



PRE-HOSPITAL TRIAGE GUIDELINE



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1. Key messages

The objective of pre-hospital triage is to reduce preventable death and permanent disability and to improve patient outcomes by matching the needs of the injured patient to an appropriate level of care in a safe and timely manner.

The triage decision in the pre hospital setting is based on anatomic, physiologic and high mechanism risk criteria, available resources, and time and distance factors to hospitalⁱ. The level of care available at the destination facility has a significant impact on outcome, therefore access to the highest level of trauma service possible within logistic and safety parameters is desirable. The VSTS aims to ensure that as many major trauma patients as possible receive their definitive care at a major trauma service (MTS) or equivalent specialist trauma service (the Austin Hospital for spinal cord trauma and the Metropolitan Neurological services for older patients with isolated head injuries). Non-major trauma patients, once identified, should remain in a local facility where their care can best be managed inclusive of family and local support services.

Overall, there has been an increase in the percentage of major trauma patients transported directly to the hospital of definitive care from the scene of injury, home or general practitioner (GP), from 65.9 per cent in 2005–06 to 68.9 per cent in 2011–12.ⁱⁱ This change indicates a significant improvement in pre-hospital triage and transportation processes. An aim of pre-hospital triage is to optimise the identification of major trauma patients and to minimise the over-triage of non-major trauma patients.

Major trauma in the pre-hospital setting in Victoria can be identified when there is a minimum of one out of three criteria present. These are: the presence of abnormal vital signs; the presence of an assumed or actual anatomic injury; or the existence of a high-risk mechanism of injury in at-risk patients.

These guidelines provide the user with accessible resources to effectively and confidently provide early care for critically injured patients. The guideline is evidence based, has followed the AGREE methodology for guideline development and is auspiced by the Victorian State Trauma Committee.

