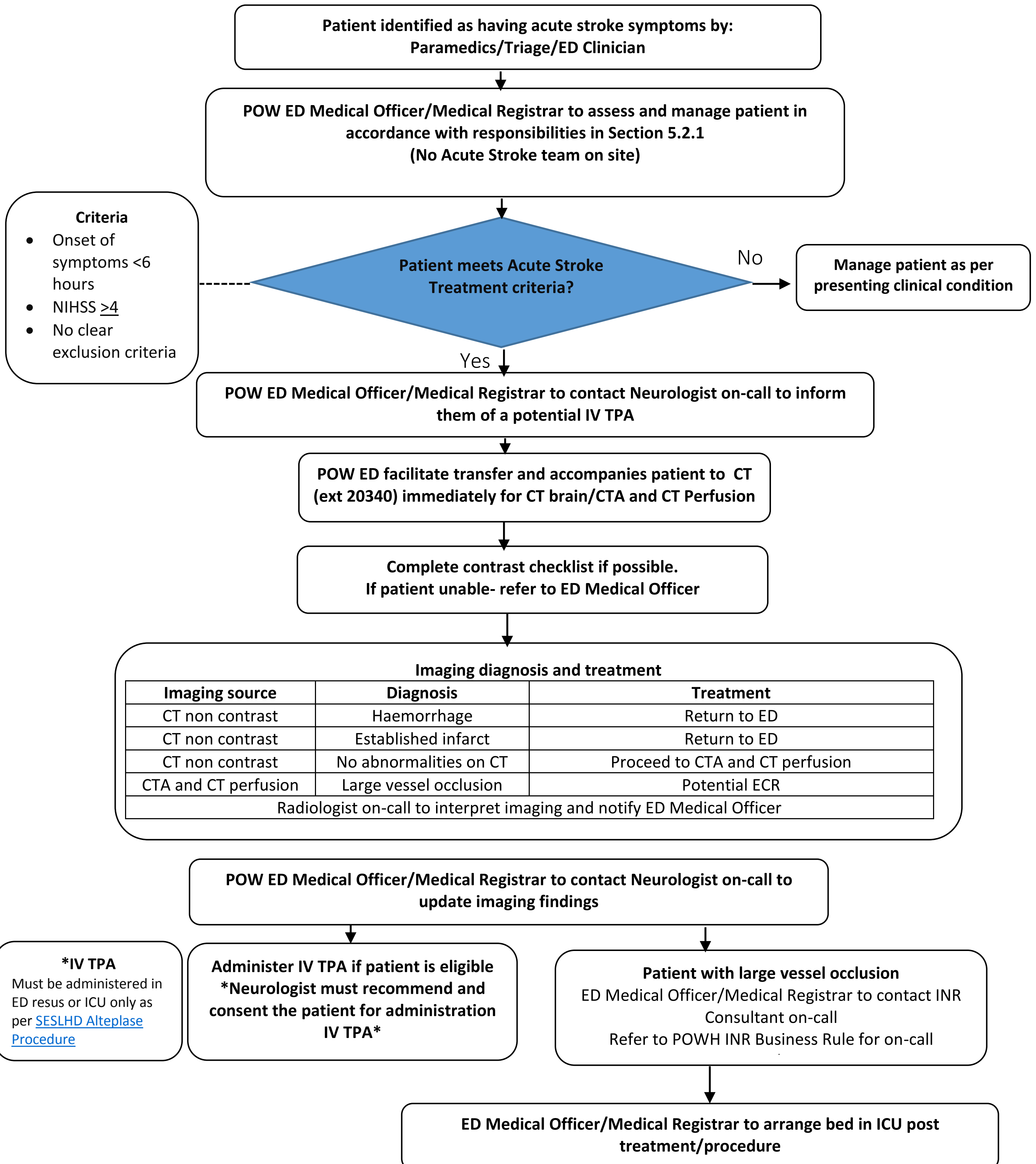
Appendix 6- Patients with Acute Stroke symptoms- POWH Emergency Department- Out of hours (1700-0800 hours)



