

**MAJOR INCIDENT MEDICAL MANAGEMENT
AND SUPPORT**

The Practical Approach in the Hospital

MAJOR INCIDENT MEDICAL MANAGEMENT AND SUPPORT

The Practical Approach in the Hospital

Advanced Life Support Group

By
Simon Carley
Kevin Mackway-Jones

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■ PREFACE ■

It is now nearly 10 years since the Advanced Life Support Group published its first book on major incident response. That book (*Major Incident Medical Management and Support: the practical approach at the scene*) and its accompanying course, affectionately known as MIMMS, are now established around the world as best practice guides. The CSCATTT approach to incidents has become a standard like ABC.

For some of us, however, the focus on the first phase of the response (the pre-hospital phase), while a good place to start, did not solve all our problems. Our practice was more likely to be delivering care within the hospital environment, and a course dedicated to this seemed badly needed.

This book has been written with the aim of promulgating the disciplines and lessons of MIMMS to the hospital provider. We hope that the multi-professional team needed for a successful response can use this text and its accompanying course (to be known as Hospital MIMMS) as successfully as their pre-hospital colleagues have used MIMMS. Certainly our pilot courses have suggested that the package does fill an unmet need. We hope that those of you who read it and train with us agree.

The days spent on courses are just part of a learning process; both skills and knowledge need continual reinforcement. At the end of your HMIMMS course you will receive a logbook for you to use back at your place of work.

K Mackway Jones
S Carley

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We will post any changes on the ALSG website, so we advise that you visit the website regularly to check for updates ([url: www.alsg.org/updates](http://www.alsg.org/updates)). The website will provide you with a new page to download and replace the existing page in your book.

REFERENCES

References are available on the ALSG reference centre www.alsg.org/references.

ON-LINE FEEDBACK

It is important to ALSG that the contact with our providers continues after a course is completed. We now contact everyone six months after the course has taken place asking for on-line feedback on the course. This information is then used whenever the course is updated to ensure that the course provides optimum training to its participants.

PART
I

INTRODUCTION

The epidemiology and incidence of major incidents

INTRODUCTION

A major incident is said to have occurred when an incident requires an extraordinary response by the emergency services. While major incidents may affect any of the emergency services, the health service's focus is the resulting casualties. A major incident cannot, however, simply be defined in terms of the number of casualties—the resources available at the time of the incident are also relevant. For example, a road traffic accident in a remote area producing five multiply injured casualties may overwhelm the immediately available local resources. However, a similar incident in a major urban conurbation may require little or no additional resources. Thus, the same incident in different localities may produce a major incident in one but not in the other.

For the purposes of planning, major incidents have been defined as: *events that owing to the number, severity, type or location of live casualties require special arrangements to be made by the health services*.

Local Highlights: Major incident definition

This definition is an operational one that recognises that major incidents occur when the resources available are unable to cope with the workload from the incident. The need to relate major incidents to the availability of resources is most clearly demonstrated when considering incidents that produce 'specialist' types of casualties. An incident producing paediatric, burned or chemically contaminated casualties may require the mobilisation of specialist services even when there are only a few casualties. This is because the expertise and resources needed to deal with these types of casualties are limited and widely scattered around any country.

Incidents such as plane crashes may occur in which all casualties are dead at the scene. Whilst these are clearly major incidents for the police and fire service, there is often little requirement for the health service beyond mortuary and pathology services. An example

of such an incident was the Lockerbie air crash where all passengers were killed and only a few people were injured on the ground.

Classifying major incidents

Whilst the health service definition is an adequate one for planners at a local level, it does not tell us anything about the size of the incident or the incident’s effect on society as a whole.

Rutherford and De Boer have classified and defined major incidents with regard to their size and effect on the health service and society. This classification system is useful for emergency planners and researchers. Their system defines major incidents in three ways:

1. Simple or compound
2. Minor/moderate/severe
3. Compensated/uncompensated

Simple or compound. A simple incident is an incident in which the infrastructure remains intact. Compound incidents are those in which the incident destroys the infrastructure of society itself. Roads, communications and even the health services may be destroyed. Compound incidents typically arise as the result of war or natural disasters.

Size. While it is not possible to decide whether a major incident has occurred purely on the basis of the number of casualties involved, an appreciation of the size of incident can assist in the planning process for a major incident response. De Boer et al. divide incidents into minor, moderate or severe. This is shown in Table 1.1.

Table 1.1. Size classification of major incidents

Size	Total number of casualties (alive or dead)	Casualties admitted to hospital
Minor	25–100	10–50
Moderate	100–1000	50–250
Severe	>1000	>250

Compensated or uncompensated. By definition, major incidents require the additional mobilisation of resources in order to deal with the health service workload. Incidents may be considered to be compensated if the additional resources mobilised can cope with the additional workload. When an incident is such that even following the mobilisation of additional resources the emergency services are still unable to manage, it is said to be uncompensated.

Failure to compensate may occur in three circumstances. First, the absolute number of casualties may be so large as to overwhelm the available health service resources. Second, the resulting casualties may require such specialised (or rare) skills or equipment that any more than a few casualties overwhelm resources. Such incidents may require relatively few casualties to reach this point, as there may be scant resources available to deal with them. Third, incidents occurring in remote areas may remain decompensated as the health services may be unable to reach the casualties.

The point at which decompensation occurs is often difficult to define and in many respects depends on the perspective of the observer. Total failure of the response to a major incident (such as the absence of any medical care) is clearly failure to compensate, and is most likely to occur in natural disasters or war. However, failure to compensate

may also be considered to have occurred when the care given to individual patients is of a standard less than that acceptable in day-to-day practice. Decompensation is only considered to have occurred when the system fails to such an extent that individual patient care is seriously compromised.

At the present time little is known about the effectiveness of the health service response to major incidents as this information is rarely recorded or analysed. However, anecdotal evidence suggests that the care given to individual patients during major incidents is often below the standard that would be delivered in normal daily practice.

The all-hazard approach and special major incidents

Major incident planning should follow an 'all-hazard approach'. This means that one basic major incident plan should be able to cope with all types of major incident. This is necessary as it is impossible for any emergency planner to predict the nature of the next incident. In addition, maintenance of separate major incident plans for all possible eventualities would be impractical. The all-hazard approach also allows planning to be kept as simple and as near to normal working practice as possible.

However, despite these guiding principles, there are still certain types of incident that require additional modifications to the basic plan. This is the only way to achieve the aim of optimal clinical management for as many casualties as possible.

Incidents involving chemicals, radiation, burns, infectious diseases or a large number of children are considered by many emergency planners as 'special' types of major incidents. Whilst it may be necessary to alter or embellish major incident plans to deal with these specific types of incidents, the required modifications should be made without significant departure from the basic (all-hazard) major incident plan. All these incidents are characterised by a type of casualty for which resources may be scarce. They may therefore result in a failure to compensate by the health services response even though there are relatively few casualties. Although these types of incident are considered separately, the general principles of emergency planning must still apply.

Natural disasters

It is worthwhile reiterating the difference between man-made and natural disasters when considering the epidemiology of major incidents. Natural disasters result from earthquake, flood, tsunami, volcano, drought, famine and/or pestilence. However, the potential for suffering and loss of life is enormous (Table 1.2).

Table 1.2. Natural disasters

Date	Place	Event	Estimated casualties
1980	Dallas	Heat wave	1 200
1985	Columbia	Volcano	25 000
1985	Mexico City	Earthquake	40 000
1988	Armenia	Earthquake	55 000
2004	Indian Ocean	Tsunami	2 50 000

On a world scale natural disasters are important but require a different type of response to the simple, compensated major incident more typical of those occurring in a developed society. Planners considering the response to a natural disaster in a foreign country face a challenge quite different from that presented in this book.

THE EPIDEMIOLOGY OF MAJOR INCIDENTS IN THE UK

Historically, major incident planning has been based upon military experience. As a consequence of this, many major incident plans have been developed to cope with a large number of traumatically injured adults. However, major incidents may occur for a variety of reasons and may produce many different types of casualties. Whilst it is impossible to predict the exact nature of the next major incident, there is little to be gained in planning for types of major incident that might never occur. By looking at the type of major incidents that have occurred in the recent past, planners can base their plans and major incident exercises on realistic scenarios.

Unfortunately, accurate data on the nature and incidence of major incidents are difficult to obtain. Little data are collected prospectively and the quality of available data is questionable. Despite these limitations some information is available from which better major incident plans can be formulated.

The incidence of major incidents

Many health care providers perceive major incidents to be extremely rare events. It is therefore not surprising that major incident planning has been accorded a low priority. If incidents are perceived as rare then emergency planners and health service staff may become complacent. It is perhaps no surprise that the most active time for major incident planning appears to be the period immediately after an incident has occurred, which is too late.

In order to examine the real need for major incident planning in Britain a 31-year review of major incidents occurring between 1968 and 1999 was conducted. In this study a major incident was considered to have occurred when 25 or more people had attended hospital, more than 20 had attended of whom 6 or more had suffered serious injury (ITU admission or multiple injuries) or when a major incident was known to have been declared by the ambulance service or receiving hospital. A total of 115 major incidents were identified. Although major incidents are perceived as rare the overall incidence over this period was 3–4 major incidents per year. However, for many years the data were incomplete. In recent years data are more reliable and an estimate of 4–5 major incidents occurred per year in years when data collection is known to have been good.

There are approximately 200 Emergency Departments in Britain. Any could receive casualties from a major incident. It follows that each hospital would expect a major incident every 28–30 years. However, as the majority of major incidents occur in population centres or along lines of mass transportation, hospitals in urban conurbations may expect a higher incidence. In addition, it is rare for only a single hospital to respond to a major incident (particularly in urban centres). The true estimate for any individual hospital is therefore difficult to calculate but an estimate of one every 10 years for urban hospitals would appear reasonable, with a lesser incidence in more rural settings.

Local Highlights: Number of major incidents per year

What type of major incidents occur?

The vast majority of incidents in the UK arise as the result of human activity. Incidents are usually characterised by a large number of people gathered together for work, travel

or leisure. Occasional incidents may result from deliberate terrorist attacks or from other forms of social disorder.

Although a wide variety of incidents occur they can be broadly subdivided into civil disorder (including terrorist incidents), industrial accidents, transportation accidents, sports stadium events and a variety of other miscellaneous types. In Britain between 1968 and 1996 63/108 (58%) incidents involved transportation accidents, 22/108 (20%) resulted from civil disturbances and industrial accidents account for 15/108 (16%). Sports stadium and other miscellaneous incidents comprise the remaining 6%. All these types of major incident are likely to be encountered again.

Transport related incidents form the majority of incidents occurring in the UK, with rail crashes being the single largest cause. Surprisingly, air crashes, although perceived as a common cause, rarely result in major incidents. This is because they result in a large number of deaths, but few survivors. Many major incident plans and exercises are tailored to receiving casualties from air crashes. Planners should look in particular at the response to all other forms of major incident when formulating plans.

Local Highlights: Types of major incident

How many patients should we plan for?

There appears to be no clear consensus as to how to predict the number of casualties. A variety of estimates for major incident plans have been made previously; some of these have been extremely unrealistic.

There are several aspects to consider when estimating the expected patient workload. First, the total number of casualties requiring medical attention is important as they will need to be processed and treated by the health services. Second, an estimate of the likely number of patients with injuries severe enough to warrant hospital admission, surgery, intensive care or specialist services would be useful.

Although the next major incident is unlikely to exactly replicate a previous one, an examination of past incidents can guide emergency planners as to the expected number of casualties that may result from major incidents. Figure 1.1 shows the total number of casualties in British major incidents.

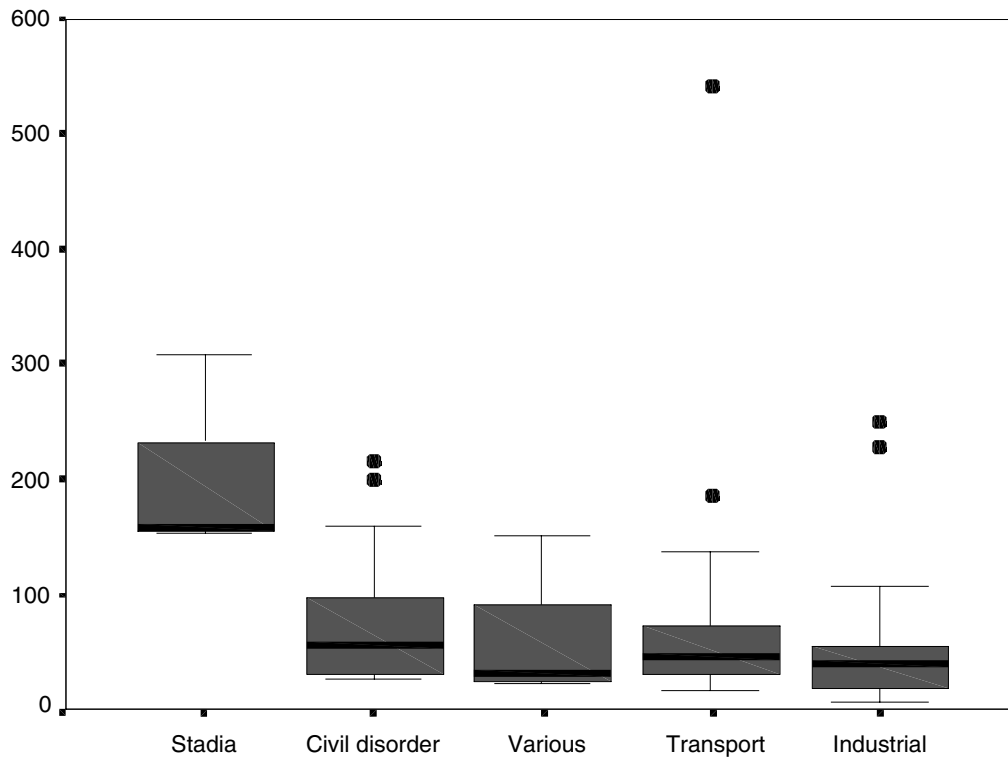


Figure 1.1. Box plot of number of casualties by type of incident (median, interquartile ranges, 95% confidence intervals and outliers 1968–1999)

The majority of major incidents result in fewer than 100 casualties. It is therefore reasonable for emergency planners to ensure that their major incident plans are capable of receiving this number of casualties. The exception to this is the disproportionately large number of casualties seen in stadia related incidents when emergency planners might be expected to plan for up to 200 casualties.

Local Highlights: Number of casualties per major incident

It is useful to look more closely at the number of live casualties, and in particular the number of casualties requiring admission to hospital. In 75 of the incidents studied between 1968 and 1996 it was possible to differentiate casualties into serious and minor. Serious casualties were those requiring admission to hospital, while minor were those treated and allowed home. It is clear that, on average, the number of casualties with minor injuries is at least twice that of those seriously injured.

For hospital planners an estimate of the number of patients requiring admission is useful. Figure 1.2 shows the range of seriously injured casualties seen in different types of incident.

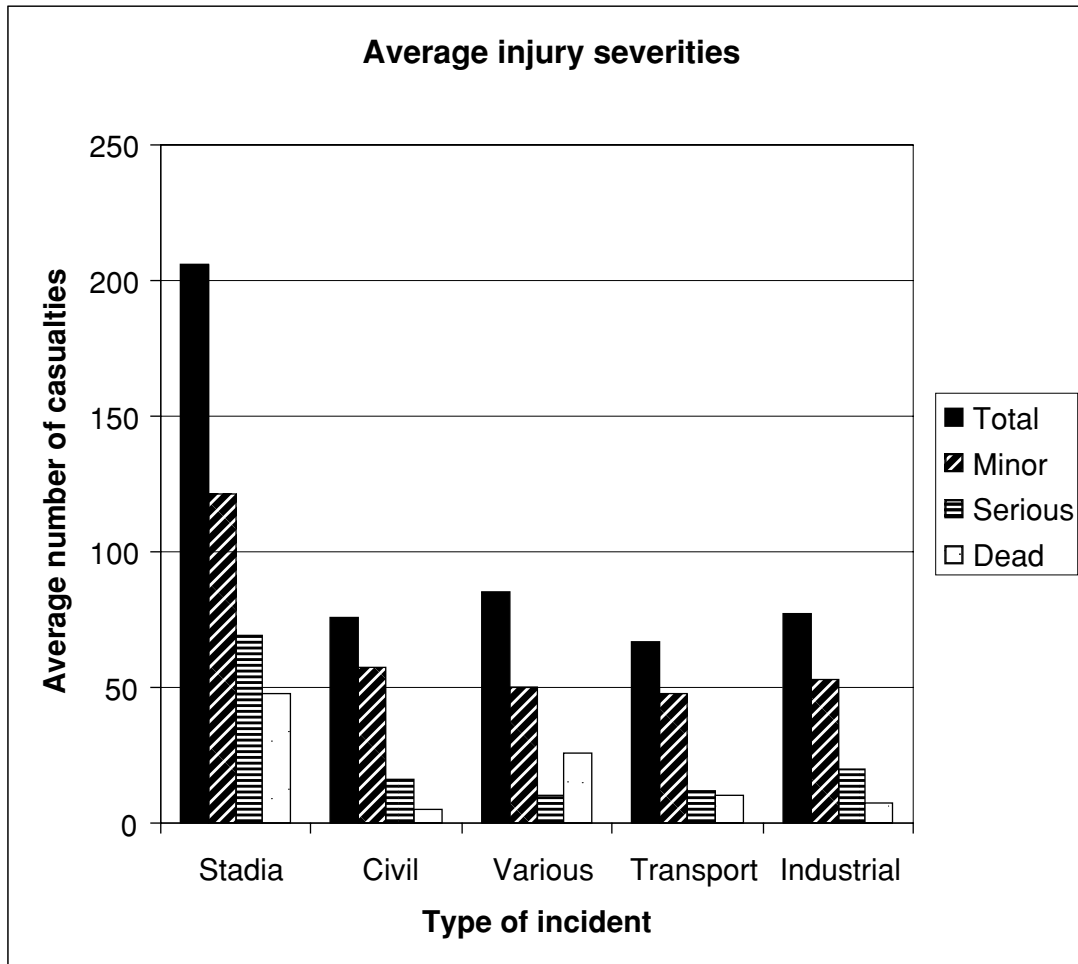


Figure 1.2. Box plot of casualty admissions by type

Local Highlights: Number of serious casualties per major incident

These data suggest that hospitals in the UK should have major incident procedures that allow them to admit up to 40 patients for the majority of incidents. This equates to an average of two wards. Again, the exception is in sports stadium incidents where hospitals should prepare to admit up to 100 patients. Clearly very few hospitals could receive and optimally treat the number of patients seen in sports stadium incidents on their own. Therefore major incident plans for stadium incidents should include a multi-hospital response wherever possible.

Unfortunately, no data exist to suggest the need for surgical, intensive care or specialist services. Empirically it would appear reasonable that hospitals might plan to be able to receive and treat five multiply injured or severely ill casualties.

SUMMARY

- The definition and classification of major incidents must include an appreciation of the number, type and location of the casualties.
- Particular types of major incident may require the mobilisation of specialist resources.
- Emergency planners can learn from examining previous major incidents occurring in their country.
- In the UK, hospital major incident plans should be designed to receive up to 100 casualties, and to admit 40 of them.
- Hospitals close to stadia (or other mass gatherings) should plan to receive up to 200 casualties and admit 100 of them. The latter will almost always require a multi-hospital response.

CHAPTER 2

Are we ready for the next major incident?

'To fail to plan is to plan to fail'

INTRODUCTION

In Chapter 1 we demonstrated that, in the UK at least, major incidents occur with sufficient frequency that it is important for health services to be prepared for them. In the UK the Department of Health (DH) issues guidance on plan contents and the planning doctrine. The guidance states that all hospitals with a 24-hour Emergency Department (ED) are required to have a regularly updated, exercised plan to deal with major incidents.

Local Highlights: Planning guidance

Unfortunately, the perceived rarity of major incidents has resulted in major incident planning being accorded a very low priority. Until recently the standard of hospital and pre-hospital planning for major incidents was unknown as there were few checks or regulations made on the content of plans.

