

## Triage in mass casualty situations

*More often than not major incidents and disasters result in a mass casualty situation, which places health services under added pressure. To deal with such a situation it is imperative to have a major incident plan for the pre-hospital and hospital sectors. The ability to 'do the most for the most' is central to dealing with such incidents. Triage is the universally accepted tool that allows health professionals to achieve this goal in a mass casualty situation.*

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The incidence of major incidents and disasters has increased over the past decades. A recent Oxfam report highlights a four-fold increase in the occurrence of weather-related disasters in the last two decades.<sup>1</sup> Moreover, increasing urbanisation seems to contribute to an increase in major incidents.<sup>2</sup>

The Division of Emergency Medicine in the Western Cape has been compiling a database of major incidents over the last 3 years. The average number of incidents is in excess of 100 per annum. The literature may vary on what is meant by the terms 'major incident' and 'disaster', but there is no doubt about the challenges that these pose to the delivery of healthcare.

A disaster, by definition, overwhelms the response capacity of the community. However, a major incident occurs more commonly. It is defined as a situation that places significant demand on medical resources in terms of the number, severity, or type of live casualties, or the location of the incident in such a place that it warrants the response of extraordinary resources.<sup>3</sup>

Many of the definitions refer to an imbalance between the number of casualties and the number of resources available to treat them. Recent disasters, such as the Haiti earthquake and the tsunami in Japan, are examples.

**A disaster, by definition, overwhelms the response capacity of the community. However, a major incident occurs more commonly.**

This imbalance – between the large number of casualties and the limited medical resources that may be available to treat them during the acute phase – calls for an extraordinary response. It could be in the form of adequate planning, testing of the plans, and education of

all staff who may need to respond to a major incident. Triage is one of the main tools used when dealing with a large influx of casualties.

### Triage

Triage is derived from the French *trier*, meaning 'to sort or sieve'. In medicine, this is the process of sorting patients in order of priority for treatment and evacuation. Triage may take many different forms, and operates at a number of different levels. However, it aims to give the right patient the right care at the right time in the right place. In certain circumstances, this may also mean 'doing the most for the most'.

Originally developed for use in military conflicts, triage is equally applicable to civilian disasters and day-to-day emergency settings. Accurate triage allows correct identification of those patients who need the most urgent intervention, as well as quickly and safely identifying those who can wait longer for treatment. The latter are the majority at a typical major incident. Triage may also be used to identify patients who are so severely injured that they will not survive, or whose treatment will tie up resources that would be best used with other patients.

Triage is dynamic – as the patient's condition progresses, so his/her need for intervention alters, and the triage category will change. To reflect this process, triage must be repeated regularly – it is only a snapshot of the patient's condition at that time. It must also be a simple procedure that is fast, reliable and reproducible. Triage tools, when applied correctly, form a key component of clinical risk management in the highly stressed emergency care environment.

### Triage systems for major incidents

Evidence-based research into the efficacies of the various triage tools is difficult, so there is no gold standard against which different triage tools can be measured.

As part of the FIFA 2010 preparation, the National Department of Health adopted the Major Incident Medical Management and

## Triage

Support System (MIMMS), which originated in the UK.<sup>3</sup> The triage system utilised in MIMMS is that of sieve and sort. It measures various physiological parameters that identify the priorities for treatment. Repeat triage is important as the patient moves from the incident site through the emergency medical services (EMS) system and into definitive care in hospital. A casualty's priority may change at any time, so such changes must be tracked.

### Triage priorities and levels

Triage priority schemes vary across the world and even within countries. Some countries use the treatment (T) system, while others use the priority (P) system. The only notable difference between the P and T systems is the use of the expectant category. Both systems are commonly used in conjunction with colour coding.

- Red (T1 or P1) – a patient whose life is in immediate danger and requires immediate treatment. This may include patients with airway obstruction or severe breathing problems.
- Yellow (T2 or P2) – a patient whose life is not in immediate danger. Surgical or medical intervention is required within 2 - 4 hours. This may include patients with intra-abdominal bleeding or complicated fractures.
- Green (T3 or P3) – a patient with minor injuries who will eventually require treatment. Minor fractures or lacerations are commonly seen in this group.
- Blue (T4 or no priority) – expectant. A patient who is either dead or has extensive injuries and cannot be saved with the limited resources available. The 'expectant' category can be the most challenging ethically and emotionally.

