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INTER-HOSPITAL TRAUMA TRANSFER

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- Because of the geographical size of NSW, not all paediatric trauma patients can be transported immediately to a Paediatric Trauma Service directly from the scene of the accident. This necessitates a secondary transfer from a local hospital to a Paediatric Trauma Centre Hospital. To facilitate the transfer, a number of phone calls are often required to be made by the transferring hospital's clinicians. These phone calls are often stressful and time consuming.
- This guideline aims to standardise and streamline the process of organising Trauma inter-hospital transfers to The Children's Hospital at Westmead (CHW) and Sydney Children's Hospital (SCH).
- John Hunter Children's Hospital (JHCH) has not been included in this document. For referral to JHCH please follow that hospital's referral pathways.
- This guideline includes information about the Paediatric Acute Trauma Care Hotline (PATCH) and feedback to referring hospitals.
- In NSW, a patient is considered paediatric and a child up to their 16th birthday. Once they are 16 years of age, they should be referred and managed through the appropriate adult pathways, irrespective of whether they are still attending school or not, see SCHN Age for Admission / Treatment - Principles Regarding Inpatient, Outpatient and Outreach Clinic Care and Clinical Research policy.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1st March 2024	**Review Period:** 3 years
Team Leader:	CNC	**Area/Dept:** Trauma CHW

NSW GOVERNMENT

CHANGE SUMMARY

- CHW document updated to make document a network (SCHN) version.
- Inclusion of the process when calls come via NETS or NETS needs to be involved.
- 21/02/24 Minor review:
    - Minor wording correction and updated network PATCH poster.
    - Reconciled Trauma phone number on page 4.
- 27/02/24: Minor review: updated links in PATCH poster.

READ ACKNOWLEDGEMENT

- Clinical staff involved in accepting inter-hospital trauma referrals may include:
    - ED Consultant or Fellow
    - On call Surgeon, Surgical Fellow or Registrar
    - PICU Consultant, Fellow or Registrar
    - Sub specialty Consultant, Fellow or Registrar (incl. Neurosurgery, Orthopaedics & Plastics as required)
    - Bed Manager or After Hours Nurse Manager (AHNM)

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

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Introduction

Paediatric trauma patients transferred to SCHN require a trauma assessment **within 24 hours** of an injury by the tertiary paediatric trauma team. This includes those patients that are intubated and/or who have had surgical or other management at the referring centre.

Best practice is that trauma reception and assessment occurs in a coordinated and timely manner and is done by a complete trauma team. At SCHN the initial trauma assessment is done in the Emergency Department (ED). ED is responsible for activating the trauma call according to the trauma call criteria. This can be done pre arrival of the patient, on arrival or after ED assessment.

The trauma team at SCHN is comprised of senior clinicians from:

- Trauma Surgery (+/- other surgical subspecialties as required)
- Emergency Medicine
- Intensive Care
- Anaesthetics
- Radiography

1 Paediatric Acute Trauma Care Hotline (PATCH)

The SCHN Paediatric Acute Trauma Care Hotline (PATCH) and supporting Flow Charts (Appendix 1) have been developed to assist referring clinicians to contact NETS or the relevant Trauma team at CHW or SCH. The flow charts enable a more streamlined, standardised and evidence-based approach to the management of paediatric major trauma patients across NSW.

The flow chart aims to provide clinicians from referring hospitals with standardised criteria for the identification, handover and transfer of trauma patients. This document provides suggested guidelines and criteria for early consultation with the Paediatric Trauma facility and transfer. These may vary with the level of clinical services available at the referral hospital.

Calling the Trauma number **13004 TRAUMA** listed on the **PATCH** poster and selecting either option 1 for CHW or option 2 to SCH, allows clinical staff at a referring hospital to directly contact the relevant clinician at that site.

During the calls CHW/SCH will:

- Triage the patient
- Provide clinical advice if required
- Inform or consult any relevant consulting specialities
- Accept the admission if appropriate
- Advise on appropriate transfer timing and method
- Consult NETS and call referring clinician back if NETS transfer and input required

2 PATCH referral documentation and checklist

The PATCH referral documentation and checklist have been developed to allow the SCHN clinician receiving the PATCH call to document patient details and the clinical advice provided in relation to the trauma patient being referred. (Appendix 2). The PATCH referral documentation and checklist is an internal form used for audit and follow-up purposes.

