Frequently Asked Questions:

Trauma 'Code Crimson' Pathway

Why did ITIM develop this guideline?

Designated trauma centres around NSW have a range of policies, procedures and guidelines and appropriate facilities for the management of patients with exsanguinating haemorrhage. The ITIM Clinical Review Committee observed that inconsistent application of these was contributing to delays to definitive surgical or interventional radiological procedures, and was affecting survival in patients with uncontrolled non-compressible haemorrhage. A process for expediting transfer to definitive intervention in the Operating Theatre or Interventional Radiology Suite may be lifesaving in such cases.

What is a trauma 'Code Crimson' patient?

'Code Crimson' is a term that has commonly been used by hospital-based teams managing patients with life-threatening haemorrhage that is refractory to resuscitation. The purpose of a 'Code Crimson' is to streamline a patient's access to definitive intervention, including an operating theatre or interventional radiology suite.

A trauma 'Code Crimson' patient has suffered blunt or penetrating trauma and requires a time-critical surgical or interventional radiological procedure to control life-threatening haemorrhage.

What does trauma 'Code Crimson' activation mean?

Pre-hospital trauma 'Code Crimson' activation means that a retrieval specialist is en route to a trauma service with a patient who they have determined to have life-threatening haemorrhage requiring urgent haemorrhage control. Activating the trauma 'Code Crimson' pathway prior to arrival in the receiving hospital is a way to expedite transfer of these patients to definitive intervention, typically the Operating Theatre or Interventional Radiology Suite.

Which patients meet the criteria for activation of a trauma 'Code Crimson'?

Patients with persistent haemodynamic instability despite standard trauma care*, assessed as being secondary to ongoing haemorrhage in blunt or penetrating trauma, which is unresponsive to intravenous fluids and or blood transfusion, meet the criteria for activation of a trauma 'Code Crimson'.

Clinical examples of potential injuries are:

- *Blunt trauma:* Abdominal trauma with grossly positive eFAST; uncontrolled maxilla-facial haemorrhage; gross pelvic disruption; massive haemothorax; traumatic amputation

- *Penetrating trauma:* Penetrating trauma to chest / abdomen; junctional penetrating trauma; pericardial tamponade

*What does this guideline consider to be standard trauma care for these patients?

- **Airway:** Patent and protected – patient alert or endotracheal tube insitu (confirmed with continuous waveform capnography)
- **Breathing:** Significant pneumothorax excluded with pre-hospital ultrasound or definitive thoracic decompression performed (surgical thoracostomy)
- **Circulation:** Pelvic binder in place, long bone fractures appropriately splinted and external haemorrhage treated (where feasible)

Which procedures can the Aeromedical and Medical Retrieval Services perform on these Code Crimson patients?

Physician-based Aeromedical and Medical Retrieval Services (AMRS) in NSW have the capability to perform a large range of procedures on-scene, en-route or in referring hospitals, which ED-based trauma teams traditionally perform in the resuscitation of trauma patients, including:

- Pre-hospital emergency anaesthesia and tracheal intubation
- Surgical thoracostomy (simple or tube)
- Pelvic and long bone fracture splinting
- Application of tourniquets
- Maxillo-facial haemorrhage control
- Administration of red blood cells
- Advanced surgical procedures such as clamshell thoracotomy, resuscitative hysterotomy, lateral canthotomy and surgical airways
- Ultrasound (eFAST) examination to detect pneumothoraces, or significant free intra-peritoneal, pericardial or intra-thoracic haemorrhage.

Patients who remain persistently haemodynamically unstable due to on-going haemorrhage despite such interventions are very unlikely to benefit from prolonged time spent in an emergency department resuscitation area following treatment by AMRS teams with similar skill sets.

What does our service need to do if we receive a trauma ‘Code Crimson’?

Local policy and procedures will determine exactly what the response to trauma ‘Code Crimson’ activation is for your service. Essential components of the statewide guideline are:

- Confirm activation of trauma ‘Code Crimson’
- Activate the trauma team including: surgeons and subspecialty surgeons; Radiographer
- Prepare to accept the patient in the operating theatre and interventional radiology suite
- Activate the Massive Transfusion Protocol
- Receive handover and conduct a primary survey
- Make a rapid decision about whether this patient should be transferred to the Operating Theatre, Interventional Radiology Suite, Hybrid Angiography Suite, or Computerised Tomography (Surgical Consultant or Fellow +/- the Trauma Consultant or Fellow)

How will this guideline be implemented?

Each LHD is encouraged to be and is responsible for the implementation of the Trauma 'Code Crimson' Pathway in their appropriate trauma centre/s. Implementation resources are available on the ITIM website: https://www.aci.health.nsw.gov.au/networks/itim/clinical/trauma-guidelines/Guidelines/trauma-code-crimson-pathway

We manage our patients well, why do we need to change?

This guideline seeks to enhance the current management of a patient with life-threatening traumatic haemorrhage by recommending that pre-hospital medical retrieval teams initiate a 'Code Crimson' activation, thereby further reducing the time to definitive intervention in these patients.

We are a Regional Trauma Service without 24/7 interventional radiology coverage; will we still receive trauma 'Code Crimson' patients?

Yes, at the discretion of the pre-hospital medical team. Although its use in Regional Trauma Services is encouraged and supported, ITIM understands that there may be limitations to surgical and interventional radiology capabilities in some centres, which may affect the response.

Has this guideline been endorsed by the NSW Ambulance Service?

The Aeromedical and Medical Retrieval Services branch of the NSW Ambulance Service was involved in the development of this guideline, are supportive of its use and have developed procedures regarding pre-hospital 'Code Crimson' activation.

Can the patient go directly from the Helipad to the operating theatre?

Delays to operating theatres or interventional radiology suite should be minimised as much as possible. Each LHD is responsible for determining where the patient goes on arrival to their trauma service. Whether the patient goes directly from the helipad to the operating theatres or interventional radiology suite on arrival will depend upon several factors e.g. admission processes, ability to perform a primary survey, availability of operating theatre or interventional radiology suite.

Is a pre-hospital trauma 'code crimson' part of the emergency codes in hospitals?

No. The Emergency Codes in hospitals are a recognised standard in Australia. The Trauma 'Code Crimson' Pathway is not mandatory or nationwide, and is therefore not included on the emergency codes.

Why haven't specific blood products been added / suggested to the guideline? e.g. TXA, FFP

Information regarding administration of specific blood products is part of the LHD's Massive Transfusion Protocol and is out of the scope of this guideline.

Are there any recommended key performance indicators or outcome measures for this guideline, and who will be evaluating it?

ITIM will evaluate the effectiveness of the Trauma 'Code Crimson' Pathway at a statewide level. Additionally, ITIM recommends that services also assess the effectiveness of the guideline. Suggested KPIs and outcome measures are:

- Trauma 'Code Crimson' Pathway is activated by a medical retrieval team according to the criteria
- The disposition of a patient fitting the criteria for Trauma 'Code Crimson' Pathway activation is determined within 10 minutes of review by the receiving hospital trauma team.
- A patient fitting the criteria for Trauma 'Code Crimson' Pathway activation is transferred to the Operating Theatre and or Interventional Radiology Suite within 30 minutes of review by the receiving hospital trauma team.
- Other trauma process indicators as outlined in the NSW ITIM Trauma Process Indicators webpage: https://www.aci.health.nsw.gov.au/networks/itim/Data/nsw-trauma-process-indicators

Is there any research to support this guideline?

Yes. Please see references on the ITIM website.

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