

Topic Overview: Trauma Triage

Module T1

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Topic overview

This handout aims to give an overview of trauma services in NSW including major, regional and specialty trauma services. We will discuss the following:

- Identification of major trauma using the Trauma Triage Tool
- The NSW strategy for management of trauma patients from the pre-hospital stage to rehabilitation
- The retrieval and transfer services within NSW

In the 15-44 age group trauma is a significant cause of morbidity and mortality, however there are also increasing admissions for trauma in older patients. This group have more co-morbidities and are at risk of increased injury severity from a lesser mechanism.

The NSW Trauma model of care identifies four areas for the management of traumatic injury and seeks to provide a coordinated multidisciplinary approach to the management of the trauma patient from the time of injury to the provision of definitive care and on to rehabilitation.

- **Pre-injury:** Injury prevention addresses public health problems related to trauma and aims to reduce the number of cases and the severity of cases.
- **Pre-hospital:** This is the period from time of injury till arrival at a definitive care trauma hospital. Can include stabilisation and inter-hospital transfer.
- **In-patient trauma care:** Consists of a multidisciplinary trauma team response to management of trauma patients and may include emergency assessment +/- surgical intervention +/- intensive care
- **Post-acute care:** Consists of ongoing multidisciplinary and rehabilitative care. The ultimate goal of trauma care is to restore the patient to pre injury status.

The Trauma Model of Care

The trauma service coordinates the care of multiple specialty teams and advocates for patients within the acute hospital and rehabilitative stages. Injury diagnosis, treatment and progress through the hospital are planned and monitored.

The diagram below is an illustration of the trauma model of care for NSW, which encompasses the trauma journey from preventative measures, pre-hospital, in-patient trauma care and post acute care.

The aim of trauma care in NSW is to integrate all hospital facilities into an inclusive trauma network to ensure definitive trauma care is provided to injured patients throughout NSW. The trauma triage process begins in the pre-hospital phase with the NSW Ambulance service T1 Protocol. The role of trauma triage is to identify major trauma and ensure the timely arrival of trauma patients to an appropriate hospital.

