

STANDARD OPERATING PROCEDURE: RECEPTION OF MAJOR TRAUMA AT CORK UNIVERSITY HOSPITAL 14/02/2023

The Trauma System for Ireland Report (HSE, 2018) identified Cork University Hospital to become a Major Trauma Centre (MTC) subject to meeting designation criteria including presence of a Trauma Team for reception and resuscitation of patients who have sustained traumatic injuries. Criteria have been set down for the constitution and activation of trauma teams based on MTC established practices internationally and consensus guidelines¹. This document details how these will apply at Cork University Hospital.

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TRAUMA TEAM ACTIVATION

The Irish Association for Emergency Medicine (IAEM) have endorsed a 2 tier Trauma Team response. Tier 1 is a local response led by the Consultant or Senior SpR in Emergency Medicine (EM), with emergency doctors and nurses, supported by a range of medical, paramedical and allied health professionals.

The Tier 2 Trauma Team response includes Anaesthesia, General Surgery and Orthopaedics as part of the Hospital Trauma Team.

The Senior clinical decision maker in the Emergency Department (ED) decides on what tier response is required based on Cork University Hospital agreed criteria (see Appendices) and the resources available in the ED.

Communication will be provided at the earliest juncture and updated as more information is received e.g. from the pre-hospital scene.

Ambulance Pre-Alerts for Trauma

On receipt of a Trauma Pre-alert from NAS (National Ambulance Service), the Senior Nurse (CNM2) will discuss the case with the Senior EM clinician. If the criteria are met, they will activate a Trauma Call. This decision will be made by collating the information provided by the National Ambulance Service (NAS) and risk assessing the capacity to receive the trauma; judging capacity and staffing in the ED at the time. The trauma activation tool (Appendix 1) below should be used as a guide.

The CNM2 will arrange a space in Resus: the Senior EM clinician will lead the trauma team or delegate this role to a senior EM decision maker to work under their supervision. The EM Consultant will be contacted, if not already present. The Senior EM clinician and CNM2 will decide what tier Trauma Call will be activated.

Other Patients (not arriving by ambulance)

Emergency Department staff will discuss any patient who meets any of the criteria on the trauma activation tool (Appendices) with the Senior EM clinician immediately. The CNM2 will arrange a space in Resus: the Senior EM clinician will lead the trauma team or delegate this role to a senior EM decision maker to work under their supervision. The EM Consultant will be contacted, if not already present. The Senior EM clinician and CNM2 will decide what tier Trauma Call will be activated. This decision will be guided by the patient's condition.

How to Put Out a Trauma Call

Activation of a Trauma Call will be made by a single call on a single system. This will alert transfusion, radiographer, clerical staff, bed management along with the relevant clinical providers.

Text alert to radiographer/bed management

Text alert/call to transfusion laboratory included.

Wording of this depends on AFIS and implementation of communication system (still pending) - investigating WHISPR

EMERGENCY DEPARTMENT TRAUMA TEAM COMPOSITION:

- EM Consultant (0800-2000)
- PEM Consultant (when on duty – paediatric calls only)
- EM Registrar (2000-0800)
- EM Resus Doctor/Trauma Fellow

- EM Nurse 1
- EM Nurse 2
- EM Nurse 3 (scribe)
- Porter
- HCA
- ED Radiographer

HOSPITAL TRAUMA TEAM COMPOSITION To Attend Immediately:

- EM Consultant (0800-2000)
- PEM Consultant (when on duty – paediatric calls only)
- EM Registrar (2000-0800)
- EM Resus Doctor
- EM Nurse 1
- EM Nurse 2
- EM Nurse 3 (scribe)
- Surgical Registrar
- Anaesthetic Registrar +/- Anaesthetic Nurse
- Orthopaedic Registrar
- Obstetric Registrar (Obstetric Calls only)
- Porter
- HCA
- ED Radiographer

Be Available for Telephone Advice within 5 minutes and Attend within 30 minutes: EM Consultant (8pm-8am)

- Surgical Consultant/Trauma Surgeon
- Anaesthetic Consultant
- ICU Registrar
- ICU Consultant
- Orthopaedic Consultant
- Neurosurgical Registrar
- Neurosurgical Consultant
- Haematology Consultant or Registrar
- Paediatric Registrar (Paediatric and Obstetric calls only)
- Paediatric Consultant
- Registrars and/or Consultants from other specialties as necessary

On the Team's Arrival:

