

National Trauma Networks Conference

National Exhibition Centre, Birmingham – 19 November 2018

Civilian Pre-Hospital Care and Preparing for Mass Casualties

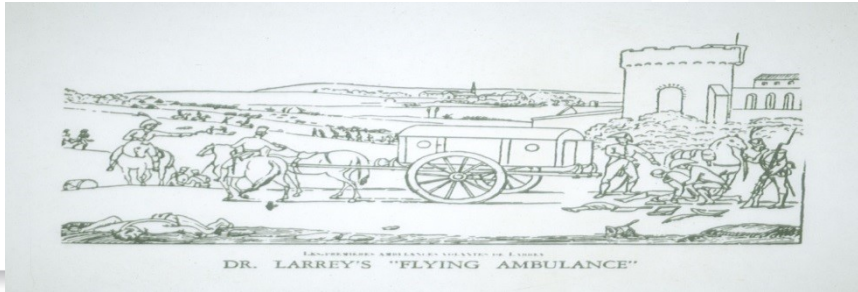
Professor Sir Keith Porter - Professor of Clinical Traumatology,
Queen Elizabeth Hospital Birmingham

Mr Steve Wheaton - Assistant Chief Ambulance Officer, West Midlands
Ambulance Service

Ms Justine Lee - Specialty Doctor Major Trauma Service, Queen
Elizabeth Hospital Birmingham

Historical Roots of Immediate Care

- The Bible – 2Kings Chapter 4 Verse 34
- The Roman Army
 - Casualty Collection
 - Medical Aid Posts
- Napoleons Army
- The Royal Humane Society



Royal Humane Society Guidelines 1770

- Warmth
- Artificial respiration by mouth to mouth with compression of the abdomen and chest
- Fumigation by the introduction of tobacco smoke into the rectum and colon
- Rubbing the body
- Stimulants
- Bleeding
- Inducement of vomiting

Royal Humane Society Leaflet 1776

First and Second World Wars

- Comprehensive emergency plans
- Local control centres
- Major role in rescue and first aid posts for GPs



Post War Development of Pre-hospital Care

- A1 1949
- Dr Kenneth Easton
- 2000 RTC's by 1965



Road Accident After Care Scheme (RAAC) 1967

- BMA 1967 Easton and McCullum
- Professor Eberhard Gogler Heidelberg – ‘therapeutic vacuum’
- 1967
 - First International Symposium on Immediate Medical Care
 - Arrival of Dr Peter Basket John Zorab
 - Professional and administrative barriers broken

Flying Squads

- 1955 – Sutton Coldfield Train Crash
- 1955 – Derby Royal Infirmary - Dr John Collins
- 1960 – Preston General Hospital - Mr H Hall
- 1964 – Birmingham Accident Hospital – Prof Gissane
- 1967 – Bath – Dr Roger Snook
- 1980 – Edinburgh – Dr Keith Little ‘Medic 1’

Collins J BMJ 1966;2:578-80

Hall HM Lancet 1965;1:904-6

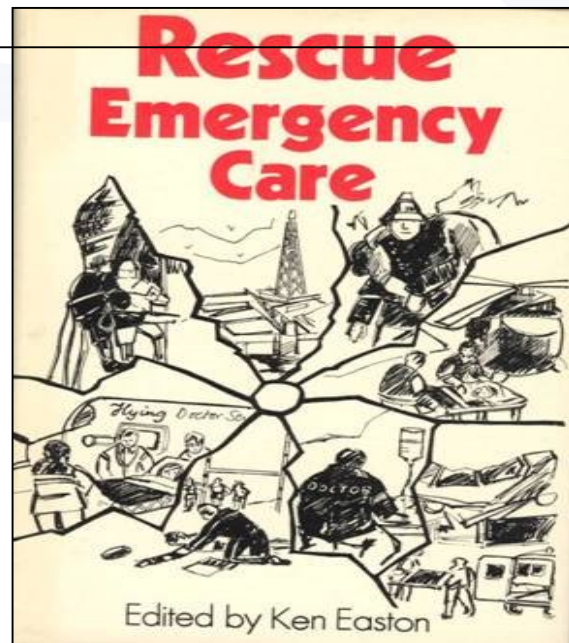
Snook R BMJ 1972;3:569-74



BASICS – BRITISH ASSOCIATION FOR IMMEDIATE CARE

- Established 1977
- Voluntary association
- Variable geographical availability
- Variable function
- Direct clinical care
 - Care in transit
 - Scene management
 - Medical direction
 - Training and education





IBTPHEM
Intercollegiate Board for Training in
Pre-hospital Emergency Medicine

Diploma in Immediate Medical Care

Finding a home

Royal College of Surgeons of Edinburgh

- Mr Myles Gibson
- Fellowship in Accident and Emergency Medicine at the Edinburgh College



*New
edition
May 2015*



Intercollegiate Board for
Training in Pre-hospital
Emergency Medicine

IBTPHEM
Intercollegiate Board for Training in
Pre-hospital Emergency Medicine

- Complex clinic decision making
- Pre-hospital emergency anaesthesia
- Pre-hospital procedural sedation



- Alternative analgesic/drugs and techniques
- Administration of critical care drugs
- Organ specific support



- Management of complex wounds/fractures
- Management of complex incidents with multiple patients
- Complex transport decision making





How well have we done?

850 additional lives saved each year

Chris Moran

The challenge for the future

Have we reached the clinical summit in pre-hospital care?

- Pre-hospital anaesthesia
- Blood based product resuscitation
- Resuscitative thoracostomy
- Retrograde endovascular balloon occlusion of the aorta (REBOA)
- Extracorporeal membrane oxygenation (ECMO)



Be prepared, not scared

www.citizenaid.org



Steve Wheaton
Assistant Chief Ambulance Officer
Resilience and Specialist Operations Director



National Trauma Network Conference

National Context Pre Hospital

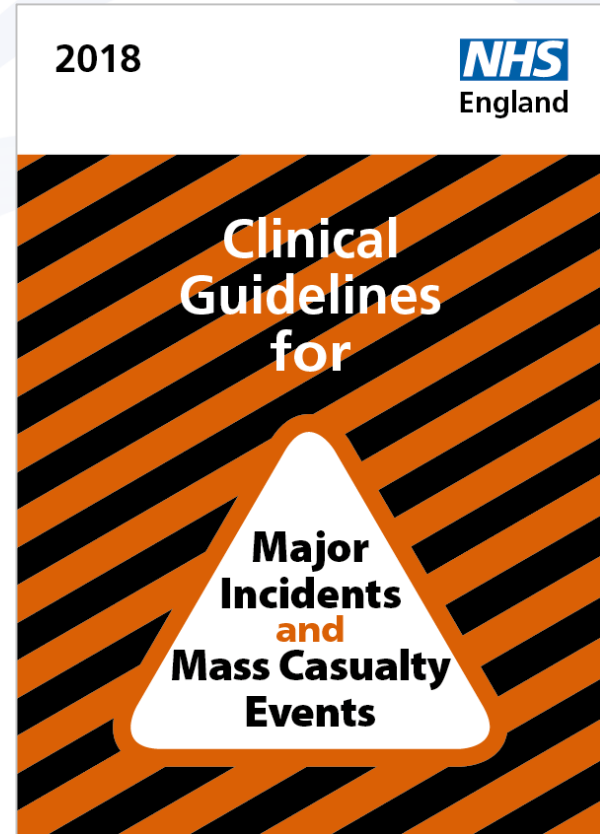
- JESIP programme audit identified progress is being made but embedment has some work to do, central programme team closes April 2019 and will hand over to regulators for Ambulance, Fire and Police, Tri Service board will stay in place.
- National learning events held for Westminster, London Bridge and Manchester Incidents.
- EPRR / NARU Core Standards in relation to Commander competencies, Training and Exercising changed in 2018 submissions. Closing the gaps!
- NARU / NHSE Auditing all Trusts, again closing the gaps and reducing inconsistencies.

Issues Encountered

- Keeping core competencies achieved vs day job
- Trying to achieve consistency and exercising with 10 Ambulance Trusts, 43 police services and 45 Fire Services
- Perception Brexit has created inertia within government on decision making / finances
- Burns – Plan vs Reality – is it fit for purpose? Capacity and Regulation plan as for Mass Cas?
- Pre Hospital PHEM as BIRT?

Miss Justine Lee
Specialty Doctor in Major Trauma
Queen Elizabeth Hospital, Birmingham, UK

NHS CLINICAL GUIDELINES FOR MAJOR INCIDENTS AND MASS CASUALTY EVENTS



https://www.england.nhs.uk/ourwork/eprp/

NHS England Emergency Preparedness, Resilience and Response Framework



The screenshot shows the NHS England website with the URL <https://www.england.nhs.uk/ourwork/eprp/> in the browser address bar. The page features a blue header with navigation links: Home, News, Publications, Statistics, Blogs, Events, and Contact us. Below the header is a search bar and a secondary navigation bar with links: About NHS England, Our work, Commissioning, and Get involved. The main content area is titled "Emergency Preparedness, Resilience and Response (EPRR)" and includes a sub-header "Information last updated: 4 August 2017". The page contains a list of links to various EPRR resources, including Guidance and Framework, Business continuity, Clinical Commissioning Groups (CCGs), Exercising, Hazardous Materials (HAZMAT) and Chemical, Biological, Radiological and Nuclear (CBRN), Local Health Resilience Partnerships (LHRP), Pandemic Influenza, Severe weather, and Five Year Forward View. A large purple checkmark is overlaid on the bottom left of the screenshot.

