

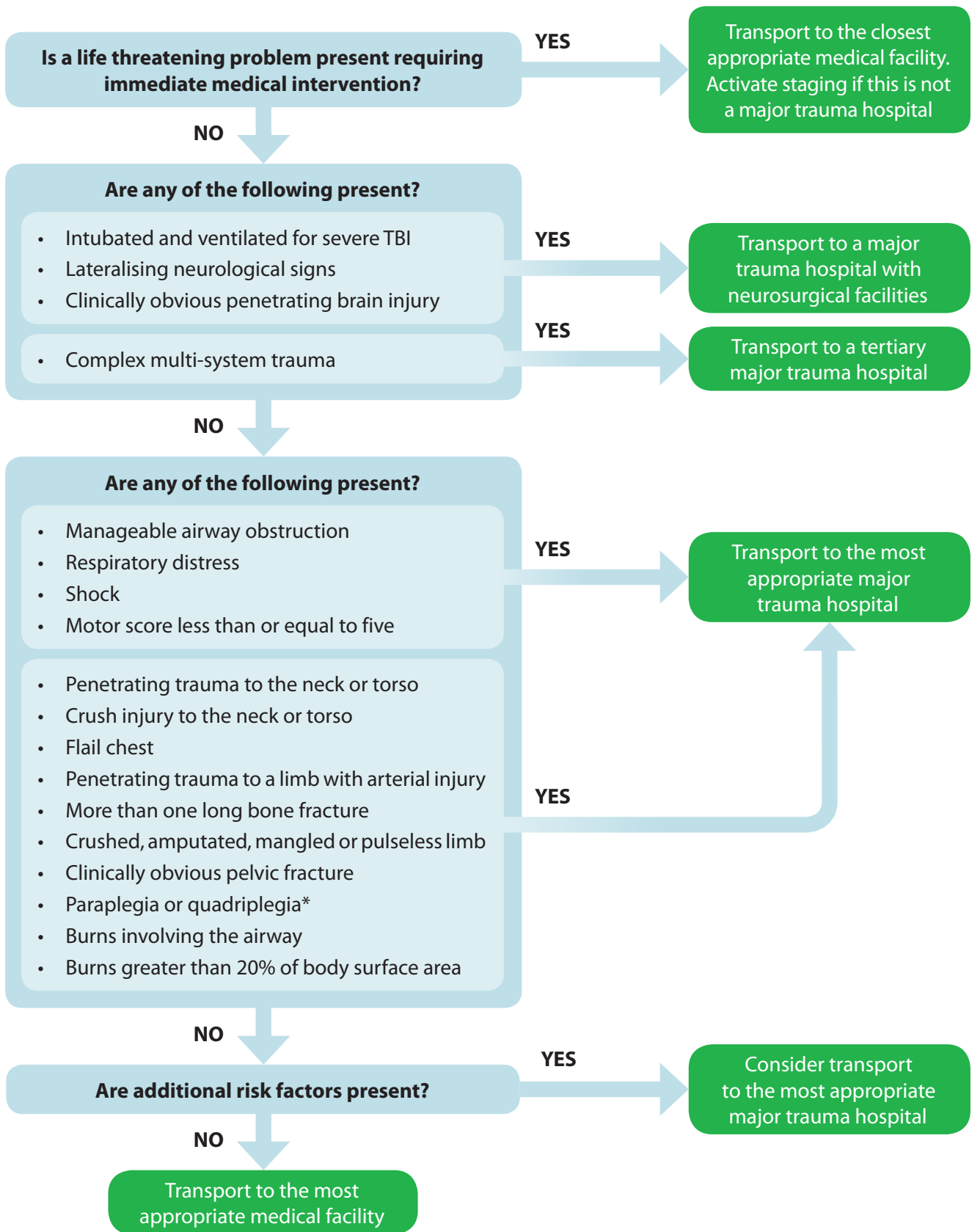
# New Zealand Out-of-Hospital Major Trauma Triage Policy

This document is for the use of clinical personnel when triaging patients with trauma in the out-of-hospital setting in New Zealand. It has been developed by the National Major Trauma Clinical Network.