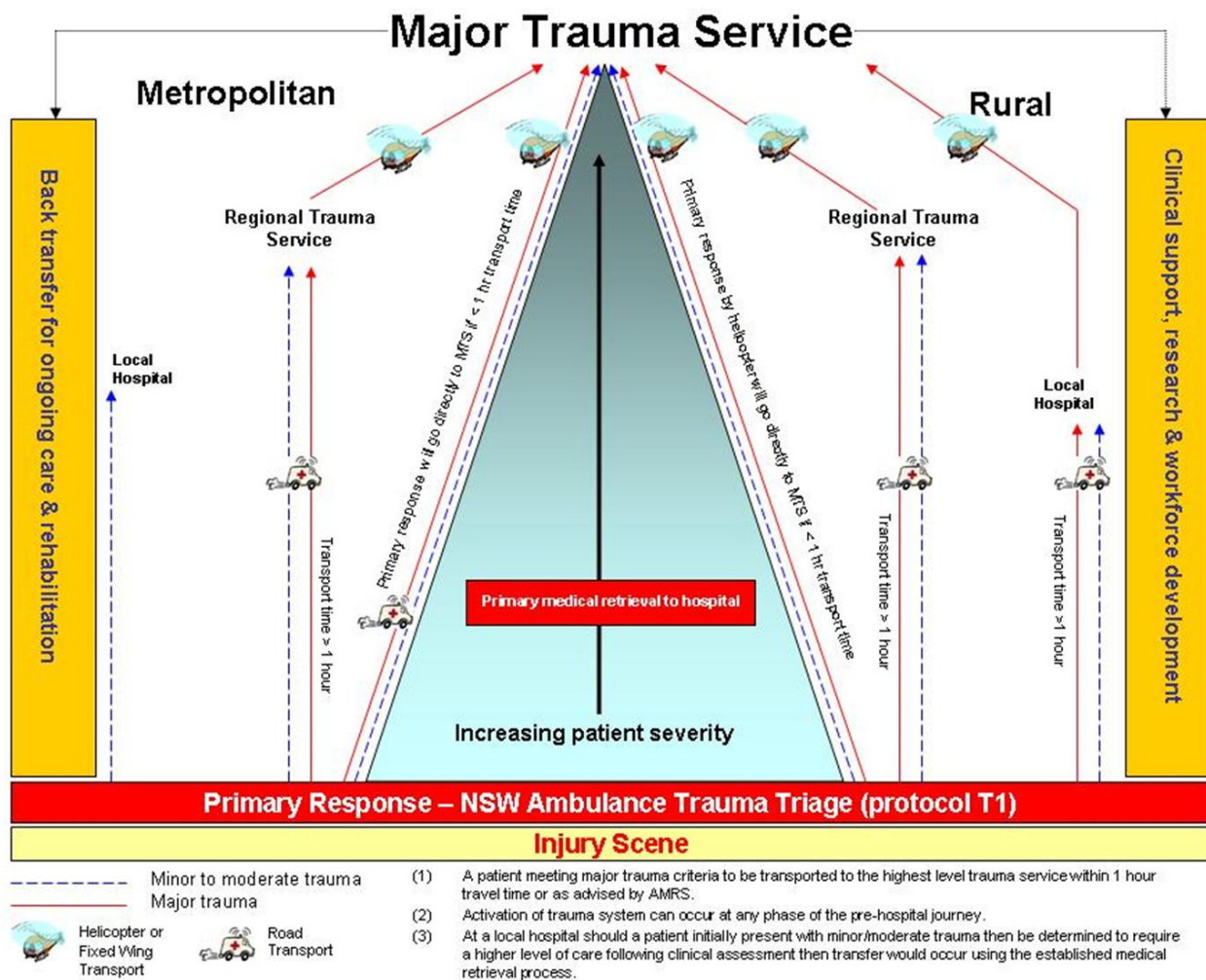


Figure 1: Trauma Model of Care NSW

Pre-hospital Management

The pre-hospital phase is the time from injury to arrival at a definitive care trauma service. It is important to remember that it starts at the time of injury, not at the time of arrival at the first health facility. Trauma patients enter the health system in 2 main ways:

- Self-presentation via the emergency department. These patients choose their hospital, which might not be the most appropriate for their injury severity.
- Via the emergency services following the application of the trauma triage tool which allows a decision to be made as to which is the most appropriate hospital for treatment.

Triage of trauma patients requires assessment of a number of criteria including physiological parameters, physical injuries and mechanism of injury. The Trauma Triage Tool (T1 protocol), used by the Ambulance Service of NSW (ASNSW), provides a quick method for identifying patients who either have, or have the potential for, serious injury using the MIST criteria (mechanism, injuries, signs and symptoms, transport). Patients who are severely injured should be taken to the highest level of care reachable within an hour of injury. This may mean that some patients first go to a regional trauma service before being transported to a major trauma service, whilst others might require a primary helicopter response to facilitate direct admission to a major trauma centre.

Figure 2: Ambulance Service of NSW Major Trauma Criteria

Trauma Triage Tool – Major Trauma Criteria (MIST)

M MECHANISM OF INJURY

Blunt

- Transport Incident:
 - Death in same vehicle
 - Intrusion into occupant compartment >30cm
 - Steering wheel deformity
 - Patient side impact
 - Vehicle v pedestrian/cyclist/MBC
 - Ejection from vehicle
 - Entrapment with compression
- Focal blunt trauma to head or torso
- Falls >3m or paediatrics twice the child's height
- High voltage injury
- Crush injury excluding fingers/toes
- Any rapid deceleration mechanism that results in a large inertia change at impact

Patients <16 & >65 years of age, Obstetric patients >20 weeks gestation, patients on anticoagulants and patients with pre-existing diseases are at greater risk and require a high index of suspicion for serious injury. If in doubt transport to Trauma Centre.

Penetrating All penetrating injury (excluding isolated injury to hands or feet)

AND/OR

I INJURIES

Head: Minor head injury with loss of consciousness or amnesic to event with:

- 2 or more vomits or a seizure
- on anticoagulants

Open, depressed skull # or signs of base of skull #.

A decreased LOC is due to traumatic injury, until proven otherwise.

Face: Injury with potential airway risk; severe haemorrhage.

Neck: Swelling, bruising, hoarseness or stridor.

Chest: Severe pain, paradoxical breathing, restraint abrasion/contusion.

Abdomen: Severe pain, rigidity, swelling, pelvic tenderness, restraint/abrasion/contusion.

Limbs: 2 or more proximal long bone #, amputation proximal to digits, ischaemia, degloving injury.

Spinal/Back: Visible deformity.

Burns: Partial or full thickness burns Adults > 20% Children >10%, or Burns involving head /neck/face/hands/feet/groin or inhalation injury.

All circumferential burns or burns in a patient with comorbidities or pregnancy.

AND/OR

S SIGNS AND SYMPTOMS

Airway: at risk, hoarseness, stridor

Breathing: RR<10 or >29, SpO2 <90% on air, cyanosis or respiratory difficulty

Circulation: HR>120, SBP <90 or severe haemorrhage

Disability: GCS ≤13 or paralysis/sensory deficit

Or

any worsening trend in ABCD

Paediatrics:

Physiological changes are late indicators of serious injury in a child whom may lose 30% blood volume prior to ANY changes in vital signs. The following are a guide:

	1st Year	1-5yrs	6-12yrs
HR	>160	>140	>120
SBP	<60	<70	<80
RR	>60	>35	>30

T TRANSPORT

If patient meets Major Trauma Criteria they are to be transported to the highest level Trauma Centre within a 1 hour travel time or Aeromedical Retrieval Service advised.

This tool can also be used to identify key information to be handed over to the receiving hospital both as pre-notification and upon arrival at the ED. The Ambulance Service of NSW has expanded MIST to the **IMIST-AMBO** handover protocol for handover upon arrival at the hospital. The Trauma Triage Tool is provided below.