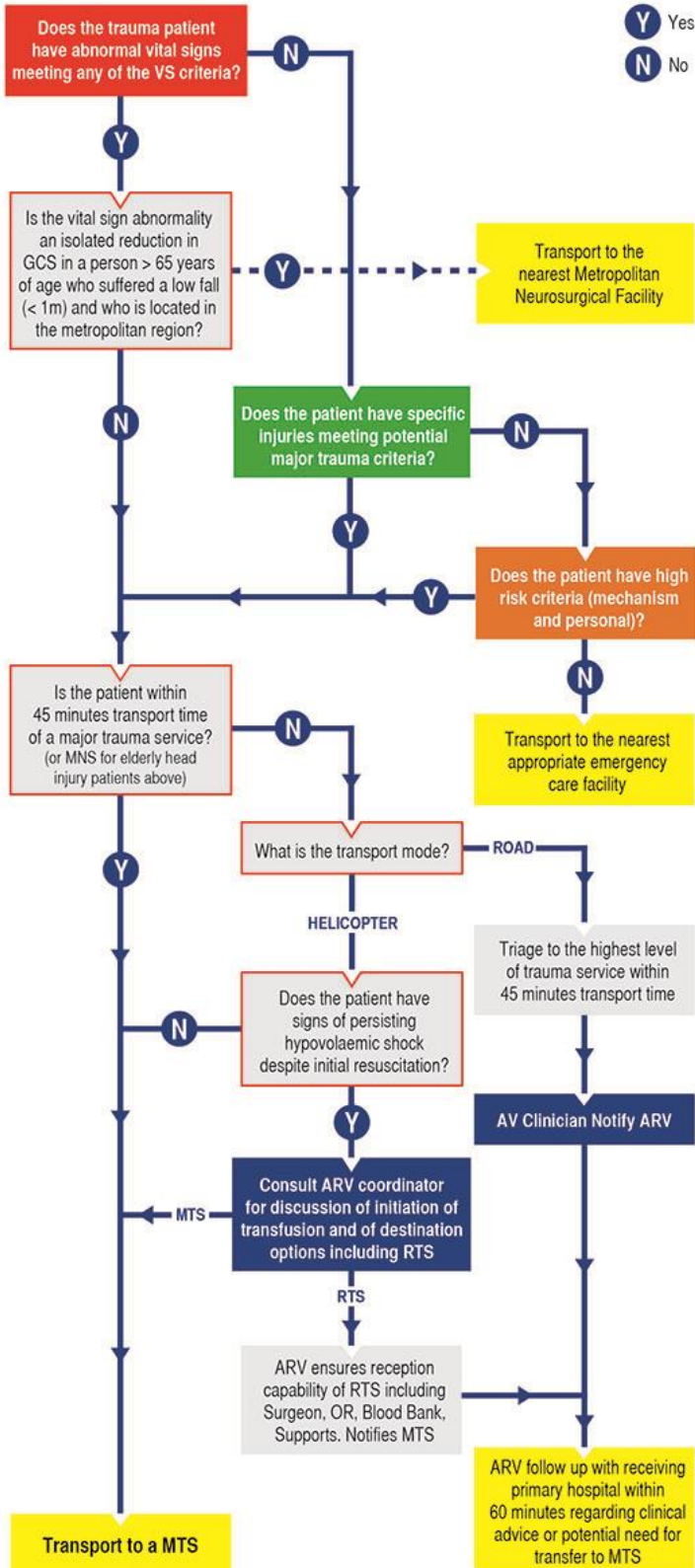
Clinical emphasis points

- Victoria's trauma system is integrated and inclusive, with system guidelines directing responders and hospitals as to the most appropriate destination facility for the patient.
- Expert scene assessment and initial pre-hospital management of life-threatening injuries is essential.
- Major trauma criteria using the defined triage guidelines must be identified.
- Initial dispatch to the scene via either road or air must be well coordinated.
- Two adult and one paediatric hospital are designated as MTS hospitals, with potential trauma-receiving hospitals assigned a trauma designation.

Pre-hospital Major Trauma Triage



RAUMA
VICTORIA



Pre-hospital Vitals Signs Major Trauma Criteria

Age	Term - 3 mths	4-12 mths	1-4 yrs	5-12 yrs	12+ yrs	Adult
HR	<100 or >180	<100 or >180	<90 or >160	<80 or >140	<60 or >130	<60 or >120
RR	>60	>50	>40	>30	>30	<10 or >30
BP sys	<50	<60	<70	<80	<90	<90
SpO ₂			<90%			<90%
GCS			<15			<13

Specific injuries meeting potential major trauma criteria

All penetrating injuries (except isolated superficial limb injuries)

Blunt injuries:

- Serious injury to a single body region such that specialised care or intervention may be required, or such that life, limb or long term quality of life may be at risk
- Significant Injuries involving more than one body region

Specific Injuries:

- Limb amputation
- Suspected Spinal Cord Injury
- Burns > 20% BSA or suspected respiratory tract burns
- Serious crush injury
- Major compound fracture or open dislocation
- Fracture to two or more of: femur, tibia, humerus
- Fractured Pelvis
- Spinal Fracture

High Risk Criteria for Major Trauma

- Ejection from vehicle
- Motor / cyclist impact > 30 kph
- Fall from height > 3 m
- Struck on head by object falling > 3 m
- Explosion
- High speed MCA > 60 kph
- Pedestrian impact
- Prolonged extrication

AND:

- Age > 55 / Age < 16
- OR Pregnant
- OR Significant comorbidity



2. Identification of potential major trauma

Vital signs

The first step to identifying the presence of potential major trauma (pMT) is to assess the vital signs. In the pre-hospital setting, major trauma is identified according to the following criteria.^{iii iv}

MAJOR TRAUMA CRITERIA VITAL SIGNS						
AGE	Term – 3 Months	4-12 Months	1-4 Years	5-12 Years	12 + Years	Adult
HR	<100 or >180	<100 or >180	<90 or >160	<80 or >140	<60 or >130	<60 or > 120
RR	>60	>50	>40	>30	>30	< 10 or > 30
BP sys	<50	<60	<70	<80	<90	< 90
SpO2	<90%	<90%	<90%	<90%	<90%	<90%
GCS	< 15	< 15	< 15	< 15	< 15	< 13

If the patient has any one of the above signs present, then pMT is identified. The patient must be assessed for any life-threatening injuries that can be immediately managed in the field and consideration of transport to an MTS must be commenced.

Injuries found or suspected

The presence of any one of the following assumed or actual anatomic injuries constitutes pMT for the purpose of primary triage^v.