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# Major Trauma Triage Flowchart



**Note:**  
\* Refer to the Spinal Cord Injury Destination Policy.

# Major Trauma Triage: Additional Information

## Introduction

The information within these guidelines complements the major trauma triage flowchart for clinical personnel and should be read in conjunction with it. The major trauma triage flowchart is to be used by clinical personnel (for example ambulance and PRIME personnel) to identify which patients meet criteria for major trauma in the out-of-hospital setting. Patients who have been identified as having major trauma should be transported directly to a major trauma hospital whenever it is feasible and safe to do so.

Major trauma hospitals are those hospitals designated by the Regional Major Trauma Networks to receive patients who have major trauma. Further details are described in the Regional Destination Policies.

### **Determining the most appropriate major trauma hospital**

- ▶ Few hospitals in New Zealand have the facilities required to treat all of the injuries a patient with major trauma may have and this includes many of the hospitals designated as a major trauma hospital. Clinical judgement must be used when determining which major trauma hospital the patient is transported to, taking into account:
  - The nature of the patient’s known injuries.
  - The patient’s anticipated clinical needs.
  - The facilities at the major trauma hospitals it is feasible and safe to transport to.
  - The location of the incident.
  - The transport modes available and the effect of weather on helicopter transport.
  - The transport times to the major trauma hospitals it is feasible and safe to transport to.
  - The other patients being transported from the scene, particularly if the number of patients is significant.
- ▶ In most cases, the most appropriate major trauma hospital will be the nearest major trauma hospital. However, in some cases there will be a choice of major trauma hospitals that the patient could be transported to within similar times. In this setting the patient should be transported to the major trauma hospital with the most appropriate facilities to meet their expected needs. Personnel should seek clinical advice if they are uncertain.

### Life threatening problems requiring immediate medical intervention

- ▶ It should be rare to utilise this step in the triage flowchart. A patient with major trauma should be transported directly to a major trauma hospital unless the patient has an immediately life threatening problem and there is a clear benefit from transporting the patient to a closer medical facility.
- ▶ The closest appropriate medical facility will usually be a hospital, but sometimes it will be a medical centre, particularly in remote areas of New Zealand.
- ▶ There are a small number of patients who have an immediately life threatening problem, such that there is a high risk of death before reaching a major trauma hospital and the problem may be able to be rectified at a closer medical facility. Examples include:
  - Severe airway obstruction despite manual techniques and airway adjuncts.
  - Inadequate breathing.
  - Severe external bleeding that is not controlled.

- ▶ The decision to transport a patient with an immediately life threatening problem to a medical facility that is not a major trauma hospital requires clinical judgement that takes into account the nature of the patient's injuries, the rate of deterioration, the relative proximity of the medical facilities and the personnel available at the closest appropriate medical facility. Personnel should have a very low threshold for seeking clinical advice in this setting.
- ▶ If a patient with major trauma is transported to a medical facility that is not a major trauma hospital:
  - Staging (see staging section on page 7) should be activated via the Ambulance Clinical Control/ Comms Centre, preferably before leaving the scene.
  - Personnel in the receiving medical facility must be notified as soon as possible of the intent to stage at the medical facility, preferably before leaving the scene.

## Severe traumatic brain injury (TBI) likely to require urgent neurosurgery

- ▶ Not all major trauma hospitals have neurosurgical facilities and most patients with severe TBI do not require urgent neurosurgery. However, patients with a high probability of requiring urgent neurosurgery should be transported to a major trauma hospital with neurosurgical facilities.
- ▶ A patient with severe TBI and any of the following clinical features should be transported to a major trauma hospital with neurosurgical facilities whenever it is feasible and safe to do so:
  - Has been intubated and ventilated **or**
  - Has lateralising neurological signs (for example unilateral pupil dilatation or unilateral weakness) **or**
  - Has a clinically obvious penetrating brain injury.
- ▶ Personnel should have a low threshold for seeking clinical advice if transport to a major trauma hospital with neurosurgical facilities will involve bypassing (or over flying) another major trauma hospital, particularly if the patient is not intubated and ventilated.