Home > Our work > Emergency Preparedness, Resilience and Response (EPRR)

Emergency Preparedness, Resilience and Response (EPRR)

Information last updated: 4 August 2017

The NHS needs to plan for, and respond to, a wide range of incidents and emergencies that could affect health or patient care. These could be anything from extreme weather conditions to an outbreak of an infectious disease or a major transport accident. The Civil Contingencies Act (2004) requires NHS organisations, and providers of NHS-funded care, to show that they can deal with such incidents while maintaining services.

This programme of work is referred to in the health community as emergency preparedness, resilience and response (EPRR). New arrangements for local health EPRR form some of the changes the Health and Social Care Act 2012 is making to the health system in England.

If you would like more information or have any queries, please email england.eprp@nhs.net.

- [Guidance and Framework](#)
- [Business continuity](#)
- [Clinical Commissioning Groups \(CCGs\)](#)
- [Exercising](#)
- [Hazardous Materials \(HAZMAT\) and Chemical, biological, radiation and nuclear \(CBRN\)](#)
- [Local Health Resilience Partnerships \(LHRP\)](#)
- [Pandemic influenza](#)
- [Severe weather \(including cold weather, heatwave and flooding\)](#)
- [Maps of England displaying geographical boundaries for NHS England, Public Health England \(PHE\).](#)

<https://www.england.nhs.uk/ourwork/eprp/>

Key:

Cabinet Office published guidance

NARU published guidance

DH or NHS England published guidance

Key:

Cabinet Office published guidance

NARU published guidance

DH or NHS England published guidance

Key:

Cabinet Office published guidance

NARU published guidance

DH or NHS England published guidance

Key:

Cabinet Office published guidance

NARU published guidance

DH or NHS England extant published guidance currently being updated

DH published guidance

HPA/PHE guidance

new guidance under development

NHS England published guidance



Business Continuity

NHS England Business Continuity Management Framework (2013)

NHS England Business Continuity Management Toolkit

Cabinet Office: Business Continuity (web-page)

ISO 22301 Business Continuity Management Systems (BCMS) - Requirements

ISO 22313 Business Continuity Management Systems - Guidance

www.england.nhs.uk

Pandemic Influenza

Operating Framework – Response to Pandemic Influenza

Roles and Responsibilities of CCGs in Pandemic Influenza

The UK Influenza Preparedness Strategy 2011

Health and Social Care Influenza Pandemic Preparedness and Response (Apr 2012)

14 x documents forming Evidence Base Underpinning the UK Influenza Pandemic Preparedness Strategy (March 2011)

www.england.nhs.uk

Reference Materials

Information on FFP3 Respirators

Information for LHRPs

A Plan for NHS Blood and Transplant and Hospitals to address Red Cell Shortages August 2016

A Plan for NHS Blood and Transplant and Hospitals to address Platelet Shortages August 2016

NHS Guidance on Planning for Disruption to Road Fuel Supply: Strategic National Guidance NHS Organisations (Nov 2008)

www.england.nhs.uk

HAZMAT & CBRN

Chemical Incidents – Planning for the management of self-presenters in healthcare settings (April 2015)

Preparing for incidents involving hazardous materials: guidance for primary and community care facilities

UK Reserve National Stock for Major Incidents – How to access stock in England (Feb 2015)

Ambulance service guidance on dealing with radiological incidents and emergencies (Mar 2010)

NHS Guidance - Incidents Involving Radioactivity (1998)

NARU: Initial Operational Response

www.england.nhs.uk

HPA: CBRN Incidents: A Guide to Clinical Management and Health Protection (September 2008)

PGD: Initial supply of ciprofloxacin tablets /suspension to children under 12 years of age exposed to a suspected biological agent

PGD: Initial supply of ciprofloxacin 500mg tablets to adults and children aged 12 years and over exposed to a suspected biological agent

PGD: Further supply of ciprofloxacin tablets/ suspension to children under 12 years of age exposed to a suspected biological agent

PGD: Further supply of ciprofloxacin 500mg tablets to adults and children aged 12 years and over exposed to a suspected biological agent

PGD: Initial supply of doxycycline 100mg capsules to adults and children aged eight (8) years and over exposed to a suspected biological agent

PGD: Further supply of doxycycline 100mg capsules to adults and children aged 12 years and over exposed to a suspected biological agent

PGD: Supply of potassium iodide 65mg tablets to adults and children exposed to radioactive iodine, or at risk of exposure

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Mass Casualty & Major Incidents

Concept of Operations for the Management of Mass Casualties

Clinical Guidance for Major Incidents

Pre-hospital care (formerly MERIT)

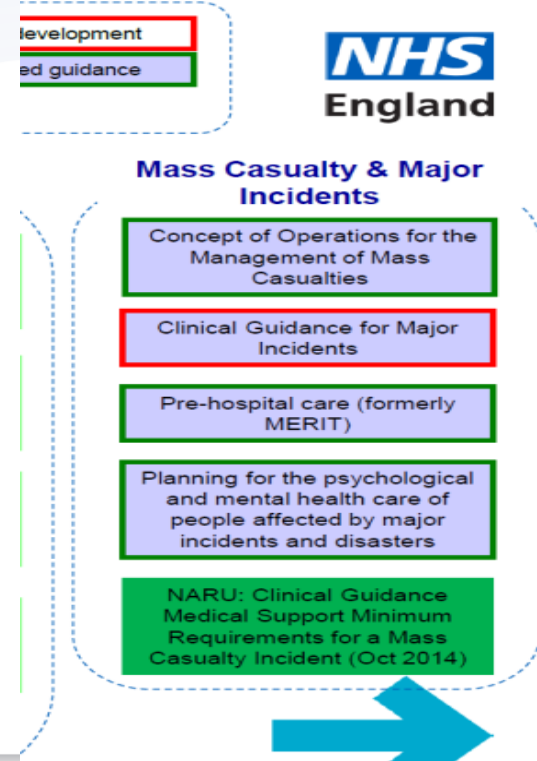
Planning for the psychological and mental health care of people affected by major incidents and disasters

NARU: Clinical Guidance Medical Support Minimum Requirements for a Mass Casualty Incident (Oct 2014)



Key NHS MI documents

- Concept of operations for the management of mass casualties
- Clinical guidance for use in an MI
- Pre-hospital care (formerly MERIT)
- Psychological and mental healthcare planning for major incidents and disasters
- National Ambulance Resilience Unit for a mass casualty incident





Clinical Guidelines for Major Incidents and Mass Casualties Workshop 25 April 2017





The Daily Telegraph

Manchester explosion kills 19 concert-goers

Police investigating blast as 'possible terrorist incident'

By Martin Power
A deadly concert explosion in Manchester has killed 19 people and injured more than 100 others, police have said. The blast, which took place at the Manchester Arena, was described as a 'possible terrorist incident'.

The explosion occurred at 10.38pm on Saturday night, just as the concert by the American pop singer Ariana Grande was about to begin. The arena, which is the largest indoor venue in the UK, was packed with fans.

Police have cordoned off the area around the arena and are conducting a search for any suspects. A police spokesman said: 'We are treating this as a possible terrorist incident and are working closely with the security services.'

The explosion was heard across the city and caused a power outage in the area. The Manchester Arena is a multi-purpose venue that has previously hosted a variety of events, including concerts, sports events and conferences.

The Manchester Arena is located in the city centre, just a short walk from the city's main railway station. It is a popular venue for fans of a wide range of artists and is known for its excellent acoustics and state-of-the-art facilities.

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Care cost chaos after May U-turn

By Sarah Wainwright
The government's decision to scrap the cap on care home fees has caused a major crisis for local authorities, with many facing huge increases in costs.

The decision, which was announced in May, was a U-turn from the government's previous policy of capping fees at £46,500 per year. The new policy allows care homes to charge whatever they want, which has led to a surge in fees.

Local authorities are now struggling to pay the increased costs, with many facing budget cuts and increased pressure on their finances. The crisis has led to a number of care homes closing their doors, leaving thousands of vulnerable people without a home.

The government has promised to provide additional funding to help local authorities cope with the increased costs, but it is unclear when this funding will be received. The crisis has caused widespread concern among the public, who are worried about the future of care for vulnerable people.

Why traditional Gloucestershire pigs are now getting hard to spot

By Sarah Wainwright
The traditional Gloucestershire pig, a breed known for its distinctive curly skin and small size, is becoming increasingly rare.

The breed was once common in the Gloucestershire area, but its numbers have declined significantly in recent years. This is due to a number of factors, including changes in farming practices and a lack of interest in the breed.

The Gloucestershire pig is a small, curly-skinned breed that is known for its excellent meat quality. It is a popular breed among small-scale farmers and is often used for breeding purposes.