This chapter examines the current state of planning for major incidents, using the UK as an example.

HOSPITAL PREPARATION FOR MAJOR INCIDENTS

A good hospital major incident plan is a key component of the major incident response. It has been suggested, however, that hospital major incident planning often receives a low priority among clinicians who appear to maintain an 'it will never happen to me' attitude. Major incident plans are extremely variable in terms of their comprehensiveness and

methods. This is probably because the majority of major incident plans are formulated locally by a committee based within hospitals.

Comprehensive plans should be in place for all health service responders to an incident. Particular emphasis should be placed on the hospital response and in particular on the hospital major incident plan.

In 1996 a survey examined 142 plans from the 224 hospitals in the UK that could have potentially received casualties from a major incident. The findings of this study are summarised in Table 2.1. The investigators examined the plans to see if they met with specific aspects of national guidance issued several years previously.

Table 2.1. Major incident planning in England (1996)

Aspect of planning	Compliance in 142 analysed plans
Use of action cards	Action cards were used for staff in 83.5% hospital plans. In only 45.8% were cards available for all staff likely to be involved in the response. Members of the <i>Hospital Co-ordination Team</i> had cards in 74.6% plans
Standard Alerting messages	Only 47.2% plans used the standard messages, a selection of the alternative messages were in use
Identity of Triage Officer	When specified the <i>Triage Officer</i> was a consultant in 69% plans. The identity of the <i>Triage Officer</i> was not specified in 7.7% plans
Press	93%
Police	88.7%
Reception of relatives	86.6%
Volunteers	73.9%
Ambulance Liaison Officer	68.3%
Traffic flow	55.6%
Paediatric casualties	31%
VIP visits	24.6%
Staff reporting procedures	In 8.5% plans all staff were informed to attend the ED. In 37.3% of plans no area was specified
Provision of a Medical Incident Officer (MIO)	The MIO was a consultant in 55.6% cases, a junior doctor in 5.6%, an immediate care doctor in 19% and not specified in 19%. An MIO from a trauma-aware speciality (emergency medicine, surgery, anaesthetics and immediate care) was specified in 62% plans. The identity of the MIO was not specified in 20.4% plans
Provision of mobile medical teams (MMT)	A consultant led the MMT in only 16.9% plans. Teams were led by junior doctors (registrar or below) in 41% plans. Many plans (31%) did not specify the composition of the <i>Mobile Medical Teams</i> . Immediate care schemes supplied the MMT in 7.7% plans. 11.6% of teams in total used Senior House Officers and 41% registrars

National Audit Office Reports

In 2002 the National Audit Office published a report entitled ‘Facing the Challenge: NHS Emergency Planning in England’. The report was timely, being published after the terrorist atrocities in New York on 11th September 2001.

Whilst using different methodologies from the 1996 study the report concluded that although there were areas of excellent practice with regard to major incident planning in England, there were also serious deficiencies. They noted deficiencies in both the planning and testing of major incident plans both in respect of existing and emerging threats. Following 9/11 they noted an improvement in the awareness of major incident planning amongst health authorities though there was still scope to improve coordination between the emergency services. A third of the health authorities did not test the plans at the required frequency and a fifth felt that testing was ineffective.

With regard to major incident plans, only 60% had been assessed and the quality of those plans was not known. It is of particular importance that when the self-reported planning was compared against actual site visits by the auditors, it was found that written submissions had overestimated the preparedness of trusts. A number of deficiencies with regard to communication training and media handling were also discovered.

Acute trusts were recommended to examine their communication procedures, inter-agency liaison, training and major incident plans.

CONCLUSIONS

What is clear from both these studies is that the actual level of preparedness could be significantly improved. It is also of note that neither the study from 1996 nor the events of 11th September made dramatic differences to the level of planning in England.

One of the aims of this book is to produce a universally applicable framework for all hospital major incident planners. The benefits of such a system are self-evident. In the UK and abroad there are certainly areas of excellent practice and we have included as many of these as possible.

SUMMARY

- The present preparation for major incidents in most hospitals is poor.
- Few hospital major incident plans conformed to guidance.
- Planning for the despatch of qualified personnel from hospital to the scene of a major incident is flawed.

CHAPTER
3

The structured approach to the hospital response

INTRODUCTION

A structured response to major incidents should be adopted by all members of the health services involved both within and without the hospital. This approach is encapsulated in seven key principles (Box 3.1). The generic nature of these principles has been shown to cross inter-service boundaries, civilian–military boundaries and international boundaries.

Box 3.1 Management and Support Principles

Command
Safety
Communication
Assessment
Triage
Treatment
Transport

This is the ‘ABC’ of major incident medical management. CSCA are the management parts of the response, while TTT represents the medical support that is provided.

Command

One of the major differences between day-to-day hospital operations and hospital major incident response is the need for a clear command structure. This not only helps deliver the hospital response effectively but also provides an unambiguous point of contact for outside agencies. The command and control structures are dealt with in detail in Chapters 7–10.

Local Highlights: Hospital command and control structure

Safety

The staff involved in a major incident response should always remember the 1-2-3 of safety shown in Box 3.2. While hospital staff might suppose that they are working in a safe environment the possibility of hazards being imported is high, and the arrival of a large number of casualties and staff can itself create risk, or cause risks that have arisen to go unnoticed.

Box 3.2 The 1-2-3 of Safety

1. Staff
2. Situation
3. Survivors

The precedence of staff over survivors may seem harsh—but it is only by protecting those with clinical skills, and the environment in which these skills can be practiced, that any care at all can be given to the patients.

Local Highlights: Hospital safety

Communication

Communication failures frequently occur between the scene and hospital, and within the hospital itself. These failures occur at all levels and both between and within services. It is essential, therefore, that communication procedures (for instance those for call-in, management of the incident and the inter-service liaison) are planned and tested. Furthermore, it is important that predictable failures (for instance overwhelming call volume freezing the hospital switchboard) are recognised and solutions are identified before the plan is activated. These issues are discussed in Chapter 5 while others are discussed in Chapters 11, 12 and 14.

Assessment

A rapid assessment of the situation to estimate the size and severity of the casualty load is essential. The information gathered is used to determine the initial medical response. It does not have to be completely accurate, and will be refined as the incident evolves. Continuing assessment will relate to the hazards that arise and the adequacy of medical resources (the right people, with the right skills and equipment to treat the casualties).

Triage. This is the sorting of casualties into priorities for treatment. The process is dynamic (priorities may alter after treatment, or while waiting for treatment) and it must be repeated at every stage to detect change. Simple, effective systems for triage are described in Chapter 13.

Treatment. The aim of treatment at a major incident is to “do the most for the most”, that is to identify and treat the salvageable. The actual treatment delivered will reflect the skills of the providers, the severity of the injuries, and the time and resources available. The casualty load and the availability of skills and equipment may restrict a provider’s ability to perform to best practice standards. A key principle here is to use staff to provide the treatments that most match those of their day-to-day practice.

Transport. Although the majority of seriously injured patients will arrive at hospital by an emergency ambulance, the emergency department must be prepared to process patients arriving via their own or unconventional transport (e.g. bus). In urban areas it is likely that the first people arriving at hospital will be priority 3 patients arriving by non-emergency ambulance means.

The principles of CSCATTT need to be applied to the phases of the hospital major incident response discussed below.

THE PHASES OF THE HOSPITAL MAJOR INCIDENT RESPONSE

A major incident may be considered to have a series of phases.

- Pre-hospital
- Reception
- Definitive care
- Recovery

Pre-hospital

Detailed descriptions of the pre-hospital phases of a major incident are beyond the scope of this book and are covered elsewhere (*MIMMS: the practical approach at the scene*). Hospital involvement in the pre-hospital phase is generally confined to the provision of a *Medical Commander* or *Mobile Medical Team*. If possible, the hospital receiving serious casualties from a major incident should not provide staff for these important pre-hospital roles, as the same individuals will usually be required to provide the hospital response.

Individuals who may be tasked to go to the scene as an MC or MMT must be specifically trained in these roles. Training should include taught courses and prior contact with the other emergency services during major incident exercises.

Reception

During this phase the hospital must be prepared for its clinical and administrative functions and the casualties themselves must be received. Usually, the reception phase lasts hours, but it may last days in very protracted incidents. It is likely to be the most chaotic part of the response. Depending on the type of incident, casualties may arrive by a number of means (including self-evacuation) and in no particular order. Minor casualties may present before the seriously injured if the seriously injured are entrapped.

The plan must ensure that this phase of the response is robust, and that appropriate casualties and appropriate staff are channelled into and out of the correct areas in the correct order.

Preparation of the hospital

The degree of preparation possible depends on the length of time between the alerting message and the arrival of casualties. In some major incidents there may be no time gap between these two events and preparation may occur at the same time as casualty care.

Preparation involves the allocation of staff and resources to clinical areas as controlled by the *Senior Nurse* and deputies. In addition, control of traffic flow and access to the hospital site is the responsibility of the security staff. Subsequent preparation of non-clinical areas is the responsibility of the *Senior Manager* and deputies.

The major incident response will require the allocation of areas of the hospital to new roles. These may be clinical areas (e.g. the physio gym becomes a body holding area) or administrative (the conference room becomes a press briefing area). These areas may remain in those roles for the duration of the major incident. Priority should be given to the preparation of those areas needed in the early stages of the major incident response. These will be the reception areas in the Emergency Department (ED) and the staff reporting area, followed by theatres and intensive care. This is illustrated in more detail in Chapter 12.

Box 3.3 Key Clinical and Administrative Areas Requiring Early Preparation

Clinical

- Reception area (Emergency Department)
- Staff reporting area
- Theatres
- ITU
- Wards
- Body holding area

Administrative

- Hospital Coordination centre
- Hospital Information centre
- Discharge/reunion area
- Press area

Management

An overall view of the response to a major incident is vital if care is to be efficiently organised. This task is achieved by the *Hospital Coordination Team* (HCT). This team must be set up as soon as the major incident plan is activated. It consists of the *Medical Coordinator*, *Senior Nurse*, *Senior Manager* and *Senior Emergency Physician* (Figure 3.1).

The *Medical Coordinator* is usually a senior doctor (but may be a senior nurse or manager) whose responsibility is to maintain an overview of the incident response. They are not involved in direct patient care. The *Medical Coordinator* is assisted by the *Senior Emergency Physician* who is in charge of the reception area, the *Senior Nurse* who controls nursing provision and the preparation of the clinical areas and the *Senior Manager* who oversees the provision of support services and dealings with relatives and the press. Each member of the HCT oversees a number of other key staff.

It is important to establish control from an early stage of a major incident. The collapsible hierarchies explained in Chapter 7 illustrate how the key clinical appointments can be made early in a major incident. As more senior staff arrive the command and control structure will develop as roles are handed on to more senior staff and subsidiary roles are filled. Initially, quite junior staff may be placed in charge of clinical areas until

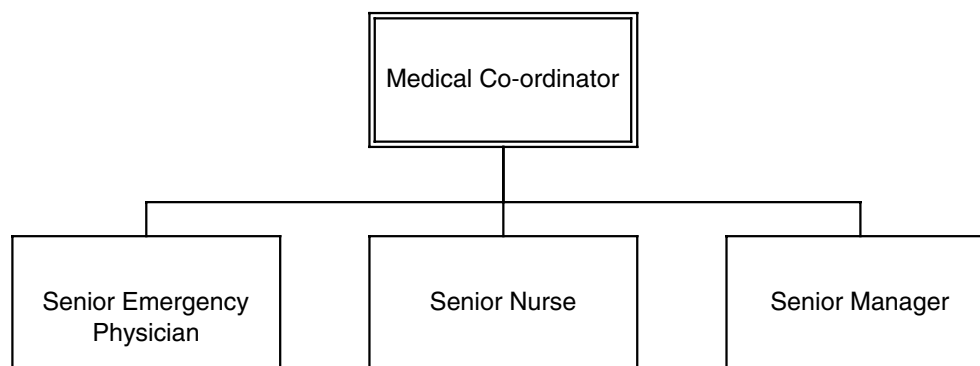


Figure 3.1. Hospital coordination team

further help arrives. Their actions must be explicit on the relevant action card. This is discussed in more detail in Chapters 4 and 11.

Adequate administrative and support staffing is essential. Patients must have some form of irremovable identification attached at triage on first arriving at the hospital. This will usually consist of a pre-prepared major incident identifying bracelet and blank notes prepared with the same number. Full administrative details should not be gathered at this stage as a bottleneck will occur. If pre-prepared notes are issued from a single point (the triage area) and all patients from the incident pass through that point, then a running tally of patients can be obtained merely by seeing how many sets of notes have been issued. A simple register of numbers can be passed to the hospital information centre and the details obtained by the clerks can be collated there. This system needs to be run in parallel with that of the Police Casualty Documentation Team to avoid needless duplication of tasks.

Accurate administrative documentation of casualties is a considerable challenge during a major incident response and is of great importance. Clinical notes need to be matched to patients in the pandemonium of the reception areas, names of patients need to be collated for reference and for information purposes, lines of communication with the Police Casualty Documentation Team (and thereby the casualty bureau) need to be set up, and note folders need to be generated. All this needs to be done without significantly slowing down the clinical care of patients. A *Senior Admissions Officer* must oversee all the documentation and will need the assistance of a considerable number of clerks if the documentation is to be processed quickly and efficiently.

Property is not only of personal value to casualties but may be of considerable value to the police. It is essential for both these reasons that a robust storage and identification system comes into play. This will usually involve pre-numbered bags matching the casualty identification system.

Support

All casualties will be met at the door of the ED by a *Triage Officer* and will be triaged (Chapter 13).

After triage patients are moved to part of the reception area (which may or may not be in the ED, depending on its size), where reassessment and treatment take place, *Treatment Teams*, undertake this task. Maintenance of an overall view of the incident response is essential if the optimal matching of patient load and clinical resource is to be managed. Senior supervision should be instituted as soon as they arrive and is necessary in all patient care areas. In the reception area it should be available both from a senior surgeon (to establish trauma and operative priority) and from a senior physician or intensivist.

Staff attending the reporting area should be formed into teams of appropriate skill mix. The teams are then sent to clinical areas depending on patient needs and numbers. The team system requires the team leader to report to the relevant senior officer as problems occur.

During the reception phase it is likely that the majority of casualties will complete clinical care and will subsequently be discharged home from the receiving areas.

Transfers from the receiving areas will take place at different stages of treatment and for different reasons. Some of those with minor injuries will be able to proceed on their own steam to the discharge and reunion area. Some of those with the most severe injuries may have to be moved immediately to an operating theatre, while pressure on scarce resources may mean that others have to be moved during resuscitation to areas such as Pre-Op and ITU where their treatment can continue. Some may have to be moved to the mortuary. It is essential that, with so many patient movements occurring, records of destinations are carefully kept, and that the hospital information centre is fully informed.

The reception phase is considered in great detail in Chapter 12.

Definitive care

In terms of the hospital response, all treatment given after casualties have passed through the receiving areas is considered to occur during the definitive care phase. This distinction is somewhat arbitrary as for some casualties (usually those requiring life-saving treatment) there is a continuum between procedures started during reception/immediate treatment and definitive care. For others, no immediate treatment will be necessary but the definitive care phase may last for weeks or even months depending on the injuries sustained.

The coordination of patients admitted to hospital for definitive care may be required for days or weeks. Initially, the principal problems of the in-patient phase will be the provision of surgical and intensive care services. The *Senior Surgeon* and *Senior Physician* play an essential role during these phases and are overseen by the *Hospital Coordination Team*. As time passes more usual management systems will be re-established.

Planning for how care is to be delivered during the definitive care phase is vital. Unfortunately it is not possible to predict in advance exactly what resources will be needed. Although many major incident plans are geared towards the care of surgical patients this is an oversight, as many incidents result in medical cases requiring care. Furthermore, critical care provision is often crucial to the overall delivery of care, and this must, therefore, be planned for in advance.

The definitive care phase is dealt with in detail in Chapter 14.

Recovery

The *Medical Coordinator* will decide the phasing of the stand down of the hospital medical response, and will inform the staff accordingly. It is likely that extraordinary activity will continue for some days after the reception phase has finished, and decisions about stand down and rostering of staff should be taken with this in mind.

Once this occurs all remaining operational issues need to be resolved and normal services restored. This will occur at the same time as reflection which involves the care of the psychological well-being of patients and the staff. Finally, audit (and possibly inquiry) must occur.

Recovery is discussed in more detail in Chapter 15.

SUMMARY

- The hospital major incident response is complex and is designed to deliver the best possible care to the maximum number of patients. The seven principles should be followed.
- All services within the hospital will be involved in the response which are divided into pre-hospital, reception, definitive care and recovery phases.
- Due to the complexity of the plan individuals are unlikely to be familiar with all aspects of it, and should therefore follow the appropriate action card.

PART
II

PREPARATION

CHAPTER
4

Planning for major incidents

PLANNING

Major incidents are rare and the health service response cannot be based on the experience of the staff involved. Planning is therefore of prime importance in ensuring that the skills and resources available are used to maximum advantage.

General principles

When writing a plan it is tempting to try to include a plan for every person and for every eventuality. However, before any planning is undertaken it is important that the general scope and aims of the plan are defined. Essentially, these are very simple. A good plan will ensure that the right people arrive in the right place at the right time, and that once there they can perform the correct job.

A major incident plan should guide individuals and organisations along general principles. Overly detailed descriptions of individuals' roles will not be practicable and are often unnecessary. For example, detailed instructions on specialised tasks will be ignored by those who already have the appropriate skills and not understood by those who do not. Thus, part of the planning process is the selection of appropriate staff. For staff with specific roles unique to the major incident response further training will be required prior to the plan activation (training issues are addressed in Chapter 6).

The major incident plan must address all parts of the response. It must deal with initial notification to final debrief. Ideally the plan should reflect the different phases of the major incident response. Staff under pressure must be able to easily assimilate the content of the plan. These two principles (comprehensiveness and comprehensibility) are to some degree incompatible; a large comprehensive plan is not easy to assimilate quickly, and a small plan will not cover all aspects of the response. This apparent dichotomy is overcome by giving all staff an overview of the response so that they know where they fit into the organisation whilst also giving specific tasks to individuals (e.g. through the use of action cards).

Specific aims

The general principles of planning are very simple. However, this does not mean that the plan itself will be simple. In order to achieve the final aim—allowing the staff to do the correct job—quite complex structures need to be put in place.

The structure of the major incident plan (and its subsequent response) can be addressed under the following headings:

- Command and control
- Communications
- Key staff selection
- Key staff tasking
- Team definition
- Key area selection
- Infrastructure

Planning advice is available from a variety of sources. The Department of Health (DH) in the UK has produced a series of guides for pre-hospital and hospital care to assist planners. The DH guidance is generic and does not address the specific roles within the hospital response. The HMIMMS manual and course provides further advice on how to integrate the principles of planning into practice.

Local Highlights: National guidelines

IN-HOSPITAL PLANS

Command and control

Very few staff will have prior experience of a major incident and will require direction if they are to work well. An incident command and control structure is important to achieve this. The overall hospital response is coordinated by the *Hospital Coordination Team* (HCT). Headed by the *Medical Coordinator*, the HCT allows control of all medical, nursing and administrative tasks within the hospital.

The structure is based upon the clinical, nursing and managerial hierarchies described in Chapters 8–10.

Communications

Poor communications are the most common failing in major incidents. There must be a robust system to handle the notification and activating procedures at the hospital. This is dealt with in detail in Chapter 11.

During the incident itself it may be difficult to communicate between departments, and individuals and patients may be lost within the system. All major incident plans must therefore have a documentation system pre-prepared to cope with this.

Key staff selection

In an ideal situation the major incident response would instantly produce the most experienced staff in the hospital. This will rarely be the case, particularly at night and

weekends. The plan should therefore take account of this and identify persons to key roles in a generic fashion. It is essential to link major incident roles to either resident or on-call post holders rather than specific individuals.