## Complex multi-system trauma

- ▶ Patients with complex multi-system trauma will usually benefit from transport to a tertiary major trauma hospital, whenever it is feasible and safe to do so. This is because tertiary major trauma hospitals have additional facilities and personnel to manage patients with complex multi-system trauma.
- ▶ Complex multi-system trauma cannot be tightly defined and clinical judgement is required, but includes patients with major trauma involving very severe injuries to more than one body region.
- ▶ It is preferable to transport patients with complex multi-system trauma to a tertiary major trauma hospital, provided the transport time is not significantly longer (this is not defined and requires clinical judgement) than the transport time to the closest major trauma hospital.

## Abnormal Primary Survey

### **Airway obstruction**

- ▶ This most commonly occurs in patients with an altered level of consciousness secondary to TBI, but occasionally occurs in the context of direct trauma to the larynx.
- ▶ Clinical judgement is required when determining the patient has manageable airway obstruction (as per step three in the flowchart), rather than life threatening airway obstruction requiring immediate medical intervention (as per step one in the flowchart). For the majority of patients their airway obstruction is 'manageable' or 'partial' and they can be adequately oxygenated using airway adjuncts and supplemental oxygen. If this is the case the patient has manageable airway obstruction and should be transported to a major trauma hospital.

### **Respiratory distress**

- ▶ The most common cause of respiratory distress is pain from rib fractures.

- ▶ A patient with chest wall bruising or a few isolated rib fractures will often have pain when taking a deep breath, but in order to have respiratory distress the patient must have clinical signs of difficulty breathing or severe pain with normal breathing.

### **Shock**

- ▶ Shock is a clinical diagnosis and cannot be tightly defined using specified vital signs.
- ▶ Clinical signs of shock include tachycardia (unless the patient is beta-blocked or has 'end stage' shock when the heart rate is falling), a narrowed pulse pressure, vasoconstriction and an altered level of consciousness (usually with a preserved motor score and agitation).
- ▶ Hypotension is a late sign and severe shock may be present without hypotension, particularly if the patient is young.
- ▶ If an IV fluid bolus is clinically indicated the patient has shock.

### **Motor score of less than or equal to five**

- ▶ A motor score of less than or equal to five is a more useful predictor of clinically important TBI than the GCS.
- ▶ If the patient has a motor score of six and a falling GCS or severe agitation, clinical judgement should be used and strong consideration should be given to transporting the patient to a major trauma hospital.
- ▶ A patient with alcohol or drug intoxication who has a motor score of less than or equal to five following a mechanism of injury consistent with trauma, should be presumed to have severe TBI (and thus major trauma) until proven otherwise, even if it is highly suspected that alcohol or drug intoxication is contributing to the altered level of consciousness.

## Injury patterns

### **Penetrating injury to the neck or torso**

- ▶ To meet the definition of penetrating injury to the neck or torso, there must be a strong clinical impression that the injury has penetrated:
  - The deep tissues when the injured region is the neck.
  - The thoracic cavity when the injured region is the chest.
  - The abdominal cavity when the injured region is the abdomen or pelvis.
- ▶ If the patient has a penetrating injury that appears to only involve skin or subcutaneous tissue and the patient's vital signs are normal, clinical judgement should be used and transport may occur to a hospital that is not a major trauma hospital. This is particularly the case if a major trauma hospital is significantly further away than the alternative hospital.
- ▶ Arterial bleeding from penetrating injuries to the limbs is usually clear, particularly if it involves the brachial, femoral or popliteal artery. However, it is common for there to be some uncertainty as to whether or not bleeding from a limb is arterial. Provided the bleeding has been adequately controlled without a tourniquet and the limb has normal perfusion, clinical judgement should be used and transport may occur to a hospital that is not a major trauma hospital provided the hospital has surgical facilities. This is particularly the case if a major trauma hospital is significantly further away than the alternative hospital.

### **Crush injury to the neck or torso**

- ▶ Most patients with a clinically significant crush injury will have abnormal vital signs and these will trigger criteria for transport to a major trauma hospital.
- ▶ If the crush injury is not clinically significant and the patient has normal vital signs, clinical judgement should be used and transport may occur to a hospital that is not a major trauma hospital provided the hospital has the facilities to meet the patient's needs. This is particularly the case if a major trauma hospital is significantly further away than the alternative hospital.