The breed is now considered a 'rare breed' and is protected by the Rare Breeds Survival Trust. The trust is working to increase the number of Gloucestershire pigs and to ensure that the breed is not lost.

Supermarkets to cut petrol during the summer

By Sarah Wainwright
Supermarkets are planning to cut the price of petrol during the summer months, which will be a welcome relief for many motorists.

The cuts are expected to be in the region of 10p per litre, which would bring the price of petrol down to around 50p per litre. This is a significant reduction from the current price of around 60p per litre.

The cuts are being made by a number of major supermarkets, including Asda, Sainsbury's and Morrisons. The cuts are being made in response to a fall in the price of oil.

The cuts are expected to last for the rest of the summer, but they may be reduced or removed if the price of oil rises again. The cuts are a welcome relief for many motorists, who are struggling to pay the high prices of petrol.

NEWSBRIEF

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2018



Clinical Guidelines for

**Major
Incidents
and
Mass Casualty
Events**

Clinical Guidelines for use in a Major Incident/Mass Casualty Event

- 40+ Guidelines
- Created by Clinical Working Group
 - and reviewed by clinicians recently involved in terror attacks
- Content aimed at Trauma Units
 - E.g. clinicians not working in major trauma centres
- Alternative strategies and aide memoires when resources are sub-optimal
- Available in all UK Emergency Departments

Topics covered

Major Incident Awareness
Major Incident Standby
Major Incident Declared
Co-ordination in a Major Incident
Forensic Awareness
Ballistic Injury
Burns
Blast Injury
Crush Injuries
CBRN
Emergency Department Triage
Surgical Triage
Radiology (CT Traumagram)
The Trauma Team response
Hyperacute Rehabilitation
Bereavement

Damage Control Anaesthesia
Analgesia
Blood Bank/Haematology
Microbiology
Damage Control Orthopaedics
Chest Injuries (Cardiothoracics)
Blast Lung
Abdominal and Vascular Injuries
Soft Tissue Injuries
Pregnancy and Trauma
Major Trauma in Children
Brain and Spinal Injuries
Head and Neck (OMFS and ENT)
Eye Injuries
Blast Ear and Hearing Loss
Staff Resilience and Counselling

Clinical guidelines for use in a trauma major incident or mass casualty event

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Mechanism of injury (MOI)

- 1 v1 Ballistic injury
- 2 v1 Blast injury
- 3 v1 Crush injury
- 4 v1 Penetrating knife injury
- 5 v1 Chemical, biological, radiation and nuclear events (CBRN)

Major Incident STANDBY

- 1 v1 Major Incident STANDBY
- 2 v1 METHANE report

Major Incident DECLARED

- 1 v1 Major Incident DECLARED
- 2 v1 Clinical impact assessment call patient summary sheet

Emergency Department (ED)

- 1 v1 ED triage (adults)
- 2 v1 ED triage (paediatric <12 years)
- 3 v1 ED outcomes, discharges and follow up advice in a Major Incident

ED Reception and Resuscitation

- 1 v1 Trauma team roles in a Major Incident
- 2 v1 Catastrophic haemorrhage and massive transfusion pathway in a Major Incident
- 3 v1 MI Senior clinical decision making
- 4 v1 MI Imaging (incl. CT whole body)

Injury management in ED

- 1 v1 MI anaesthesia for P1/Resus casualties
- 2 v1 MI neuro trauma (brain injuries)
- 3 v1 MI surgical/proximal haemorrhage control
- 4 v1 MI thoracic trauma
- 5 v1 MI abdominal trauma
- 6 v1 MI pelvic and long bone injuries
- 7 v1 MI immediate wound management
- 8 v1 MI universal fasciotomies

Specialty overviews

- 1 v1 Pain management in a Major Incident
- 2 v1 Antimicrobial prophylaxis in a Major Incident
- 3 v1 Management of blast ear and hearing loss in a Major Incident
- 4 v1 Management of blast lung in a Major Incident
- 5 v1 Management of burns in a Major Incident
- 6 v1 Management of eye injuries in a Major Incident
- 7 v1 Forensic awareness in a Major Incident
- 8 v1 Management of head, face and neck injuries in a Major Incident
- 9 v1 Management of paediatric casualties in a Major Incident
- 10 v1 Management of a pregnant casualty in a Major Incident
- 11 v1 Psychosocial support for anyone affected by a Major Incident
- 12 v1 Psychosocial support for staff after a Major Incident
- 13 v1 Rehabilitation co-ordination and medical support in a Major Incident
- 14 v1 Safe spinal injury care in a Major Incident
- 15 v1 Management of bereavement in a Major Incident

Appendices

Glossary
Links
Acknowledgements

MI Awareness

Mechanism of Injury

MI STANDBY

MI DECLARED

ED Triage

ED Resus

ED Injury Management

Specialty overviews

Appendices

Clinical Guidelines for use in a Major Incident/Mass Casualty Event

- Sections:
 - Pre-event awareness
 - Mechanism of Injury
 - Major Incident STANDBY / DECLARED
 - Emergency Department Triage
 - ED Reception and Resuscitation
 - Injury Management in ED
 - Speciality Overviews

Pre-event Awareness MI Standby and Declared

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Major Incident STANDBY

1 v1 Major Incident STANDBY

2 v1 METHANE report

Major Incident DECLARED

1 v1 Major Incident DECLARED

2 v1 Clinical impact assessment call patient summary sheet



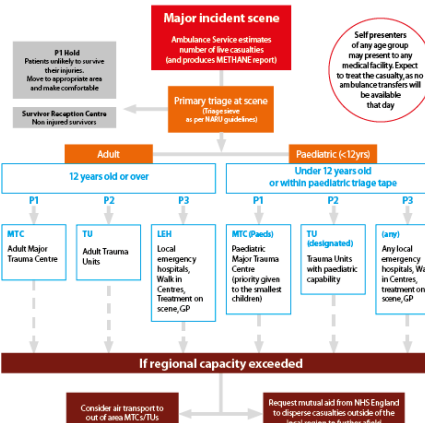
Major incident awareness

A mass casualty incident for UK health resources is an incident (or series of incidents) causing casualties on a scale that is beyond the normal resources of the emergency and healthcare services; ability to manage.

- may involve hundreds or thousands of casualties with a range of injuries, the response to which will be beyond the capacity of normal major incident procedures to cope and require further measures to appropriately deal with the casualty numbers.
- casualties are likely to be a mixture of categories with 25% requiring immediate life saving intervention (P1), 25% requiring intervention that can be delayed (P2) and 50% being walking wounded or minor injuries (P3).
- usually caused by sudden onset events (big bang), and exclude casualties as a result of infectious diseases such as pandemic influenza.

Several smaller incidents may combine, or be geographically located, so as to require a mass casualty response to be initiated due to the large number of simultaneous casualties.

For specialist services such as burns, the trigger for activation of their mass casualty arrangements will be lower due to the limited availability of resource for incident response.



Major incident STANDBY

Major incident STANDBY message has been announced

- External source of order: Message has been received from any of the emergency services or NHS England authorities, direct into ED, requesting your hospital to STANDBY for a major incident.
- Internal source of order: Unusual activity reported within ED, news via social media or other sources etc., may lead to a self-declaration of major incident standby by an ED consultant in discussion with the hospital or call team.

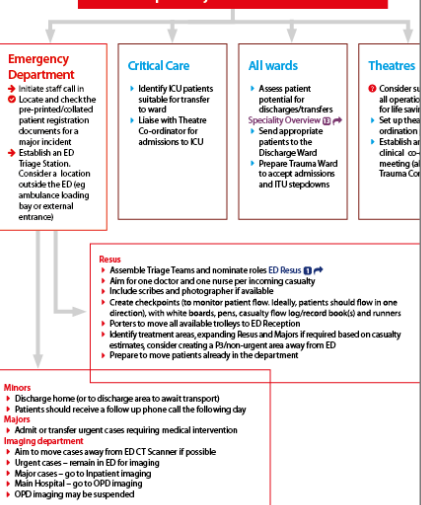
Use the METHANE chart to record details of any alert message. If you are self-declaring, other agencies may call you to ask for your METHANE information, so make it visible to all.

Exact numbers are difficult, therefore estimates of total numbers of P1+P2 casualties may be given to help receiving hospitals understand severity of incident and numbers to prepare for.

Self-presenting casualties may start to arrive without warning, pre-alert or declaration, particularly if non-ambulance service transport is used.

- Major incident status
- Exact location of incident
- Type of incident
- Hazards/potential
- Access (best route access to and exit (the hospital))
- Number of casualties
- Which emergency services are involved/needed

Hospital Major Incident STANDBY



Major incident DECLARED

Be prepared to update the METHANE report or give out METHANE information to others

Major Incident has been DECLARED

- The EXACT location is
- The TYPE of incident is
- HAZARDS identified are
- Casualties should arrive by
- Estimated NUMBER of Casualties are P1 P2 P3
- The EMERGENCY services involved are: Paramedics/HART/MERIT/HEMS/MCW/Others? Fire and Rescue/Police/Others?

Major Incident - Cancelled

If the message, 'Major Incident - Cancelled' is received, the plan is not activated and the standby call is cancelled.