All penetrating injuries

- Excludes isolated superficial limb injuries

Blunt injuries

- Serious injury to a single region such that specialised care or intervention may be required, or that life, limb or long-term quality of life may be at risk
- Significant injuries involving more than one body region

Specific injuries

- Limb amputations or limb-threatening injuries
- Suspected spinal cord injury
- Burns to more than 20% of the body for an adult or 10% for a child, or suspected respiratory tract burns
- High-voltage burn injuries
- Serious crush injury
- Major open fracture or open dislocation
- Fracture to two or more of the femur, tibia or humerus

- Fractured pelvis
- Spinal fracture

Isolated head injury in older people

Where a person has an isolated head injury with an altered conscious state (GCS < 13) **and** is over 65 years of age **and** has sustained their injury as a result of a low fall (< 1 m) **and** is located in the metropolitan region **then** the patient should be transported to the nearest metropolitan neurosurgical service (MNS) or MTS. Data from the Victorian trauma system demonstrates that outcomes for this subset are comparable when care is delivered in an MNS as when provided in an MTS.^{vi}

High-risk criteria

The triage of trauma patients who are physiologically stable and where only a single mechanistic criterion is present has a high potential for over-triage. The Victorian pre-hospital high-risk criteria requires both a specific trauma mechanism **and** either an age or comorbidity element present in order to identify as pMT.^{vii}

Specific trauma mechanism

- Ejection from vehicle
- Motor/cyclist impact > 30 kph
- Struck on the head by object falling > 3 m
- Explosion
- High-speed car accident > 60 kph
- Pedestrian impact
- Prolonged extrication
- Fall from height > 3 m

AND

Additional patient criteria

- Age > 55 or a child < 16
or
- Pregnant
or
- Significant comorbidity to include one or more of:
 - diabetes, epilepsy, cardiac failure, angina, acute myocardial infarction (AMI), obesity, chronic respiratory disease, chronic renal failure, symptomatic chronic obstructive airway disease (COAD), renal or liver failure, chronic liver disease or congenital coagulopathy

3. On Scene

Scene Time

As a general rule, the aim should be for a scene time of 20 minutes or less for non-trapped major trauma patients.^{viii}

It is acknowledged that longer scene times may be necessary when interventions such as Rapid Sequence Intubation are required^{ix}. In these circumstances a risk / benefit should be undertaken to determine if the interventions are essential (including consideration for proximity to hospital) or whether transport should be the priority. Additional considerations that may influence scene time include the number of patients versus resources available and the time to a primary hospital versus time to aeromedical transport to enable direct transport to a Major Trauma Service.

Adult Retrieval Victoria notification

If it is necessary for a pMT patient to be taken by ambulance to a hospital designated other than an MTS, Ambulance Victoria will notify ARV of the case and ARV will contact the primary receiving hospital within 60 minutes to determine the need for advice or support, or the need for retrieval or transfer to an MTS.

4. Transport time

Where an MTS is within 45 minutes' transport time, the patient with pMT should be taken to that service, bypassing other hospitals in order to minimise the time from injury to definitive care. This will also avoid the need for subsequent inter-hospital transfer later on. (This also applies to an older patient with an isolated head-injury for whom a 45-minute transfer to an MNS/MTS is appropriate.)

Road transfer

Transport time by road will vary according to many factors including the time of day, traffic conditions and distance. Time will be calculated from loading the patient to the time of arrival at the receiving centre. Some flexibility in the 45-minute timeframe should be shown where a small increment added to transport time means that the patient is delivered to a facility for definitive care.

Where a patient is more than 45 minutes from an MTS, then the patient will be transported by road to the highest level of trauma care available within the 45-minute transport timeframe.

Where a major trauma patient appears to be in an immediately life-threatening situation during transport, the patient is to be diverted to the nearest designated trauma service for stabilisation, with subsequent transport to a MTS at the earliest appropriate time.

Helicopter transfer

If the flight time is more than 45 minutes and the patient has signs of persisting hypovolaemic shock despite resuscitation, consultation with the ARV coordinator for blood transfusion authorisation and destination planning will occur (this may include diversion to a



regional trauma service (RTS)). If the patient does not have signs of persisting hypovolaemic shock, they will be transported directly to an MTS.

Persisting hypovolaemic shock

Road transfer: Where a major trauma patient appears to be in an immediately life-threatening situation during transport, the patient is to be diverted to the nearest designated trauma service for stabilisation, with subsequent transport to a MTS at the earliest appropriate time.

Helicopter transfer: MICA flight paramedics (MFPs) will assess the patient and initiate resuscitative procedures, administer drugs and perform interventions in accordance with Ambulance Victoria's *Clinical practice guidelines*.

If signs of shock are present, then non-hypovolaemic causes need to be excluded, including neurogenic shock in spinal injuries as well as obstructive shock from possible tension pneumothorax and/or cardiac tamponade.