## Flail chest

- ▶ Flail chest is a clinical diagnosis.
- ▶ There must be clinical signs of paradoxical chest wall movement with breathing.
- ▶ The patient usually has very severe pain, but pain alone is not a diagnostic sign of flail chest.

## Fractures of long bones

- ▶ For the purposes of this policy a fractured long bone requires the patient to have a clinically obvious fracture of the shaft of the femur, tibia or humerus. A fracture that is clinically isolated to the neck of femur or to the ankle is not considered a long bone fracture.
- ▶ No distinction is made between closed and compound fractures for the purpose of determining major trauma.

## Clinically obvious pelvic fracture

- ▶ It is rare to make an out-of-hospital diagnosis of a clinically obvious pelvic fracture because this requires an obvious major deformity or clear evidence of a pelvic fracture visible through a wound.
- ▶ The most common symptom of a pelvic fracture is the presence of pelvic pain but the presence of pain alone is not sufficient to diagnose a clinically obvious pelvic fracture.
- ▶ There is no role for examining the pelvis for signs of instability or crepitus because the pelvis may be severely unstable without these signs being present and the force required to elicit signs may cause harm.

## Paraplegia or quadriplegia

- ▶ Refer to the Spinal Cord Injury Destination Policy.
- ▶ If the patient has paraplegia or quadriplegia and no other signs of major trauma, the patient should be transported directly to a spinal cord impairment centre whenever it is feasible and safe to do so.
- ▶ If the patient has any other signs of major trauma in addition to their spinal cord injury, or it is not feasible and safe to transport the patient directly to a spinal cord impairment centre, the patient must be transported to the most appropriate major trauma hospital.

## Burn injury

- ▶ Patients with burns greater than 20% of body surface area should usually be transported to the nearest major trauma hospital and then subsequently referred to a Burn Centre. This is because some patients will be referred to Middlemore Hospital (the National Burn Centre).
- ▶ However, it is preferable to transport the patient to a Regional Burn Centre\* provided the transport time is not significantly longer than the transport time to the closest major trauma hospital. 'Significantly longer' is not defined and requires clinical judgement.

\* Middlemore Hospital, Waikato Hospital and Christchurch Hospital. Note that although Hutt Hospital is a Regional Burn Centre, patients with major burns in the Lower North Island Area and northern aspect of the South Island will be transported to Wellington Regional Hospital and not Hutt Hospital.

- ▶ Burns less than or equal to 20% of body surface area and burns involving the face (without airway burns), hands or genitals may require treatment in a Burn Centre, but in the absence of major trauma these are not time critical and the patient should usually be transported to the most appropriate hospital and be subsequently referred if required.

## Skull fractures

- ▶ Skull fractures are not listed in the injury patterns that determine the presence of major trauma, even if the fracture is compound or depressed, because:
  - It is common for personnel to suspect that a skull fracture is present, when one is not.
  - Skull fractures can be present without TBI.
  - TBI can be present without skull fractures.
  - Skull fractures in the presence of a motor score of six are not time critical.

## Additional risk factors

### Significant additional signs or symptoms

- ▶ If the patient has clinically significant additional signs or symptoms, strong consideration should be given to transporting the patient to a major trauma hospital.
- ▶ Incorporating significant additional signs or symptoms into decision making requires clinical judgement and must be considered in conjunction with the mechanism of injury and the patient's additional risk factors.
- ▶ Examples of significant additional signs or symptoms include (but are not limited to):
  - Severe soft tissue injury, particularly if it involves the face.
  - Severe abdominal pain.
  - Agitation.

### High risk mechanism of injury

- ▶ Mechanism of injury alone is a very poor predictor that a patient has major trauma.
- ▶ Incorporating the mechanism of injury into decision making requires clinical judgement and must be considered in conjunction with the patient's additional risk factors and their signs and symptoms.
- ▶ Examples of high risk mechanisms of injury include (but are not limited to):
  - Vehicle vs pedestrian, motorcyclist or cyclist where the injured person is 'run over' or there is clinically significant impact.
  - Ejection from a vehicle.
  - Fall greater than twice the patient's height.
- ▶ Even in the presence of a high risk mechanism of injury, if the patient has apparently minor injuries and normal vital signs, clinical judgement should be used and transport should usually occur to the most appropriate hospital, rather than to a major trauma hospital. This is particularly the case if a major trauma hospital is significantly further away than the alternative hospital.

