GUIDE

Institute of Trauma and Injury Management

NSW Inter-hospital major trauma transfer

INTERIM GUIDELINE – NOVEMBER 2019

NSW GOVERNMENT

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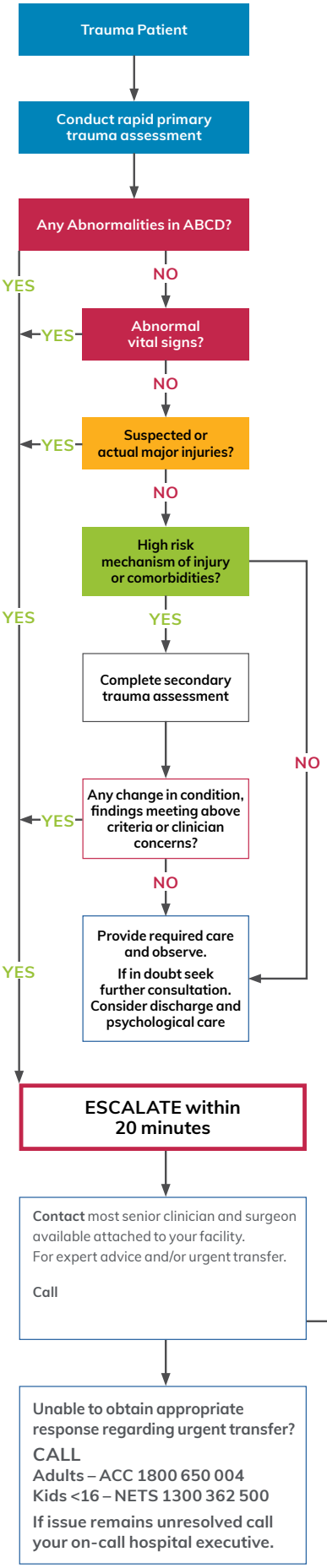
NSW Inter-hospital major trauma transfer algorithm



Abnormal Assessment in ABCD

Airway	Breathing	Circulation	Disability
• Uncontrolled airway that cannot be managed locally • Swelling, bruising, haematoma, hoarseness or stridor	• Respiratory compromise • Hypoxia, cyanosis	• Severe and / or ongoing significant haemorrhage • Haemodynamic instability. • Symptoms of shock;	• GCS ≤13 or decreasing • Lateralising signs • Motor and sensory deficit in suspected spinal cord injury • Neurovascular compromise e.g. limb injury; pain, numbness, cool, pulseless, reduced cap return

Abnormal Vital Signs

AGE	< 3 MTHS	3–12 MTHS	1–4 YRS.	5–11 YRS.	12+ YRS.	ADULT > 16 YRS.
HR	<100 or >170	<90 or >170	<80 or >150	<70 or >140	<50 or >130	<50 or >120
RR	<25 or >65	<25 or >55	<20 or >50	<15 or >35	<10 or >30	<10 or >25
BP SYS	<60 or >120	<70 or >110	<80 or >120	<90 or >130	<90 or >160	<100 or >180
SpO2	<95%					<90%
GCS	<15					<13

Any clinical deterioration in patients condition which causes concern

Suspected or Actual Major Injuries

Head
- Intracranial foreign body
- Skull fracture – open, depressed, or complex
- Intracranial haemorrhage – traumatic

Chest
- Mediastinum or great vessels injury
- Thoracic cage injury – e.g. flail chest
- Massive Haemothorax

Face
- Severe / complex maxillo-facial injuries with potential airway compromise and / or bleeding.

Abdomen / Pelvis
- Pelvic fracture – complex or open
- Solid organ or hollow viscus injury
- Haemoperitoneum

Neck / Spinal
- Any paraplegia / tetraplegia or unstable spinal fracture + / – suspected cord injury.
- Aerodigestive injury – larynx, trachea, oesophagus
- Vascular injury – carotid / vertebral artery, jugular vein

Limbs / Extremities
- Amputation - limb
- Crush injury – limb

Penetrating injuries
- Any penetrating injury to the trunk, head, neck or limb junction (groin & axilla region) e.g. Blast / Shooting / Stabbing / Impalement.
- Other injuries causing uncontrolled bleeding