### Who is best equipped to perform triage?

In a disaster two types of triage are necessary. Primary triage occurs at the scene of the disaster, for example in train carriages in the event of a train collision. It needs to be:

- fast
- reliable
- reproducible
- easy to use
- easy to teach.

Ideally, it should be done by a junior member of the healthcare team utilising the triage sieve (Fig. 1).

Secondary triage occurs as patients are evacuated to the casualty clearing station or when they arrive at a hospital. A more experienced clinician is preferred in this case, as more clinical detail has to be explored as part of the triaging process using the triage sort algorithm (Fig. 2).

The sieve and sort system is used for adult casualties in a mass casualty incident. It could also be used for children who may be involved in such an incident. It should be noted, however, that this system tends to over-triage children because the normal vital signs such as respiration rate and pulse rate are higher than those of an adult. Over-triage of children in this way is acceptable because

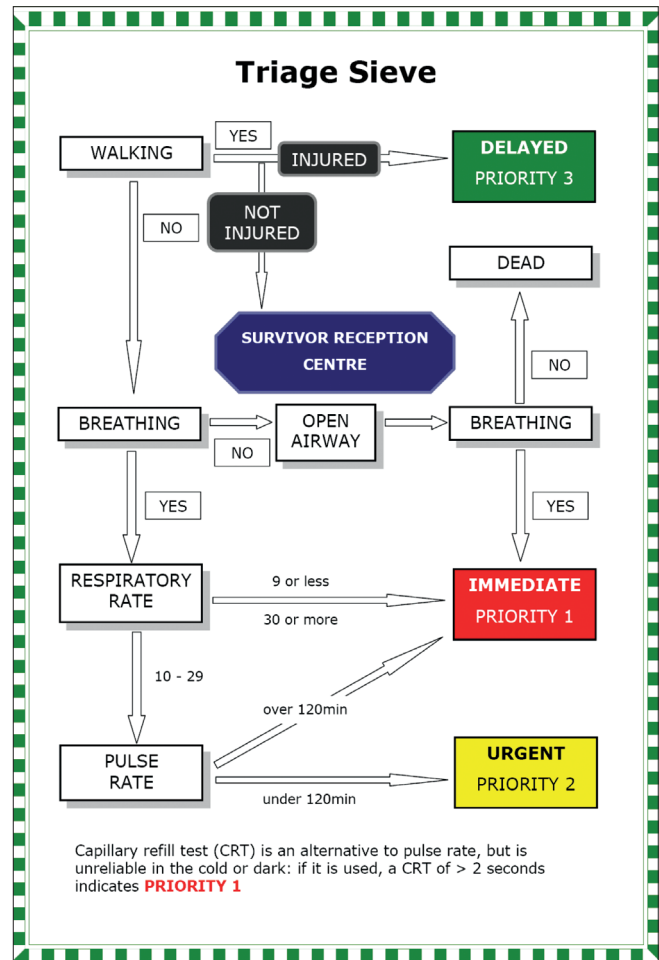


Fig. 1. Triage sieve.

children are likely to decompensate faster than adults. Paediatric triage tapes do exist and are recommended if the mass casualty incident exclusively involves children.

### Triage labels

In a major incident or disaster, once a triage priority has been assigned, the triage officer must label the patient appropriately to prevent duplication of effort and confusion among other rescuers. Many labelling systems exist, with wide variation between countries and no accepted international standard. The key to a successful labelling system is that everyone involved in the response understands the system being used.

Labels should be:

- easy to use
- clearly visible
- resilient in wet environments
- easy to attach to the patient
- can be written on for clinical record keeping.

Ideally, each label should have a unique identifying number. Labels must also allow for patients to improve or deteriorate.