- Team members will sign in on the front page of the TraumaDoc booklet

- Team members will:
 - don PPE as appropriate
 - affix role stickers
 - ensure that they understand their role, as assigned by the Trauma Team Leader (TTL).
- The Team Leader will give a short pre-brief on the known details of the patient, including what injuries to expect and what procedures may be necessary.
- If the patient is awaited, team members will prepare equipment needed for their role
- A scribe will be assigned

On the Patient's Arrival:

- A hands off approach should be adopted unless otherwise instructed by the team leader, with the exception of:
 - The airway manager, if the airway appears to be at immediate risk or a ventilated patient does not appear to be ventilating
 - The primary survey doctor, if there appears to be significant uncontrolled external haemorrhage
- Handover will be taken with the patient on the ambulance stretcher unless there are any significant ABC concerns. Once handover is complete, the patient will be transferred to the ED trolley, ED monitoring will be attached and oxygen will be transferred to wall supply.
- If there are ABC concerns, the patient should be transferred across immediately and the concerns addressed.
- The ambulance crew have significant information to impart and they know whether or not the patient is well enough to wait for 2-3 minutes for this information to be imparted, and will state if this is not the case. The **whole** team will therefore listen quietly to the handover without touching the patient or performing any other tasks. The scribe will take contemporaneous notes of the handover in the TraumaDoc booklet.
- The patient should remain on the NAS VacMat for the transfer.
- Clothes should be routinely removed (preferably with the use of a trauma shears to maintain spinal precautions) to allow the whole of the patient's body to be examined. Underwear may remain in conscious patients for dignity, but the primary survey doctor must inspect the covered area. Patients should be covered with a blanket and active efforts made to prevent hypothermia.
- The patient assessment in CUH ED will be done according to the ATLS system however rather than CABCADE being done in sequence, assessment is done in parallel by team members who feed back to the team leader in a closed loop manner with the scribe capturing the exchange.
- The team will perform the tasks delegated to them by the Trauma Team Leader and according to their **roles and** skill level.

- During the primary survey, haemorrhage control will be actively employed. This may include direct pressure/haemorrhage-control suturing to wounds, pressure dressings, CAT tourniquets, traction splinting of long-bone fractures, stabilisation of other fractures and pelvic splinting. Accurate recording of the time of application of tourniquets is essential.
- The pelvis will be palpated and examined for signs of trauma, and should NOT be “sprung” during examination and a pelvic binder applied if there is any clinical suspicion of an open-book fracture, and one has not been applied prehospital.
- The patient must only be log-rolled if they are:
 - 1) Haemodynamically normal
 - 2) There is no suspicion of major haemorrhage (internal or external)
 - 3) There is no suspicion of pelvic fracture
 - 4) They are fully conscious and able to comply with the examination.

- PR examination is not routinely required unless there is a specific indication.
- All patients will receive at least two sets of observations even if apparently uninjured.
- The use of oxygen will be reviewed early to reduce oxygen free radical production: oxygen is not required if the patient’s saturations are above 94% on room air.
- At least one point of intravenous (IV) or intraosseous (IO) access will be obtained. A second will be required for any patient with haemodynamic abnormality or those undergoing intubation. Large bore preferred i.e. 16G or larger.

- Permissive hypotension will be employed in the resuscitation room where appropriate; hypotensive patients must be discussed with the EM (& any other relevant) Consultant(s) and transferred for definitive care as soon as possible. IV fluids will not be hung unless an active decision has been made to give them. Where fluid is required this will be given as titrated ~250ml (adults) or 10ml/kg (children) boluses. In blunt trauma patients, titration will be to a peripheral pulse, no evidence of confusion (if conscious) and a BP sufficient to perfuse the vital organs (in adults ~80mmHg). In penetrating trauma, titration will be to a central pulse. The optimal fluid to give is blood products and efforts should be made to have it available and primed to administer on arrival of a haemodynamically unstable patient (take Group and cross match, Full Blood Count, Coagulation studies, Calcium, Renal, Liver, Amylase, hsTroponin, Venous Blood Gas tests first without delay).
- Permissive hypotension is contraindicated in the management of brain or spinal cord injury.
- Any patient who has a significant haemorrhage (internal or external) requiring blood and/or blood product transfusion will receive a tranexamic acid (TXA) bolus 15mg/kg up to 1g (usually given in 5% glucose over 10-20 minutes) followed by an infusion of 15mg/kg up to 1g over 6 hours if injury is within 3 hours.
- Blood and blood products will be given according to the massive transfusion protocol.

- 6ml/kg 5% hypertonic saline will be given to adult patients with significant head injury with evidence of increased ICP and herniation from Traumatic Brain Injury (TBI). 3ml/kg in paediatric patients over 15 minutes.