Burns
- >20% Adult. >10% Child
- Airway burns
- High voltage injury

High-risk mechanism of injury or comorbidities

Blunt mechanism – Transport incident	Blunt mechanism - Other incidents
• Death in same vehicle • Steering wheel deformity • Patient side impact • Vehicle vs. pedestrian / cyclist / motor bike • Ejection (complete or partial) from vehicle • Entrapment with compression • Focal blunt trauma to head or torso • Cyclist/Motorcyclist (Fall or Collision)	• Falls > 3m, or serious injuries in the very young • High voltage injury • Crush injury (excluding fingers/toes) • Livestock (horse / cattle) • Agricultural Machinery or equipment / Quadbike • Near drowning / hanging • Any rapid deceleration incident • Blast incident

Comorbidity factors associated with any injury

• <16 years of age • >65 years of age or >50 years Aboriginal / Torres Strait Islander • Patients on anticoagulants or antiplatelet medications or bleeding disorders	• Immunosuppression • Cardio, respiratory or chronic disease • Morbid obesity • Alcohol or Illicit Drug use • Obstetric patients >20 weeks gestation

Specialist Referral

Adult Spinal Cord Injury (SCI)
- Call
- Aim for patient to arrive at a SCI Unit < 12 hours
- SCI patients with associated major injuries to be referred to RNSH only.

Adult Burns injury
- Call
- Burns patients with associated major injuries to be referred to RNSH only.

Acronyms

RTS = Regional Trauma Service
MTS = Major Trauma Service
ACC = Aeromedical Control Centre
NETS = The Newborn & paediatric Emergency Transport Service
SCI = Spinal Cord Injury

Purpose

- The NSW Inter-hospital major trauma transfer interim guideline has been developed to assist clinicians in the rapid identification, early intervention, initial management and transfer of the major trauma patient. It is not intended to replace senior clinical decision-making.
- The guideline aims to reduce preventable death and disability by activating the trauma system early and expediting the patient to definitive care.
- This is an interim guideline, to accommodate for expected changes within the critical care and trauma networks in the short- to-medium term.
- The guideline should be read alongside the NSW Critical Care Tertiary Referral Networks and Transfer of Care (ADULTS) PD2018_011 and NSW Policy Directive PD2018_11 Emergency Paediatric Referrals and local policy.
- The guideline does not provide guidance for specific injury management (i.e. clinical procedures) of major trauma, but it strongly suggests making early contact with primary advisory services who will provide this.

Intended audience

This document is intended for all healthcare workers who provide initial care and coordination to NSW patients with major trauma.

Guiding principles

Early identification and escalation saves lives

Identification

- Identify major trauma patients early.
- Thoroughly assess and closely observe all trauma patients, as some patients with significant trauma may not initially present with abnormal signs and symptoms. If in doubt, seek further consultation within your local network processes.

Escalation

- Seek advice via your primary advisory service as per local health district (LHD) processes.
- Escalation and delivery of lifesaving interventions should occur concurrently.
- Deliver care within your skill-set or as guided by a senior clinician.
- For major trauma patients who have time critical injuries with a clear need for transfer, it is strongly suggested the retrieval service, i.e. the NSW Aeromedical Control Centre (ACC) and the primary advisory service (i.e. local trauma hotline), is in the initial teleconference call. This will activate the retrieval response sooner, save valuable time, avoid multiple handovers and free up the referring clinician to focus more on patient care.
- Regional trauma centres (RTS) are encouraged to consult their linked major trauma centre (MTS) early for clinical advice/support and confirm need for transfer with major trauma patients.
- Refer patients <16 years to the Newborn and Paediatric Emergency Transport Service (NETS) on 1300 362 500. Refer to the Critical Care Tertiary Referral Networks (Paediatrics).
- For clinicians caring for paediatric trauma patients who don't have any major trauma escalation criteria but require further specialist consultation, please follow your local procedures. This may include contacting the Paediatric Acute Trauma Care Hotline (PATCH) if you refer within the Sydney Children's Hospitals Network. If you refer to John Hunter Children's Hospital, contact the patient flow unit in business hours or, for afterhours, contact JHH switch and page the paediatric surgeon.