Key staff tasking

Few individuals are interested enough or mad enough to read and remember the whole of the major incident plan. An aide memoir is therefore needed. This takes the form of an action card which must be available to all those likely to be involved in the major incident response. The action card should state the roles of the individuals, their positions within the relevant hierarchy and the basic information needed for them to carry out their major incident roles.

As described in Chapter 7, in the initial stages it may be necessary for relatively junior staff to undertake command roles. Those roles will be handed over as more senior staff arrive at the hospital.

Team definition

For optimal casualty care medical and nursing staff will need to form teams. The allocation to these teams should be done by a senior member of staff undertaking the role of *Team Coordinator*. Additional information on team formation will be carried on the action cards of the relevant individuals. Action cards must be available for all teams with specific roles in the major incident response.

Key area selection

A major incident will require the environment of the hospital to change. Certain areas may need to expand to accommodate patient numbers. Typically the Emergency Department (ED) may use an adjacent area for priority 3 casualties, and critical care may expand into theatre recovery. High demand areas like ITU and the ED should plan in advance how they might increase their capacity (Table 4.1).

Table 4.1. Key area selection

Area	Staffing	Characteristic
Staff reporting area	Team Coordinator	Near to the emergency department. Easy access from outside of hospital. Major incident phone ^a
Discharge/reunion area	Senior nursing staff WRVS	Separated from press and general public. Route out to avoid press. Major incident phone
Body holding area	Pathology staff	Large area. Close to ED. No access to press or public (e.g. gym)
Hospital Control Room	Hospital Coordination Team, clerks	Next to or within ED. Good communications. Access to phone and fax
Volunteer reporting	Volunteer Coordinator	Near hospital entrance. Major incident phone
Hospital Enquiry Point	Enquiries Officer	Near discharge/reunion area. Major incident phone

Continued

Table 4.1. Key area selection (*Continued*)

Area	Staffing	Characteristic
Press area	Press Officer	Space to hold news conference
Emergency blood donation	Blood transfusion service staff	Arrange location with local BTS (may not be in hospital)
Relatives area	Relatives Officer	Refreshments. Major incident phone

^aMajor incident phone is one that will work during the incident.

Wards that are to be used during the incident should be pre-designated so that staff on those wards become familiar with their roles and responsibilities.

Other areas may only exist for the duration of the incident itself. These should be identified in the major incident plan together with a system for their designation and staffing.

Infrastructure

The response will fail if there are inadequate facilities to provide care for patients and staff. Part of the planning process is to look at what services are needed to support the clinical response and to assess their adequacy in a major incident scenario. Examples of areas where planning for changes to the hospital infrastructure may be needed are shown in Table 4.2.

Table 4.2. Examples of areas where planning for changes to the hospital infrastructure may be needed

Area	Example
Catering	Increased catering supply to different areas
Laundry	Increased laundry use in different hospital areas
Supply of clinical equipment	Resupply the ED when all consumables have been used
Supply of non-clinical equipment	Supply of traffic cones to security
Supply of specialist equipment	Obtain more portable ventilators
Crèche	Childcare for staff called in from home

SUMMARY

- Planning is essential if a major incident plan is to run well.
- The information in this manual should aid planners in constructing a comprehensive, but workable major incident plan.

CHAPTER 5

Major incident equipment

INTRODUCTION

In just the same way as major incident response requires special arrangements to be put in place for staffing, special arrangements must also be made to make sure that clinicians and managers have the equipment they require.

Some of this equipment relates to the special circumstances that apply—for instance personal protective equipment for pre-hospital teams or antidotes in hazardous chemical incidents, while some is required because of the larger number of patients involved. Whatever the reason for need it is important that systems are in place to ensure that whatever is needed is available in timely fashion.

In this chapter equipment for major incident response, staff protection, clinical care and communications is considered.

MAJOR INCIDENT RESPONSE

The major incident response itself requires some special equipment if it is to be implemented effectively. This mostly involves equipment to enable good incident management. Thus major incident documentation should be available as should property bags. Provision should be made for tabards and badges to identify staff and staff functions. White boards or other means of recording information in the Hospital Information Centre and Hospital Enquiry Point may need to be provided. Other equipment required for good communication is dealt with later.

STAFF PROTECTION

Personal protective equipment is necessary for hospital staff involved in the pre-hospital response. This is dealt with in detail in *MIMMS: the practical approach at the scene*. It must be available in sufficient size options.

For staff working within the hospital universal precautions generally suffice—although casualties covered in debris may require clinicians to wear heavy duty gloves.

Hazardous material incidents are discussed in Chapter 16.

CLINICAL CARE

Special arrangements for the provision and resupply of clinical equipment will be necessary in the pre-hospital and reception phases, and, to a lesser degree, during definitive care.

Pre-hospital phase. Again, this is dealt with in detail in *MIMMS: the practical approach at the scene*. The principles are that equipment must be modular, and that equipment supplied by hospital staff should complement rather than duplicate that provided by the ambulance service. *Mobile Surgical Teams* need to ensure they carry all the instruments they require as there is no other source outside hospital.

Reception phase. There are two reasons for special equipment provision during the reception phase. First, it is usually necessary to commandeer new areas for patient treatment (commonly for minor cases). These areas are unlikely to be equipped for this purpose, and plans must ensure that easily transportable extra equipment (commonly in luggable boxes) is available immediately. Second, the use of ‘just in time’ resupply principles in hospitals means that disposable items may run out if unusual patient loads occur. Plans must acknowledge this potential problem and put in place potential solutions. One such solution is to agree major incident loading lists and delivery times with suppliers (in the UK with NHS Logistics). The tables below show the equipment resupply necessary for 50 minor cases and 25 major cases respectively. A similar supplementary list for 10 paediatric casualties is shown in Chapter 18.

Local Highlights: Disposable item supply

Table 5.1. Resupply picklist for disposable equipment needs per 50 minor cases

BubbleTub	30m	1	Paratulle	40m	5
SucTubing (5)	30m	1	Velband 7.5	Box (12)	10
OxTubing (3)	30m	1	Velband 15	Box (12)	8
DispGownGreen	Packet (100)	2	Collar/Cuff	Box	5
PtExamGown	Packet (100)	1	Stethoscope	Each	10
POPRoll 7.5	Box (12)	10	Penlight	Each	10
POPRoll 15	Box (12)	10	Scalpel 15	Box (10)	5
POPSlab 10	Box	2	Scalpel 23	Box (10)	5
POPSlab15	Box	2	BurnBin	Each	5
Crepe 7.5	Each	100	Venflon 18	Box (50)	2
Crepe 10	Each	100	Gloves (StSm)	Pair	150
Kling 7.5	Each	100	Gloves (StM)	Pair	150
Kling 15	Each	100	Gloves (StL)	Pair	150
TriSling	Packet (12)	5	Gloves (NStSm)	Box (100)	5
TubigripB	Box (10m)	5	Gloves (NStM)	Box (100)	5
TubigripC	Box (10m)	5	Gloves (NStL)	Box (100)	5
TubigripD	Box (10m)	5	Tourniquets	Each	15
TubigripE	Box (10m)	5	Yankauer	Each	50
TubigripF	Box (10m)	5	Syringe 2	Box (100)	5
TubigripG	Box (10m)	5	Syringe 5	Box (100)	5
Stockette 7.5	Box (20m)	3	Syringe 10	Box (100)	5

Table 5.1. Resupply picklist for disposable equipment needs per 50 minor cases (*Continued*)

Stockette 15	Box (20m)	3	Syringe 20	Box (100)	5
Tubigauze 01	Roll	3	Jumbo Toilepaper	Each	10
Transpore 1.25	Box (24)	2	Clipboard	Each	20
Transpore 2.5	Box (12)	2	Clingfilm	Roll	2
Mefix 5	Roll (10m)	3	IncoPads	Box (50)	1
Mefix 10	Roll (10m)	3	Pens: black	Pen	100
Bandaid 3.8	Box (100)	3	Pens: red	Pen	50
Melolite 5	Packet (100)	5	A1 Flip Chart	Each	1
Melolite 10	Packet (100)	5	Pink Photopap	Ream	4
Steristr	Box (50)	3	Velband 7.5	Box (12)	10

Table 5.2. Resupply picklist for disposable equipment needs per 25 major cases

Chestdrain	Box (10)	1	Venflon16	Box (50)	2
Giving Sets	Box (10)	5	Sucker (Flex10)	Each	30
OxTubing (3)	30m	5	Sucker (Flex12)	Each	30
POPSlab 10	Box	1	Sucker (Flex14)	Each	30
POPSlab 15	Box	1	Catheter 12	Each	10
Crepe 10	Each	25	Catheter 14	Each	10
Domette 15	Roll (5m)	3	Catheter 16	Each	10
Transpore 1.25	Box (24)	1	Catheter 18	Each	10
Transpore 2.5	Box (12)	2	SwivConn	Packet (10)	2
Velband 7.5	Box (12)	8	Ultipor SQ405	Packet (6)	5
Velband 15	Box (12)	4	Gloves (StSm)	Pair	50
TractKit (Ad)	Each	15	Gloves (StM)	Pair	50
Collar/Cuff	Box	3	Gloves (StL)	Pair	50
Airway 2	Airway	25	Gloves (NStSm)	Box (100)	2
Airway 3	Airway	25	Gloves (NStM)	Box (100)	2
Airway 4	Airway	25	Gloves (NStL)	Box (100)	2
OxMask (Ad)	Mask	25	Tap3Way	Each	10
Nebulisers	Each	25	ABGSyr	Each	50
ETT 7	Tube	20	Tourniquets	Each	5
ETT 7.5	Tube	20	NGT14	Tube	15
ETT 8	Tube	20	NGT18	Tube	15
ETT 8.5	Tube	20	Yankauer	Tube	25
ETT 9	Tube	20	Syringe 2	Box (100)	1
DefibPads	Pairs	10	Syringe 5	Box (100)	1
ECGElectr	Bag (25)	2	Syringe 10	Box (100)	1
Stethoscope	Each	5	Syringe 20	Box (100)	1
Penlight	Each	5	CentLin 16	Each	10
Scalpel 15	Box (10)	2	PerDialCath	Each	10
Scalpel 23	Box (10)	2	Clipboard	Each	10
CathBags	Each	50	Clingfilm	Roll	2
BurnBin	Each	2	Tissues	Box	10
Venflon 20	Box (50)	1	Pens: black	Each	25
Venflon 18	Box (50)	1	Pens: red	Each	25

While it is necessary to have potential solutions in place, the reality is that with many Emergency Departments seeing 200–400 patients in a normal day—the average major incident load (see Chapter 1) is unlikely to cause significant immediate shortages. Resupply is necessary to ensure business continuity.

Definitive care phase. As is the case with management arrangements and staffing, equipment supply and resupply during the definitive care phase is likely to use more day-to-day solutions. Thus the supplies department is likely to use normal contacts to gain supply of exceptional requirements (such as additional external fixators). It is only in moderate to severe incidents that local availability (i.e. within country) is likely to be limited. In these situations manufacturers and suppliers have shown themselves to be more than helpful in coming to solutions.

COMMUNICATIONS

Good communications are as vital for the successful operation of the hospital plan as they are for any other aspect of the major incident response. Both existing systems and special systems will be needed. The possibilities are listed below.

Box 5.1 Existing and Special Systems of Communication Required During a Major Incident Response

Existing systems

- Telephones via switchboard
- Telephones not via switchboard
- Payphones
- Cellular telephones
- Ambulance net radio
- Hospital radios (portering/security)

Special systems

- Major incident telephones
- Additional telephones from the service provider
- Emergency service radios
- Runners

Existing systems

Conventional telephones will form the backbone of the hospital communication system. Key staff will be notified by switchboard; other staff will be called from identified direct dial phones, and steps will be taken to ensure that staff use of the switchboard is minimised.

It is likely that there will be considerable pressure on the hospital switchboard as soon as the incident becomes public knowledge, and it is possible that even the most modern systems can become overloaded. Communications within the hospital will most probably be possible, but direct dial lines may fail in such circumstances. In the event of a switchboard failure there will usually be a backup facility, and the number of backup extensions should be included in the major incident directory. Telephones not routed via the hospital switchboard (both private exchange lines and pay phones) should be used

for outside calls wherever possible. Even these phones may fail if the volume of calls into the area is large enough to overload the service providers' exchanges.

Cellular phones

A number of cellular phones will be held by the hospital. These should be made available to senior key personnel if necessary. These phones should be programmed to work under access overload conditions.

Radios

Existing radio links between the Emergency Department (ED) and Ambulance control should be maintained; they will mostly be used by the Ambulance Liaison Officer, but can be used if warranted to provide direct communications with the scene.

Security and portering staff may well use UHF radios, and these can be used as necessary to facilitate all communications on site.

Special systems

Whenever possible special incident telephones should be provided in key areas and for senior key personnel as shown in Box 5.2. These can be provided either by renting dedicated lines separate from the main hospital switchboard, or by installing switching equipment to allow "commandeering" of the line once the incident plan is activated. The latter method involves low revenue cost (as the line rental is already being paid) and is therefore the preferred option.

Box 5.2 Key Personnel Requiring Access to Special Incident Telephones

Telephone

Medical Coordinator
 Senior Emergency Physician
 Senior Nurse
 Senior Manager
 Police Casualty Documentation Team
 Ambulance Liaison Officer
 Hospital Enquiry Point

Fax

Police Casualty Documentation Team
 Hospital Enquiry Point

It is worthwhile considering setting up special phone lines in the press area so as to encourage the press to use the facility. On no account should internal phones be available in this area since they may be abused.

The specially provided lines will be ex-directory and it is essential that a major incident directory is disseminated as soon as possible to those who need to know the numbers.

Should the incident become prolonged, service providers can be contacted to provide extra phones for the press and relatives as necessary. This will generally take at least 24 hours to arrange and is not therefore an option during the early part of the response when lines are probably busiest.

SUMMARY

- Special equipment will be necessary to enable an effective major incident response.
- Personal protective equipment will be needed for certain staff. This should be available and properly specified.
- Special arrangements for initial provision and resupply of clinical equipment and supplies may be needed during the pre-hospital, reception and definitive care phases.
- Communications equipment must be fit for purpose.

CHAPTER 6 Training

INTRODUCTION

Written plans are important, and are the cornerstone of the planning process, but if they forever remain on a shelf gathering dust, only to be opened when a major incident has occurred, they will fail. Training is therefore an integral part of major incident preparation. It should have two aims:

- To ensure that personnel know their role within the major incident response
- To ensure that the plan is feasible and will work

Traditionally major incident exercises have been fairly large-scale affairs, with simulated casualties and multi-agency involvement. Whilst these exercises may be very useful, they are expensive, difficult to organise and often fail to meet their aims. Training should concentrate on addressing those aspects of the plan that will be new during the major incident. For example, there is little point in asking consultant surgeons to describe how they would manage a wound as this is something they practice for real on a regular basis. It is however of benefit to ask the same surgeons how they would prioritise a group of patients for whom there is only limited surgical capacity.

The aspects of a major incident response which differ from day-to-day practice are command, control, communication and triage. These do need practice and are often overlooked in multi-agency simulations.

Training for these may involve education and/or exercises:

- Personal training
- Triage exercises
- Tabletop exercises
- Multi-agency exercises

Personal training

Wherever possible an individual's role within the major incident response should closely reflect their normal roles and responsibilities. If many new tasks are to be undertaken they will surely fail to be achieved as a major incident is not the time to learn new skills.

Certain roles within the major incident response will be fairly specific to the incident itself and therefore will require formalised personal training.

- Command and control in the hospital
- Command and control at the scene MC
- Mobile Medical Team
- Press/media training
- Triage

The need for this training should be identified in advance and individuals likely to fulfil these roles should be educated accordingly.

In the pre-hospital environment specific training courses exist to teach both the clinical and management skills required. All individuals required to undertake roles in the pre-hospital plan should be trained for their tasks. Table 6.1 below shows those courses specifically applicable to the pre-hospital setting.

Table 6.1. Pre-hospital training courses

Course	Content	Applicability
MIMMS ^a (Major Incident Medical Management and Support: the practical approach at the scene)	Management and delivery of the pre-hospital major response	Doctors Nurses Ambulance staff
PHTLS (pre-hospital trauma life support)	Clinical care of the pre-hospital trauma patient	Doctors Nurses Ambulance staff
PHEC (pre-hospital emergency care)	Clinical care in the pre-hospital environment	Doctors Nurses
PHPLS (pre-hospital paediatric life support)	Clinical care of children in the pre-hospital environment	Doctors Nurses Ambulance staff

^aAlso available as a one day team provider course.

In the hospital environment specific training courses exist to teach both the clinical and management skills required. All individuals required to undertake roles in the hospital plan should be trained for their tasks. Table 6.2 shows those courses specifically applicable to the hospital setting.

Table 6.2. In-hospital training courses

Course	Content	Applicability
HMIMMS ^a (Major Incident Medical Management and Support: the practical approach in the hospital)	Management and delivery of the hospital major incident	Doctors Nurses Management staff
ALS ^a (Advanced Life Support)	Cardiac resuscitation skills	Doctors Nurses
APLS ^a (Advanced Paediatric Life Support)	Clinical care of children in the hospital environment	Doctors Nurses
ATLS (Advanced Trauma Life Support)	Clinical Care of the Trauma Patient	Doctors
MedicALS	Care of patients with acute medical emergencies	Doctors

Continued

Table 6.2. In-hospital training courses (*Continued*)

Course	Content	Applicability
STaR (Safe Transfer & Retrieval)	Structured approach to transfers	Doctors Nurses ODPs
PNeo-STaR (Paediatric & Neonatal Safe Transfer & Retrieval)	Structured approach to the transfer of children and neonates	Doctors Nurses

^aAlso available as a one day team provider course.

Media training can often be organised within hospital trusts or health authorities.

Triage exercises

Triage during major incidents does differ from the methods used during normal working practice in the Emergency Department (ED). Specific training in initial major incident triage takes place on nurse led triage courses and in MIMMS. However, triage also takes place at later stages of the incident response, such as pre-operatively for specialist services, and for secondary transfer. Training for all aspects of triage may take place in two ways.

Paper triage exercise

Trainees are asked to triage a number of casualties having been given enough clinical information about each. This is best done by identifying whether the casualties are immediate, urgent, delayed, expectant or dead rather than by assigning a numerical order of intervention. This more closely resembles the situation in real life. Paper exercises can incorporate as much background information and incidental training as the instructors deem necessary. For instance, the command structure and layout of the hospital may be re-emphasised.

Dynamic triage exercise

A similar scenario to the paper exercise is used, but trainees are asked to respond as a group. This allows the discussion of triage decisions and an open appraisal of how the decisions may be achieved. This method may be used to get the group to place patients into triage categories and also to determine in which order patients should be treated within each group.

Tabletop exercises

A tabletop exercise is usually run in a small group. A scenario is described to the group and it is then tasked to solve a number of problems based on the scenario. An instructor leads the group through the exercise, allowing the group to discuss and solve its own problems but identifying any major flaws in its reasoning and hypothesising about the results of its actions.

Tabletops work best when the group is a mixture of representatives from different organisations/groups of staff. This allows all aspects of the problems to be discussed. For example, a tabletop on the management of the theatre response may include the following personnel:

- Surgeons
- Theatre nurses

- Anaesthetists
- ODPs
- TSSU
- CSSD
- Theatre porters

Tabletops are a very powerful way of illustrating and solving complex problems in major incident plans. They are applicable to almost any aspect of the major incident planning process but are particularly useful in demonstrating command, control and communication.

Large multi-agency exercises

Multi-agency exercises are often held on an annual basis (especially at airports where it is a statutory requirement). These exercises use simulated live casualties, usually provided by voluntary organisations.

Most exercises involve all the pre-hospital emergency services and are therefore a method of testing the out-of-hospital major incident plan. Casualties involved in the exercise may be transported to hospital and may then form part of an in-hospital exercise. However, this is often difficult to achieve in practice as it is neither feasible nor desirable to stop work within the hospital to deal with simulated casualties. Tabletops are usually a better way of testing and training for the in-hospital response.