- Analgesia will be offered and given at the earliest opportunity.
- eFAST will be performed in parallel to CABCDE
- Primary trauma survey X-Rays including CXR and Pelvic X-ray will be performed in parallel by radiographer in advance of transfer to CT scan which is a distance from the resuscitation room currently. A lateral C-spine is not necessary as it will not change management if the spine has been immobilised appropriately, and a formal CT C-spine is being done.

Post-Primary Survey

Immediately after the primary survey, the Team Leader (in conjunction with the team) will decide the patient's next phase of management. Options are:

1. The patient needs to go to theatre for immediate life-saving (damage control) surgery
 2. The patient needs to go to the CT scanner but specific resuscitation measures (e.g. intubation; chest drainage) are required first
 3. The patient needs to go to the CT scanner and can go immediately
 4. The patient can be managed primarily in the resuscitation room (but may need transfer elsewhere at a later stage) with radiology, as needed, in the ED
- If 1-3 apply, and the patient deteriorates at any time or the Team Leader subsequently considers it necessary to transfer the patient to another hospital (e.g. Burns unit; PICU) they should notify the EM Consultant (if not already present) immediately
 - Fluid resuscitation alone should not delay transfer to CT/definitive care. Fluid may be given in transit; however the team must remember that hypovolaemic patients tend to tolerate significant movement poorly and that adequate resuscitation must be performed to enable safe transit to CT and to the onward destination
 - If the patient needs theatre for resuscitative/emergency surgery the relevant Surgical and Anaesthetic Consultants must be notified by their Registrars or SHOs
 - The Trauma Team Leader (or a nominated deputy, able to perform any procedure that the patient may require) will accompany the patient to the CT scanner, as needed.
 - The Team Leader will release team members if possible after they have written in the TraumaDoc Booklet

Post CT or X-ray (if indicated)

The Trauma Team Leader (with relevant members of the team) will decide whether the patient needs admission at CUH (including Clinical Decision Unit (CDU)), transfer to another hospital (e.g. Burns unit/PICU) or if the tertiary survey is normal, discharge.

If the patient needs admission at CUH, the Trauma Team Leader will decide which specialty or specialties the patient will need care from. If this is a single specialty the registrar will be called (if not still in attendance) to observe/perform a secondary survey and arrange admission. If this is more than one specialty, the Trauma Team Leader will ask the relevant Registrars to contact their Consultants to plan the patient's care. The relevant Consultants will attend if in the hospital; if not, their registrar may deputise for them with telephone input from the Consultant.

The patient may go home if the secondary and tertiary surveys are normal; this will be completed or overseen by the Team Leader who will then discharge the patient or refer/arrange treatment as required. The CDU may be used to facilitate performance of a tertiary survey in these patients at an interval. **The CDU should not however be used for complex trauma patients who warrant a formal admission to the hospital, these will be admitted primarily under the Trauma Service and then taken over by the appropriate surgical specialty when deemed necessary.**

Transfers Out of the Hospital

- The EM Consultant will be informed of all potential major trauma transfers from CUH ED to other hospitals by the referring specialty and will liaise with the receiving hospital, if needed.
- The Team Leader will decide the appropriate clinical escort
- The team will complete their section of the patient's notes in the TraumaDoc booklet
- The Resus nurse will book an ambulance with the appropriate level of urgency, liaise with clerical staff re copying of the notes and send them with the patient.
- The Trauma Team Leader will ensure that any images are transferred electronically to the receiving hospital, that any verbal reports are documented and copied and that any written reports are sent to the hospital even if they are received after the patient has left the hospital.
- If blood and blood components have been provided to ED and the patient is to be transferred onwards, the Transfusion Laboratory should be made aware of this – for traceability of product, correct packaging of blood for transfer.

SPECIAL CASES

Paediatric Trauma

- This SOP also applies to paediatrics (except where stated otherwise)
- The paediatric registrar and/or PEM or General Paediatric Consultant will assist with procedures at which they may be more proficient than others such as IV or IO access
- They, along with the Trauma Team members, will also consider whether there are any Safeguarding concerns and act accordingly
- In an emergency, any paediatric patient may be intubated in the ED but early involvement of Anaesthetics is advised

- There is a Cork University Hospital Protocol for Management of Massive Haemorrhage in Paediatrics that clinicians can refer to: see PPG-CUH-CUH-210 for guidance if required
- The Trauma Service or surgical specialties will need to be involved, even if just to make referrals to Dublin Childrens' Hospital for ongoing care.