Transfer

- If you cannot provide definitive and or ongoing trauma care, the patient will likely require transfer.
- Unless there is local definitive care available, there is usually no patient too unstable to transfer – most will die if an attempt is not made to transfer. Escalate the transfer process at the earliest possible time.
- The optimal destination for a major trauma patient is a MTS.
- In some locations or circumstances, patients may require immediate care in a non-MTS, e.g. a regional trauma centre.
- Notify receiving hospitals about major trauma patients whilst continuing to provide treatment and gain imaging. Do not delay notification for want of a definitive diagnosis.
- Never delay transferring patients who require immediate life or limb saving interventions due to a lack of beds.
- If you experience unacceptable delays or have concerns with the transfer process, contact the ACC on 1800 650 004 or NETS 1300 362 500 for patients <16 years.

When to call for advice and transfer

Call for advice and to discuss transferring your patient in the following situations:

- You are caring for a trauma patient who has an abnormal assessment of ABCD; abnormal vital signs; and or suspected or actual major injuries.
- You are unsure or worried about a trauma patient in your care.
- Your facility cannot provide definitive and or ongoing management of a trauma patient.

Who to call for advice and transfer

- Your LHD has arrangements regarding making an initial call for trauma advice and transfer. Follow your local arrangement as per the NSW Inter-hospital major trauma transfer algorithm in the ESCALATE tables.
- Referring clinicians are encouraged to provide handover to the receiving clinician using the standardised mnemonic ISBAR (Identify, Situation, Background, Assessment and Recommendation).
- If you cannot contact your local referral service, or you have problems transferring a patient who you feel needs urgent transfer (e.g. refused admission due to lack of ICU beds), contact:

EMERGENCY CONTACTS		
Adult	Aeromedical Control Centre (ACC)	1800 650 004
Child <16 years old	Neonatal and Paediatric Emergency Transfer Service (NETS)	1300 362 500
Unresolved Issues	Hospital executive on-call	

Determining urgency of transfer

- The urgency of transfer needs to be determined on a case-by-case basis in consultation with primary trauma contact and the ACC.
- When determining urgency it is essential to establish clear communication between the referring and receiving facilities. It is important that discussions are cooperative and solution focused.
- In general, patients who have abnormal assessment for ABCD, abnormal vital signs and/or clinical deterioration and suspected or actual major injuries (as indicated in red or yellow boxes in the algorithm) require more urgent escalation and transfer.
- The following questions have been designed to guide the determination of the urgency of transfer:

Questions	Considerations
Does the patient have immediate life-threatening injuries unable to be managed at the referring facility?	If yes, the primary advisory service should activate an immediate transfer response and provide continued clinical support as required.
What are the capabilities of the referring facility to manage the patient's condition?	Does the patient require lifesaving interventions/management that the referring centre can't offer, or can the referring facility safely manage the patient in the short term?
What is definitive care for the patient?	Consider the specialist service(s) and procedures the patient may require. For non-trauma facilities managing a major trauma patients, the need for further trauma assessment and management at a designated trauma facility is considered definitive care.
Where is definitive care located?	This is usually a trauma centre (i.e. RTS, MTS, or paediatric trauma service PTS) or specialist unit (i.e. burns or spinal).
When is definitive care required?	This may require specialist consultant input from the receiving MTS (e.g. consultant neurosurgeon). What are the risks and likelihood of further clinical deterioration?
What is the management and transfer plan?	The ACC/NETS and receiving trauma service is best placed to provide guidance regarding: • setting timeframes for transfer • possible remote and ongoing specialist support

Any unresolved issues are to be escalated to the ACC State Retrieval Consultant and/or your hospital executive.

The destination for the major trauma patient

- Every NSW hospital is linked to a RTS and/or MTS and PTS; these links can be found in the NSW Critical Care Tertiary Referral Networks and Transfer of Care (ADULTS) PD2018_011.
- The severity, type of injuries and timeframes for definitive care will usually determine the destination of the trauma service required.
- Patients with actual or suspected major trauma identified during their initial assessment MUST be referred as soon as possible to a designated trauma centre.
- Owing to proximity, some facilities may refer major trauma patients to an interstate trauma service or specialty service.

Specialty services

Burns

Patients with severe burn injuries should be referred according to the NSW Burn Transfer Guidelines by the NSW Burn Injury Service.

There are three burns centres:

Royal North Shore Hospital (RNSH)
(02) 9926 7111 page burns registrar/consultant on-call

Concord Hospital
(02) 9767 5000 page burns registrar/consultant on-call. Concord Hospital does not accept burn injury with other associated major trauma, refer to RNSH

The Children's Hospital at Westmead
(02) 9845 0000, then page registrar on-call for burns.