### Additional patient risk factors

- ▶ If the patient has clinically significant additional risk factors, strong consideration should be given to transporting the patient to a major trauma hospital.
- ▶ Incorporating additional patient risk factors into decision making requires clinical judgement and must be considered in conjunction with the mechanism of injury and the patient's signs and symptoms.
- ▶ Examples of additional patient risk factors include (but are not limited to):
  - Pregnancy.
  - Taking an oral anticoagulant.
  - Known bleeding disorder.
- ▶ Even in the presence of additional patient risk factors, if the patient has apparently minor injuries and normal vital signs, clinical judgement should be used and transport should usually occur to the most appropriate hospital, rather than to a major trauma hospital. This is particularly the case if a major trauma hospital is significantly further away than the alternative hospital.

## Staging

- ▶ The majority of patients with major trauma should be transported directly to a major trauma hospital. However, it is occasionally appropriate for the patient to be transported to another medical facility (one that is not designated as a major trauma hospital) at the same time that a helicopter is dispatched to transport the patient to a major trauma hospital. This is termed staging and should occur when all of the following apply:
  - The patient meets criteria to be transported by helicopter to a major trauma hospital.
  - Transport by road to the major trauma hospital is not appropriate because of distance and time.

- The patient has immediate treatment needs for a life threatening problem that cannot be met by personnel already at the scene.
  - The closer (staging) medical facility has personnel and facilities to meet those immediate treatment needs.
  - The patient can be transported to the closer (staging) medical facility significantly faster than the helicopter can locate at the scene. 'Significantly faster' cannot be tightly defined and requires clinical judgement.
- ▶ When a medical facility is being used as a staging point:
    - The aim of treatment at the staging medical facility is to provide immediate treatment and prepare the patient for helicopter transport.
    - Personnel must activate staging via the Ambulance Clinical Control/Comms Centre if the medical facility is not a major trauma hospital, preferably before leaving the scene.
    - Personnel in the receiving medical facility must be notified as soon as possible of the intent to stage at the medical facility, preferably before leaving the scene.
    - An appropriate helicopter and crew will be dispatched as soon as possible and preferably before the patient arrives at the staging medical facility.
  - ▶ When a helicopter is being dispatched to a medical facility (including hospitals) that is being used as a staging point:
    - The helicopter job will be dispatched as a prehospital job and not as an inter-hospital transfer.
    - The clinical care of the patient during transfer will be provided by the normal helicopter crew.
    - If a doctor is available to be part of the normal helicopter crew they will be dispatched whenever this is feasible.

## Additional information

### **Determining the most appropriate medical facility**

- ▶ If the patient does not meet criteria to be transported directly to a major trauma hospital, they should be transported to the most appropriate medical facility, taking into account:
  - The location of the scene.
  - The anticipated healthcare needs of the patient.
  - Where the patient lives.
- ▶ The patient should be transported to a medical facility capable of meeting their anticipated healthcare needs whenever this is feasible. For example, a patient with a compound fracture should be transported to a hospital with orthopaedic surgical facilities and a patient with minor injuries should be transported to an appropriate medical centre.

### **Patients that rapidly improve without treatment**

- ▶ A patient may initially meet criteria for major trauma but then rapidly improve without specific treatment. For example, a patient may have lost consciousness and then rapidly recovered, or had respiratory distress from an emotional cause that has rapidly improved. Provided the patient is very clearly improving and meets no other criteria for major trauma, clinical judgement should be used and transport should usually be to the most appropriate hospital, rather than to a major trauma hospital. This is particularly the case if a major trauma hospital is significantly further away than the alternative hospital.

### **Ambulance status codes**

- ▶ Status codes cannot be used to automatically define the presence or absence of major trauma.
- ▶ The major trauma triage criteria must be used to determine whether or not the patient has major trauma.





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