3 Retrieval conference call

Major trauma calls from hospitals within the referral network of SCH or CHW will usually come via NETS or other retrieval services. **All** retrieval co-ordination calls requesting transfer and/ or advice for Paediatric Trauma patients **must** include:

- Emergency Medicine Consultant/Fellow on call
- Trauma surgeon on call
- Sub specialty as required

If subspecialty registrars/consultants receive call first they need to **ensure others are included in the call**

In addition

IF the patient is expected to need an ICU admission the call must include:

- Emergency Medicine Consultant/Fellow on call
- Trauma surgeon on call

AND

- Intensive Care consultant/fellow on call

If the intensive care consultant or fellow receives call first they need to ensure others are included in the call

The clinician receiving the PATCH call must call NETS (1300 362 500) to organise a conference call with relevant sub specialties as mentioned above.

4 NETS Retrieval conference call process

NETS calls are moderated by a retrieval consultant who will contact the rostered Emergency Medicine Consultant/Fellow and/or ICU Consultant/Fellow dependent on the expectation for needing Intensive Care. NETS will include the rostered trauma surgeon and also, as required, sub-specialists.

If SCHN clinicians (PATCH, Trauma, ED, ICU, sub-specialty, etc.) are contacted about patients apparently needing retrieval, they should call NETS urgently to set up a conference call. It is vital that the referring clinician's full name and direct contact number are obtained to avoid lengthy delays locating the referrer.

Importantly, NETS calls are recorded for later review, quality improvement and form part of the medical record.

Subsequent to the clinical conference calls, clinicians in either SCH or CHW should contact the Bed Manager or AHNM to discuss disposition.

5 Trauma Transfer Feedback

Hospitals which have transferred a Paediatric Trauma patient via an inter-hospital transfer are provided with written Trauma feedback on return transfer or discharge of the patient from either hospital.

This feedback is provided not only as a courtesy to referring clinicians but to assist with clinical audit, education, and performance improvement and governance activities. Feedback should acknowledge the good care delivered at the referring hospital, supporting excellence and confidence in local teams. The Trauma CNC and the Director of Trauma are responsible for completing this feedback via the Major Trauma Transfer Feedback form (Appendix 3) and a formal letter.

6 References

1. Institute of Trauma and Injury Management 2019, NSW Inter-hospital major trauma transfer, interim guideline- November 2019, Viewed 30 September 2021 https://aci.health.nsw.gov.au/__data/assets/pdf_file/0007/560257/ACI_ITIM_NSW-Inter-hospital-major-trauma-transfer-guidelines-002.pdf
2. Australian Commission on Safety and Quality in Health Care 2014, The national Safety and Quality Health Service (NSQHS) Standards, Viewed 30 September 2021https://www.safetyandquality.gov.au/sites/default/files/migrated/National-Safety-and-Quality-Health-Service-Standards-second-edition.pdf
3. NSW Kids and Families 2010, Critical Care Tertiary Referral Networks (Paediatrics) Viewed 30 September 2021 https://aci.health.nsw.gov.au/__data/assets/pdf_file/0004/244255/Critical_Care_Tertiary_Referral_Networks_Paediatrics_-_2010.pdf
4. Sydney Children's Hospital, Referrals to Emergency Department – SCH, 2014, Viewed 30 September 2021
   https://aci.health.nsw.gov.au/__data/assets/pdf_file/0016/304225/2014_Referrals_to_Emergency_Department_SCH.pdf
5. Sydney Children's Hospital Trauma Service
   http://sch.schn.health.nsw.gov.au/departments/trauma/

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Appendix 1 PATCH Flowchart

PATCH
Paediatric Acute Trauma Care Hotline

DO YOU HAVE AN INJURED CHILD THAT FULFILS MAJOR TRAUMA CRITERIA?

HIGH RISK INJURIES
- Head injury with
  - CSF leak
  - Penetrating wound
  - Skull Fracture (CT or otherwise)
  - Contusion, ICH, SAH (CT)
- Penetrating injury: neck, chest, abdomen
- Bleeding in chest or abdomen (clinical or imaging findings)
- Flail chest
- Major fractures
  - 2 or more long bones
  - Any spinal fracture
  - Any pelvic fracture
- Spinal cord injury
- Burns*
- Complex limb injury
  - Compound fracture
  - Amputation
  - Degloving, crush
  - Compartment syndrome
  - Neurovascular injury

ALTERED PHYSIOLOGY
- **A**irway / **B**reathing
  - Compromise ("Between the Flags >yellow zone**)
  - Deteriorating
  - Requires intubation and ventilation
- **C**irculation
  - Unexplained tachycardia and/or hypotension ("Between the Flags >yellow zone**)
  - Shock (compensated or uncompensated)
  - Transfusion requirement
- **D**epressed or **D**eteriorating level of consciousness, GCS < 14

HIGH RISK MECHANISMS
- Transport
  - Entrapment with compression
  - Significant blunt or penetrating force/intrusion
  - Pedestrian/cyclist impact
  - Motorcyclist impact
  - Ejection from vehicle
  - Prolonged extraction
- Other incidents
  - Fall (with significant injury)
  - Significant blunt/penetrating head/chest/abdomen
  - Significant penetrating injury to limbs
  - Suspected non-accidental injury
  - Explosion
  - Major crush
  - Electric burn
- Drowning

Does your child have ANY high risk injury and/or ANY altered physiology?