Those individuals likely to be involved in the pre-hospital response should seek to take an active role in the pre-hospital aspect of the multi-agency exercise (i.e. the *Medical Incident Officer* and *Mobile Medical Teams*).

SUMMARY

- Even the best plan will fail if the staff using it are unfamiliar with its use and institution.
- Training must be an integral part of major incident preparation.
- A variety of methods are available for major incident training, but the most effective training is aimed at testing those aspects of the plan which do not occur in day-to-day practice, namely, command, control, communication and triage.

PART
III
MANAGEMENT

CHAPTER 7

The collapsible hierarchy concept

THE RATIONALE FOR A COMMON FRAMEWORK FOR MAJOR INCIDENT PLANS

A major incident may occur just about anywhere. Consequently, any hospital with an Emergency Department (ED) may be expected to receive casualties from one. Clearly, hospitals come in many different sizes and may contain a variety of different on site specialities. Unfortunately, hospitals can neither predict nor control the types of casualties they may receive following a major incident. All hospital plans must therefore be able to cope with a range of casualties and deal with them appropriately. Because of this, all major incident plans will contain the same core roles and responsibilities that need to be carried out as part of the response.

For example, all plans must identify staff for the resuscitation of Priority 1 casualties. Exactly who does this, and how this is achieved may vary between different types of hospital. In large hospitals, it may be possible to divide *Treatment Teams* according to the different types of patients expected. These may be divided, for example, into surgical, medical and paediatric teams. In smaller hospitals all these roles may have to be undertaken by a single resuscitation team. In other words, the person or persons responsible for tasks in the major incident response may vary between hospitals depending upon the number of staff or facilities available.

A similar situation exists in all hospitals during the build up to a full major incident response. Many hospital major incident plans contain a large number of action cards that (rightly) cover all the responsibilities within a hospital. However, it is unlikely that all those persons allocated tasks in the plan will be immediately available. The response to most major incidents develops over a period of time as more staff arrive. It is vital that a major incident plan is capable of being initiated by a small number of staff. A useful guideline would be for the major incident response to be capable of being initiated by only those staff available outside working hours.

In smaller hospitals, and during the build up of a major incident response, a small number of people may take control of a large number of tasks until further help arrives. Clearly, these individuals must have means of prioritising the tasks allotted to them. This

must be explicit on their major incident action cards. As further staff arrive roles may be delegated according to priority.

The system used to delegate staff in different sized hospitals and during a major incident response is termed the *collapsible hierarchy*.

The roles within a major incident may be grouped under three headings:

1. *Clinical roles*: This includes the appropriate staffing of the clinical response and the overall clinical management of the incident.
2. *Nursing roles*: This includes the management of the nursing response including provision of nursing staff to different areas of the hospital and the preparation of key areas and equipment.
3. *Management roles*: This includes the management of the support services of the hospital and covers services such as press management, portering, catering, traffic control and security.

These three role groups are based upon the structures used within the day-to-day running of a hospital. Each area has unique responsibilities, but clearly none can act in isolation. They are all essential for an adequate major incident response. Coordination between each of the three areas occurs at many points within the major incident, but each area has a single person with overall responsibility for all roles and individuals within that group. These individuals, together with the *Senior Emergency Physician*, comprise the *Hospital Coordination Team*.

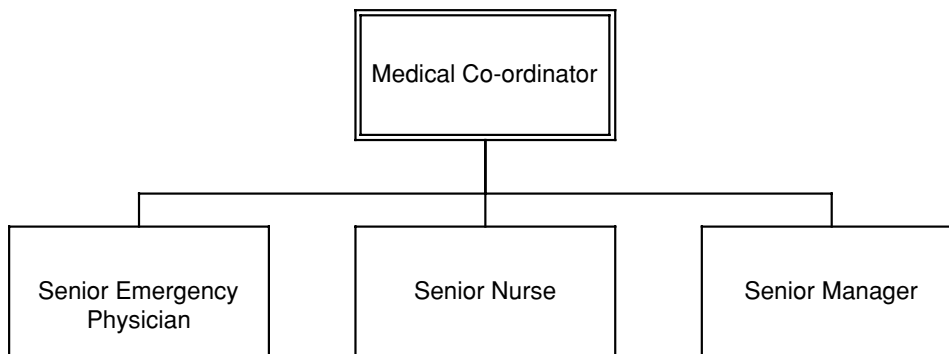


Figure 7.1. Hospital coordination team

The hospital coordination team

The overall hospital response is controlled by the *Hospital Coordination Team* (as shown in Figure 7.1). In overall charge is the *Medical Coordinator* who will typically be the medical director or his/her deputy. The *Medical Coordinator* also heads the clinical hierarchy.

The *Senior Emergency Physician's* responsibility is primarily that of organising the reception phase of the major incident. Initially tasks may be undertaken by the most senior doctor available in the ED.

The *Senior Manager* coordinates the hospital support services. This role should be filled by a senior member of the management team. Initially this may be the on-call duty manager.

The *Senior Nurse* coordinates the nursing response in the hospital. This should be a senior member of the nursing hierarchy. Initially, this should be a senior member of the nursing staff from outside the ED.

The actions of the *Hospital Coordination Team* (HCT) are vital to the successful running of a major incident. Planners must ensure that those individuals who might fill these

key roles during a response are familiar with their responsibilities in advance and have adequate training.

THE COLLAPSIBLE HIERARCHIES

The following chapters (Chapters 8–10) discuss the three hierarchies involved in the major incident response in more detail. Each hierarchy is headed by a member of the HCT. Each role is colour coded.

Roles depicted in **RED** are essential roles that must be a component of all major incident plans. These are roles that manage either an area or a phase of the major incident response. All major incident plans must make provision for these roles to be filled. Major incident plans must also make explicit the need for these roles to be filled from the very start of the major incident response. As time passes and more senior help arrives the individual undertaking each role may change. However, essential roles should be filled even from the on-call/resident staff available out of hours in hospitals.

Roles depicted in **YELLOW** are additional roles that may be of benefit in a major incident. Some hospitals may never have enough staff to fill these roles and they are not essential to a major incident response. Similarly, during the early stages of a major incident response these roles need not be filled.

Roles depicted in **GREEN** are integral parts of all major incident responses but are primarily concerned with the delivery of care or services rather than the management of them. All plans must ensure these roles are filled.

How the collapsible hierarchies work

The *Senior Manager* is responsible for a large number of other roles within the hospital. In a large hospital, it may be possible to staff all of these roles with different individuals. However, in a smaller hospital or during the early stages of a major incident response the duty hospital manager will be responsible for ensuring that all the responsibilities held by the subordinates are taken care of. This will require that individual to prioritise those responsibilities vital in the early stages of an incident (e.g. ensuring that portering services are available).

Some roles and responsibilities can be amalgamated, for instance the roles of the *Senior Manager*, *Press Officer*, *Senior Porter*, *Senior Transport Manager* and *Senior Security Manager* may initially be undertaken by the same individual.

The collapsibility in the hierarchies relates to the fact that if subordinates are not present or available then the roles and responsibilities of subordinates fall to the level immediately above. For example, in a small hospital with no doctors available for the treatment of Priority 3 casualties (i.e. *Treatment Teams*) the care of these patients will be undertaken by the *Surgeon Minors* and *Physician Minors* themselves. Similarly, junior staff may ‘act up’ into command roles. For example, the resident on-call ITU registrar may initially take on the role of *Senior Intensivist* (until the consultant arrives). This ‘acting up’ means that a command and control structure may be assembled very quickly from staff immediately available within the hospital **on a 24 hour basis**.

This rationale extends to the use of collapsible hierarchies during the build up of a major incident. It is implicit within the collapsible hierarchy system that if the staff are unavailable to fill all roles within the major incident plan, then the responsibilities of all their subordinates are taken on by those staff present. For example, the *Senior Surgeon* is responsible for the care of surgical patients in the hospital. This includes the triage and treatment of such patients, a task normally aided by other staff. Initially there may be no other help available and a single individual may be needed to oversee the whole of the surgical response. Until help arrives, individuals must prioritise their tasks accordingly.

Each post within the major incident response is explained on an action card, examples of which can be found at the end of Chapters 8–10. The action cards explain the immediate actions and responsibilities for each individual in the response. In the collapsible hierarchy system, the action cards contain information on the additional roles that the individual may need to take on.

As a major incident passes from the reception to the definitive care phase the roles of certain individuals, such as the *Senior Emergency Physician*, become less important. The reason that the hierarchies are depicted in the way they are is to show how they can be rapidly formed to provide a comprehensive initial response.

SUMMARY

- All major incidents, wherever they occur and wherever the patients are received, will require very similar roles to be undertaken.
- The use of a collapsible hierarchy ensures a logical framework for allocating these roles and responsibilities.
- The ‘collapsibility’ of the framework allows the response to be adaptable to different hospitals, different incidents and different times of the working week.
- It also allows the response to a major incident to be dynamic, initiating on a small number of staff and then growing as more senior help arrives.
- The use of collapsible hierarchies is a simple and logical way to achieve an all-hazard approach to major incident planning.

CHAPTER
8

The clinical hierarchy

The clinical hierarchy is responsible for the delivery of clinical care to patients. Physicians directly involved with the assessment and treatment of patients are accounted for within this hierarchy. It is overseen by the *Medical Coordinator*, a member of the *Hospital Coordination Team*.

THE ESSENTIAL CLINICAL ROLES

There are five essential clinical roles that must be included in all major incident plans. All plans should include a mechanism for these roles to be filled at an early stage of the response. They comprise the skeleton clinical response of a hospital to a major incident. This skeleton can develop to include additional roles as further staff become available.

1. Medical Coordinator
2. Senior Emergency Physician
3. Senior MLSO
4. Senior Surgeon
5. Senior Physician

Medical Coordinator

This is a senior physician who is in overall control of the hospital response. The *Medical Coordinator* is the head of the *Hospital Coordination Team* and should not become directly involved in patient care. This is a key role and should be undertaken by a senior clinician with knowledge of the major incident plan.

Senior emergency physician

Ideally, the *Senior Emergency Physician* should be a senior doctor experienced in the assessment of a wide variety of surgical and medical disorders. The first priority is the triage of the casualties as they arrive at the hospital. The task of triage may be delegated to another experienced member of the staff once one arrives or be undertaken by a senior

member of the ED nursing staff. Senior ED nurses triage on a day-to-day basis and many now receive specific training in major incident triage (see *Emergency Triage*, BMJ Books).

Once triage is established, the next priority is for the treatment of the most seriously injured casualties. The *Senior Emergency Physician* in conjunction with the *Senior Nurse Emergency Department* and the *Team Coordinator* must organise the staff into *Treatment Teams* comprising one nurse and one doctor. These teams will initially treat Priority 1 and 2 patients. The supervision of patient management for Priority 1 and 2 casualties will be done by the *Senior Emergency Physician*, *Senior Surgeon* and the *Senior Physician*.

Senior MLSO

The *Senior MLSO* will need to take responsibility for the preparation and provision of laboratory services. The initial priority is to ensure that haematology and transfusion services are available. This will almost always require the mobilisation of additional staff if an incident occurs out of hours. The *Senior MLSO* will need to liaise with the *Medical Coordinator* and clinical staff to assess the need for laboratory support.

Senior surgeon

The *Senior Surgeon* oversees the surgical response to the incident. Understandably, this post should be filled by a senior surgeon. Initially their responsibility lies in the supervision of patient care in the ED. However, their most important role will be in ensuring that the right patients reach the right operating theatre at the right time, with the right surgeons and only following the best possible resuscitation. The *Senior Surgeon* is responsible for allocating surgeons, anaesthetists and theatre staff into *Operating Teams*. This is done in conjunction with the *Senior Nurse Theatres* and *Senior ODP/Anaesthetic nurse*.

Senior physician

The *Senior Physician* oversees the medical response to the incident (i.e. the treatment of non-surgical casualties). It is now known that a significant proportion of major incidents result not in traumatic injury but in medical illness (e.g. poisoning). The *Senior Physician* role should be undertaken by the most senior available physician, ideally a consultant acute physician, emergency physician or critical care physician. They are responsible for ensuring the optimal care for the resuscitation of Priority 1 and 2 medical patients in the ED. They must liaise closely with the *Senior Intensivist* if patients require critical care.

ADDITIONAL CLINICAL ROLES

As an incident develops, further roles may be required. In smaller hospitals and in the early stages of a major incident *it is vital that the essential roles are filled first*. In some hospitals it may never be possible to fill all the roles given from available staff. In these circumstances all the roles of the staff below are taken by the more senior position as depicted in the collapsible clinical hierarchy in Figure 8.1.

The additional roles are:

- Consultant Haematologist
- Consultant Biochemist
- Senior Pharmacist
- MLSO Biochemistry
- MLSO Haematology

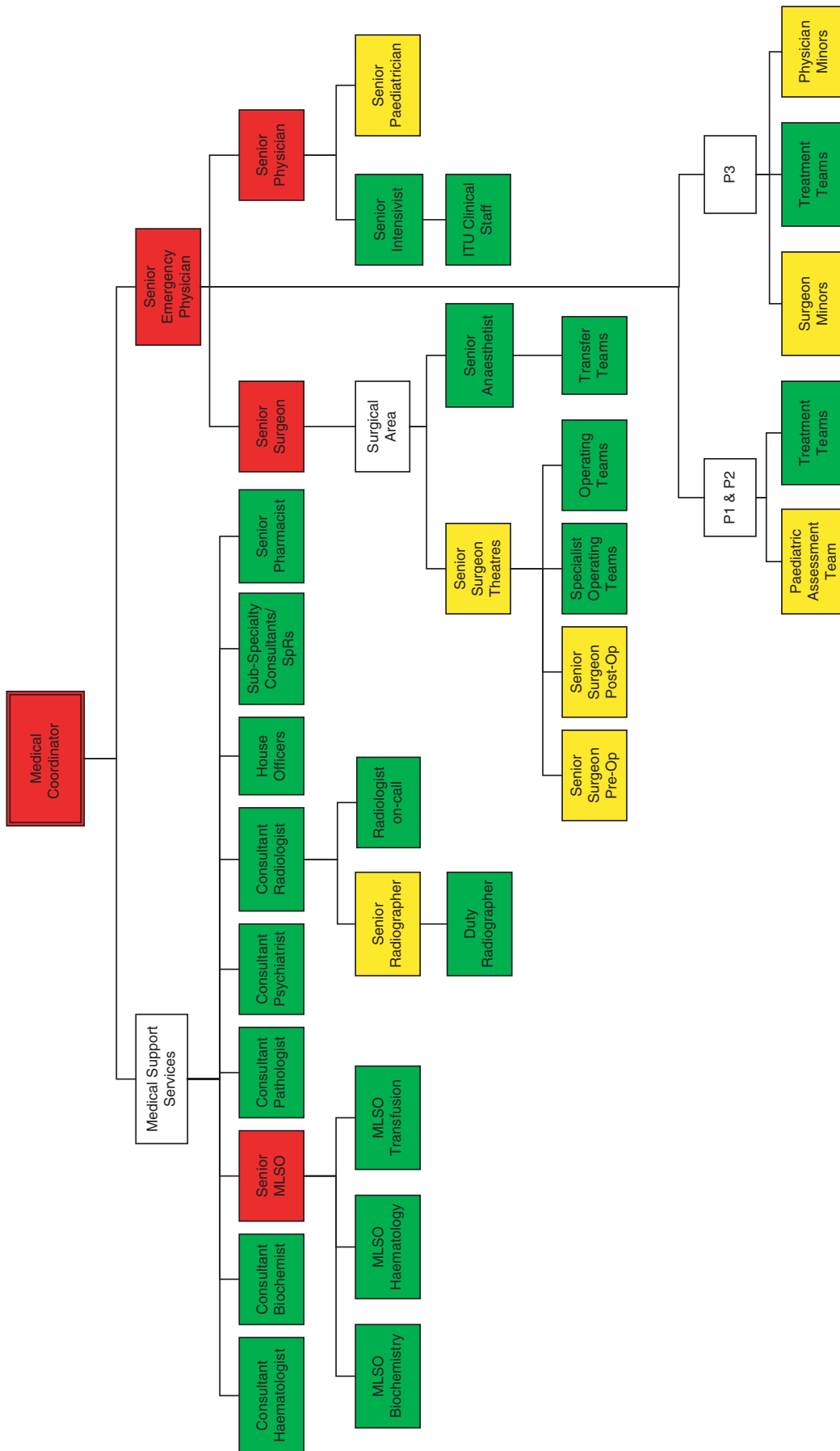


Figure 8.1. The clinical hierarchy

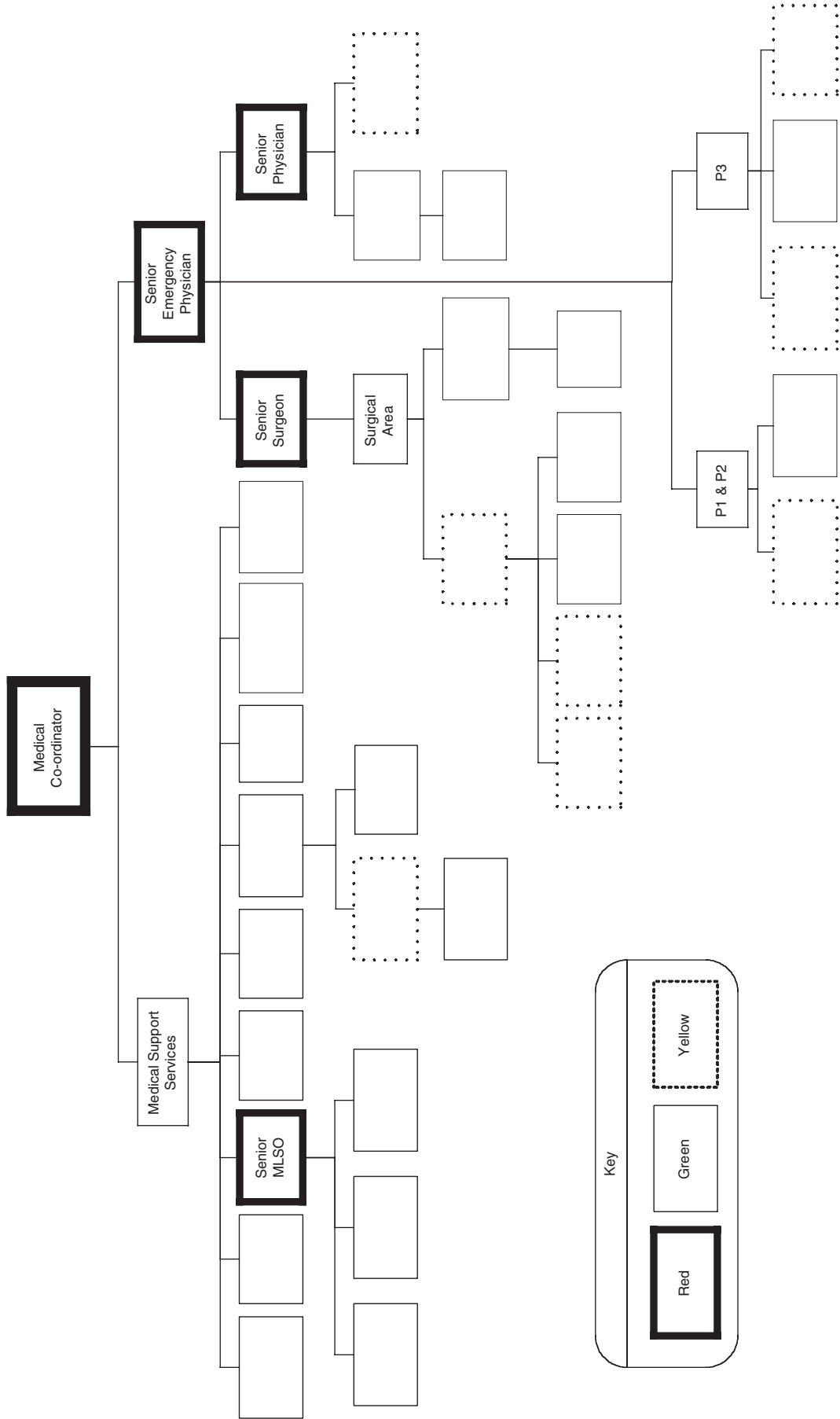


Figure 8.2. The clinical hierarchy: local highlights

- MLSO Transfusion
- Senior Intensivist
- Senior Surgeon Theatres
- Senior Anaesthetist
- Senior Surgeon Pre-Op
- Senior Surgeon Post-Op
- Surgeon—Minors
- Physician—Minors

Consultant Haematologist

The *Consultant Haematologist* is responsible for ensuring that haematology and blood transfusion services are available for the duration of the incident. They may be required to give advice regarding the appropriate use of blood products.