Obstetric Trauma

- The SOP also applies to pregnant patients (except where stated otherwise)
- While all women of child-bearing age should be considered to be pregnant unless they have tested negative, this should not stop them receiving imaging which is in their best interests

- Recognisably pregnant patients should be nursed with a wedge under their right flank to tilt them to their left side if possible; otherwise a member of the team should perform manual displacement of the uterus
- If a patient is recognisably pregnant, an Obstetric registrar will be called if they are seriously injured to consider and, if necessary, perform a resuscitative hysterotomy. If an Obstetrician is not immediately available, the EM or Surgical Consultant or Registrar should proceed with this, if indicated, and they have been trained to do so
- Pregnant patients will be observed by an Obstetric team even if apparently uninjured
- The Obstetric registrar will advise on the use of anti-D injection and fetal monitoring
- A Paediatric team should also be activated to seriously injured pregnant patients to care for the baby if a resuscitative hysterotomy is performed.

Trauma Patients Transferred in from Other Hospitals to CUH

- Patients transferred to CUH from other institutions, irrespective of whether they have an inpatient bed will be re-assessed by the trauma team on arrival
- Tertiary (neurosurgical) trauma patients transferred in from other hospitals will be re-assessed by the trauma team in Resus on arrival unless they have an urgent need for time critical surgery. All transfers to CUH should be discussed with the receiving team leader in the ED.
- The Blood Transfusion laboratory is to be informed immediately if the patient is accompanied by any blood products from the transferring institution and if not going to be transfused in ED on receipt. The transferred blood components must be delivered to the Blood Transfusion laboratory.

Appendix 1: Trauma Team Activation Tool

ED Trauma Team

MECHANISM OF INJURY

- Motor Vehicle Collision $\geq 60\text{kph}$
- Motor/Cyclist impact $\geq 30\text{kph}$
- Pedestrian impact $\geq 30\text{kph}$

- Ejection from vehicle
- Same vehicle rollover
- Fatality same vehicle

- Prolonged extrication >30 mins
- Explosion
- Fall $\geq 2\text{m}$
- Fall (any height) on anticoagulation

WITH NORMAL PHYSIOLOGY

- RR 10-30bpm
- Sats $\geq 90\%$
- SBP $\geq 90\text{mmHg}$
- HR 50-120bpm
- GCS ≥ 14

Appendix 2: Trauma Team Activation Tool

HOSPITAL Trauma Team

MECHANISM OF INJURY

- Motor Vehicle Collision $\geq 60\text{kph}$
- Motor/Cyclist impact $\geq 30\text{kph}$
- Pedestrian impact $\geq 30\text{kph}$

- Ejection from vehicle
- Same vehicle rollover
- Fatality same vehicle

- Prolonged extrication ≥ 30 mins
- Explosion
- Fall $\geq 2\text{m}$
- Fall (any height) on anticoagulation

WITH ANY OF THE FOLLOWING

PHYSIOLOGY

- RR < 10 or $> 30\text{bpm}$
- Sats $< 90\%$
- SBP $< 90\text{mmHg}$
- HR < 50 or $> 120\text{bpm}$
- GCS < 14

ANATOMY

- Airway compromise (actual or potential)
- Airway or facial burns
- Intubated patient

- Suspected severe chest/pelvic/upper thigh injury
- Crush injury
- >2 long bone fractures
- Limb amputation (proximal to wrist/ankle)
- Pulseless limb
- Major burns ($\geq 20\%$ TBSA)
- Spinal paralysis
- Open or depressed skull fracture
- Evisceration

OTHER

- Penetrating neck/chest/abdominal injury
- Gun Shot Wounds
- ≥ 3 patients expected
- Near drowning/submersion
- All HEMS Trauma transfers

Appendix 3: Trauma Team Activation Tool

TRAUMA in Older Adults ≥ 65 years of age

HOSPITAL Trauma Team

- Fall >3 steps
- Fall (any height) on anticoagulation or 2 antiplatelet agents
- Motor Vehicle Collision ≥ 50 kph
- Pedestrian impact (any speed)

- Ejection from vehicle
- Same vehicle rollover
- Fatality same vehicle
- Prolonged extrication ≥ 30 mins

WITH ANY OF THE FOLLOWING

PHYSIOLOGY

- RR <12 or >24 bpm
- SpO₂ $<90\%$
- SBP <90 mmHg at any time
- HR >65 bpm
- GCS <15
- Severe pain
- Lactate ≥ 2
- Base Excess ≤ -2

ANATOMY

- Injury ≥ 2 body regions
- Suspected head/spine/chest/pelvic/upper thigh injury
- Open fracture