Due to proximity:

- Northern NSW LHD refers to Royal Brisbane Hospital
- Far Western NSW LHD refers to Royal Adelaide Hospital
- Albury and some Murrumbidgee LHD hospitals refer to the Alfred Hospital.

Spinal cord injuries

All trauma patients who have sustained a spinal cord injury (SCI) with neurological deficit (i.e. paraplegia and tetraplegia) must be transferred to a spinal cord injury service < 12 hours of injury or as soon as medically stable.

There are four acute state spinal cord injury service;

RNSH
(02) 9926 7111 page on-call spinal surgical consultant

Prince of Wales Hospital (POWH)
(02) 9382 2222 page on-call spinal surgical consultant. POWH does not accept SCI with other associated major trauma, refer to RNSH

Sydney Children's Hospital and The Children's Hospital at Westmead
Refer to Critical Care Tertiary Referral Networks (Paediatrics).

Due to proximity:

- Northern NSW LHD refers to Prince Alexandra Hospital
- Far Western NSW LHD refers to Royal Adelaide Hospital
- Albury and some Murrumbidgee LHD hospitals refer to the Austin Hospital.

Refer to 11.2 NSW State Spinal Cord Injury Referral Network (Adult) in the NSW Critical Care Tertiary Referral Networks and Transfer of Care (ADULTS) PD2018_011

Preparation for transfer

- Seek advice from the senior clinician you have contacted regarding how to manage and prepare your patient for transfer.
- The patient's airway, breathing and circulation should be managed and maintained according to trauma specialist advice. All efforts should be made to control significant haemorrhage prior to transfer. If such control cannot be achieved, advice should be sought from the senior trauma clinician at the networked MTS or ACC State Retrieval Consultant.
- A senior clinician from the networked MTS/ primary advisory service/ACC consultant or retrieval service involved should advise the referring hospital regarding preparation for transfer using their established processes.
- Wherever practicable, all patients identified as requiring inter-hospital trauma transfer should be seen by the most senior clinician prior to leaving the referring hospital whilst not delaying the transfer process.
- Where available, telemedicine should be used to connect the patient and clinicians with the remote specialists.
- Where possible the patient's Aboriginality status should be identified and handed over to the receiving facility for early referral to and engagement of Aboriginal Liaison Officers.
- The use of a transfer checklist may assist in streamlining the preparation of the trauma patient for safe transfer. Follow your LHD's transfer checklist as per local procedure, otherwise the following resources may assist:
  - ECI Preparation for adult retrieval – making the call
  - ECI Preparation for adult retrieval – checklist
  - ECI Preparation for retrieval of critically unwell adult patients

Definitions

Major trauma patient

For the purpose of this guideline, a 'major trauma patient' is someone with single or multiple serious injuries that meet any of the criteria on the NSW Inter-hospital major trauma transfer algorithm (i.e. abnormal initial assessment (ABCD) findings; abnormal vital signs; and or suspected or actual major injuries).

Major trauma service/centre (MTS)

A designated service that can provide the full spectrum of care for major and moderately injured patients, from initial resuscitation through to rehabilitation and discharge.

Regional trauma service/centre (RTS)

A designated service that can provide all aspects of care to patients with minor to moderate trauma and definitive care to a limited number of major trauma patients, in collaboration with the linked MTS. These services provide initial assessment, stabilisation, and definitive care, and initiate transfer to MTSs when a patient requires services not available at the RTS.

Paediatric trauma service/centre (PTS)

A designated service that can provide the full spectrum of care for major and moderately injured patients, from initial resuscitation through to rehabilitation and discharge for paediatric patients usually <16 years of age.

Primary Advisory Service

A designated service determined by each LHD responsible for providing trauma advice/ coordination and guidance regarding need and timing of transfer. It is the primary contact point when referring facilities escalate a major trauma patient. This may include but not limited to the: Aeromedical Control Centre (ACC), Neonatal and Paediatric Emergency Transfer Service (NETS), regional retrieval service, trauma hotlines and critical care advisory services.

Acknowledgements

NSW Institute of Trauma and Injury Management (ITIM)

NSW Trauma Innovation Committee