Major Incident - Stand Down

If the message, 'Major Incident - Stand Down' is received, no new casualties are expected. The call may be full or a partial stand down, and this will be further described by the Incident Director.

(H)MIMMS general checklist

- Prepare areas for clinical and administrative uses
- Call in appropriate number of staff (use cascade contact system)
- Maintain internal and external communications
- Provide a command and control structure for the medical, nursing and administrative staff
- Staff already on duty should report to their clinical areas
- Called in staff should report to the Staff Reporting Area and await further instructions
- Review MCI section of these guidelines if mechanism(s) of incident known Mechanism of injury

ED checklist

- Hospital Ambulance Liaison Officers (HALO), if available will improve communications into the receiving hospital. They can also give real-time ED Resus capacity updates to the ambulance control centre and divert ambulances if required
- Know how many patients your hospital is expected to manage within the first hour (Patient dispersal framework and casualty capability chart) and plan to exceed this number
- Minimal relatives should attend ED, however keep parents and children together if possible
- Security may need to assist with management of relatives to the relatives area
- Documentation should be kept to a minimum
- Involve clinical photography early to guide clinical care and for forensics
- Security screening (sanitization) of patients and relatives may be required and must be planned for

ED Triage

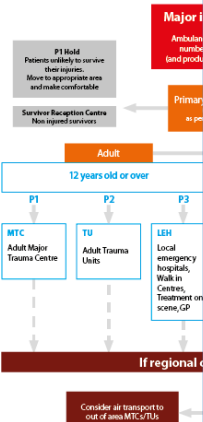
- Should be established outside of ED, eg in the Ambulance reception area
- Should be staffed by a Senior ED consultant and a Senior ED Nurse
- Patients must be re-triaged at this point, in case of any change/deterioration since their on-scene triage category was given
- Patients should be triaged to ED Resus (P1 Resuscitation), Majors (P1&P2 likely to need surgery/critical care) and Minors (P2)
- Ideally, P3 walking wounded patients should not enter the ED but be directed to and managed in a separate area, given a clinic appointment, or advised to see a GP at other treatment facility
- Patients should be given a pre-assigned (random) hospital ID number and this should remain their hospital number until the patient is on the wards, even if their real identity is known

Major incident aware

A mass casualty incident for UK health resources is an incident beyond the normal resources of the emergency and health services that may involve hundreds or thousands of casualties with capacity of normal major incident procedures to cope with casualty numbers.

- casualties are likely to be a mixture of categories with requiring intervention that can be delayed (P2) and 5% usually caused by sudden onset events (big bang), an pandemic influenza.

Several smaller incidents may combine, or be geographically clustered due to the large number of simultaneous casualties. For specialist services such as burns, the trigger for active limited availability of resource for incident response.



Clinical impact assessment call patient summary sheet (Patients 1 to 10)

- Precise details of injuries should not be recorded on this summary sheet
- Please only include admitted patients
- Easiest method: use one grid for patients with single injury and one for multiple system trauma

Injury	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Hospital number										
Patient identifiers										
On scene triage (P1/P2/P3)										
ED triage (P1/P2/P3)										
Age										
Mechanism										
Arrival time										
Destination										
Outcome (critical care/ward/RI/P)										
Traumatic brain injury										
Spinal injury – cord or fracture										
Chest trauma										
Abdominal trauma										
Vascular trauma										
Pelvic trauma										
Single open fracture										
Multiple open fracture										
Single closed fracture										
Multiple closed fractures										
Soft tissue injuries										
Burns										
Maxillofacial trauma										
Ocular trauma										
Others										

Official Sensitive upon completion

Official Sensitive upon completion

Major incident DECLARED

Information to others

EXIT by
P3
HEMS/MCW/Others?
Others?

– Stand Down
for Incident – Stand Down is received, as expected. The call may be full or a and this will be further described by or.

ity should report to their clinical areas and report to the Staff Reporting Area instructions in these guidelines (if mechanism(s) of mechanism of injury)

s should attend ED, however keep them together if possible. ed to assist with management of relatives area should be kept to a minimum photography early to guide clinical care ng (sanitization) of patients and required and must be planned for

be triaged to ED Resus (P1 Major) (P1&P2 likely to need surgery/ Minor) (P2) ng wounded patients should not enter ected to and managed in a separate ic appointment, or advised to see a GP/ facility be given a pre-assigned (random) ber and this should remain their i until the patient is on the wards, even ity is known

MID/2 © Updated: 07/11/2018 © v1.0

Major incident declared © Clinical impact assessment call patient summary sheet

MID/1 © Updated: 07/11/2018 © v1.0

Major incident declared © Major incident DECLARED

Mechanism of Injury (from acts of terrorism)

Mechanism of Injury:

Blast

Ballistics

Crush

Penetrating Knife

Biological, Nuclear, Chemical and Radiological

Blast injury

Introduction

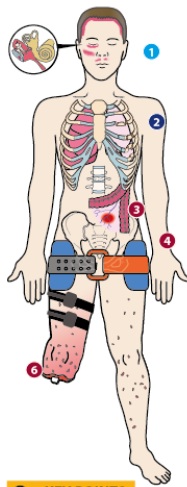
- Aggressive resuscitation is required in close range survivors.
- Look for a occult injuries and monitor for evolving injuries.

Catastrophic haemorrhage

Does patient have a traumatic amputation or is this an isolated injury? Look for other associated injuries:

- Blast Thorax** - High risk of catastrophic great vessel and aortic disruption - seek early cardiothoracic opinion.
- Blast Lung** - early intubation, lung protective ventilation from outset and through to ITU care.
- Blast Abdomen** - risk of significant intra-abdominal bleeding and late bowel perforation, even if abdominal wall is not breached.
- Blast Pelvis** - High mortality rate from exsanguination, especially if SI joints are open (of relevance for landmines, IEDs and floor-based devices).

→ apply pelvic binder, gain rapid proximal control, resuscitation/surgery.



KEY POINTS

- Early CT whole body (head to ankles)
- Use rapid infuser (Level I/Reimsort)
- Give tranexamic acid (TXA) early
- Do a blood-borne virus screen (BBV) if fragment injury
- Fasciotomy for blast limbs
- Damage control surgery



A

- Have a high index of suspicion for airway compromise if blast and casualty were in a confined space (bus/underground/metro)
- Flash burns indicate a high risk of blast lung



B

- Have a high index of suspicion for blast lung (incidence increases when casualty in an enclosed space) see Speciality Overview
- Blast Lung is the most common fatal injury among initial survivors
- Low initial O₂ Sats may indicate primary blast lung injury
- Rib fractures, pneumothorax and lung contusions are commonly associated with a blast
- Have a low threshold for chest decompression/chest drain
- Consider early intubation and lung protective ventilation from outset and through to ITU care



C

- Neck**
 - Penetrating neck injuries are common and often fatal
- Chest**
 - Great vessel/aortic injury
 - Pericardial tamponade
 - Myocardial contusions - may lead to cardiac arrhythmias
- Abdomen**
 - Blunt abdominal injury caused by secondary and tertiary blast mechanisms can cause significant bleeding and late bowel perforation, even if the abdominal wall is not breached
 - Liver/spleen rupture
 - Air embolism leading to mesenteric ischaemia
- Pelvis**
 - Significant bleeding can occur with open SI joints
 - The wider the pubic symphysis, the greater the transfusion requirement
 - Manage initially with pelvic binder and rapid proximal control
 - Further resuscitation and surgery may be required
- Traumatic amputation**
 - Check tourniquet(s) have been applied
 - Prepare to exchange for pneumatic tourniquet(s)
 - Avoid crystalloids during resuscitation (worsens coagulopathy)



D



E

MM/2 © Updated 07/11/2018 © H.D.

Blast

- Mechanism of Injury
- Revision of injuries from blast mechanism
- Recommendations for:
 - early intubation
 - lung protective ventilation from outset
 - ICU care
 - blood borne virus screen
 - tranexamic acid
 - whole body CT
- Reminder to look for TM rupture, features of blast lung, diffuse axonal injury, rhabdomyolysis

Ballistic injury

Introduction

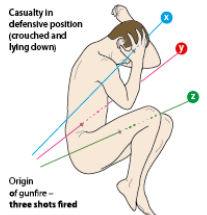
- Bullets cause injury by two main mechanisms:
 1. Tissue being crushed and lacerated along the bullet path.
 2. Tissue being stretched and displaced by the temporary cavity.

The clinical effects will depend on the body area and underlying organs hit by the bullet.

Summary

- Immediate casualty management follows the standard ABC approach and is dictated by the casualty's clinical condition.
- Diagrams below demonstrate the average path of bullets. However it must be appreciated that bullets will tumble, fragment and produce fragments that are not in the average path.

Casualty in defensive position (crouched and lying down)



Origin of gunfire – three shots fired

Clinical presentation of casualty

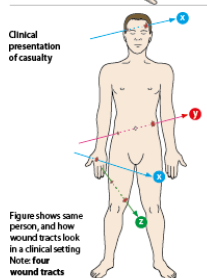


Figure shows same person, and how wound tracks look in a clinical setting. Note: four wound tracts

KEY POINTS

- Bullets that fragment may lead to multiple wound tracts across different body (or anatomical) regions.
- Some tissues tolerate deformity from temporary cavitation better than others ie skeletal muscle versus bone.

