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# Triage in surgery: from theory to practice, the Medecins Sans Frontières experience

**Patrick Herard · François Boillot**

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**Abstract** Establishing triage is necessary in mass casualty events. If the concept of triage itself is easy, its application in the field encounters many difficulties at times unforseen. MSF offers a list of the main obstacles encountered when establishing an efficient triage system.

The concept of triage was first introduced by Dominique Larrey during the Napoleonic wars.

The aim was initially to maximise the survival rate of the injured. Triage is necessary when the mass of casualties exceeds hospital medical resources. The causal element is termed "mass casualty incident". Two types are known, "sudden occurring disasters" such as earthquakes, or terrorist attacks and "insidious disasters" such as guerrilla warfare or exposure to radiation. Either type generates a rapid or progressive influx of patients. Triage can therefore affect a significant amount of people in an extremely short time, the perfect example is the bombing of the American embassy in Nairobi which caused 213 deaths and 4,044 injured. Finally, the "mass casualty incident", depending on its nature, generates different ratios of injured/deaths, i.e., Earthquake wounds and tsunami kills. The relation between killed and injured varies from 20 to 50 % in earthquakes and is 80 to 90 % in Tsunamis.

Triage has benefited greatly from war surgery experience. It has been well codified thanks to International Committee of the Red Cross [1] work and other authors [2]. International Committee of the Red Cross classification is clear. Upon arrival at the hospital, patients are classified into four categories. Category 1 concerns patients that fall under immediate medical/surgical management. Category 2 is patients who are able to wait. Category 3 is patients waiting ambulatory care, and category 4 is patients who have little/no hope of survival whatever care management given.

Though these rules of triage are simple in their conception, implementation of the process is significantly more complex and can clash with difficulties such as cultural, emotional, ethical, logistics, and medical management.

These difficulties are discussed in the light of MSF recent experience in Haiti. A model of triage for level 2 hospitals (general hospital district type) follows.

**Cultural difficulties:** Some populations, for cultural reasons, require that they look after the deceased as a priority. The deceased are often evacuated first by medical means at the expense of the injured. Thus, the deceased are the first to arrive at the hospital.

In other cases, in certain societies care is first given to adults and not children, whatever the emergency may be.

**Human difficulties:** Those managing triage are often local personnel and can be faced with sorting their loved ones. An "objective" triage can be difficult.

Another frequent difficulty observed is the degree of emergency that is evaluated by the person sorting and the medical team. The difference in judgment can also add to further confusion in an already chaotic situation. Finally, the person sorting can face different types of pressure on behalf of the families, military or armed groups.

**Ethical difficulties:** The very idea of 'sorting' can be considered unacceptable to 'Western' doctors, who are used to treating individuals regardless of a patient's state in optimum conditions. Ranking a patient in category 4 is extremely difficult for the doctor. Moreover, drastic surgery such as amputation can be justified in such circumstances whilst in 'normal' circumstances the judgement may have been different [3].

**Difficulties in logistics**: The lack of preparation of a management plan to organise a massive arrival of injured is the basis for disorganisation, or even chaos, that

P. Herard (✉) · F. Boillot
Medecins Sans Frontières (MSF), Paris, France
e-mail: patrick.herard@paris.msf.org

can overwhelm a medical structure. The major areas of complaints are the absence of secure locations, sufficient medicine, medical disposable supplies and well-defined roles for each person. Haiti was a good example of lack of stretchers, mattresses, and traction pins.

The quality of a hospital's structure where the triage takes place can have an impact on the quality of establishing and the management of triage. Level 2 structures (general hospital district type) often only have one operating theatre and only one surgical team. The absence or difficulties in patient referrals considerably weigh down the medical teams workload.

The Haiti experience clearly shows that a full surgical hospital could not be operational within ten days. Starting with lighter structures would have been more efficient [4].