- I** Identification
- M** Mechanism
- I** Injuries
- S** Signs& symptoms
- T** Treatment and trends
- A** Allergies
- M** Medications
- B** Background history
- O** Other relevant information

Hospital Triage

Individual hospitals may have local policies with regard to trauma team activation, but all emergency department patients require a triage category to be allocated based on clinical urgency. The Australasian Triage Scale specifically mentions trauma as shown below.

Australasian Triage Scale (as related to trauma)

Category 1 (immediate)	Immediately life threatening
Category 2 (within 10 minutes)	Major multi trauma requiring rapid organised team response Severe localised trauma – major fracture, amputation
Category 3 (within 30 minutes)	Head injury with short LOC, now alert Moderate limb injury – Deformity, severe laceration, crush
Category 4 (within 60 minutes)	Minor limb trauma - Sprained ankle, possible fracture
Category 5 (within 120 minutes)	Minor wounds – Abrasions, minor lacerations Major trauma requires a rapid and often resource intensive response.

Trauma Teams usually have activation criteria using a tool similar to the tool used by ambulance personnel to make their initial transport decision (see generic table below). The trauma team activation is two tiered in some hospitals. You should know your local policy.

All triage tools have an element of over triage to avoid missing major injury. If your hospital does not have a trauma team it is important to realise that patients who meet one or more of these criteria require a rapid coordinated assessment as they are at higher risk of major injury.

Generic Trauma Team Activation Criteria

<p>Mechanism / History</p> <ul style="list-style-type: none"> ▪ MVA with ejection ▪ Cyclist or pedestrian hit by car > 30km/hr ▪ Fall >5m ▪ Fatality in same vehicle ▪ Inter-hospital transfer meeting activation criteria 	<p>Physiological</p> <ul style="list-style-type: none"> ▪ Systolic BP < 90 with evidence of shock ▪ Respiratory rate <10 or >30 per minute ▪ Depressed LOC or fitting ▪ Deterioration of vital signs in the ED ▪ Age > 70 with chest injuries ▪ Pregnancy >24 weeks with torso injuries
<p>Anatomical</p> <ul style="list-style-type: none"> ▪ Injury 2 or more body areas ▪ Fractures in 2 or more proximal long bones ▪ Spinal cord injury ▪ Limb amputation ▪ Penetrating injury head, neck, torso or proximal limb ▪ Burns >15% adults, >10% paedrs or airway burns 	

The Trauma Team response should be appropriate to the facility. Generally trauma teams are composed from the following groups: ED staff specialist / ED registrar, nurses, trauma CNC, surgical, anaesthetic and ICU registrars, mobile x-ray, specialties as required (obstetrics, orthopaedics, neurosurgical, vascular etc), social work etc in major hospitals to ED staff specialist / registrar and ED nurse in local / rural hospitals.

At this stage staff should also be considering transport or activation of Aeromedical retrieval services if the patient requires a level of care not available in their local hospital.

Retrieval and Transfer

There are 2 specialist medical retrieval services in NSW

- Aeromedical and Medical Retrieval Service (AMRS)
- Newborn and Paediatric Emergency Transport Services (NETS)

Both of these services in conjunction with regional retrieval services coordinate retrievals from all rural and metropolitan areas. They are comprised of medical, nursing and ambulance staff and transport patients by road ambulance, helicopter and fixed wing vehicles.

In rural areas where travel times are too great for direct transport to a regional trauma service, rural hospitals provide initial assessment, resuscitation and limited stabilisation until early transfer to an appropriate regional or major trauma service. The Rapid Launch Trauma Coordinator may arrange a team to attend a primary accident site or begin travelling towards the regional area based on information received from the site.

The NSW Trauma Hospitals are listed below. It is important to remember however that all the hospitals are part of the trauma system.

Major Trauma Services

- John Hunter
- Liverpool
- Royal North Shore
- Royal Prince Alfred
- St George
- Westmead

Paediatric

- Sydney Children's Hospital
- Westmead Children's Hospital
- John Hunter

Regional Trauma Services

- St Vincent's
- Gosford
- Wollongong
- Nepean
- Coffs Harbour
- Lismore
- Orange
- Port Macquarie
- Tamworth
- Tweed Heads
- Wagga Wagga

There are also some specialty services listed below.

Statewide Burn Injury Service

- Westmead Children's
- Royal North Shore
- Concord (not a trauma centre)

Spinal Cord Injury Service

- Westmead Children's Hospital
- Royal North Shore
- Sydney Children's Hospital
- Prince of Wales (not a trauma centre)

References

NSW Trauma Services Plan, NSW Department of Health, 2009

Guidelines for the Implementation of the Australasian Triage Scale in Emergency Departments, ACEM, 2005

Iedema R and Ball C. (2010) NSW Ambulance/Emergency Department Handover Project Report. Sydney: NSW Health & UTS Centre for Health Communication