Small entry and exit wounds may mask catastrophic internal damage

Investigations

- The pattern of bone fragments and bullet debris may show the direction of travel of the bullet within the casualty.
- Some bullets 'break up' (fragment) within the casualty producing multiple wound tracts.
- CT is used to screen for bullet fragments prior to MRI (if needed). Retained bullets and fragments are likely to have steel components and be affected and moved by the MRI magnetic field.
- Imaging is covered in ED Resus

A

- Gunshot involving face/neck – see [Speciality Overview](#)
- Gunshot not involving face/neck – standard airway management.

B

- Standard care.

C

- Standard care.
- The bullet path will not respect anatomical boundaries so look for multicavity/multi organ injury.
- Small entry and exit wounds may be associated with significant internal injury.
- Be guided by the clinical condition – 'what you see may not be what you get'

D

- Immediate wound management as per [ED injury management](#)
- Entry and exit wounds do have different characteristics but practically, can be very difficult to distinguish (and it is rarely important during initial care).

E

- The actual path taken by the bullet within the casualty will depend on how they were orientated when struck (standing, sitting, crouching, running) – which is often not the position the casualty is examined in by responding clinicians.
- Bullets that ricochet off an intermediate surface or pass through intermediate targets (bags, clothing) may become unstable, hit side face on (rather than with the tip) and produce greater immediate energy transfer.

Ballistics

Ballistic injury

Ammunition

- A round of ammunition consists of two main parts:
 1. Bullet the part that leaves the gun and strikes the target.
 2. Cartridge case that contains primer and propellant.

The cartridge is ejected from the gun in 'spent case' or 'brass' and may be present at the incident scene.

Ammunition is often described by width and length:

- A 'Victorian' has a bullet head term in width and a brass case 19mm long. This describes ammunition often fired from a handgun/pistol.
- A '7.62-caliber' has a bullet 7.62mm wide and a case 39mm long. The longer case, compared to the Victorian ammunition, allows for more propellant to be packed into the case. This gives the bullet more kinetic energy when fired.

Ammunition can also be described using imperial measurements for the bullet width – usually fractions of an inch (eg .223 or .50) using both imperial and metric measurements (eg .223x5.56mm).

Bullet effects

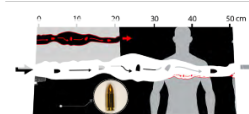
- When a bullet impacts a target, energy is transferred to the target. The effects depend on:
 1. the material properties of the target
 2. the bullet design

This is illustrated using the figures below depicting bullet impacts into 500x200x20mm 10% gelatine blocks (derived from high speed digital photography of actual impacts). When shot, 10% gelatine behaves in a similar way to muscle tissue.

The temporary cavity (also shown superimposed on the outline of a human torso to illustrate possible wounding effects).

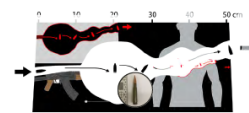
The energy from the bullet impact creates a 'temporary cavity' within gelatine or muscle lasting for fractions of a second. This collapses down around a much smaller permanent tract created by the bullet.

If the bullet becomes unstable within the gelatine or muscle and begins to tumble, it will present its side face to the material rather than its tip. In this way more energy is transferred, due to a greater contact surface area between the bullet and tissue, and the cavity will be larger.



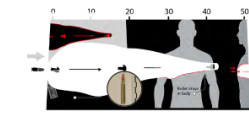
Pistol

9x19mm ammunition
The temporary cavity is smaller than that associated with rifle ammunition.



AK47

7.62x39mm ammunition
The bullet flies straight initially then becomes unstable, creating a large temporary cavity associated with tissue stretching and tearing.



Police rifle

.223 Remington exposed tip
This is an example of a bullet designed to flatten out ('expand') soon after impacting on a target, so that energy is transferred rapidly and the temporary cavity is large early in the bullet's flight. The bullet is more likely to stay in the body of the first person shot and not go through and hit someone else.

Copyright used with kind permission from 'Defence Academy of the United Kingdom, Winchester, Nov 2017'

Crush injury and crush syndrome

Patients are at risk of:

Reperfusion Injury

- Acute hypocalcaemia with metabolic abnormalities
- May occur when a trapped limb or casualty is suddenly released

Observe for:

- cardiac arrhythmias (may be lethal)
- myoglobinuria (release of toxins from necrotic tissues into the circulation which may cause renal failure)

Hypotension

- Casualties may require considerable fluid replacement in the first 24 hours (third space losses)

Observe for:

- Compartment syndrome (consider prophylactic fasciotomies)
- Signs of renal failure

ED Resus

- Initiate (or continue) IV hydration—up to 1.5 L/hr

Renal Failure

- Rhabdomyolysis releases myoglobin, potassium, phosphorus, and creatine kinase into the circulation
- Myoglobinuria may result in renal tubular necrosis if untreated
- Release of electrolytes from ischaemic muscles causes metabolic abnormalities

ED Resus

- Patient may require IV fluids and mannitol to maintain diuresis of at least 30mls/hr to prevent renal failure

ITU

- Patient may require haemodialysis

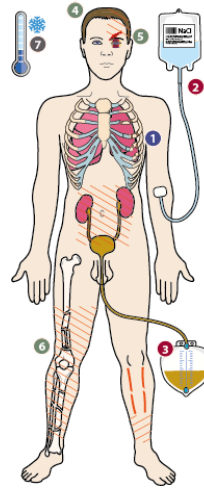
Patients with acute renal failure may require up to one to two months of dialysis treatment; however, in the absence of any infection, patients are likely to regain normal kidney function.

Crush injury

Summary

- Patients may have multiple injuries affecting different tissues and organs and are at risk of crush syndrome.
- In exposures, additional injury types such as blast and fragment injury should also be considered.

- Prolonged entrapment may occur.
- Extraction after a long period of entrapment is associated with a high risk of cardiovascular collapse; may lead to worsened renal failure or cardiac arrest.



KEY POINTS

Consider multiple other injuries;

- burns
- fragmentation injuries
- blast lung
- multi-fragmentary fractures
- subdural haematoma
- eye injuries
- tympanic membrane rupture – steroids may salvage sensorineural hearing loss

▲ Have a high index of suspicion for crush syndrome

- Rhabdomyolysis
- Check creatine kinase
- Check urine myoglobin
- Give crystalloid to establish good urinary output if rhabdomyolysis suspected or confirmed

A

Standard care

▲ Do not use Succinylcholine for RSI – risk of hyperkalaemia/death

B

Lung Protective Ventilation for all ventilated patients from ED onwards

- Rib fractures
- Early multimodal analgesia
- Surgical stabilisation of flail segment if more than four ribs involved

C

Risk of:

- CV collapse on release from entrapment
- Risk of internal bleeding from organ contusions
- High risk of pelvic fracture with associated haemorrhage
- Consider need for pelvic binder
- If prolonged entrapment, patient may have had IV fluids at scene
- Continue adequate fluid resuscitation
- Patient is at risk of rhabdomyolysis
- Use blood if haemorrhagic shock is present, then give crystalloid solutions to ensure adequate urine output
- Do not apply tourniquet to a crushed extremity unless there is catastrophic haemorrhage

D

Cranial trauma

- Associated with poor outcome → early neurosurgical advice

Penetrating eye injuries

- Are easily missed → inspect the globes (if unable to do so, refer to ophthalmology)

Multiple fractures are common

- Look for occult nerve/blood damage
- small child/old person with co-morbidities are at increased risk of death due to crush syndrome

E

- Treat hypothermia if present

Crush

- Mechanism of Injury
- Risk factors
 - Polytrauma
 - Entrapment
 - Head Injury
- No tourniquet to crushed extremity
- Watch for cardiovascular collapse on release from entrapment
- Monitor for Rhabdomyolysis, compartment syndrome
- Investigations

Hazardous Materials (HAZMAT) and Chemical, Biological, Radiological and Nuclear events (CBRN)

The management of CBRN casualties including HAZMAT follows general principles as well as specific treatment priorities including trauma care. Priorities depend on the type of exposure and presence of any contamination or contagious casualty hazards.

Assistance on managing such incidents should be obtained quickly through the national ECOSA (Emergency Coordinated Scientific Advice System) and the clinical management of individual patients supported by NPS (National Poisons Information Service).