YES → **Call NETS 1300 362 500**

NO → ANY high risk mechanism, other injuries, not sure or need advice?

→ **Call PATCH 13004 TRAUMA**
Press 1 for CHW
Press 2 for SCH

*Isolated Paediatric Burns- See NSW Clinical Practice Guidelines: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0009/250020/ACI-Burn-patient-management-guidelines.pdf

** NSW Between the Flags- http://webapps.schn.health.nsw.gov.au/epolicy/policy/5035/download

SCHN NSW Trauma Network
https://aci.health.nsw.gov.au/networks/trauma/system/services/locations

Principal Referral Hospital: Sydney Children's Hospital, Randwick

- Illawarra Shoalhaven LHD
- Murrumbidgee LHD [i.]
- Northern Sydney LHD (Northern Beaches Hospital, Royal North Shore Hospitals)
- South Eastern Sydney LHD
- Sydney South West Area LHD (Balmain, Bankstown, Bowral, Camden, Campbelltown, Canterbury, Royal Prince Alfred)
- Southern NSW LHD [ii.]
- Sydney LHD
- Australia Capital Territory (ACT)
- Private hospitals and day-surgery facilities in the above geographical regions

Principal Referral Hospital: The Children's Hospital at Westmead

- Central Coast Area LHD (Gosford, Hornsby, Ryde, Wyong)
- Far West LHD [iii.]
- Nepean Blue Mountains LHD
- Northern Sydney LHD (Hornsby, Ryde)
- Sydney South West LHD (Liverpool, Fairfield, Concord)
- Western NSW LHD
- Western Sydney LHD
- Private hospitals and day-surgery facilities in the above geographical regions

- i.Owing to proximity, Albury Hospital maintains a clinical referral network with Victoria.
- ii.Owing to proximity, referrals from the Southern NSW LHD may go to Royal Children's Melbourne.
- iii.Owing to proximity, referrals from the Far West LHD may go to Adelaide

NB: During NETS discussions every effort is made to transfer trauma patient to their dedicated referral hospital. In some cases, depending on resources, weather & bed availability, a trauma patient will be transferred to the most appropriate referral Hospital.

Appendix 2 Patch Referral Form

SCHN PATCH referral- Clinical advice documentation and check list

Patient's Name:	SEX:	DOB:	AGE:
Referring hospital:	Date/time of Referral:	Referring Doctor name & role Contact number:	
	Date/Time of Injury		

MIST from referring Hospital	
Airway	Adjuncts: Y □ N □ Other:
Breathing	RR: SAO_2: Intubated/ventilated: Y □ N □
Circulation	HR: BP: Cap Refill: Fluids (mL/kg): Crystalloid: Colloid: Blood products: Other:
Disability	GCS: E: V: M: PEARL Y □ N □ L: R:
Temperature	
Spinal protection/ Other immobilization	Collar Y □ N □ Type: Other:
Imaging & other investigations +/- results	CXR: PXR: C-spine XR: FAST: CT: Bloods: Other:
Imaging reviewed	Y □ N □
T/F of images request with provisional report	Y □ N □

If CHW/SCH accepted patient transfer

Treatment prior to transfer	
Mode of transfer agreed upon	
Is Trauma consultant aware of plan?	Y □ N □ If yes: Trauma Consultant's Name: Trauma Consultant's Contact details:

ED and or PICU aware	**ED** Y ☐ N ☐ **PICU** Y ☐ N ☐
Other teams informed	Y ☐ N ☐ If Yes: Team details:
Notification to Bed Manager/AHNM	

If patient transfer not accepted by CHW/SCH

Reason for refusal	
Alternate transfer arrangements made	
Name of Trauma Centre accepting care	
Clinician details of receiving Trauma Centre	Name: Contact Details:

Name/contact details of the person taking the PATCH call at CHW/SCH	Name: Contact Details:

Appendix 3 Standards for Feedback to Referring Hospitals

An integral component of a functional trauma system is the provision of feedback to those involved in the care continuum of a trauma patient. It is envisaged that this feedback would be used for local clinical audit and governance activities.

Purpose To define the key deliverables in regards to feedback for transferred trauma patients to referring hospitals.

