

## Definitions

No standard definition. A disaster may be described as a mass casualty incident that overwhelms local services & requires external assistance with a multi-agency response. May be subclassified as natural (e.g. climate-related) or human-generated (e.g. transportation crashes). The former tend to be more common, and affect many more - though have a lower mortality rate (though higher absolute death toll). Casualty subclassification is used too: Mild (>25 injured or 10 req adm), mod (>100 injured or 50 req adm), Major (>1000 injured or 250 req adm).

## Types of Disaster

### *Natural disaster*

- E.g. - earthquake, flood, fire, cyclone, volcanoes
  - Earthquake
    - Richter scale >6 associated with injuries, >8 major earthquake
    - Ratio of injuries: death is 3:1
    - Acuity - 50% ambulatory, 20% ambulatory+help, 30% non-ambulatory
    - Injuries - lacerations, contusions, fractures
- Communication often destroyed
- Transport systems interrupted - i.e. may need air transport
- Psych issues - staff may desert to protect family, ineffective remaining staff, PTSD
- Social work - shelter, hygiene, nutrition, water

### *Man-made*

- Transport - bus, rail, airplane, maritime
- Construction failure - building collapse, stadium, bridge collapse
- Industrial (factory, nuclear) - chemical, biological, radiation
- Terrorism
- People disasters - war, crowd incidents
  - Crowd incidents
    - Likely types of casualties - heatstroke, cuts, missile injuries, fainting, exhaustion, trampling/ crushing, moshing/ crowd surfing or stage diving, illicit drug and alcohol use, strobe lighting induced epilepsy, age related illnesses
    - St John Ambulance provision of first aid -
      - for each 500 patrons 1 first aid post and 2 first aid personnel
      - for each 5000 patrons 2 first aid posts and 8 first aid personnel
      - for each 10 000 patron 2 first aid posts and 12 personnel

## Most common causes of disaster in Australia

- Storms
- Flood
- Transport
- Earthquakes, droughts, forest fires
- Industrial accidents

## MIMMS - major incident medical mx and support

People are commanded. Situations are controlled. People communicate. Resources are coordinated. Organizations co-operate

### *Command*

- The direction of members and resources of an organisation in the performance of the organisation's role and tasks - authority to command is established in legislation or by agreement with an organization
- Vertical hierarchy

### *Control*

- The overall direction of emergency mx activities in an emergency situation
- Has the responsibility of tasking and coordination other organisations in accordance with the needs of the situation
- Control relates to situations and operates horizontally across organizations

### *Coordination*

- Resources - organizations, manpower and equipment

## Disaster scoring systems

- Services needed - regional, national, international (0,1,2)
- Cause - man-made, natural (0,1)
- Duration - <1 hour, <24h, >24h (0,1,2)
- Radius of area (0,1,2)
- Casualties <100, 100-500, >500 (0,1,2)

Total score out of 13

## Disaster levels

- I - Escalated local response needed
- II - Regional response needed
- III - National/International response needed

## On-site Disaster Management

### *Elements of response*

- Command
- Safety
- Communications
- Assessment
- Triage
- Treatment
- Transport

### *Disaster zones when bio/chemical or radiation hazards*

- Hot zone: Area immediately around hazardous material where protection suits & breathing apparatus req.
- Warm zone: decontamination area between hot & cold zones
- Cold zone: Safe without protective clothing (medical services in this area)

### *Triage*

- **RED** - Airway,  $10 > RR > 29$ ,  $HR > 120$  or  $CRT > 2s$  - immediate care req., simple life-saving Rx
- **GREEN** - Walking - minor injuries
- **ORANGE/YELLOW** - Not red or green - significant injury but not immed life-threatening
- **BLACK** - No airway - unlikely to survive or needing complex life-saving measures. Palliative.

## Principles of Mx

Optimise patient flow - Do only what needs to be done now and arrange for next team to do the next bit.

On site management is limited to immediately life-threatening problems only:

- A & B - O<sub>2</sub>, Intubation, needle decompression of tension PTX
- C - Pressure bandage, IVF
- Other - C-spine collar if strong suspicion of neck injury. Splintage if limb-threatening.
- Transport out

## Counter disaster planning

Aim - instead of providing maximal care of a limited number of patients, try to achieve the greatest good for the greatest number of potential survivors

Planning involves a all hazards, all agencies approach

- Prevention
- Preparation
- Response
- Recovery

## Disaster plans

### *National*

- All states have an Emergency Management Act
- Charges govt departments with specific responsibilities - police, fire, health, communications, gas, water, transport, SES

*Hospital* - all should have a written disaster plan

- Internal and external
- Staff should be familiar with roles

# Hospital Disaster Plan

## Aims

- Clear the ED - of existing patients in a timely, appropriate and safe manner
- Receive and treat casualties - striving for the best clinical outcome
- Secure the ED - so that staff and patients are in a safe clinical environment
- Manage load in ED - manage initial surge & subsequent load on ED in a sustainable manner

## Stage 1 - Notification

- Only official notification via ambulance co-ord or hospital exec else refer to hospital exec (hospital disaster controller)
  - Name of caller and organization
  - Caller's contact
- Details to be communicated:
  - Major incident
  - Exact location
  - Type of incident
  - Hazards - CBR
  - Access
  - Number & types of casualties
  - Emergency services in attendance & required
- Disaster team alerted
  - Switch - 222
  - ED SS/registrar/NUM
  - Hospital medical exec & NARMU