Imaging source	Diagnosis	Treatment
CT non contrast	Haemorrhage	Return to ED
CT non contrast	Established infarct	Return to ED
CT non contrast	No abnormalities on CT	Proceed to CTA and CT perfusion
CTA and CT perfusion	Large vessel occlusion	Potential ECR
Radiologist on-call to interpret imaging and notify ED Medical Officer		

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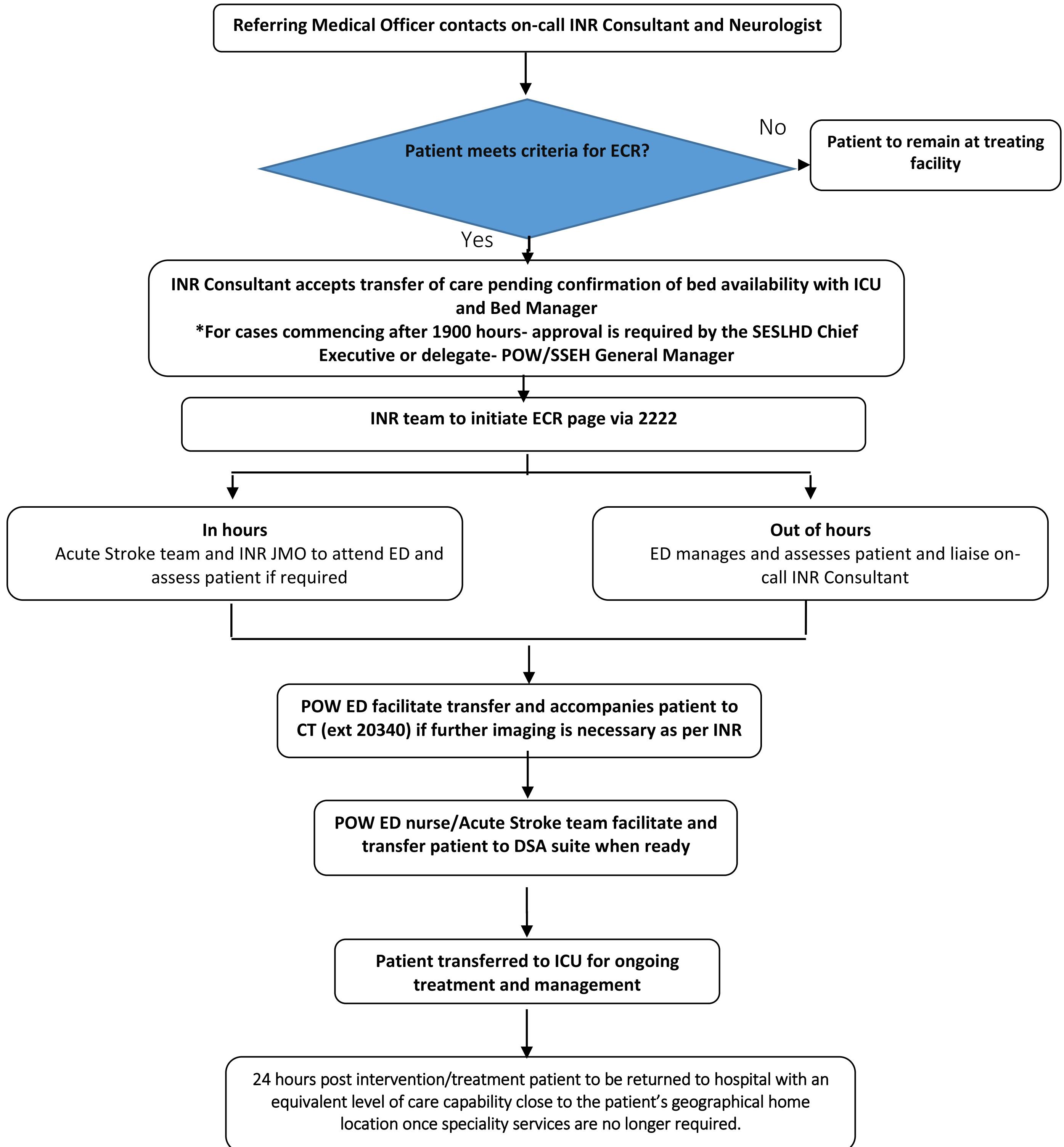
Appendix 7- Transfers to POWH for ECR



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