Consultant Biochemist

The *Consultant Biochemist* has responsibility for ensuring that Biochemistry services are available for the duration of the major incident.

Senior Pharmacist

The *Senior Pharmacist* may be required to resupply clinical areas within the hospital. They may also be required to obtain specific drugs (e.g. antidotes in chemical incidents).

MLSO Biochemistry

The *MLSO Biochemistry* is responsible for the provision of biochemical services and the running of the biochemistry laboratory.

MLSO Haematology

The *MLSO Haematology* is responsible for providing haematology services.

MLSO Transfusion

The *MLSO Transfusion* is responsible for the running of the blood transfusion service within the hospital.

Senior Intensivist

The *Senior Intensivist* is responsible for the assessment, management and disposal of patients requiring critical care and should be a clinician experienced in the management of Intensive Care patients. Typically, this will be the Consultant on call for ITU (in the early stages of a major incident this role may be undertaken by a more junior member of the ITU team). This involves establishing the need for critical care resulting from the incident by liaison with the *Senior Emergency Physician* and the *Senior Surgeon* and *Senior Physician*. They are also responsible for establishing the best way to deliver critical care, the availability of which is likely to be limited. A rapid appraisal of in-hospital facilities

and liaison with neighbouring units will be required. In addition, the clinical skills of the *Senior Intensivist* may be required in the ED, theatre suite or intensive care unit. Close liaison with all these areas is essential.

Senior Surgeon Theatres

The *Senior Surgeon Theatres* is responsible for coordinating the surgical effort within the theatre area. This role is performed in conjunction with the *Senior Nurse Theatres*. A close liaison between these two posts is essential. This individual is responsible for facilitating the care of patients requiring surgery. Close liaison with the *Senior Surgeon* and *Surgeon—Minors* is essential. If sufficient staff are available they may be assisted in this role by the *Senior Surgeon Pre-Op* and the *Senior Surgeon Post-Op*.

Senior Anaesthetist

The Senior Anaesthetist works closely with the *Senior Nurse Theatres* and *Senior Surgeon Theatres* to establish the need and provision of anaesthetic services within the theatre suite and the ED.

Senior Surgeon Pre-Op

This person is responsible for ensuring that patients are fit for theatre and that all appropriate investigations have been performed.

Senior Surgeon Post-Op

This person is responsible for monitoring patients in the immediate post-operative period both in the recovery and receiving ward areas.

Surgeon—Minors

Casualties with minor injuries are treated in the Priority 3 area. Although their injuries are likely to be less severe it is important that they receive an adequate standard of care. The *Surgeon—Minors* is responsible for overseeing the care of surgical patients in the Priority 3 area. This post would typically be filled by a junior doctor with ED or orthopaedic experience.

Physician—Minors

This role is similar to that of the *Surgeon—Minors*. The role is to oversee the care of patients in the Priority 3 area with medical complaints. A junior doctor with ED or Acute Medical experience would be suited to this role.

NON-MANAGERIAL CLINICAL ROLES

A number of clinical roles are essential to a major incident response and should have individual action cards. These roles are essentially non-managerial and are primarily concerned with the delivery and facilitation of patient care.

Consultant Radiologist

The Consultant Radiologist has an important role in coordinating and providing specialist radiological investigations in consultation with clinical staff.

Senior Paediatrician

Many major incidents involve children and some involve exclusively children. It is therefore a vital component of all major incident plans to involve individuals with skills in the resuscitation of children.

Consultants/SpRs/Senior House Officers in other specialities

The range of injuries and illnesses that may result from a major incident are huge. As in day-to-day practice these may require specialist advice and/or intervention. Hospitals differ in the range and availability of specialist services and this should be borne in mind by major incident planners. Staff from specialist teams may play an important role in a major incident response either fulfilling their specialist role or as general duty physicians allocated to other tasks (e.g. as members of *Treatment Teams* in the ED).

Operating Teams

The provision of *Operating Teams* and theatre staffing is a high priority for the *Senior Surgeon and Senior Nurse Theatres*. They may be aided in this task by other members of the surgical hierarchy such as the *Senior Surgeon Theatres* (if one is available). Surgeons, anaesthetists and other theatre staff should be organised into teams with a complementary mix of skills as decided by the senior nurse and surgeon. These teams work under the direction of the *Senior Surgeon* or *Senior Surgeon Theatres* to deliver the best surgical care to patients requiring surgery.

Specialist Operating Teams

Certain types of incident may require the involvement of specialist surgeons. For example hospitals may request help from neurosurgery, ophthalmology, paediatric surgery or plastic surgery. These surgical teams should work under the guidance of the *Senior Surgeon Theatres* and *Senior Surgeon*.

Transfer Teams

It is likely that patients with critical injuries will need to be transferred. Transfers will be required between hospitals and between different clinical areas within hospitals. All transfers, whether within or between hospitals, should be conducted with the same diligence. The transfer of critically ill or injured patients should be undertaken by staff with transfer training. This will usually mean an anaesthetist with a competent nurse escort and a porter.

Treatment Teams

The patients with the highest priority for treatment will be those with the most serious injury or illness. These patients should be triaged to the Priority 1 and 2 treatment areas where their care will be delivered by these *Treatment Teams*. Each team consists of at least one doctor and one nurse as directed by the *Team Coordinator*. Doctors and nurses assigned to the *Treatment Teams* working in the Priority 1 and 2 areas should have experience in the management of the critically ill or injured patient. Thus *Treatment Teams* work under the direction of the *Senior Physician* and *Senior Surgeon*. Doctors and nurses with experience in the management of minor illness and injury who are not required for the urgent treatment of Priority 1 and 2 casualties should be tasked to work in the Priority 3 area under the supervision of the *Surgeon—Minors* and *Physician—Minors*.

SUMMARY

- A well thought out clinical hierarchy is essential to a major incident response.
- The hierarchy is based upon the principles of getting the right people to the right place at the right time doing the right job.
- As with all other aspects of major incident planning triage takes precedence over treatment.
- The clinical hierarchy is designed to achieve these goals by ensuring that essential roles are filled early within the major incident response.

Table 8.1. Senior Surgeon action card

SENIOR SURGEON		
<p>Responsibilities</p> <ol style="list-style-type: none"> 1. Control of the surgical response. 2. Setting priorities for treatment and surgery for surgical casualties. 3. Liaising with the <i>Senior Physician</i> regarding the surgical aspects of casualty priorities. 4. Advising <i>Treatment Teams</i> on management. 5. Appoint a <i>Senior Surgeon Pre-Op</i> and <i>Senior Surgeon Post-Op</i> and a <i>Senior Surgeon Theatres</i> as staff become available. If not yet available assume the responsibilities of these staff in addition to your own. 6. Liaison with the <i>Senior Surgeon Pre-Op</i> and <i>Senior Surgeon Post-Op</i> regarding changing surgical priorities of casualties in Pre-Op. 7. Liaison with the <i>Senior Surgeon Theatres</i> regarding theatre availability and usage, and the formation of <i>Operating Teams</i>. 8. Liaison with the <i>Senior Anaesthetist</i> regarding anaesthetic provision for surgery. 9. Liaise with <i>Specialist Surgeons</i> as required. 10. Operational debriefing of senior surgical staff involved in the Major Incident Response. 		
Senior Surgeon Pre-Op / Post-Op	Senior Surgeon Theatres	Specialist Operating Teams / Operating Teams
<ol style="list-style-type: none"> 1. Preparation of the Pre-Op / Post-Op ward. 2. Supervision of patient care in the Pre-Op / Post-Op ward. 3. Documentation in the Pre-Op / Post-Op ward. 4. Operational de-briefing of medical staff involved in the major incident response on the Pre-Op / Post-Op ward. 	<ol style="list-style-type: none"> 1. Preparation of theatres for Major Incident casualties. 2. Co-ordinate the formation of Operating Teams. 3. Supervision of theatre usage by Operating Teams. 4. Allocation of priorities to non Major Incident cases. 	<ol style="list-style-type: none"> 1. Life saving surgery. 2. Limb saving surgery. 3. Definitive surgery.
<p>Immediate Action</p> <ol style="list-style-type: none"> 1. On being informed of a Major Incident proceed to the Emergency Department. 2. Liaise with the <i>Senior Emergency Physician</i>. 3. Assume the role of <i>Senior Surgeon</i>. 4. Liaise with the <i>Senior Emergency Physician</i> and the <i>Senior Physician</i>. 5. Appoint suitably senior surgeons to act as <i>Senior Surgeon Pre-Op</i> and <i>Senior Surgeon Post-Op</i> and <i>Senior Surgeon Theatres</i>, and ensure that they are aware of their tasks as shown on their action cards 6. Proceed to the resuscitation area and assess the priorities of surgical patients. 7. In conjunction with the <i>Senior Physician</i> oversee the treatment being provided by <i>Treatment Teams</i>. 8. Set priorities for movement and surgery of casualties. 9. If requested liaise with the <i>Medical Co-ordinator</i> regarding the selection of suitable personnel for the <i>Mobile Surgical Team</i>. 10. Continually liaise with the <i>Senior Surgeon Pre-Op</i> and <i>Senior Surgeon Theatres</i> regarding priorities and theatre availability. 11. If necessary liaise with the <i>Senior Nurse</i> regarding the establishment of a Post-Op overflow ward. 		
<p>Priorities</p> <ol style="list-style-type: none"> 1. Triage of surgical casualties for surgery and admission. 2. Advise <i>Treatment Teams</i> on casualty treatment. 3. Liaison with <i>Senior Surgeon Pre-Op</i>, <i>Senior Surgeon Post-Op</i> and <i>Senior Surgeon Theatres</i>. 4. Provision of 24-hour <i>Operating Team</i> availability, using a rota system if necessary. 		

Table 8.2. Operating Team action card

OPERATING TEAM							
<pre> graph TD SS[Senior Surgeon] --- SST[Senior Surgeon Theatres] SST --- SN[Senior Nurse Theatres] SST --- SA[Senior Anaesthetist] SST --- OT[Operating Teams] </pre>	<table border="1"> <tr> <td style="background-color: #cccccc; width: 20px;"></td> <td>Red Role: essential management role</td> </tr> <tr> <td style="background: repeating-linear-gradient(45deg, transparent, transparent 2px, #cccccc 2px, #cccccc 4px); width: 20px;"></td> <td>Green Role: integral delivery of care /services role</td> </tr> <tr> <td style="background-color: #ffffcc; width: 20px;"></td> <td>Yellow Role: non-essential role</td> </tr> </table>		Red Role: essential management role		Green Role: integral delivery of care /services role		Yellow Role: non-essential role
	Red Role: essential management role						
	Green Role: integral delivery of care /services role						
	Yellow Role: non-essential role						
<p>Each team will consist of:</p> <p>Surgeons Anaesthetists Nurse / ODP</p>							
<p>Responsibilities</p> <ol style="list-style-type: none"> 1. Lifesaving surgery 2. Minimum safe surgery as indicated by the <i>Senior Surgeon</i> and their advisers. 							
<p>Immediate Action</p> <ol style="list-style-type: none"> 1. On formation proceed to the theatre indicated by the <i>Senior Surgeon Theatres</i>. 2. Check equipment as necessary. 3. Liaise with the <i>Senior Nurse Theatres</i> regarding equipment required for the procedures contemplated (some equipment may not be available). 4. Operate as agreed with the <i>Senior Surgeon Theatres</i>. 5. Ensure any fragments of extrinsic material removed at operation are labelled with the Major Incident Casualty Number, and saved for forensic examination. 6. Inform the <i>Senior Surgeon Theatres</i> if there is any change in projected operating time. 7. Inform the <i>Senior Surgeon Theatres</i> once the time the operation will end is known. 							
<p>Priorities</p> <ol style="list-style-type: none"> 1. Lifesaving surgery. 2. Minimum safe surgery. 							

Table 8.3. Consultant Radiologist action card

CONSULTANT RADIOLOGIST		
<pre> graph TD MC[Medical Co-ordinator] --- CR[Consultant Radiologist] CR --- SR[Senior Radiographer] CR --- ROC[Radiologist on call] SR --- DR[Duty Radiographer] </pre>		
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Red Role: essential management role Green Role: integral delivery of care /services role Yellow Role: non-essential role </div>		
<p>Responsibilities</p> <ol style="list-style-type: none"> 1. Co-ordination of the provision of radiological services. 2. Radiological staffing. 3. Operational debriefing of radiological staff involved in the Major Incident Response. 		
<p>Immediate Action</p> <ol style="list-style-type: none"> 1. Liaise with the <i>Senior Radiographer</i> with regard to staffing within the X-Ray departments. 2. On being informed of a Major Incident proceed to the main X-Ray department. 3. Ensure that the Departmental call in for relevant staff has been implemented. 4. Ensure that the Departments are cleared of all but the most urgent of non Major Incident cases. 5. Liaise with the <i>Medical Co-ordinator</i> (Control Room) with regard to the likely nature and duration of the hospital response. 6. Consider the need to institute a shift system for senior radiological staff later in the incident. 7. Liaise with the <i>Medical Co-ordinator</i> and the <i>Consultant Pathologist</i> regarding the provision of forensic radiological investigations. 		
Senior Radiographer	Duty Radiographer	Radiologist on Call
<ol style="list-style-type: none"> 1. Co-ordination of radiography resources. 2. Liaison with Consultant Radiologist to prioritise workload. 	<ol style="list-style-type: none"> 1. Provision of radiography in the radiography department. 2. Radiography in ED, Theatres, ITU. 	<ol style="list-style-type: none"> 1. Prioritising and advising on radiological investigations. 2. Interpretation of radiological investigations.
<p>Priorities</p> <ol style="list-style-type: none"> 1. Provision of radiological services. 2. Provision of urgent radiological services for non Major Incident purposes. 3. 24-hour rostering of radiological staff as necessary. 		

CHAPTER 9

The nursing hierarchy

Nursing staff are key components of a major incident response. Failure to plan for the roles and responsibilities of the nursing team will lead to a failure of patient care.

The roles of all nurses fall within the nursing hierarchy which is led by the *Senior Nurse* who is also a member of the *Hospital Coordination Team*.

Nursing staff often remain employed in the same hospital for a greater length of time than junior medical staff. They therefore have more opportunity to become familiar with major incident plans. This fact will be an advantage to major incident planners. It is beneficial to utilise nursing staff in managing areas which may only exist during a major incident (e.g. volunteer areas). Similarly nursing staff may be more familiar with the hospital and its environment. They are therefore well suited to the running and preparation of clinical areas.

Nursing also has a large number of staff familiar with people management as many senior nurses run a clinical area in their day-to-day practice. This factor should again be utilised by major incident planners.

THE ESSENTIAL NURSING ROLES

There are six essential roles within the nursing hierarchy . These are:

1. Senior Nurse
2. Senior Nurse Emergency Department
3. Senior Nurse ITU
4. Senior Nurse Theatres
5. Senior Nurse Wards
6. Team Coordinator

Senior Nurse

The *Senior Nurse* is a member of the *Hospital Coordination Team* and is responsible for all nursing matters relating to the major incident response. This post should be filled by a senior member of the nursing team. They are responsible for ensuring that clinical

areas are prepared and adequately staffed. They are the key link to other services in the hospital with regard to nursing matters.

Senior Nurse Emergency Department

The *Senior Nurse Emergency Department* is responsible for the preparation and running of the ED. They will work very closely with the *Senior Emergency Physician* to ensure that triage and treatment areas are appropriately prepared and staffed.

Senior Nurse ITU

The scant availability of ITU beds and the likelihood of critically ill patients means that ITU services may be at a premium during a major incident. The *Senior Nurse ITU* is responsible for ensuring that the availability and preparedness of ITU facilities is maximised. These decisions will be made in conjunction with the *Senior Intensivist*, possibly after liaison with other nearby units.

Senior Nurse Theatres

The *Senior Nurse Theatres* works closely with the *Senior Surgeon Theatres* (or *Senior Surgeon*) to allocate nursing staff to form *Operating Teams* and *Specialist Operating Teams*. Close liaison with the *Senior Surgeon* is necessary to determine the optimal time for patients to undergo surgery. They are responsible for the care of patients within the theatre suite.

Senior Nurse Wards

This person is responsible for the preparation of ward facilities for major incident patients. Liaison with other staff members is essential to determine the need for in-patient admissions, the number requiring surgery, etc. The day-to-day role of the bed management team makes them well suited to this role.

Team Coordinator

The *Team Coordinator* assists the *Senior Nurse Emergency Department* in the allocation of staff to specific roles within the reception phase of the major incident. This role should be filled by a member of staff familiar with the staff and facilities of the receiving hospital.

ADDITIONAL NURSING ROLES

As an incident develops, further roles may be required. In smaller hospitals and in the early stages of a major incident *it is vital that the essential roles are filled first*. In some hospitals it may never be possible to fill all the roles given from available staff. In these circumstances all the roles of the staff below are taken by the more senior position as depicted in the collapsible nursing hierarchy as seen in Figure 9.1.

The additional roles are:

1. Triage Nurse
2. Senior Nurse Priority 1 area
3. Senior Nurse Priority 2 area

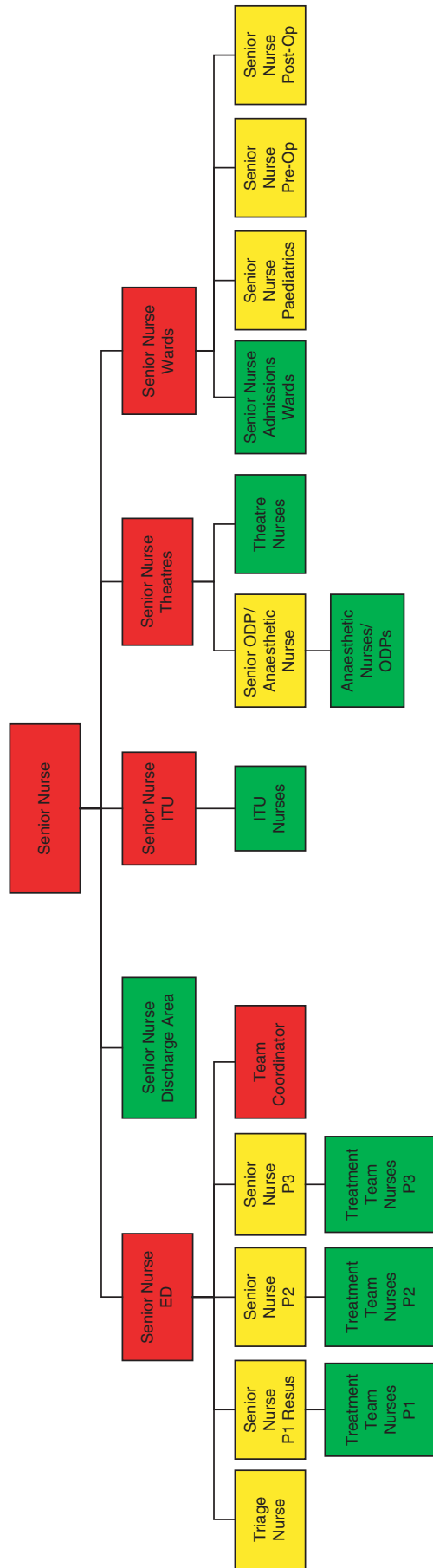


Figure 9.1. The nursing hierarchy

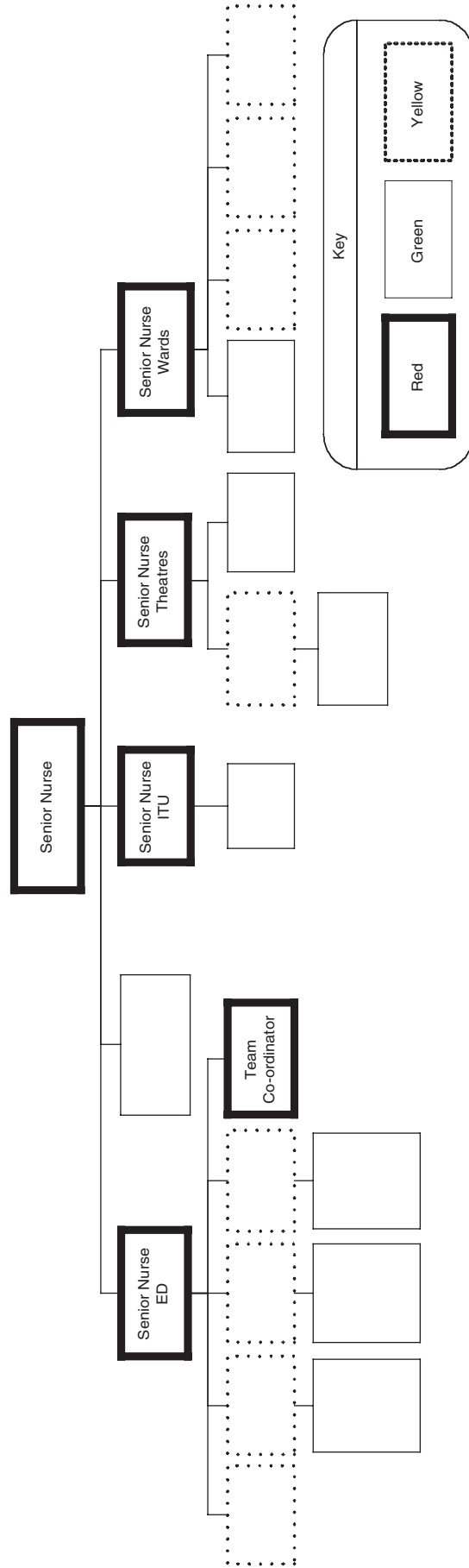


Figure 9.2. The nursing hierarchy: local highlights

4. Senior Nurse Priority 3 area
5. Senior Nurse Admissions Ward
6. Senior Nurse Paediatrics
7. Senior Nurse Pre-op
8. Senior Nurse Post-op
9. ITU Nurses
10. Theatre Nurses

Triage Nurse

It is vital that patients are triaged on their arrival at hospital according to their clinical priority. In day-to-day practice ED triage is undertaken by members of the ED nursing staff. It is therefore common sense that senior emergency department nurses may be able to undertake this role during a major incident with additional training in major incident triage methods. The *Triage Nurse* may conduct triage on their own or in conjunction with the *Senior Emergency Physician* if available.

Senior Nurse Priority 1 area

This person is responsible for coordinating the care of patients in the Priority 1 area of the ED. They will work closely with the *Senior Emergency Physician*, *Senior Surgeon* and *Senior Physician*. They are responsible to the *Senior Nurse Emergency Department*.

Senior Nurse Priority 2 area

This person is responsible for the nursing care of patients in the Priority 2 area. They will work closely with the *Senior Emergency Physician*, *Senior Surgeon* and *Senior Physician*. They are responsible to the *Senior Nurse Emergency Department*.

Senior Nurse Priority 3 area

The Senior Nurse Priority 3 area works with the *Surgeon—Minors* and *Physician—Minors* to ensure the care of patients in the Priority 3 area. They are responsible to the *Senior Nurse Emergency Department*.

Senior ODP/Anaesthetic nurse

In conjunction with the *Senior Nurse Theatres* and the *Senior Surgeon Theatres* the *Senior ODP/Anaesthetic nurse* is responsible for coordinating the provision of anaesthetic staff to surgical teams.

Senior Nurse Admissions Wards

The Senior Nurse Admissions Wards is responsible for ensuring that the designated major incident wards are prepared to receive and treat casualties from the major incident.

Senior Nurse Paediatrics

Many major incidents involve children. The *Senior Nurse Paediatrics* should be a senior nurse with experience of treating children. The *Senior Nurse Paediatrics* is responsible for the preparation of clinical areas for the reception of children. In incidents involving a large number of children they may also be responsible for assisting non-paediatrically trained staff in the management of children.

Senior Nurse Pre-Op

This should be a senior ward based nurse. They are responsible for the preparation of beds for patients prior to theatre. Patients will be received from the ED. Close liaison with the *Senior Nurse Emergency Department*, *Senior Nurse Wards* and the *Senior Nurse Post-Op* is clearly essential.

Senior Nurse Post-Op

This should be a senior ward based nurse. They are responsible for the preparation of beds for patients following surgical intervention. Close liaison with the *Senior Nurse Wards* and the *Senior Nurse Pre-Op* is clearly essential.

Non-managerial nursing roles

A number of nursing roles are essential to a major incident response and should have individual action cards.

ITU Nurses

The *Senior Nurse ITU* coordinates the *ITU nurses*. Their responsibility is to assist the *Senior Nurse ITU* in the preparation and running of critical care areas.

Theatre Nurses

Theatre Nurses will be allocated to surgical teams by the *Senior Surgeon Theatres* and *Senior Nurse Theatres*. Allocations should be based on training and experience.

SUMMARY

- A well thought out nursing hierarchy is essential to a major incident response.
- The hierarchy is based upon the principles of getting the right people to the right place at the right time doing the right job.
- As with all other aspects of major incident planning, triage takes precedence over treatment.
- The nursing hierarchy is designed to achieve these goals by ensuring that essential roles are filled early within the major incident response.

Table 9.1. Senior Nurse action card

SENIOR NURSE		
<p>Responsibilities</p> <ol style="list-style-type: none"> Overall control of the preparation of clinical areas. Overall control of nursing provision. Staffing of key nursing appointments. Operational debriefing of senior nursing staff involved in the Major Incident Response. 		
<p>Immediate Action</p> <ol style="list-style-type: none"> Liaise with the <i>Team Co-ordinator</i> on duty, regarding action already taken. Liaise with Senior Nurse ED regarding the current state of the Reception Areas. Ensure that the following posts are filled: <i>Senior Nurse Pre-Op / Post-Op</i> <i>Senior Nurse Theatres</i> <i>Senior Nurse ITU</i> <i>Senior Nurse Wards</i> <i>Senior Nurse Discharge Area</i> <p>If not appoint suitably senior members of staff as necessary or assume their roles until the Key Personnel arrive.</p>		
Senior Nurse ITU	Senior Nurse Theatres	Senior Nurse Wards
<ol style="list-style-type: none"> Assess ITU capability with <i>Senior Intensivist</i>. Preparation of ITU. Treatment of ITU patients. 24-hour staffing of ITU 	<ol style="list-style-type: none"> Assess theatre capability with <i>Senior Surgeon Theatres</i>. Preparation of Theatres. Co-ordination of theatre Teams. 24-hour staffing of theatres 	<ol style="list-style-type: none"> Assessment of current bed state. Preparation of admissions wards. Identification of patients suitable for discharge. 24-hour staffing of wards.
Senior Nurse ED	Senior Nurse Discharge Area	Team Co-ordinator
<ol style="list-style-type: none"> Preparation of ED. Co-ordination of nursing care in ED. 24-hour staffing of ED. 	<ol style="list-style-type: none"> Preparation of the discharge area. Safe discharge of in-patients. Safe discharge of incident patients. 	<ol style="list-style-type: none"> Assist <i>Senior Nurse ED</i> in allocating teams to clinical areas. In the reception phase allocate ED staff to work ED areas if possible.
<ol style="list-style-type: none"> Liaise with the <i>Medical Co-ordinator</i> regarding current nurse staffing levels. Assess the preparedness of key clinical areas by phoning: Pre-Op / Post-Op ITU Theatres Post-Op Admissions and establish any immediate requirements for additional sterile and non-sterile supplies, and laundry. Continually liaise with the following Key Personnel: <i>Senior Emergency Physician</i> <i>Senior Manager</i> <i>Senior Nurse ED</i> <i>Senior Nurse Pre-Op</i> <i>Senior Nurse Post-Op</i> <i>Senior Nurse Theatres</i> <i>Senior Nurse ITU</i> <i>Senior Nurse Admissions</i> <i>Senior Nurse Discharge Area</i> <p>to ensure adequate nurse staffing, and to supervise. Advise key personnel on necessary staffing levels, and likely duration of the response once this becomes clear. Ensure that shift systems at adequate staffing levels and skills are instituted as soon as possible so that staff get maximum rest.</p> <ol style="list-style-type: none"> Consider the need for deployment of psychiatric nursing staff to key areas, and approach the psychiatric incident team nurse if necessary. Report any difficulty in maintaining services in any areas to the <i>Medical Co-ordinator</i>. If necessary set up a receiving ward (depending which is already in use as Pre-Op / Post-Op) to become Post-Op overflow. Ensure staff on this ward are fully briefed to carry out their tasks and issue appropriate action card to the <i>Senior Nurse</i> in the area. 		
<p>Priorities</p> <ol style="list-style-type: none"> Control of the preparation and senior nurse staffing of key clinical areas. Senior nurse staffing. Control of the maintenance of nursing services throughout the hospital. Control of the provision of the required numbers of suitably qualified nurses to allow adequate 24-hour cover in key clinical areas. 		

Table 9.2. Senior Nurse ITU action card

SENIOR NURSE ITU

Immediate Action

1. On being informed of a Major Incident inform all staff in ITU.
2. Appoint one nurse to institute ITU call-in (including non duty consultants and technicians).
3. Assume the role of *Senior Nurse ITU* until relieved by a more senior ITU nurse.
4. Assess the current ITU staffing and bed state.

ITU Nurses
<ol style="list-style-type: none"> 1. Preparation of ITU for Major Incident casualties 2. Treatment of critically ill or injured patients.

Priorities

1. Liaise with the *Senior Intensivist* regarding the predicted ITU bed availability.
2. Liaise with the *Senior Intensivist* regarding the possibility of transferring current patients.
3. Preparation of the maximum number of ITU beds for use by Major Incident casualties.
4. Control of nursing in ITU, including liaison with the *Senior Nurse* for 24 hour shift cover at the necessary staffing levels and skills.
5. Report by phone to the *Senior Nurse* once the predicted ITU bed availability is known.
6. Monitoring of ITU stores.
7. Provision of hourly casualty statements to the *Medical Co-ordinator*.
8. Operational debriefing of all ITU nursing staff involved in the Major Incident Response.

CHAPTER 10

The management hierarchy

For a major incident response to be successful, it is vitally important that the effort put into planning for the support services of the hospital is similar to that put into planning the clinical services. A major incident response without the support of estates, kitchens, portering, etc. will rapidly fail in its aim to deliver the highest possible care to injured or ill casualties.

The roles of all managers fall within the management hierarchy which is led by the *Senior Manager* who is also a member of the *Hospital Coordination Team*. The support services to a hospital are considered in the management hierarchy. Like the nursing and clinical hierarchies, this is designed to be a collapsible hierarchy adaptable to different types of hospitals and situations.

THE ESSENTIAL MANAGEMENT ROLES

There are three essential roles within the management hierarchy:

1. Senior Manager
2. Senior Porter
3. Senior Telephonist

Senior Manager

The *Senior Manager* is responsible for the support service response to a major incident. They should be a senior member of the management team. They are a member of the *Hospital Coordination Team* and are the essential link on management/support matters to the clinical and nursing hierarchies.

Senior Porter

The portering services during a major incident may be particularly stretched, especially if an incident occurs outside normal working hours. The *Senior Porter* is responsible for the prioritisation of portering tasks. In the initial stages of a major incident response, the

portering staff may be required to assist in the provision of security and traffic control at the hospital site.

Senior Telephonist

Communications are a common failing in major incidents. Hospital telephonists play a vital role in the mobilisation of resources for a major incident. An enormous number of calls may be received during a major incident and hospital switchboards may rapidly become swamped. The *Senior Telephonist* is responsible for ensuring that communications are as effective as possible.

ADDITIONAL MANAGEMENT ROLES

As an incident develops, further roles may be required. In smaller hospitals and in the early stages of a major incident *it is vital that the essential roles are filled first*. In some hospitals it may never be possible to fill all the roles listed below from available staff. In these circumstances all the roles of the staff below are taken by the more senior position as depicted in the collapsible management hierarchy in Figure 10.1.

The additional roles are:

1. Press Officer
2. Senior Enquiries Officer
3. Volunteer Coordinator
4. Relatives Coordinator
5. Senior Transport Manager
6. Senior Security Manager
7. Senior Catering Manager
8. Senior Supplies Manager
9. TSSU Manager
10. CSSU Manager

Press Officer

The *Press Officer* is responsible for handling the press. This involves the receipt and distribution of information on the incident to the media. They may also be required to assist other managers and clinicians in their interviews with the media. The *Press Officer* should ideally be a member of the hospital communications department with specific training in media management.

Senior Enquiries Officer

Hospitals will receive a large number of enquiries during a major incident. These will be from relatives, members of the public and the press. Where possible, information should be released. The *Senior Enquiries Officer* is responsible for coordinating the response and directing enquiries to the appropriate area.

Volunteer Coordinator

Volunteers may arrive at the hospital with a variety of skills or backgrounds. Although it is preferable to rely on 'in house' staff it may be necessary to use some volunteers in

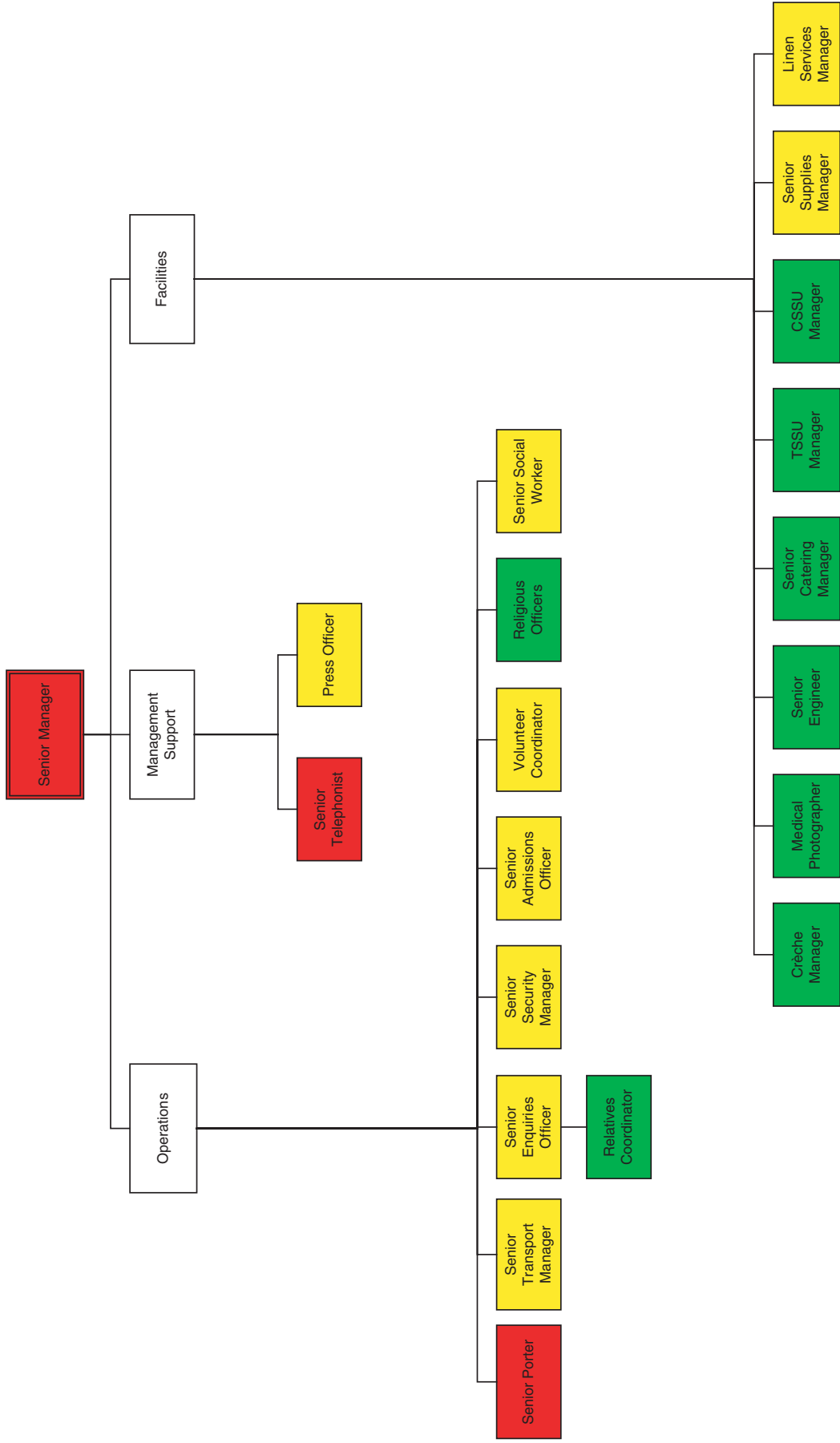


Figure 10.1. The management hierarchy

the major incident response. The *Volunteer Coordinator* should be a senior member of the nursing or management staff capable of assessing the ability of the volunteers to aid the major incident response. Volunteers may range from members of the public offering blood donation to passing senior surgeons from other hospitals. The *Volunteer Coordinator* must be aware of the need for staff within the response and weigh this against the use of unfamiliar volunteers. Even if it is perceived that volunteers will not be needed during a major incident response, the likelihood of volunteers arriving at the hospital justifies the need for a *Volunteer Coordinator* in most major incident plans.

Relatives Coordinator

Relatives attending the hospital should be accommodated in a separate area away from other members of the public or members of the press. Systems for the release of information to relatives should be coordinated by the *Relatives Coordinator* in conjunction with the *Senior Enquiries Officer*.

Senior Transport Manager

This manager is responsible for coordinating transport requirements during the response. This may include delivering samples and collecting supplies.

Senior Security Manager

It is important to prevent unwarranted access to clinical and other areas within the hospital site. Individuals without hospital ID should not be allowed entry to the clinical areas. Traffic control and parking are also likely to be a major issue. The *Senior Security Manager* is responsible for security on the hospital site. They may be assisted in this by the police.

Senior Catering Manager

The importance of providing food to staff and patients is not to be underestimated. The *Senior Catering Manager* is responsible for ensuring that adequate amounts of food are available for the duration of the incident response.

Senior Supplies Manager

Many hospitals and clinical equipment suppliers now operate on a 'just in time' basis. In other words, it is unlikely that all the surgical/clinical equipment required to treat a large number of major incident casualties will be immediately available. Some stocks are available from within hospitals but additional equipment may need to be recycled or obtained from other sources (i.e. other hospitals or suppliers). The *Senior Supplies Manager* is tasked to ensure that necessary equipment is available and that resources are channelled into preparing the equipment required by the clinical teams. Close liaison with the *Senior Nurse Theatres* and *Senior Nurse Emergency Department* will be required to assign priorities.

TSSU Manager

The *TSSU Manager* assists the *Senior Supplies Manager* in the preparation of equipment for theatre use. The role should be taken by someone with working knowledge of the TSSU department.

CSSU Manager

The *CSSU Manager* assists the *Senior Supplies Manager* in ensuring that clinical equipment is made available. The role should be undertaken by an individual with a working knowledge of the CSSU department.

OTHER ROLES IN THE MANAGEMENT HIERARCHY

A number of roles may be overseen in the management hierarchy:

Crèche Manager

Crèche facilities are often forgotten during a major incident but are important for staff and relatives. Staff with children may be unable to attend the hospital unless there is some provision for childcare. This service can only be provided if the hospital normally provides crèche facilities, as it should be run by the staff normally providing it.

Religious Officers

Religious officers representing the faiths of families and casualties may be required to support families during the major incident or to perform religious acts (e.g. last rites).

SUMMARY

- A well thought out management hierarchy is essential to a major incident response.
- The hierarchy is based upon the principles of getting the right people to the right place at the right time doing the right job.
- The management hierarchy is designed to achieve these goals by ensuring that essential roles are filled early within the major incident response.

Table 10.1. Press Officer action card


<p>PRESS OFFICER</p>	<table border="1"> <tr> <td><input type="checkbox"/></td> <td>Red Role: essential management role</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Green Role: integral delivery of care /services role</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Yellow Role: non-essential role</td> </tr> </table>	<input type="checkbox"/>	Red Role: essential management role	<input checked="" type="checkbox"/>	Green Role: integral delivery of care /services role	<input type="checkbox"/>	Yellow Role: non-essential role
<input type="checkbox"/>	Red Role: essential management role						
<input checked="" type="checkbox"/>	Green Role: integral delivery of care /services role						
<input type="checkbox"/>	Yellow Role: non-essential role						
<div style="text-align: center;">  <pre> graph TD SM[Senior Manager] --- PO[Press Officer] </pre> </div>							
<p>Responsibilities</p> <ol style="list-style-type: none"> 1. Liaison with the Press Corps. 2. Setting up the special telephone provision for the Press. 3. Arranging for Press Releases and regular Press Conferences. 4. Liaison with Security regarding security arrangements. <p>Immediate Action</p> <ol style="list-style-type: none"> 1. On being appointed liaise with the <i>Medical Co-ordinator</i> and the <i>Senior Manager</i> regarding an initial Press Release. 2. Proceed to the Press Room. 3. Set up the special telephone provision in the Press Room. 4. Liaise with any members of the Press Corps already present. 5. Liaise with the <i>Senior Security Manager</i> regarding security arrangements for control of the Press. 6. Liaise with the <i>Medical Co-ordinator</i> and the <i>Senior Manager</i> regarding initial and subsequent Press Conferences. 7. Ensure the press are briefed to direct all requests for interviews and photographs through the <i>Press Officer</i>. Liaise with the <i>Medical Co-ordinator</i> and the <i>Senior Manager</i> regarding these requests. 8. Liaise with the <i>Senior Catering Manager</i> regarding provision of refreshments for the Press Corps. 9. Consider the use of the Department of Medical Illustration to supply photographs to the Press. 10. Continue to keep the Press informed of developments with due regard to medical confidentiality. 							
<p>Priorities</p> <ol style="list-style-type: none"> 1. Setting up of the Press Room. 2. Security arrangements. 3. Liaison with the Press Corps. 							

Table 10.2. Senior Manager action card

SENIOR MANAGER

Red Role: essential management role
 Green Role: integral delivery of care /services role
 Yellow Role: non-essential role

Responsibilities

1. Co-ordination of the provision of non-clinical support services.
2. Control of administrative services.
3. Staffing of non clinical support service and administrative key appointments.
4. Operational debriefing of Senior Managers involved in the Major Incident Response.

Senior Porter	MLSO Biochemistry / Haematology / Transfusion	Senior Telephonist	Non-clinical Support Services
<ol style="list-style-type: none"> 1. Provision of portering services. 2. Prioritisation of portering services. 	<ol style="list-style-type: none"> 1. Institute the department call-in list. 2. Inform the Regional blood centre. 3. As staff arrive form them into laboratory teams. 	<ol style="list-style-type: none"> 1. Initiate hospital call-in 2. Enable major incident phones. 3. Alert additional telephonists. 	<p>Ensure the following services are alerted:</p> <ul style="list-style-type: none"> • Pharmacy • Catering • Volunteer co-ordinator • Security • Crèche for staff • Religious officers • Porters • Linen service

Immediate Action

1. Liaise with the *Senior Manager* regarding action already taken.
2. Ensure that the following posts are filled:
Senior Admissions Officer
Senior Supplies Manager
Senior Catering Manager
Senior Security Manager
Crèche Manager

If not appoint suitably senior members of staff as necessary until the Key Personnel arrive. Ensure that they are aware of their tasks as shown in sections 3. Liaise with the *Medical Co-ordinator* and the *Senior Nurse* regarding current staffing levels. If necessary arrange that local broadcasters are contacted and requested to transmit the following message:

"A Major Incident has occurred. Would St Emlyn's Hospital staff please report directly to their Major Incident reporting areas without phoning the hospital".

If too many staff have come in request that the following message is broadcast:

"No further staff are required at St Emlyn's Hospital to deal with the Major Incident. Would members of staff remain available at home if not on duty. Please do not phone the hospital".

The main contact numbers are:

Source	Telephone number

4. When suitable Senior Managers arrive appoint the following as necessary:
Press Officer
Senior Enquiries Officer

and ensure that they are aware of their tasks.

5. Liaise with the *Medical Co-ordinator* regarding an initial press release.
6. If interpreters are required arrange for their provision.

Table 10.2. Senior Manager action card (*Continued*)

7. Continually liaise with the following key personnel:

Senior Admissions Officer
Senior Supplies Manager
Senior Catering Manager
Senior Security Manager

to ensure adequate staffing, and to supervise. Advise key personnel on necessary staffing levels, and likely duration of the response once this becomes clear. Ensure that shift systems are instituted as soon as possible so that staff get maximum rest.

8. Report any difficulty in maintaining services in any areas to the *Medical Co-ordinator*.
 9. Receive constant reports from the *Press Officer*, and ensure that as much information as it is possible to give without breaking medical confidentiality, is passed on.
 10. If VIP visits are requested liaise with the *Medical Co-ordinator* regarding the time that these will be possible without hindering the hospital response. Liaise with the *Senior Security Manager* regarding security arrangements if such visits are going to occur.

Priorities

1. Control of non-clinical support areas and services.
2. Staffing of non-clinical support areas and services.
3. Control of administrative services.
4. Control of dealings with the Press.
5. Co-ordination of VIP visits.

PART
IV
SUPPORT

Declaring a major incident and activating the plan

DECLARING A MAJOR INCIDENT

All hospitals must have a major incident plan. The purpose of the plan is to mobilise additional staff and resources to cope with an increased clinical workload. Unfortunately, even the best plans take some time to mobilise such resources and preparation is rarely complete before casualties begin to arrive at the hospital. It is therefore vital that when a major incident occurs the plan is activated efficiently at an early stage.

Major incidents are normally declared by the ambulance service. This should be given as a clear message using a specified form of words. The message is relayed from the scene to the ambulance control room. It is then sent to the hospital, preferably via the switchboard. There are two levels of major incident alert, 'standby', and 'declared-activate plan'.

Table 11.1. Standardised major incident messages

Major incident—Standby	This alerts the hospital that a major incident is possibly imminent. A limited number of staff need to be informed
Major incident declared—activate plan	In this case the incident has occurred and the major incident plan must be activated
Major incident cancelled	This is used to cancel a standby call

Major incidents may also be declared from within the hospital even if the ambulance service has not declared one. This may occur if a large number of patients suddenly arrive at the Emergency Department (ED). A major incident for a hospital cannot be declared by the fire or police services.

Major incident—standby

The 'Major incident—standby' message is used by the ambulance service when there is the possibility of a major incident. This would usually be as a result of a warning from the scene or from one of the other emergency services that an event with the possibility of producing a major incident has occurred (for example, a report of a bomb explosion).

As far as the hospital is concerned there is little immediate response and only a limited number of people are contacted.

If a standby message is received by the hospital the information given in that call should be relayed to key personnel.

1. Senior Nurse Emergency Department
2. Senior Emergency Physician on call
3. Duty Manager
4. Senior Nurse

In general the response is low key and involves senior staff assessing the state of preparedness of the hospital. This is done with particular regard to actions that would be necessary if the incident plan were to be activated. Thus, the *Senior Nurse Emergency Department* would inform all members of staff currently on duty and would make an assessment of the current departmental workload and capacity.

Major incident—cancelled

This message revokes any previous message (usually major incident—standby). Those individuals informed as a result of the initial call should be informed of the cancellation.

Major incident declared—activate plan

If this message is received, the hospital plan should be activated in full. The possibility of hoax calls may be reduced by the use of a dedicated line from ambulance control to switchboard. Such concerns should not delay the activation of the plan, if in doubt activate.

There is no place for partial activation of the major incident plan. It is an all or nothing response; modifications to the activation procedure that are done as an incident proceeds are unnecessarily complex and rarely succeed as the information required for a graded response is rarely accurate.

The response should set in motion a series of events that will allow the hospital to receive a large number of casualties. The plan must:

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

In the initial stages of the plan only those staff already present in the hospital will be able to prepare the initial clinical areas and cope with the first influx of patients. This is likely to be particularly difficult outside normal working hours. The major incident plan should take account of this build up period.

A number of incidents in the UK have been characterised by considerable delay in major incident plan activation. On a few occasions it appears that the ambulance service has simply forgotten to inform hospitals that a major incident was in progress. However, even when information is received, plans are sometimes not instituted. This may be for reason of professional pride, for fear of criticism of calling a major incident unnecessarily or out of ignorance.

The problem is often not the enforcement of the plan, but rather a reluctance to institute it.

ACTIVATING THE PLAN

Describing how a major incident response is to be mobilised is a vital part of any major incident plan and should be explicit. The method of activation should be achievable at any time and on any day. The hospital switchboard plays an essential role in this.

Calling in staff

When a ‘major incident declared—activate plan’ message is received the hospital switchboard should contact key personnel. This is usually the first step in the major incident response.

A great number of people need to be informed that a major incident has been declared. Telephoning every person on the plan is too time consuming as even a brief call will take 1 minute and there may be in excess of 100 people who need to be contacted. For this reason, a cascade system of activation should be used. A cascade system involves key individuals being notified by the switchboard, it is then their responsibility to contact other persons in their service/speciality. For example, switchboard may contact the consultant surgeon on call who is then responsible for contacting other surgical consultants before attending the hospital. The cascade system allows the simultaneous activation of many members of the hospital response.

In this way the switchboard need only contact key personnel. The amount of information given in the call may be very brief.

- Place of incident
- Type of incident
- Time of incident
- Estimated number of casualties

This information may be given by the ambulance services in the initial activation message. Further information is unnecessary at this stage.

In order for a cascade system to work effectively, accurate lists of people and their contact details must be disseminated to those on the cascade list. As it cannot be predicted who will be on call at any one time, all persons need to know, or have access to the contact details of their own team. Such a list may be kept in the hospital, with the resident on-call person the first to be informed for medical teams. Nursing teams usually keep contact details of staff within their own departments (e.g. wards, theatres, ED). Administrative and support service staff may not be resident on a 24 hour basis and such personnel must be carefully instructed if a cascade system is to work.

The order of the call in of staff should be decided in advance of an incident and should reflect the urgency with which their skills/expertise will be required. Clearly there is little point in calling in the *Duty Transport Manager* before the *Senior Emergency Physician*. An example call-in list is shown in Table 11.2.

DECLARING A MAJOR INCIDENT AND ACTIVATING THE PLAN

Table 11.2. Hospital call-in list

Hospital call-in list			
		Standby	Activate
Give full details to the following			
1	Senior Nurse on duty Emergency Department		
2	Senior Nurse on duty Hospital		
3	Consultant on duty Emergency Department		
4	Medical Director		
5	Duty Manager		
then continue the call out by calling the following			
6	Duty Consultant Surgeon		
7	Duty ITU Consultant		
8	Senior Porter		
9	Duty MLSO Haematology		
10	On-Call Radiographer		
11	Duty Security Controller		
12	Duty Consultant Anaesthetist		
13	Duty Consultant Physician		
14	Duty Orthopaedic Registrar		
15	Duty Medical Registrar		
16	Additional Telephonists		
17	On-Call Radiologist		
18	Duty Consultant Pathologist		
19	On-Call Pharmacist		
20	Duty Facilities Manager		
21	Matron—Crèche		
22	Hospital Chaplain		
23	Supplies Officer		
24	Volunteer Coordinator		
25	On-Call Photographer		
26	Duty Engineer		
27	Social Worker		
28	Duty Consultant Psychiatrist		

During the call in phase the operator must not answer incoming calls. Departmental staff are called in using a cascade mechanism as described above. It is vital that departmental call-in lists are regularly maintained and updated.

Box 11.1 Call-in System Key Points

1. Many staff will need to be contacted in a major incident. Switchboard cannot do all of it.
2. Staff can be contacted by phone or pager.
3. Cascade contact systems must be carefully set out and updated regularly
4. Key medical, nursing and administrative staff should be contacted using a group pager system.
5. It is vital that call-in lists are regularly updated.

Other methods of contacting staff

An alternative method to the telephone cascade system is the use of pagers. Staff can be paged using a predetermined message. Modern pager systems allow group paging calls which allow the switchboard to simultaneously alert many staff. In most hospitals pagers will be held by senior doctors, nurses and managers. Unfortunately, pagers are not held by all staff, therefore telephone systems cannot be discarded entirely. Pagers may also be used to alert junior doctors who commonly carry these on the hospital site.

Some hospitals have tannoy systems that may be used to alert all members of the hospital staff on site, though these have the problem of alerting the patients as well.

Many hospitals have a significant amount of onsite accommodation for junior nursing and medical staff. Arrangements should be in place for alerting staff in these areas.

Use of the media

Occasionally it may be necessary to use the media to alert staff or volunteers via radio or television. Such a decision is made by the *Hospital Coordination Team* and would be organised by the *Senior Manager*. The form of the messages to be used should be set out in the major incident plan. These messages should address either too many or too few staff and should avoid overloading the hospital switchboard.

‘A major incident has occurred. Would St Emlyn’s Hospital staff please report directly to their major incident reporting areas without calling the hospital’.

‘No further staff are required at St Emlyn’s Hospital to deal with the major incident. Would members of staff remain available at home if not on duty. Please do not phone the hospital’.

Staff reporting

For many nursing and administrative staff it will be clear where they will be required to go (for example, the *Catering Manager* will proceed to the catering area). However, for many of the medical staff, and for those unaware of the content of their action cards a single point of reporting is required. This will allow the issue of roles (together with the relevant action cards) and for a log to be kept of who has responded to the major incident.

The staff reporting area should be close to the ED, but not within it. Locating the area in the ED will lead to a large number of staff cluttering this area.

Conversely, locating the area a long way away from the ED will not control those members of staff unaware of where to report, such persons usually default to reporting to the ED anyway.

Box 11.2 Characteristics of the Staff Reporting Area

1. Located next to the Emergency Department
2. Located near the major incident store
3. Contains copies of staff action cards
4. Access to telephone
5. Clearly signposted
6. Map of key major incident areas (e.g. relatives reporting area etc.)
7. Space to accommodate staff

Identification of staff

It is vital that the staff are easily identifiable during a major incident. In the chaos of a major incident the ability to identify key staff in each area is essential to aid command, control and communication. This may be achieved by the use of tabards, sashes, hats or other identifying clothing. It is especially important to identify the Hospital Coordination Team, senior clinical staff (e.g. Senior Nurse Emergency Department) and ED staff (because of their familiarity with the reception area). The issue of identification clothing may also serve as a record of which posts have been filled as part of the response.

Tabards are the best method of identifying clinical staff as they are easily seen, do not impede movement and can contain a pocket for the relevant action card. Tabards may also be colour coded to identify specific groups. Administrative and other non-clinical staff should be identified using their standard hospital ID badges.

Table 11.3. Identification of staff

Group	Example	Identification method
Senior Key personnel	Medical Coordinator	Yellow tabard with green/white checkers on the yoke marked with appointment
Key clinical personnel	Senior Physician	Yellow tabard with appointment
Emergency	Emergency	Orange tabard marked doctor or nurse
Department Staff	department nurse	
Clinical teams	Surgical SHO	Green tabard marked with appointment
Other staff	Duty Engineer	Hospital ID badge
Volunteers	Local GP	Major incident volunteer badge

Ensuring that only bona fide staff are involved in the incident response is essential for the security, safety and confidentiality of casualties. Most hospitals issue ID cards to their staff and it is good practice to only allow access to holders of ID badges unless the individual is recognised.

Action cards

Once informed of a major incident, the staff need to know what to do and where to go. Many staff will not have read the major incident plan, and few will be able to recite their roles and responsibilities without a reminder. It is clearly impractical to expect the staff

to read the major incident plan whilst one is in progress, so some form of aide-memoir is needed. This takes the form of an action card. Examples of action cards can be seen at the end of Chapters 8–10.

The action card tells the individual what their role is and outlines how they should achieve it.

All staff likely to be involved in the incident response will need action cards. This includes the support services of the hospital (e.g. catering). It is not acceptable to only provide action cards for medical and nursing staff.

Ideally the staff should be aware of what is on their action card but this is unlikely in practice. Copies of the action cards should therefore be held in the staff reporting area (ideally in a pocket of the appropriate tabard) and/or in the normal place of working. Those likely to be called in from home should keep a copy of their action card at home.

Ensuring that the staff are familiar with their action card roles is difficult, particularly amongst junior medical and nursing staff who tend to change jobs frequently. Most hospitals conduct induction days for new staff and the major incident plan should be mentioned at that time. An alternative solution to the problem of action card availability is to print an abbreviated action card on the back of the individual's hospital identification badge.

SUMMARY

- Robust alerting procedures are essential in order to ensure that the major incident response runs well.
- Major incident planners must ensure that alerting mechanisms are in place and regularly updated to ensure that the right people are activated in a timely manner.
- On arrival it is essential that all the staff have an area to report to where they should be given an action card detailing their duties during the major incident.
- All copies of the plan should prominently display the advice below:

If the major incident procedure has been activated, and you have not read it before, do not do so now. Find your action card and do what it says.

CHAPTER 12

The reception phase

The reception phase is the period during which patients arrive at hospital and receive their initial triage, assessment and emergency treatment. It may last from a few hours in small incidents to days in disaster scenarios. Many patients may receive all their care during the reception phase of the incident if they are discharged home directly from the Emergency Department (ED).