If the trauma patient has signs of hypotensive end-organ impact such as altered conscious state (or intubated), marked pallor, clammy skin or has no response to initial crystalloid resuscitation (20–30 mL/kg), urgent management of that hypovolaemic shock is required.

In such patients, diversion to an RTS may be necessary where capability exists and where flight and landing logistics allow in order to access immediate haemostatic interventions. For this to be considered, an RTS must have available surgical, operating theatre and blood bank capability and capacity. This will be determined and confirmed by the ARV coordinator after consultation with the MFP crew and RTS staff.

The patient will be transferred by road or helicopter (if a helipad is available at the RTS), whichever is quickest.

ARV will also contact a nominated MTS to initiate early referral and case support between RTS clinicians and the MTS clinicians. The patient may be subsequently transferred for definitive care.

Trauma Victoria

The Victorian State Trauma System (VSTS) facilitates the management and treatment of major trauma patients in Victoria. The VSTS aims to reduce preventable death and permanent disability and improve patient outcomes by matching the needs of injured patients to an appropriate level of treatment in a safe and timely manner.

The system works to have the right patient delivered to the right hospital in the shortest time.

One of the best ways to facilitate this is to provide an education resource to all clinicians.

Trauma Victoria is a statewide education initiative directed towards clinical staff (doctors, nurses, allied health, paramedics) who provide early patient care for major trauma outside of a MTS.

Guidelines are in place to support awareness of **key aspects of the trauma system** and early trauma care and include **specialist trauma transfer** guidelines.

A web-based learning management system provides modules to support each of the principle guideline areas. Skills tutorials on key trauma procedural interventions will also be accessible.

Moderated remote tutorials will be offered in the future. Clinicians will join a multisite, multiparty videoconferenced meeting room for tutorials and discussions on relevant trauma subjects. It will allow local practitioners to tap into specialised clinical knowledge and to develop their learning to the fullest extent.

Regional simulation and team training will also be supported via a remote expert facilitator and will involve regional and subregional simulation trainers. It will build capacity among simulation trainers to enhance local trauma team training programs.

Facilitated visits will also be arranged whereby medical, nursing and allied health staff may be placed for brief rotations with a MTS in order to increase their experience and familiarity in major trauma management. The aim is also to promote the development of clinical relationships between organisations.



Created by Adult Retrieval Victoria on behalf of the Victorian State Trauma System.

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Authorised and published by the Victorian Government, 50 Lonsdale St, Melbourne.

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AGREE II score sheet – pre-hospital triage guideline

Domain	Item	AGREE II Rating						
		1 Strongly Disagree				7 Strongly Agree		
		1	2	3	4	5	6	7
Scope and purpose	The overall objective(s) of the guideline is (are) specifically described.							X
	The health question(s) covered by the guideline is (are) specifically described.						X	
	The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.							X
Stakeholder involvement	The guideline development group includes individuals from all the relevant professional groups.						X	
	The views and preferences of the target population (patients, public, etc.) have been sought.						X	
	The target users of the guideline are clearly defined.							X
Rigor of development	Systematic methods were used to search for evidence.						X	
	The criteria for selecting the evidence are clearly described.					X		
	The strengths and limitations of the body of evidence are clearly described.						X	
	The methods for formulating the recommendations are clearly described.						X	
	The health benefits, side effects and risks have been considered in formulating the recommendations.						X	
	There is an explicit link between the recommendations and the supporting evidence.						X	
	The guideline has been externally reviewed by experts prior to its publication.						X	





Domain	Item	AGREE II Rating							
		1 Strongly Disagree				7 Strongly Agree			
		1	2	3	4	5	6	7	
	A procedure for updating the guideline is provided.								X
Clarity of presentation	The recommendations are specific and unambiguous.								X
	The different options for management of the condition or health issue are clearly presented.								X
	Key recommendations are easily identifiable.								X
Applicability	The guideline describes facilitators and barriers to its application.								X
	The guideline provides advice and/or tools on how the recommendations can be put into practice.								X
	The potential resource implications of applying the recommendations have been considered.								X
	The guideline presents monitoring and/ or auditing criteria.								X
Editorial independence	The views of the funding body have not influenced the content of the guideline.								X
	Competing interests of guideline development group members have been recorded and addressed.								X
Overall Guideline Assessment	Rate the overall quality of this guideline. 1- Lowest possible quality 7- Highest possible quality								X
Overall Guideline Assessment	I would recommend this guideline for use.	Yes		Yes, with modifications			No		
		X							



References

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