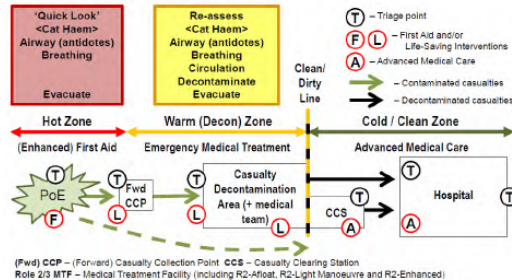
Emergency CBRN assistance:

Incident management ECOSA:
0300 3033 493
Clinical management NPS:
0344 892 0111

PRINCIPLES OF CBRN CASUALTY CARE

- ▼ RECOGNITION
- ▼ SAFETY
- ▼ SELF AID/FIRST AID
- ▼ TRIAGE Emergency Medical Treatment
- ▼ QUICK LOOK
- ▼ LIFE SAVING INTERVENTIONS (T1 casualties)
- ▼ CASUALTY HAZARD MANAGEMENT
- ▼ SUPPORTIVE MANAGEMENT Advanced Medical Care
- ▼ DEFINITIVE MANAGEMENT (Including critical care)
- ▼ REHABILITATION

PRIORITIES FOR CASUALTY CARE



Chemical, Biological, Radiological, Nuclear (CBRN)

- Military guidance re-written for the NHS
- Signs and Symptoms to look for:
 - Pinpoint pupils, blurred vision
 - Excessive secretions
 - Excessive sweating
- Guidance includes
 - how to decontaminate
 - medical therapies
 - atropine
 - oxime therapy
 - benzodiazepines
 - ventilation

Emergency Department in a major incident

ED trauma team response
ED and Surgical Triage

Imaging including CT Whole Body

Senior decision making
Safe discharges

Major Incident DECLARED

- 1 v1 Major Incident DECLARED
- 2 v1 Clinical impact assessment call patient summary sheet

Emergency Department (ED)

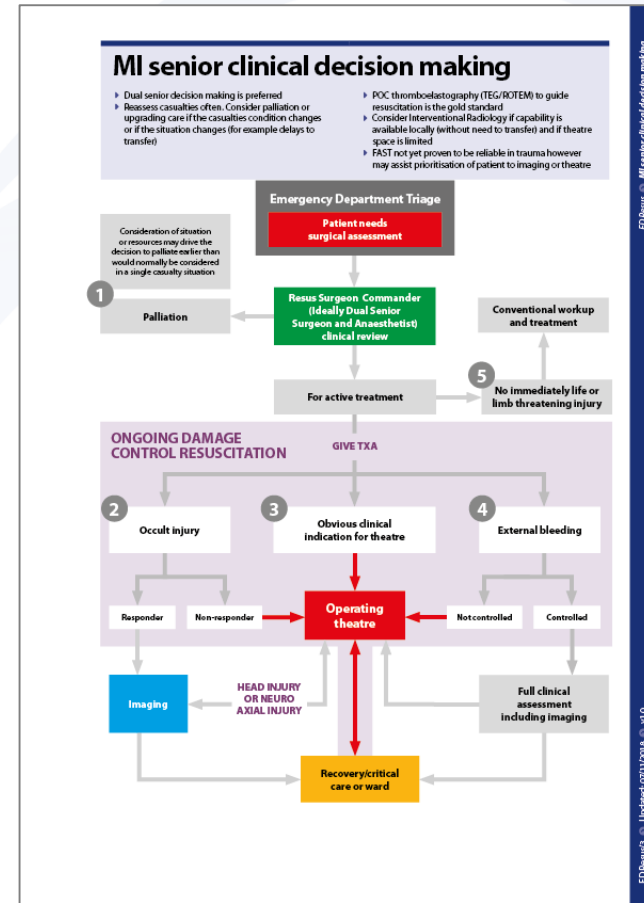
- 1 v1 ED triage (adults)
- 2 v1 ED triage (paediatric <12 years)
- 3 v1 ED outcomes, discharges and follow up advice in a v1 Major Incident

ED Reception and Resuscitation

- 1 v1 Trauma team roles in a Major Incident
- 2 v1 Catastrophic haemorrhage and massive transfusion pathway in a Major Incident
- 3 v1 MI Senior clinical decision making
- 4 v1 MI Imaging (incl. CT whole body)

Surgical Triage and Co-ordination

- Surgical decision making for a senior trauma surgeon or trauma anaesthetist
- Use of Area Controllers
 - Resus Controller
 - Imaging Controller
 - Surgeon Commander
 - Theatre Controller
 - Critical Care Controller



Radiology

- CT Whole Body imaging
 - In major trauma means 'head to GT'
 - In a major incident means 'head to ankles'
- **Never** consider MRI in the acute setting of a blast or ballistic major incident

MI imaging (including CT whole body)

Imaging is vital for triaging patients, helping to plan surgery, how critical is the need to have surgery and to help guide ongoing surgery. Unusual mechanisms and unfamiliar pathology are the hallmark of MI patients.

- Plan for interval imaging over the next few weeks as injuries evolve, blast injuries in particular.
- Use FAST USS imaging to stratify multiple patients; to decide who needs a CT, who needs it urgently and who needs to go directly to theatre.

CT is no longer the 'doughnut of death'. Patients can be resuscitated during a CT scan unless critically unwell, in which case the patient probably should have gone direct to theatre.

CT whole body takes two minutes, the rest of the time is spent on patient transfer and preparation. Regular team training will reduce this. Radiation exposure is approx 12mSv.

1 - Head

- Haemorrhage
 - intra- or extra-axial
 - small petechial foci
 - at bone ridges
- Middle ear effusion
- +/- ossicular disruption
- Fractures

2 - Neck

- Oedema
- Larynx and oesophageal
 - penetration
 - rupture
- Laryngeal fracture

3 - Thorax

- Pericardial and great vessel integrity
- Tracheobronchial integrity
- Pneumothorax/haemothorax
- Lung parenchyma
 - contusions
 - infiltrates
 - emboli (may be transient)
 - ARDS may develop over next 24-72 hrs

4 - Abdomen and pelvis

- Hollow viscus rupture
- Repeat scans for solid organs
 - AIM/pseudo-aneurysm
 - cavitation effect

5 - Bones

- Spinal fractures and mal-alignment
- Long bone fractures
 - fat embolus
- Pelvic ring injury
 - SIJ integrity
 - sacral fractures

KEY POINTS

⚠️ Avoid MRI in acute phase

- Assume all frag/metallic: foreign bodies are ferromagnetic until proven otherwise
- Pistol wounds tend to be non-ferrous but there are exceptions
- MRI likely to be safe after six weeks with caveats
- PKC and heeds guidance is available online

CT whole body

- Low threshold to image in mass events and in blast (blast radius can be large)
- CT whole body means head to ankles
- CT trauma scan means head to lesser trochanters (Bastion protocol)
- Intraoperative CT can be done after haemorrhage control is gained
- Repeat, delayed imaging at 5-7 days should be considered if solid organ injury

Department planning

- Consider senior consultant in ED to coordinate imaging flow
- Use USS in ED to triage to CT
- Two consultants per CT scanner
- The first issues an acute report, the second completes a full report

ED Issue 4 © MI radiology (including CT whole body)

ED Issue 4 © Updated 07/12/2018 © v1.0

Building healthier lives

University Hospitals Birmingham
NHS Foundation Trust

Injury management in ED

Specialty to Generalist guidance

Injury management in ED

- 1 v1 MI anaesthesia for P1/Resus casualties
- 2 v1 MI neuro trauma (brain injuries
- 3 v1 MI surgical/proximal haemorrhage control
- 4 v1 MI thoracic trauma
- 5 v1 MI abdominal trauma
- 6 v1 MI pelvic and long bone injuries
- 7 v1 MI immediate wound management
- 8 v1 MI universal fasciotomies



Speciality Overview

Consultant to Consultant guidance

Specialty overviews

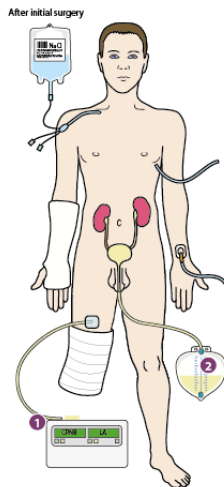
- 1 v1 Pain management in a Major Incident
- 2 v1 Antimicrobial prophylaxis in a Major Incident
- 3 v1 Management of blast ear and hearing loss in a Major Incident
- 4 v1 Management of blast lung in a Major Incident
- 5 v1 Management of burns in a Major Incident
- 6 v1 Management of eye injuries in a Major Incident
- 7 v1 Forensic awareness in a Major Incident
- 8 v1 Management of head, face and neck injuries in a Major Incident
- 9 v1 Management of paediatric casualties in a Major Incident
- 10 v1 Management of a pregnant casualty in a Major Incident
- 11 v1 Psychosocial support for anyone affected by a Major Incident
- 12 v1 Psychosocial support for staff after a Major Incident
- 13 v1 Rehabilitation co-ordination and medical support in a Major Incident
- 14 v1 Safe spinal injury care in a Major Incident
- 15 v1 Management of bereavement in a Major Incident



Pain management in a major incident

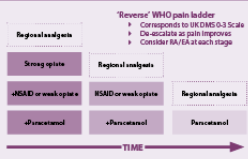
Reverse the WHO pain ladder in complex injury and establish effective pain control early; then reduce and stop pain medications as appropriate

- Start analgesia as soon as possible
- Use multi-modal medication principles
- Consider peri-operative nerve blocks



KEY POINTS

- Start analgesia as soon as possible
- Use multi-modal medication principles
- Reverse WHO pain ladder
- Consider peri-operative nerve blocks



1 - Chest injury

- Intercostal nerve blocks
- Serratus plane blocks

2 - Abdominal injury

- Transverse abdominus plane (TAP) block
- Epidural Analgesia or LA (Lignocaine) infusion

3 - Limb injury

- Single shot nerve block
- +/- Indwelling nerve catheter for continuous infusion

Regional or epidural analgesia

- Consider regional analgesia at every step
- Single shot block +/- continuous nerve blockade
- If spinal and epidural analgesia
- Urinary catheter may be required
- Beware:
 - Hypovolaemia
 - Coagulopathy
 - Distorted spinal anatomy eg crush fractures in explosive injury

Direct or anticipated nerve injury

- Pregabalin
- Tricyclic anti-depressants

Complex pain management

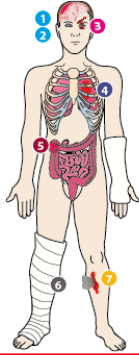
- Reverse 'WHO' pain ladder
- Consider using regional analgesia at every step
- Much more effective to manage the pain quickly and effectively, then wean off.