## Stage 2 - Standby - Preparation

- Starts after official notification
- Patients in ED - identify if for DC, Admit, or requiring further assessment (consider referral to ward including paediatrics, ICU, CCU for this)
- Staff - assemble available staff, inform of disaster, assign roles
- Equipment - check resus bays - equipment and drugs
- Communication - set up disaster telephones & disaster task cards for distribution

## STAGE 3 - ACTIVATION

Follows Stage 2 and continues until all casualties sorted (disposition)

- Clear the ED
  - Dispose of patients identified for DC, Admit or further assessment on ward (inc paediatrics, ICU, CCU) do so
  - Those patients TBS in waiting room informed and if possible directed to LMO
  - Those patients TBS requiring hospital assessment should go to TPU
  - Do not direct patients to other public hospitals
- Allocate staff to clinical areas
  - Set up hierarchy of teams - ED reg/surg reg/JMO/2 nurses to designated beds, area overseen by ED SS, report to medical commander
  - Extra teams can be made from surg reg/anaesthetic reg as directed by OT chief surgeon and OT anaesthetic coordinator

- Medical JMOs could be used as part of team, order tests, scribe, redirected to other parts of the hospital
- Medical student and volunteers - scribes and runners
- Prepare clinical areas
  - Medical commander to consider lock-down, need for security or police
  - Triage: obtain pre-prepared disaster packs with MRNs, name bands
  - Equipment:
    - A - Intubation (CAMELS), O<sub>2</sub> and NRB masks, c spine collars, ventilators
    - B - ICC
    - C - IV lines and fluids, syringes, needles, blood tubes
    - Disposables - Gloves, sterile/ impervious gowns, goggles
    - Wastes - Garbage bins, sharp containers
    - Other - Analgesia, splints, AB, anaesthetic drugs
  - Prepare areas - monitored cat 1-2, unmonitored cat 3, holding cat 4-5 but must walk, expectant and mortuary - allocate space
- Reception of patients
  - Registration: use disaster specific MRN, name bands, add name to paperwork (but don't change on computer) only if patient is able to identify self. Change MRN if nec when stable on ward/ ICU
  - Re-triage: Give category NTS 1-5 & allocate to appropriate physical location
  - Cat 1: Immediate intervention required - Airway or Breathing
    - Allocate to monitored area - resus, acute, procedure room
    - E.g. Airway burn, face trauma, GCS<8, Chest injury needing - ETT, ICC
    - Needs C-spine collar
    - Inv: Head CT - if also shocked → CXR, PXR, FAST, XM
    - Disposition to OT if ICH or shock, ICU if no ICH and not shocked
  - Cat 2: Urgent - shock but no AB issue - HR>120, BP<100, CRT >2
    - Allocate to monitored area - resus, acute, procedure room - overflow to subacute, paed, emu
    - E.g. Abdo pain or back pain or limb injury
    - Inv: CXR, PXR, FAST, XM, (Hb if available)
    - ?C-spine collar
    - Disposition to OT (laparotomy, cardiothoracic), angio (pelvic, aorta), ICU to await OT if stable after resus
  - Cat 3: Non-ambulant, not shocked or expectant death
    - Allocate to non-monitored area - subacute, paed, emu
    - E.g. Abdo, pelvic, limb injury, spinal, burns
    - ?C-spine collar
    - May require O<sub>2</sub>, ivi, fluids, bloods, trauma XR, FAST, G&H, control external bleeding, splints, analgesia, txf to ward unless worsens, may need OT later
  - Cat 4: Ambulant, RR 10-30, HR <120, cap refill normal
    - Needs intervention but not spinal protection e.g. splinting, control external bleeding, analgesia - does not need urgent (4-6 hours) tests, or O<sub>2</sub>/IVF
  - Cat 5: Ambulant, no intervention required by nurse, observation only
    - E.g. psych-social issues
- Disposition

- Prioritisation for ICU / OT - Surge management and upscaling - Medical commander and Trauma surgeon to identify, prioritise and communicate
- Forensics - People and clothing
- Co-ordination with bedmanager - esp forward patients
- Plan for managing normal day's patients on specific wards by specific team- e.g. STEMIs (who get disaster MRNs) straight to CCU for review cardiology registrar
- Transport
  - Anyone going to ICU, ICU pick up and take
  - Anyone going to OT, radiology:
    - Tubed - airway capable DR and nurse escort
    - Not tubed, shocked - Resident or Nurse from ED disaster team
    - Not tubed, Not shocked - porter
  - Runners for: Blood, Equipment
  - To mortuary

#### STAGE 4 - STAND DOWN

Formal stand down will come from the hospital disaster controller. Includes:

- Clearing remaining disaster casualties
- Re-stocking
- Cleaning up
- Relief of staff
- Resumption of normal activities
- Debriefing of staff

#### Roles

##### Medical commander

- Senior emergency physician or registrar. Responsibilities:
  - 1. Staff
    - Call in available non rostered staff
    - Ensure sustainable roster
    - Adequate rest and meal breaks
  - 2. Equipment
    - ED NUM to procure extra needs
  - 3. Communication
    - Overall command of the ED
    - UP - Responsible to hospital disaster controller
    - Level - Liase with OT chief surgeon (with trauma surgeon), ICU consultant
    - Down - Trauma surgeon and ED Trauma Anaesthetist re additional anaesthetic and surgical staff for resus and transport
    - ED physicians and disaster teams
    - ED NUM - Liase with NARMU and Hospital nurse commander re staffing and equipping ED, allocate roles for external nursing staff as appropriate
    - Triage Doctor
    - Bed manager re ward and ICU beds
  - 4. Patient Flow
    - Medical commander liases with ED physician in charge of each area for patient numbers and disposition
    - ED Physician (in command of an area) has a clipboard: