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# Experience of Florence University Hospital: the Disaster Emergency Plan in a third level hospital

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## Summary

**Objective**. The study aims to explain how to prepare a disaster manual, describes it and shows how it is applied it in a tertiary care hospital when emergency occur.
**Methods**. We based the article on the principles of disaster medicine, on recent literature and on the experiences gained during the pandemic COVID emergency.
**Results**. Recent terrorist attacks have highlighted the importance of a contingency plan to effectively and efficiently manage a large influx of wounded. Careggi Hospital's PEMAF (emergency plans for a massive influx of injured) is a comprehensive and well-coordinated response to a disaster situation. The hospital's specialized disaster response team, surge capacity plan, and patient tracking system provide the necessary resources to provide immediate and efficient care to patients in the event of a disaster.
**Conclusions**. Disaster medicine protocols play a critical role in preparing healthcare professionals to respond to large-scale disasters, including terrorist attacks. By following established protocols and principles of disaster medicine, healthcare professionals can provide effective care to those affected by disasters and help to mitigate the impact of future disasters.

**Key words:** disaster manual, preparedness, PEMAF, emergency plan

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## Introduction

Today's world is characterized by growing uncertainty and a constant threat of terrorist attacks. In recent years, terrorist attacks have caused a large number of deaths and injuries, such as the attack on the Atocha train station in Madrid in 2004 and the attack on the Christmas market in Berlin in 2016. In these cases, the influx of injuries to health facilities was enormous, creating a major medical emergency. When a maxi emergency occurs, it is possible to suddenly receive a large number of injured. It is therefore advisable to identify and designate the resources that must be made available and the clinical-care pathways to be implemented. PEMAF (emergency plan for a massive influx of injured) is essential to maintain a high standard of treatment for patients involved in incidents, comparable to what is delivered to patients on an ordinary day. This article will focus on how to develop a contingency plan for the mass influx of injured based on recent literature and experiences gained in these terrorist attacks taking as an example the plan of the Careggi Hospital in Florence.

## Materials and methods

This work is based on an observational protocol formed on occasional events, and therefore it is difficult to unify these events into a statistic because each one is different from the others. We search for recent literature and reports of past tragedies focusing on specific incidents in Atocha, Berlin, and Nice, and what has been learned from those situations. We collected data and articles about what happened during those catastrophies, how they were faced, and what the final balance was. We then have developed the PEMAF of Careggi Hospital by combining the lessons learned from previous experiences.

## Results

The Careggi Hospital's massive influx of injured contingency plans are comprehensive and effective. The hospital's capacity expansion, communication strategies, and medical resource mobilization plans enable it to handle emergencies effectively. The hospital's emphasis on maintaining a safe environment for patients and staff members also ensures that patients receive the necessary medical attention without compromising their health or safety. Overall, the Careggi Hospital's contingency plans are a testament to its commitment to providing high-quality healthcare services to patients, even in the face of unexpected emergencies.

The plan is a mix of:

- strategy: elaboration of relief plans (municipal, provincial, regional plans), which in the event of disasters define the role and methods of intervention of the various components involved;
- logistics: availability of materials, resources, necessary for rescue and personnel that are readily available and sufficiently prepared and trained;
- tactic: application of relief plans.

In the event of a maxi-emergency in the area, the first intervention on the site of the event is carried out by the central system 118 which alerts the PS-DEA (emergency - Department of Emergency and admission) of the AOUC providing the first information. In particular, information is provided on the type of event, number, and conditions of the people involved. Subsequently, the physician in charge of the PS-DEA on duty alerts, via the STM (Patient Transport Service), the board of Medical Directors providing information received on the event. If the latter deems it necessary to activate the PEMAF, it sends the alarm to the STM.

While waiting for the settlement of the UCA (Aziendal Crisis Unit), the director of the DEA emergency room or the physician on duty in the emergency room, after having heard the Medical Director, must implement measures that cannot be postponed:

- blocking of deferrable or scheduled activities on internal or external patients with maintenance of internal and external emergencies and urgencies;
- suspension of the programmed activity of the operating room;
- preparation of the reception and treatment area, simultaneous preparation of the waiting area for carers;
- use of materials present in the premises set up for the maxi-emergency.

In general, the UCA would be composed of individuals with expertise in crisis management, risk assessment, and communication. It is a specialized team within an organization that is dedicated to managing and responding to unexpected events that could have a significant impact on the operations, reputation, or stakeholders.

It has important roles:

- coordinate emergency management within the AOUC;
- maintain relations with the police forces;
- decide the modulation of the ordinary activity and of the emergency activity;
- appoint the sole manager for external communication and with the press;
- organize spaces for patient evaluation and for relatives.

The next step of the plan consists in reorganizing healthcare. The response to the increased need for beds for emergency room admissions is dictated by protocol P/903/65 which provides for the progressive reorganization of the same.

The PS DEAS is able to receive 10 red codes and 25 yellow codes in the first hour. By changing the reception capacity, it is possible to accommodate the injured and at the same time to support the maintenance of the emergency system's operations and receptivity.

With a cascade activation mechanism, each service adjusts its efficiency as best as possible to manage the health emergency. The available personnel is alerted, among these there are physicians who deal with intensive care, medical personnel of the operating room, personnel who work for radio-diagnostic service, laboratory service and the pharmacy.

Everything is part of the plan, which keeps improving. The Medical Director has the responsibility to update the plan every year, depending on the regional indications.

The secret to being ready to face an emergency, in addition to having a good action plan, is knowing how to apply it. This is the reason why the Medical Director organizes exercises and/or simulated alarms periodically, so that the staff is sufficiently trained and ready in case of an emergency.

## Discussion

Disasters and emergencies can happen anywhere, anytime, and to anyone, causing immense physical and emotional harm. Disaster medicine protocols are crucial in responding to and mitigating the effects of these events. Disaster medicine is a specialized field that encompasses the preparation, response, and recovery from disasters, including natural disasters, pandemics, and acts of terrorism. The following text will provide

an overview of the disaster medicine protocol based on the existing literature, with a focus on specific incidents in Atocha, Spain, Berlin, and Nice, and what has been learned from those situations.

## Disaster medicine protocol

The disaster medicine protocol involves the coordinated efforts of various healthcare providers, emergency responders, and government agencies to respond to and manage disasters. The disaster medicine protocol consists of four phases: mitigation, preparedness, response, and recovery. Mitigation involves the actions taken to reduce the risk and severity of disasters, including hazard identification, risk assessment, and risk reduction. Preparedness involves the development of plans and procedures, training and education, and stockpiling of resources to respond to disasters. Response involves the immediate actions taken to mitigate the effects of disasters, including search and rescue, triage, and treatment of casualties. Recovery involves the actions taken to restore the affected area to its pre-disaster state, including rebuilding infrastructure, providing psychological support to affected individuals, and managing long-term health effects.

### *Atocha, Spain*

On March 11, 2004, a terrorist attack occurred in Atocha, Spain, when multiple bombs exploded on commuter trains, killing 191 people and injuring over 2,000. The attack was the deadliest terrorist attack in Spanish history and highlighted the importance of disaster medicine protocols in responding to acts of terrorism. In response to the attack, Spanish healthcare providers and emergency responders quickly implemented disaster medicine protocols to triage, treat, and transport casualties to hospitals. The response involved the deployment of mobile hospitals, ambulances, and helicopters to transport patients to hospitals with the capacity to provide specialized care. The response was effective in managing the surge of patients and minimizing mortality and morbidity.

There were initial delays in transporting patients to hospitals due to confusion over which hospital was designated to receive the most critically injured patients. Lessons learned from the Atocha attack include the importance of rapid communication and coordination among healthcare providers and emergency responders. The implementation of disaster medicine protocols and the deployment of specialized resources, such as mobile hospitals and helicopters, can significantly improve patient outcomes. The attack also highlighted the need for increased resources and training for healthcare providers to manage complex trauma cases.

### *Berlin*

On December 19, 2016, a terrorist attack occurred in Berlin, Germany, when a truck was driven into a Christmas market, killing 12 people and injuring 56. The attack demonstrated the importance of rapid response and effective triage in managing a mass casualty event. The disaster medicine protocol was implemented, and healthcare providers and emergency responders worked together to triage and transport patients to hospitals. The response involved the deployment of mobile hospitals and helicopters to transport patients to specialized trauma centers.

Lessons learned from the Berlin attack include the importance of training healthcare providers and emergency responders to manage a mass casualty event, including triage, treatment, and transport. The attack highlighted the need for increased resources and funding for disaster medicine preparedness and response.

### *Nice*

On July 14, 2016, a terrorist attack occurred in Nice, France, when a truck was driven into a crowd of people celebrating Bastille Day, killing 86 people and injuring over 400. The attack demonstrated the importance of psychological support for survivors and healthcare providers, as well as the need for effective communication and coordination among healthcare providers and emergency responders.