Aim

♦ To provide concise and targeted feedback regarding patient condition and outcome. This includes provisional/actual diagnoses and treatments.

♦ To provide specific feedback regarding issues associated with the care of the trauma patient at referring hospitals.

Minimum Standards

1. **Case Selection**

   All cases that meet PATCH criteria for transfer (Appendix 1)

2. **Timing**

   After Tertiary Trauma Survey has been completed no later than 14 days after admission

3. **Recipient**
   - Referring clinician
   - Designated Director of Trauma for the Hospital
   - Director of Emergency Department
   - Nurse Manager Emergency Department
   - Trauma CNC

4. **Dataset**
   - Patient demographics,
   - Mechanism of injury,
   - Anatomical diagnosis,
   - Surgical intervention/s,
   - ITIM data sets (KPIs).

5. **Other related information pertinent to the case or for performance feedback purposes.**

   Instructions for the use of the Paediatric Major Trauma Service Feedback information

   Feedback is essential and a valuable adjunct to clinical audit activities, staff moral and performance improvement. It is an important function of a PTC to provide feedback to acknowledge good care delivered at a referring centre and also provide feedback for improvement.

To enable referring hospitals to measure their performance in their own audit process the Major Trauma Service will provide a set of best practice standards along with a tick sheet covering which of those standard.

Major Trauma Transfer Criteria are based on Vital Signs, Injuries and Mechanism of Injury

Calling the PATCH numbers provides communication access between the two Children's Hospitals in Sydney and the referring hospital.

Calling the PATCH numbers allows a doctor at a referring hospital to make immediate contact with a trauma clinician at either Sydney Children's Hospital (SCH) Randwick or at The Children's Hospital Westmead (CHW). Senior trauma physicians will provide clinical advice and assistance to manage major trauma patients, prior to their transfer to a PTS for definitive care, as stated in the PATCH guidelines. Advice provided by the trauma clinician will be documented in an internal form for audit and follow-up purposes. (Appendix 2)

Transfer documentation

All patients transferred should be accompanied by the following documentation

♦ Spinal precautions

♦ Oxygen therapy

♦ All tubes/lines secure

♦ Monitoring equipment secure

♦ X-rays chest/pelvis/c/spine

♦ Photocopies of the following

- o Trauma Notes
- o Medical Referral Letter
- o Original Ambulance case Sheet
- o Trauma medical consultation record
- o Pathology results
- o Blood alcohol
- o ADT given
- o Urinalysis complete
- o Clothing, aids, valuables
- o Additions items listed

Pre-Transfer Clinical Audit filters.

Audit filters have been proven to be successful in assisting clinicians rapidly identify those cases for review. Given the limited amount of information contained within the feedback document, it was decided that we would apply these clinical audit filters to assist senior clinicians at referring agencies.

This Guideline may be varied, withdrawn or replaced at any time.

A failed audit filter only demonstrates that a predetermined filter threshold was not met. For example, a patient temperature of <35 degrees Celsius with no documented active warming. This audit filter will give an indication that the patient was hypothermic and there was no documentation of active warming.

It is recommend that managers familiarise themselves with these audit filters and explain the rationale for the data to staff.

Clinical Parameters

Prior to transfer ABCDs should be appropriately managed

Airway

Intubation in all patients with:

♦ Airway compromise (facial trauma/inhalation injury/airway injury)

♦ Inadequate oxygenation or ventilation (chest injury/spinal injury)

♦ Evidence of respiratory failure:

- $PaO_2 \leq$ 60mmHg (or SaO2 <90%) with FIO_2> 0.5
- $PaCO_2$ >50mmhg with pH: 7.3
- Respiratory Rate between the flags red zone for age
- GCS of less than 9

If intubated an orogastric or nasogastric should be inserted to assist in preventing aspiration

Breathing

♦ All trauma patients require oxygen

♦ Ventilation to maintain normal ABGs

♦ Intercostal catheters for haemothorax/pneumothorax

For transport air

Increasing altitude potentiates hypoxia resulting from a reduction in alveolar partial pressure of oxygen. Reduced cabin pressures can expand trapped air (pneumothorax) or liquids (swollen brain); unless pressurisation is available. Some inter-hospital transfers expose patients to altitude more by road than by air. Seek advice from NETS if in doubt.

Circulation

♦ Control external bleeding

♦ Establish 2 large calibre IVs

♦ Transfuse warmed crystalloid solution / blood products to restore blood volume and aim to normalise vital signs

♦ Insert IDC to allow urine output measurement

♦ Treat hypovolaemic shock

♦ Stabilise fractures with splints (check pulses)

Trauma Triad

Greatest risk to a trauma patient in the first 24 hours after definitive care is the trauma triad of

hypothermia, acidosis and coagulopathy.