Antimicrobial prophylaxis

Antimicrobial prophylaxis

Introduction
Blast wounds are extensive and contaminated (and will remain so even after extensive debridement, or will rapidly become recontaminated); whereas gunshot wounds (GSW) are relatively clean. Give your microbiologist as much information as possible. How was the injury sustained? What was the environment in which it was obtained? Any organic contamination or water exposure?

Keep to simple measures and antibiotics
Recognise your patient will have a huge inflammatory response and it may not be due to an infection.



▲ If patient is known to be colonised with MRSA, CPE, ESBL+ve, or other resistant organisms: Discuss with a microbiologist

KEY POINTS

Bacterial infection in blast or ballistic injury, is the same as other wounds but don't just treat the microbiology report.
● Consider if this is colonisation or infection.
● Close liaison with a microbiologist within the multidisciplinary team is essential.
● Common things occur commonly, but be on alert for an unusual clinical picture.
● Tell the lab about the unexpected findings or unusual clinical picture, as diagnostic labs are set up to look for common pathogens and may overlook others.

CSF leak post skull fracture 1

- ▶ No antibiotics required
- ▶ Give Pneumovax (if sinus/auditory canal breached)

Penetrating CNS injury 2

- ▶ Ceftriaxone 2g bd iv + Metronidazole tds iv
- ▲ Non-severe Penicillin allergy: Meropenem 2g tds iv
- ▲ Severe Penicillin Allergy (Anaphylaxis): Ciprofloxacin 400mg bd iv + Vancomycin 1g bd iv + Metronidazole 500mg tds iv
- All courses two weeks duration

Penetrating eye injury 3

- ▶ Ciprofloxacin 400mg bd iv + Clindamycin 450mg tds iv
- Give for 2-3 weeks after removal of foreign body

Penetrating chest trauma 4

- ▶ Co-amoxiclav 1.2g tds iv (if unavailable, give Cefuroxime 750mg tds iv and Metronidazole 500mg tds iv)
- ▲ Penicillin allergy: Clindamycin 450mg qds iv
- One to two weeks, depending on progress or presence of intercostal drains

Penetrating abdominal trauma 5

- ▶ Co-amoxiclav 1.2g tds iv (if unavailable, give Cefuroxime 750mg tds iv and Metronidazole 500mg tds iv)
- ▲ Penicillin allergy: Clindamycin 450mg qds iv
- One to two weeks, depending on progress or presence of intercostal drains

Open fracture limb/hands 6

- ▶ Co-amoxiclav 1.2g tds iv (if unavailable, give Cefuroxime tds iv and Metronidazole 500mg tds iv)
- ▲ Penicillin allergy: Clindamycin 450mg qds iv
- Until soft tissue cover or 72 hours, whichever is sooner (BOAST4 guidelines)

Penetrating soft tissue injury 7

- ▶ Co-amoxiclav 1.2g tds iv (if unavailable, give Cefuroxime 750mg tds iv or Metronidazole 500mg tds iv)
- ▲ Penicillin allergy: Clindamycin 450mg qds iv
- Until first surgical debridement/washout

- Be aware or suspicious of wounds with evolving (unexpected) necrosis.
- Post event transfers: Infection Prevention and Control (IPC) teams need advance notice of patient movements and suspect organisms. If possible, to ensure the receiving unit is prepared and can mitigate risk (ie there is a side room available).

- Simple to follow guide
- Uses common antibiotics only;
 - Co-Amoxiclav
 - (Clindamycin)
 - Ciprofloxacin
 - Cefuroxime
 - Metronidazole
 - Vancomycin
- Short treatment times

Children and Major Trauma

- Created for Adult trauma centres/units
- For management of the younger child (<12)
- Aide memoire for 'how children are different'

Paediatric casualties in a major incident

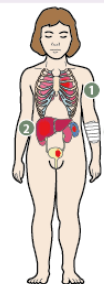
This guideline has been created for non-paediatric specialists. The paediatric groups are defined as:
Baby 0-6 months, Infant 6-12 months, Toddler 1-2 years, Child >3 years.
>12 years can cautiously be managed as an adult

History - take an AMPLE history

- A** Allergies
- M** Medications
- P** Past medical history
- L** Last food/liquids
- E** Event

Extras

- Is child up to date with routine vaccinations?
- Birth History: As child becomes older, this is less significant.
- In infants, perinatal respiratory difficulties may contribute to a condition worsening beyond what would be expected based on injury



Normal paediatric vital signs by age group

Age group	Respiratory rate	Heart rate	Min systolic BP
Term baby	40-60	100-170	50
3 month	30-50	100-170	50
6 month	30-50	100-170	60
1 year old	30-40	110-160	70-90
1-2 years	25-35	100-150	80-95
2-5 years	25-30	95-140	80-100
5-12 years	20-25	80-120	90-110
>12 years	15-20	60-100	100-120

- A**
 - Place infant head in neutral position (larger occiput than adults)
 - Fulcrum of C-Spine is C1-2 (high C-Spine injury more likely)
- B**
 - Smaller airway and softer cartilage is more easily obstructed by swelling, foreign bodies or poor positioning
 - Infants are obligate nose breathers; tonsils are often enlarged
 - If intubation is higher and more difficult to view during intubation
 - An uncuffed ET tube is used in children
- C**
 - Blood volume is relatively larger 80-90mls/kg (adult 65-70mls/kg)
 - Record all blood loss (100mls in a 3kg child = 10% of total blood volume)
 - Hypotension is a late sign
 - If there small vessels: consider IO, scalp veins and ext. jugular vein
- D**
 - Head**
 - 0-18 months have open sutures and fontanelles
 - Bulging fontanelle = intracranial bleeding (↑ ICP)
 - Sunken fontanelle = significant blood loss
 - Chest**
 - The force transmitted may not fracture ribs, but may cause significant internal injuries
 - Mobility of mediastinum increases the likelihood of a simple pneumothorax developing into a tension pneumothorax, or a mediastinal vessel transection.
 - Abdomen**
 - Thin abdominal wall, with less muscle and sub cut fat, offers less protection to abdominal organs than in adults
 - Increased likelihood of bladder, liver and spleen injury
 - Musculoskeletal**
 - Fractures through growth plates may influence x-ray interpretation, however if missed can seriously affect future growth of the fractured bone
- E**
 - Increased risk of multiple organ involvement from blunt trauma
 - Monitor plasma glucose. Children have a higher metabolic rate and smaller glycogen stores than adults.
 - Heat loss: large surface area to volume ratio therefore increased risk of heat loss. Remember the patient's exposed head

Future

- Requires your help to be continuously updated and relevant
- <https://www.england.nhs.uk/ourwork/eprp/>
- Editor: justine.lee@uhb.nhs.uk
- Aligned with WHO and ICRC guidance
- www.MISTT.co.uk training course
- ?Embedded into major incident IT systems
- ?Training manual for the UK Emergency Medical Teams

www.MISTT.co.uk



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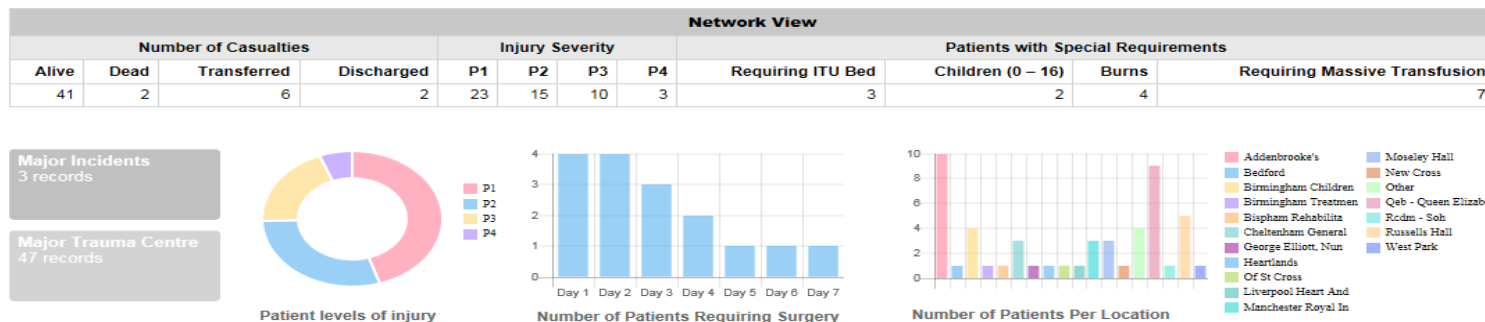
- For anyone interested in disaster medicine and the major incident response
 - e.g. emergency planners, pre-hospital, trauma clinicians, theatre staff
- 2 days of seminars and discussions
- 1 day pre-hospital to ED, team leadership, co-ordination and skills training
- 2 days immediate surgery course
- Next Courses
 - 8-12th June 2019
 - 16-20th November 2019

https://nwww.norse.uhb.nhs.uk

**NORSE
TEST**
Major Incidents
T: 07951409064

University Hospitals Birmingham **NHS**
NHS Foundation Trust

Your Current Role : Consultant for UHB - Major Trauma Cen: [Logout](#)
Logged in as: Justine Lee University Hospital Birmingham NHS Foundation Trust (RRKUNLE)