## Triage

### Triage Sort

**STEP 1:** Calculate the GLASGOW COMA SCORE (GCS)

A Eye opening:	B Verbal response:	C Motor response:
spontaneous 4	orientated 5	obeys commands 6
to voice 3	confused 4	localises 5
to pain 2	inappropriate 3	pain withdraws 4
none 1	incomprehensible 2	pain flexes 3
	no response 1	pain extends 2
		no response 1

GCS = A + B + C

**STEP 2:** Calculate the TRIAGE SORT SCORE

X GCS	Y Respiratory rate	Z Systolic BP
13 - 15 4	10 - 29 4	≥ 90 4
9 - 12 3	≥ 30 3	76 - 89 3
6 - 8 2	6 - 9 2	50 - 75 2
4 - 5 1	1 - 5 1	1 - 49 1
3 0	0 0	0 0

TRIAGE SORT SCORE = X + Y + Z

**STEP 3:** Assign a triage PRIORITY

<b>12 = PRIORITY 3</b>
<b>11 = PRIORITY 2</b>
<b>≤10 = PRIORITY 1</b>

**STEP 4:** Upgrade PRIORITY at discretion of senior clinician, dependent on the anatomical injury/working diagnosis

Fig. 2. Triage sort.

	<b>Priority 1 Critical</b>  Time: <input style="width: 50px;" type="text"/>																						
<b>Dead</b>  Time: <input style="width: 50px;" type="text"/>	Patient Name: <input style="width: 100%;" type="text"/> <b>VITAL SIGNS</b> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Time</th> <th>Pulse</th> <th>Resp</th> <th>BP</th> <th>AVPV</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> Drugs given:    Name:    Dose:    Time: <input style="width: 50px;" type="text"/> BY: <input style="width: 100%;" type="text"/>	Time	Pulse	Resp	BP	AVPV																<b>Priority 2 Serious</b>  Time: <input style="width: 50px;" type="text"/>	
Time	Pulse	Resp	BP	AVPV																			
	<b>Priority 3 Minor Injuries</b>  Time: <input style="width: 50px;" type="text"/>																						

Fig. 3. South African triage label.

Many systems use single, coloured cards. These labels have most of the desired characteristics, but do not allow for easy changes. This means that a new card has to be filled out with clinical data each time the patient is re-triaged. If the out-of-date card is thrown

away, vital information may be lost. However, if it is left with the patient, it may be difficult to tell which card is the most recent. Folding labels are currently the best option. Clinical information is recorded on the label, which is then folded and attached to the patient so that only one colour is visible. If the category changes, then the card is simply refolded.

There are two types of folding labels: cruciform and linear. Cruciform labels are cross-shaped. The folding cruciform label, shown in Fig. 3, is currently favoured by South African EMS providers and health institutions. They can be folded to show the current triage category and have space for variable clinical information, depending on the exact label. If dedicated labels are not available, simple alternatives such as coloured pegs may be used. While such methods are not recommended as first-line practice, they are an acceptable alternative as long as everyone involved in the patient care and evacuation chain understands the system.

### Conclusion

Triage remains the most important tool at our disposal when dealing with a major incident and/or disaster. It will ensure that limited medical resources are correctly directed towards those casualties who have the most life-threatening injuries.

The triage tool, however, is only as good as the medical teams using the tools. It is important that health professionals are aware of these systems and become proficient in their use. South Africa has many major incidents, and while the medical fraternity may not be able to prevent their occurrence, awareness of the triage system will go a long way towards reducing the impact on the casualties.

### IN A NUTSHELL

- Major incidents and disasters are noted to be on the increase.
- Increasing urbanisation is contributing to the increased incidence of major incidents.
- Major incidents and disasters result in an imbalance between the number of casualties and the available resources to manage these large numbers of patients.
- The aim of the medical fraternity in such situations is to be able to provide suitable care to the most number of casualties.
- Triage is the tool adopted in such situations, which allocates a priority to each patient in terms of their condition.
- In South Africa the triage sieve and sort system is used.
- Triage is a dynamic process that continually gets repeated as the patient progresses through the health system.
- While the sieve and sort can be used for children, it must be noted that it most likely tends to over-triage children.
- It is imperative that all health professionals who may be involved in patient care during times of major incidents are aware of the triage system currently used in South Africa.