Hypothermia

Hypothermia is defined as a core body temperature of below 35°C. Due to the susceptibility of trauma patients to hypothermia, the aim should be to keep temperature, aim should be to keep temperature >36°C.

Acidosis

PaO_2 ≤ 60mmHg (or SaO2 <90%) with FIO_2> 0.5

$PaCO_2$ >50mmhg with pH: 7.3

Respiratory Rate between the flags red zone for age

Diagnostic studies should not delay transfer

Ensure that the spine is managed according to the cervical spine acute care guidelines, analgesia to treat pain, wounds are clean and dressed and that tetanus immunisation is complete and antibiotics commenced if necessary

If at any time you require more urgent feedback in relation to a major trauma patient transferred to us please contact the trauma coordinators where the patient was transferred to:

CHW: 02 9845 1051 or 0436651965

SCH: 0419608341

Adapted from Victorian State Trauma Committee. Created December 2018 Version 3

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Major Trauma Transfer Feedback Form:

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<tr><td></td><td>Addressed</td><td colspan="6">Director of Trauma/ED:
C/O Transferring Hospital :</td></tr>
<tr><td></td><td>Patient</td><td colspan="6">Name :
DOB :
Date of Injury:
Mechanism of Injury (MIST)
M:
I:
S:
T:</td></tr>
<tr><td></td><td>Referring hospital</td><td colspan="6">Hospital Name:
Key Contact:</td></tr>
<tr><td rowspan="8">Referring Hospital Details</td><td rowspan="2">Transfer details</td><td>Escort</td><td>Dr ☐</td><td colspan="2">AMRS ☐ Careflight ☐ NETS ☐ NSWAS ☐</td><td colspan="2">Other ☐</td></tr>
<tr><td>Type</td><td colspan="3">Road Ambulance ☐</td><td>Helicopter ☐</td><td>Fixed wing ☐</td></tr>
<tr><td rowspan="2">Vitals on Admission</td><td>HR:</td><td>BP:</td><td>RR:</td><td>ETT:</td><td colspan="2">Muscle relaxants:</td></tr>
<tr><td>Spo2:</td><td>Temp:</td><td>GCS:</td><td>E V M</td><td colspan="2">Pearl:</td></tr>
<tr><td rowspan="2">Operations & Procedures</td><td>Date & Time</td><td>Location</td><td colspan="4">Details</td></tr>
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NSW GOVERNMENT

<table>
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☐No</td></tr>
<tr><td colspan="2">Did the patient arrive at the PTS within 6 hours of arrival at referring hospital?</td><td colspan="2">☐Yes
☐No</td></tr>
<tr><td colspan="2">Did all <u>appropriate</u> documentation accompany the patient?
See box below for documentation inclusion</td><td colspan="2">☐ Yes
☐ No</td></tr>
<tr><td>☐ Triage Notes
☐ Progress Notes
☐ Ambulance case sheet
☐ Medication Chart
☐ Observation Chart</td><td>☐Medical referral letter
☐ Pathology results</td><td colspan="2">Imaging
☐ Chest
☐ Pelvis
☐ C-spine
☐ Others</td></tr>
<tr><td colspan="2">Intubated if GCS <9</td><td colspan="2">☐ Yes
☐ No
☐ Not required</td></tr>
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☐ No
☐ Not required</td></tr>
<tr><td colspan="2">Hypoxia corrected
Pao2<60mmHg (spo2<90%) with Fi)2>.05</td><td colspan="2">☐ Yes
☐ No
☐ Not required</td></tr>
<tr><td colspan="2">Hypothermic Core Temperature < 36</td><td colspan="2">☐ Yes
☐ No
☐ Not required</td></tr>
<tr><td colspan="2">Coagulopathy corrected
APPTT>40sec/INR>2.0/Plt<100,000</td><td colspan="2">☐ Yes
☐ No
☐ Not required</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2">Acidosis
$PaCO_2$ >50mmhg with pH ≤ 7.3</td><td colspan="2">☐ Yes
☐ No
☐ Not required</td></tr>
<tr><td>Treatment at PTC</td><td colspan="4"></td></tr>
<tr><td>Comments</td><td colspan="2"></td><td colspan="2">ISS:</td></tr>
<tr><td>Contacts</td><td></td><td></td><td></td><td></td></tr>
</table>

NB: This form was compiled with all available data at time of reporting. If more complete information is required please contact the appropriate Trauma Coordinator

Adapted from Victorian State Trauma Committee. Created December 2018 Version 3