Major Incidents

MI Reference	Major Incident	Controlling Location	Start Date	Patients	Locations	Status	
0000011	DLKH Test Incident	QEB - Queen Elizabeth Hospital Birm	12/10/2018 10:00:00	20	11	Declared	Edit Add Remove
0000009	Test Major Incident	Royal United Hospital	08/04/2018 10:00:00	9	6	Declared	Edit Add Remove
0000001	New Street Rail Crash	QEB - Queen Elizabeth Hospital Birm	22/07/2017 02:22:00	22	7	Declared	Edit Add Remove



https://nwww.norse.uhb.nhs.uk

**NORSE TEST**
Major Incidents
T: 07951409064

University Hospitals Birmingham 
NHS Foundation Trust


Your Current Role : Consultant for UHB - Major Trauma Cen Logout
Logged in as: Justine Lee University Hospital Birmingham NHS Foundation Trust (RRKUNLE)

Network View

Number of Casualties				Injury Severity				Patients with Special Requirements			
Alive	Dead	Transferred	Discharged	P1	P2	P3	P4	Requiring ITU Bed	Children (0 – 16)	Burns	Requiring Massive Transfusion
41	2	6	2	23	15	10	3	3	2	4	7

Major Incidents
3 records

Major Trauma Centre
47 records


Patient location

Major Incidents

MI Reference	Major Incident
00000011	DLKH Test Incident
00000009	Test Major Incident
00000001	New Street Rail Crash

New Major Incident

Incident Name

Exact Location

Controlling Location

Region

Trust

Hospital

Details

Date and Time of Incident

Incident Type

Hazards

Access

Emergency Services

Incident Status

Please Select

Please Select

Please Select

Please Select

Please Select

Please Select

☐ Police ☐ Fire ☐ Ambulance ☐

Stand By

Save

Cancel

Addenbrooke's

Bedford

Birmingham Children

Birmingham Trestmen

Bispham Rehobilita

Cheltenham General

George Elliott, Nun

Heartlands

Of St Cross

Liverpool Heart And

Manchester Royal In

Moseley Hall

New Cross

Other

Qeb - Queen Elizabe

Rcdm - Soh

Russells Hall

West Park

or Incident


New Patient

Status

1 Declared

6 Declared

7 Declared



Clinical Impact Assessment
Call Agenda

Hospital Numbers Per Location

Nationalities

Patient Summary Sheet

Patient Assessment Summary

Hospital Casualty Reporting

Patient Casualty Reporting

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NORSE
TEST

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Patient levels

Major Incidents

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Patient Casualty Reporting

Hospital **Qeb - Queen Elizabeth Birmingham**

Injury Type	Tot	Pt 1	Pt 2	Pt 3	Pt 4	Pt 5	Pt 6	Pt 7	Pt 8	Pt 9
Traumatic Brain Injury	3						Y		Y	Y
Spinal Injury: Cord or Fracture	2								Y	Y
Chest Trauma	2						Y	Y		
Abdominal Trauma	1								Y	
Vascular Trauma	3						Y	Y	Y	
Pelvic Trauma	0									
Single open fracture	2						Y		Y	
Multiple open fractures	0									
Single closed fracture	2	Y					Y			
Multiple closed fractures	0									
Soft tissue injuries	1						Y			
Burns	0									
Maxillofacial Trauma	2	Y					Y			
Ocular Trauma	0									
Other	57						Y			Y
Total	20	2	0	0	0	0	8	2	5	3

Close

- Addenbrooke's
- Bedford
- Birmingham Children
- Birmingham Treatment
- Bupham Rehabilitation
- Cheltenham General
- George Eliot, Nant
- Heartlands
- Of St Cross
- Liverpool Heart And
- Manchester Royal In
- Moseley Hall
- New Cross
- Other
- Qeb - Queen Elizabeth
- Rodm - Soh
- Russells Hall
- West Park

Major Incident New Patient

Locations Status

11	Declared			
6	Declared			
7	Declared			

Clinical Impact Assessment Call Agenda

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Major Incident Guidelines

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Comment

Ballistic injury

Introduction
Bullets cause injury by two main mechanisms:
1. Those being crushed and torn along the bullet path.
2. Those being crushed and displaced by the temporary cavity.
The clinical effects will depend on the body area and underlying organs hit by the bullet.

Causality in defensive position
(wounded and lying down)

Origin of gunfire
Three shots fired

Clinical presentation of causality

Figure shows some patterns, and how wound tracks look in a clinical setting

KEY POINTS

- Bullets that fragment may lead to multiple wounds across different body (or anatomical) regions.
- Some bullets (certain deformity from temporary cavitation better than others) at chest level may cause bone.
- Small entry and exit wounds may mask catastrophic internal damage


Summary
Immediate casualty management follows the standard CABC approach and is dictated by the casualty's clinical condition.
Diagrams below demonstrate the average path of bullets, however must be appreciated that bullets will tumble, fragment and produce fragments that are not in the average path.

Standard care
The bullet path will not respect anatomical boundaries so look for multiple organ injury.
Small entry and exit wounds may be associated with significant internal injury.
Always guided by the clinical condition - "what you see may not be what you get".

Investigations
The pattern of bone fragments and bullet debris may show the direction of travel of the bullet within the casualty.
Some bullets (small or fragment) within the casualty producing multiple wound tracts.
CT is used to assess for bullet fragments prior to MDT of resuscitated, retained bullets and fragments are likely to have metal components and be affected and moved by the MRI magnetic field.
Imaging is covered in [Specification in E2 E3 E4](#)

Major Incidents and Mass Casualty Events

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Major Incident Guidelines

Page Thumbnails

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21

Major incident DECLARED

22

Check impact assessment and summary sheet

Major incident DECLARED
Be prepared to update the METHANE report or give out METHANE information to others

M Major Incident has been DECLARED

E The EXACT location is

T The TYPE of incident is

H HAZARDS identified are

N Estimated NUMBER of Casualties are P1 and ambulances should EXIT by P2 P3

E The EMERGENCY services involved are: Paramedics/HART/MERITHEMS/MCW/Other? Fire and Rescue/Police/Other?

Major Incident - Cancelled
If the message, 'Major Incident - Cancelled' is received, the plan is not activated and the standby call is cancelled.

Major Incident - Stand Down
If the message, 'Major Incident - Stand Down' is received, no new casualties are expected. The call may be full or a partial stand down, and this will be further described by the Incident Director.

MIMMS general checklist

- Prepare areas for clinical and administrative uses
- Call to appropriate number of staff
- Maintain internal and external communications
- Provide a command and control structure for the medical, nursing and administrative staff

- Staff already on duty should report to their clinical area and await further instructions

ED checklist


- Hospital Ambulance Liaison Officers (if available) will improve communications into the receiving hospital. They can also give real time ED Resus capacity updates to the ambulance control centres and direct ambulances if required
- Know how many patients your hospital is expected to manage within the hour Patient Disposal Framework and Casualty capacity chart) and plan to exceed this number
- Minimal relatives should attend ED, however keep parents and children together if possible.
- Security may need to assist with management of relatives in the relatives area
- Involve clinical photography early, to grade clinical cases and for forensic.
- Security screening (identification of patients and relatives) may be required and must be planned for


ED Triage


- Should be established outside of ED, in the Ambulance reception area
- Should be staffed by a Senior ED consultant and a Senior ED Nurse
- Patients must be no triaged at this point, in case of any change/interim status that no scene triage category was given
- Patients should be triaged to ED Resus (P1 Resuscitation, Major (P2) likely to need surgery/ critical care) and Minors (P3)
- Ideally P3 waiting unsorted patients should not enter the ED but be directed to and managed in a separate area, given a clinic appointment, or advised to see a GP
- Patients should be given a pre-assigned triad (senior ED member and two should complete their hospital number until the patient is on the words, even if their real identity is known)


Comment

ical Impact Assessment
Agenda
Capital Numbers Per Location
Specialities
Patient Summary Sheet
Patient Assessment Summary
Capital Casualty Reporting
Patient Casualty Reporting



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Major Incident Guidelines

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 - Stephen Groves
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 - Andrew Dakin
- Our Patients

Thank you

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