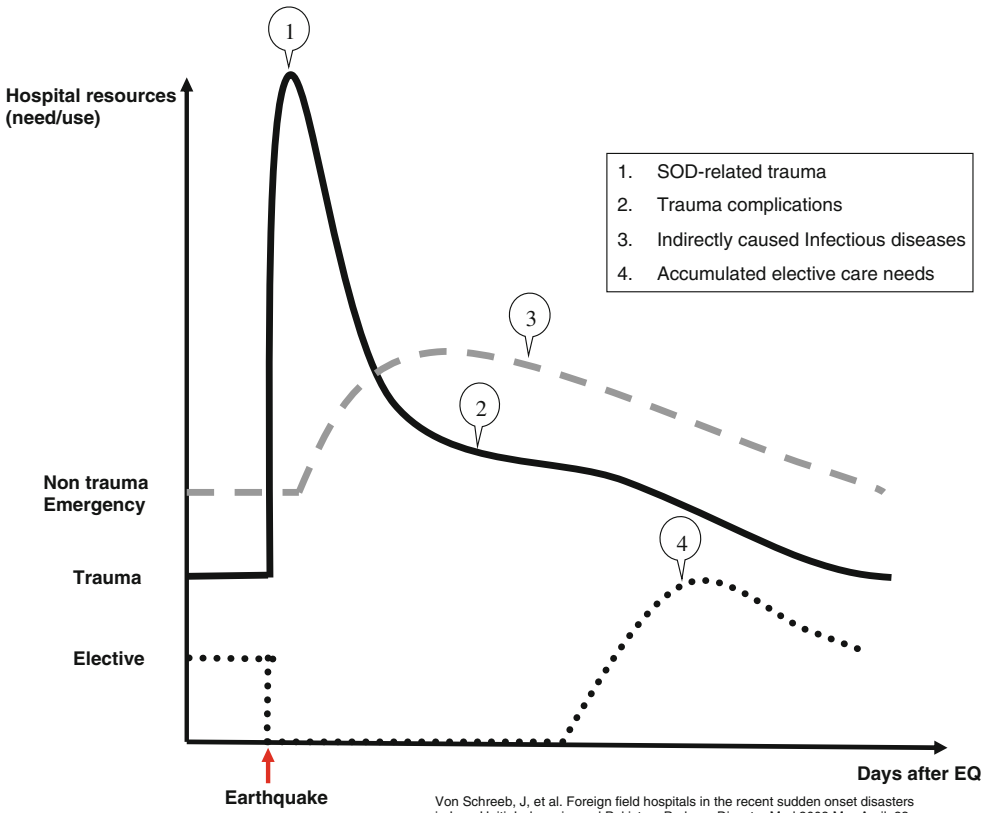
**Medical difficulties:** The phenomenon of triage can occur in completely different contexts producing a variety of pathologies necessitating diverse medical expertise, such examples are earthquakes, wars, terrorist attacks, etc. Such expertise is not necessarily available in the field, notably, ear, nose and throat emergencies or ophthalmology, especially when the triage occurs in level 2 structures.

A patient's category may change owing to the worsening condition of the patient or owing to the availability of the care-givers, for example, the absence of category 1 or several teams being established that can treat category 2. Patient reassessment often becomes secondary when the incoming casualties are continuous.

Maintaining medical files other than the triage document often becomes secondary. Usable information following triage is often lost. Medical and legal constraints are not necessarily taken into account. It becomes an area of exception where the sovereign decision of those responsible is taken without any legal sovereign power.

Moreover, the hospital manages patients with pathologies requiring surgery that have nothing to do with the triage. Taking the earthquake in Haiti as an example, obstetric surgery, notably C-sections, had to be managed.

Johan Von Schreeb [5] has taken the earthquake to model the kinetics of an arrival of mass casualties.




Von Schreeb, J, et al. Foreign field hospitals in the recent sudden onset disasters in Iran, Haiti, Indonesia, and Pakistan. Prehosp Disaster Med 2008 Mar-April; 23 (2):144-51.

He describes three phases. The first phase being the management of the injured relating to the earthquake, often carried out in confusion and consequent isolation. The second phase is the management of complications or the second stage surgery of the first phase; the means of communication is often re-established. And

the third phase is the slow return to life prior to the earthquake.

This model can be applied to cases of sudden events that bring about a significant number of injured such as wars or terrorist attacks. The number of days is deliberately unspecified to take into account the variability of time in the different phases. For example phase 1 lasted five days during the earthquake in Haiti and 12 days during the last war in the Ivory Coast.

Of course the list of difficulties is not exhaustive. The list urged Medecins Sans Frontières to establish recommendations to set up a system of triage.

The system of categories is kept but with a more universal classification in four colours. The colour red was used for patients requiring urgent medical attention, yellow for those who can wait, green for patients requiring ambulatory care and black for those who will not survive no matter what care they receive.

For each Medecins Sans Frontières hospital a mass casualty plan exists with red, yellow, green and black zones identified. These zones are secured. The plan is comprised of a very detailed description of each role and the means of contacting each other. The plan is often rehearsed by the team members.

A mediator is appointed who manages the interface between the families and who indicates the green zone for those most able to express themselves. The mediator, a key person, must be experienced and well respected by the team.

Prior positioning of emergency medical kits must be established in the triage zones.

Each time the plan is launched a meeting follows where the anomalies are analysed and improvements and changes ensue. An example is the incorrect practise of preventive fasciotomies for closed fractures during the earthquake in Haiti. These fasciotomies were then neglected due to the increase in workload and as a result major bone infection developed resulting in amputation.

## Conclusions

Medecins Sans Frontières surgical structures are mainly level 2. These hospitals present specific characteristics (limited number of bed and human resources, isolated situation that does not allow references), which can make the income of mass casualties problematic.

The earthquake of Haiti happened in a capital already in a very precarious situation and makes us reconsider our organisation concepts of surgical emergency in terms of logistics and human resources. Furthermore, cultural, human, ethical, logistics and medical unexpected factors can interfere with surgical triage. We cannot emphasise enough the meticulous preparation and rehearsal of the mass casualty plan.

**Conflict of interest** The authors declare that they have no conflict of interest.

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