The disaster medicine protocol was implemented, and healthcare providers and emergency responders worked together to triage, treat, and transport patients to hospitals. The response involved the deployment of mobile hospitals and helicopters to transport patients to specialized trauma centers.

Learning from these tragic events, the committees of members from the hospital administration, and from clinical, diagnostic and supportive departments worked on a document prepared according to the law and gave their inputs to write down a comprehensive contingency plan for the massive influx of casualties. Each hospital has its plan that is different from the others, although there are common characteristics that each emergency plan should contain.

It should include the following stages:

- preparedness: this includes training medical and support staff, preparing medical infrastructure, and establishing emergency management protocols;
- immediate response: this includes assessing the scene of the accident, assessing the number and severity of injuries to the injured, and providing immediate medical attention;
- transportation of casualties: this includes managing the transportation of casualties to medical facilities, establishing transportation priorities, and coordinating with ambulances;
- hospitality management: this includes managing the influx of patients into medical facilities, establishing resource allocation policies, and managing patients with critical injuries;
- continuity of care: this includes managing long-term care for patients requiring long-term care, assessing support needs, and establishing emergency management protocols.

Furthermore, it is important that the emergency plan includes an effective communication system between all parties involved in emergency management, as well as constant evaluation and continuous improvement of the plan based on experiences gained in emergency situations.
Overall, a contingency plan for massive casualties should be prepared in advance and should be flexible and adaptable to specific situations. The preparation and training of medical and support personnel are essential to ensure an effective response in the event of an emergency, and regular drills and training exercises ensure that the hospital's disaster response team is prepared to respond quickly and effectively when disaster strikes. Careggi Hospital, located in Florence, Italy, is no exception, every year the health management organizes sporadic simulations to keep training the personnel for being ready to fight the emergency in every moment. As a tertiary care center, it is expected to provide medical care for a significant number of patients in the event of a disaster.
The emergency plan for a massive influx of injured at Careggi Hospital in Florence is a comprehensive and well-organized system, which guarantees an effective and timely response to emergency situations. Close collaboration with local authorities and emergency services ensures coordinated emergency management and a fair distribution of patients between the various hospitals in the city.
Careggi's emergency plan provides for the creation of an emergency zone inside the hospital, called the "red area", where patients are immediately treated and divided according to the severity of the injuries. Medical, nursing, and technical staff are mobilized to deal with the flow of patients and ensure their constant treatment and monitoring.
In addition, the hospital works closely with local authorities, law enforcement, and emergency services to coordinate the arrival and distribution of patients between hospitals in the city as needed.
The emergency plan also provides for the activation of an alarm system that immediately warns medical personnel in the event of an emergency, so that they can act quickly and effectively. This is also possible thanks to "action cards", which allow rapid recognition among staff operators during the emergency phase. Furthermore, the staff is constantly updated on new techniques and protocols.
It is important to underline that Careggi's emergency plan not only addresses emergency situations at the local level, but is also capable of handling large-scale emergencies, such as transport accidents or natural disasters.

## Conclusions

In conclusion, managing mass casualty influxes is a complex issue that requires proper planning, preparation, and response. A strategy for managing casualty surges must be designed to ensure that medical resources are available and that casualty flows are managed efficiently. Preparedness for such an emergency must include comprehensive planning involving a range of organizations, including law enforcement, emergency medical services, health care providers, and government agencies.
In the aftermath of these attacks, several lessons were learned about the application of disaster medicine protocols. In the case of the Atocha attack, the key lesson was the importance of communication and coordination between healthcare professionals and other agencies involved in the response effort. The importance of disaster preparedness is what we learned from the Berlin attack. Finally, the importance of mental health support for both victims and healthcare professionals was highlighted in the Nice attack.
With the increased incidence of terrorist threats, the requirement to have plans to respond to chemical, biological, and radiological incidents including decontamination procedures must be developed and exercised. Scheduled large volume occasions such as concerts or sporting events can be used to exercise emergency plans to educate and familiarize staff. Frequent drills and exercises allow for evaluation and revision of plans before the disaster occurs.
The plan for a massive influx of injured patients in the Careggi Hospital is based on a well-structured and tested system. The hospital's emergency response system is activated whenever there is a significant accident or natural disaster. The system comprises of different units, including the medical staff, administrative personnel, security personnel, and logistical support staff. The hospital has a well-trained and experienced medical team that can handle all types of injuries and has access to modern medical equipment and technology. The hospital also ensures that patients' families are informed of their loved ones' condition and provided with emotional support. All these factors combine to ensure that the hospital can handle a large influx of injured patients effectively and efficiently.

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