PREPARATION OF THE HOSPITAL

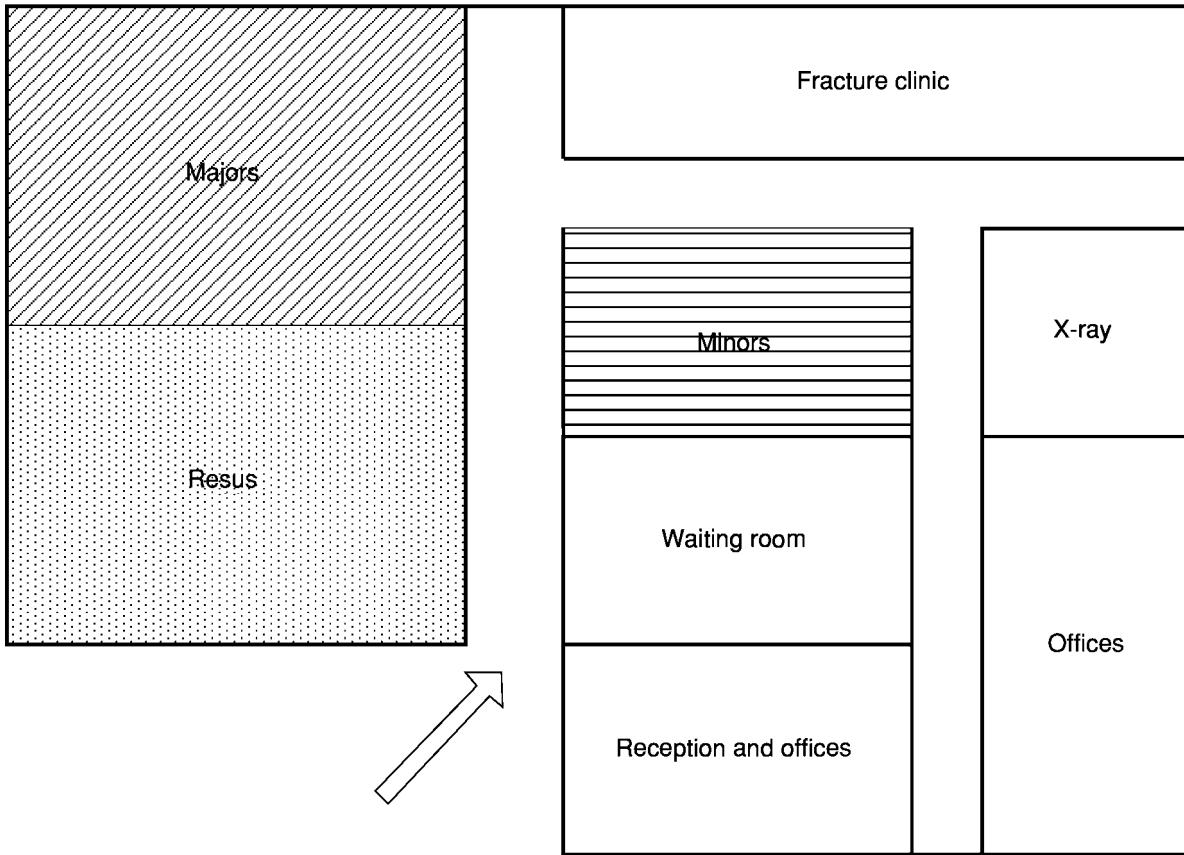
The reception areas of the hospital should be prepared first as they will be used first. The nursing and medical staff should ensure that the non-incident patients who are in the department when the plan is activated are dealt with quickly and safely. This is done to try and clear space for the incoming casualties. Broadly speaking the following plan should be followed:

- Minor cases: Advised to see a GP or given a clinic appointment time
- Major cases: Admitted to a non-designated ward with minimal documentation

Preparation of the ED should be prioritised to ensure that triage and immediate life saving treatment can be delivered. The department should be divided into areas suitable for the different triage categories of patients. Most EDs will need to expand into adjacent areas in order to cope with the influx of patients. It is usually logical to move minor patients (priority 3) into an adjacent area in order to allow the rest of the department to receive priority 1 and 2 casualties. An example of this system using an adjacent clinic area for priority 3 patients is shown in Figure 12.1.

In addition to preparation of the ED, other areas of the hospital should be alerted and prepared for their roles. Both intensive care and theatres may be required early during the incident and an assessment of their current workload and capability should be made. If possible the opening of additional resources (e.g. closed ITU beds) should be considered. Similarly the number of available beds within the hospital should be assessed. This should count the number of currently staffed beds and also estimate the number that could be opened if additional staff became available. Medical and nursing staff at ward level should appraise the current workload and determine if there are any patients suitable

Normal allocation of Emergency Department Areas



Major incident allocation of Emergency Department Areas

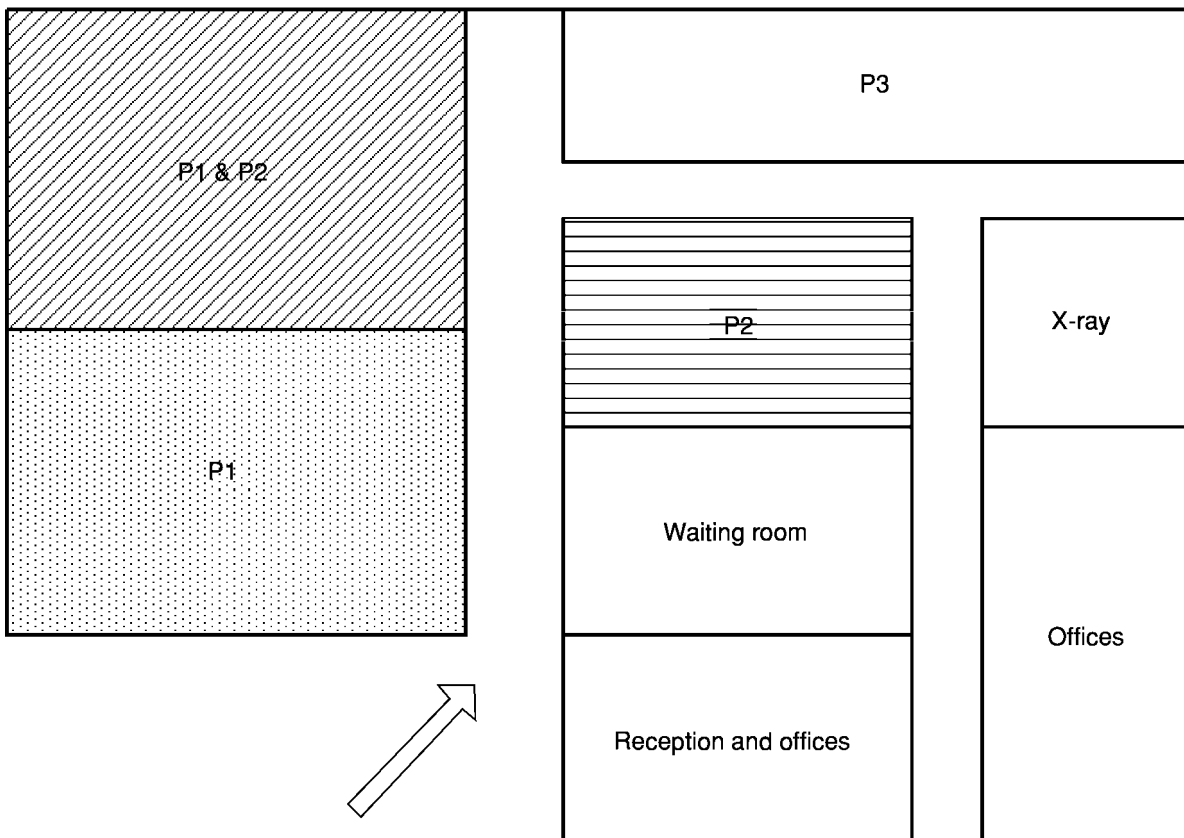


Figure 12.1. Schematic to show take-over of adjacent areas for major incident response

for immediate discharge or transfer to a less intensive clinical area. This information must be fed back to the *Hospital Coordination Team* (HCT).

Table 12.1. Responsibilities during hospital preparation

	Medical	Nursing	Managerial
Assessment of current staffing levels	✓	✓	✓
Assessment of current clinical workload	✓	✓	
Preparation of key clinical areas		✓	
Call in of additional staff	✓	✓	✓
Preparation of non-clinical areas			✓

CLINICAL CARE

The *Senior Emergency Physician* will coordinate clinical care during the reception phase of the incident.

Casualties are triaged as they arrive at the ED. They should then be further assessed and receive emergency treatment in the ED. Some patients will be admitted for further definitive care although many will be discharged directly from the ED.

Triage

All casualties will be met at the door of the ED and will be triaged according to the major incident triage categories, and labelled. If casualties have already been triaged at the scene they must be re-triaged at this point. The initial triage will usually be rapid and will determine which clinical area the patient is to be sent to.

Triage categories should reflect the urgency for intervention, be it resuscitation, surgery or transfer. An individual patient's triage category may change following deterioration or treatment. Triage is discussed in detail in Chapter 13.

Treatment

Once triaged, casualties will be taken to the appropriate part of the reception area (which may be in the ED depending on its size), where they will be reassessed and treated; this will be done by *Treatment Teams*.

These teams are formed as staff report to the staff reporting area. They are then despatched to clinical areas as patient number and severity dictate—one team per patient in the priority 1 area, and one or two teams in total to the priority 3 area. The organisation of these *Treatment Teams* is critical to the success of the reception phase and should be done by a senior doctor or nurse. Initially this role will be overseen by the *Senior Nurse Emergency Department*, and later by the *Team Coordinator*. Regardless of who is allocating the teams it is important that that individual maintains contact with the senior clinicians in each of the receiving areas (and at a later stage with senior physicians on receiving wards) to establish staffing requirements.

If the layout of the hospital is such that priority 1 and 2 patients are triaged to one area and priority 3 patients are triaged to another, there is a need for surgical and medical supervision in two areas. The Duty Consultants and Registrars for surgery and medicine are usually available to fill these roles. It is essential that the individuals doing these jobs understand the importance of maintaining an overview and resist the urge to become personally involved in patient care. As this is probably against their basic medical instincts

it must be specifically addressed on their action card. These issues must also be covered in training as discussed in Chapter 6.

It is important that the *Treatment Teams* understand the structure of the response and their role within it. The system relies on the team leader reporting to the relevant *Surgeon* or *Physician* as problems or solutions are found. All action cards should show a diagrammatic representation of the relevant hierarchy. This will allow all staff to know who they need to report to, and who they are responsible for. The hierarchies should be reinforced during major incident training.

It is vitally important to keep accurate notes during a major incident. The large number of casualties means that confusion may easily arise and important information may be mislaid. Most major incidents now result in a criminal investigation, and medical notes may form a part of such an inquiry. Accurate notes are also helpful when assessing and auditing the plan once the incident is over. Both team leaders and the senior clinicians should try to ensure that adequate notes are made.

Discharge during the reception phase

During the reception phase many casualties may have all their clinical care completed within the ED and then be discharged home. A contact number should be given so that patients can contact the hospital if they have any further problems. Advice cards may be prepared in advance with contact numbers for the hospital and police services.

Casualties seen and discharged may feel isolated following an incident and this may result in subsequent psychological morbidity. This problem may be accentuated in transport incidents where a large number of casualties may live in a different area from that where the incident occurs. Local incidents often supply an effective local support network. However, the train passenger who returns home many miles from the incident will also benefit from a point of contact.

Ideally patients should be discharged from the ED via a specific discharge area in the hospital. This area will allow information to be given to patients and allows them a quieter, step down area to gather their thoughts prior to leaving. The discharge areas should be away from the ED, the press and the public. It should be staffed by nursing and administrative staff. Voluntary Caring Organisations (such as the WRVS) are often very helpful and effective at providing help and support in this area.

Transfer

Casualties that are not discharged from the ED will be transferred within or between hospitals. Casualties will need to be transferred from the receiving areas at different stages of treatment and for different reasons.

The actual movement of severely ill casualties from the priority 1 and 2 areas should be undertaken by *Transfer Teams*. These teams (consisting of a porter, a nurse, and a doctor) should be formed by the *Team Coordinator* or *Senior Surgeon/Senior Physician* and despatched to appropriate areas as requested.

Casualty documentation

As casualties enter the hospital they will be assessed by the *Senior Emergency Physician* or his/her deputy at the triage point. Each casualty will be assigned a priority group which will be shown on the triage label (see Chapter 13); this label may have been attached at the scene and may therefore have some patient details written on it. It will not be

possible to take full administrative details at this time since this would cause a bottleneck; however, it is essential that all the patients entering the hospital are logged and given an identifying number. The clerk at the triage point must issue a numbered set of pre-prepared notes to each patient as they pass through, and should ensure that a wristband with a corresponding number is attached to the patient.

Clerks must be assigned to each area that receives patients and should take every opportunity to obtain details and mark them on the numbered notes. These details must be passed back to the Hospital Information Centre where they will be collated and entered into existing administrative systems as time allows. Since the initial part of the response is very fluid the clerks may have to use considerable initiative to obtain adequate details from all the patients. The *Senior Admissions Officer* will need to check the numbers issued at the triage point against the details obtained. Missing details must be actively sought.

Police Casualty Documentation Team

A Police Casualty Documentation Team is likely to be despatched to all hospitals taking major incident casualties, since the police usually coordinate the casualty bureau. This team will be tasked with obtaining as much administrative and physical detail as possible about each casualty to assist in identification and answering of telephone enquiries to the casualty bureau. Since a great deal of the information required by the police and the admitting hospital is the same, opportunities for close liaison exist.

Casualty property

Property bags should be supplied with each pre-prepared major incident casualty card. These must be numbered with the corresponding major incident casualty number. All property should be placed into these bags and should be kept with the casualty at all times. Property can be invaluable in the identification of unknown casualties and it is therefore essential that none is lost or misplaced.

Hospital Information Centre

In the early stages, virtually nothing will be known about any of the casualties. As the incident progresses, more data will become available until eventually nearly all the casualties are documented. During this time the casualties will be moved around the hospital according to their clinical need, and may stay permanently or transiently in various areas. In such a fluid circumstance it is essential to have a central register of patient details and locations—this is the Hospital Information Centre. The *Clerks* who obtain patient details will need to register this with the information centre as discussed above.

A system must be put in place to obtain details of the current location and condition of the casualties. This is usually achieved by requiring all areas to produce a casualty statement every hour on the hour. The senior staff in all areas dealing with major incident casualties must ensure that accurate casualty statements are completed hourly and returned to the *Medical Coordinator* via the information centre. This will involve the reception areas, all wards with casualties, theatres, x-ray and all discharge areas. If the forms are not received then they should be actively sought by the *Senior Admissions Officer*, who must collate all the information and should maintain an accurate casualty state board.

CLINICAL SUPPORT SERVICES

Clinical support services are vital in both the reception and definitive care phases of the response and the *Medical Coordinator* should take direct responsibility for their provision. Each supporting service should produce an internal plan consistent with the overall plan. This should address both the standard issues such as call-in and control of the departmental response, as well as specific issues relevant to the department in question.

Radiology

This plan must address the provision of both clinical (radiological) and technical (radiographical) services. The *Consultant Radiologist* will be responsible overall for the provision of the service. On the clinical side there will be a need to coordinate the priorities of both major incident and in-patient requests, to ensure immediate reporting of all major incident investigations and to supervise the radiological input to more complex investigations. The need for radiological investigations will probably be greatest in the reception phase, but there will be an increased load in theatres and the wards for some days. There may also be a forensic role for radiologists during subsequent investigations, and this should be planned for in advance.

On the technical side, the *Senior Radiographer* will need to ensure that both staffing and equipment are sufficient for the task. In order to achieve the former the radiological and radiographical call-ins should be combined. The departmental plan should also ensure, for example, that the location and availability of all portable equipment are known. Some thought needs to be given to the resupply of consumables—this may require liaison with suppliers of equipment; the methods of doing this need to have been established at the planning stage.

Laboratory services

The provision of all laboratory services throughout the incident should be coordinated. It makes little difference whether there is a single coordinator (such as the Director of Pathological Services) for all laboratory functions, or whether each laboratory has its own coordinator. Particular parts of the laboratory response (such as call-in) may be more efficient if centralised while other aspects are better dealt with in each specialist area.

Blood and blood products

Both the technical and clinical parts of the transfusion service must be addressed, and senior laboratory scientists and *Consultant Haematologists* must be involved.

An initial plan should be implemented as soon as the major incident plan is activated. This should be designed to maximise the amount of blood immediately available from within the hospital. All blood units (except those marked for imminent use) should be returned to stock and each should be sampled, ABO checked, and labelled appropriately. As transfusion requests are made they should be prioritised, and supplied from this stock if immediate or urgent.

The blood transfusion plan must include agreed procedures for the use of any major incident casualty number for identification of samples and blood that has been cross-matched. It is likely that less identifying information than usual will be available during the reception phase.

The national blood service should be contacted early on and should be informed about any blood product requirements as soon as these become clear. In normal circumstances

the national blood service makes deliveries to hospitals; this may not be possible during a major incident and the hospital *Transport Manager* may need to arrange urgent pick-ups.

It is probable that members of the public will attend the hospital to offer blood donation; the need for this and the best location should be discussed with the national blood service which will have the staff and facilities necessary.

Diagnostic services

The clinical and technical staff in both the biochemical and haematological diagnostic laboratories must ensure that procedures are in place for processing and reporting the requests for tests that originate from the major incident. It is unlikely that the volume of tests will present a particular problem once additional staff have been called-in, since these laboratories are capable of carrying out many tests every day. It is possible, however, that patients from a single incident may all require a particular test (for example following smoke exposure), and plans should address ways of dealing with this.

Pathology services

It is very unlikely that the number of patients dying in the hospital will be such that extra mortuary space is necessary although, in exceptional circumstances, there might be a need for a temporary incident mortuary. Bodies will not be moved from the scene initially, but may be moved to special facilities once initial forensic procedures are complete; this might be the hospital mortuary depending on local circumstances. The *Consultant Pathologist* will need to liaise with the Coroner and Forensic Pathologists about this as required. There may also be a need to coordinate forensic maxillo-facial and radiological services.

It is unlikely that the need for histopathological services will be overwhelming, but plans must be made so that this service can be provided as needed.

Pharmacy

There will be an exceptional need for drugs, fluids and medicines, and this should be coordinated by a *Senior Pharmacist*. In the early stages the key areas will need extra stocks of resuscitation drugs and analgesics. As the response develops casualties that have been discharged will need their prescriptions dispensed, as will patients who have been sent home early to make room for the incident. Wards will need to be resupplied and areas such as theatres and ITU will require frequent restocking. Plans should be in place for liaison with wholesalers and other suppliers should hospital stocks become depleted.

Social work

In the early part of the hospital response social workers will be needed to help casualties and relatives in an immediately practical way. For example patients for discharge may have lost all their possessions, and may need grants and aid for clothing and to enable them to travel home. Similarly relatives may need help in finding local accommodation.

As the response develops social workers will become involved in the counselling of discharged patients.

NON-CLINICAL SUPPORT SERVICES

The clinical staffing discussed in detail above must be matched by adequate administrative and support staffing.

Portering

As soon as the hospital is activated and preparation of the key areas commences porters are central to all movements of patients, supplies and equipment. Such an important service must be tightly coordinated and a *Senior Porter* should take charge as soon as possible.

Even before casualties begin to arrive *Porters* will be needed to assist in the set up of the reception areas and wards and to move patients who are being rapidly admitted from the ED. As the incident progresses, porters will be needed to form part of *Transfer Teams*, and to move resupply and samples around the hospital.

There will still be a need for standard portering tasks (such as moving food to the in-patient wards) and the *Senior Porter* will have to sort requests by priority. Volunteers may be used for non-critical portering jobs as discussed later.

Supplies

A *Senior Supplies Officer* should be called in to oversee resupply of essential supplies, and to liaise with local stores, other local hospitals, manufacturers and suppliers. Plans should address the need for pre-arranged resupply from local stores (see Chapter 5).

Sterile supplies

The sheer number of casualties means that extra sterile supplies will be needed and if these patients require operative intervention, there will also be an extraordinary need for theatre supplies. The Central Sterile Supplies Department should be called in early in the plan, and should maximise the amount of sterile supplies available. As equipment is used it will be necessary to clean and re-sterilise it as quickly as possible and the duty manager in this department should ensure that this is done efficiently. If such work is usually done off-site then appropriate service level agreements must be in place to ensure that major incidents can be dealt with.

The *Theatre Sterile Supplies Manager* should work closely with both the *Senior Surgeon* and in theatres to make sure that operating equipment tray turn around is as fast as possible. If a large number of relatively quick procedures are carried out in many theatres then the re-sterilisation of equipment can be rate limiting.

Security

Most hospitals have security staff on site. It is absolutely essential that they are called at an early stage since they will assist in the preparation of the approach routes within the hospital and in the security of the site (during both the reception and definitive care phases). A *Senior Security Officer* must be appointed and will be responsible for the coordination of security throughout the incident, and for liaison with the police about this.

Traffic control

Traffic controls will probably be set up by the Police on the approaches to the hospital with the aim of keeping one route clear for emergency vehicles. Once these vehicles reach the site their route into and out of the reception areas must be clearly marked (quite often ambulance crews who are unfamiliar with a particular hospital may be involved). This

is the responsibility of the *Security Staff* who will need to place signs on the route and ensure it is kept clear.

Staff reporting for duty will also need to enter the hospital and procedures must be in place to ensure that they are allowed to enter quickly. Larger number of staff than usual will need to park their cars, and *Security Staff* need to control the parking carefully to ensure optimum use of space and to prevent traffic congestion. Parking by visitors will need to be restricted in the early stages both to maximise available space for staff and to help with traffic flow.

Use of helicopters

It may be necessary to use helicopters during the major incident response, either to bring casualties to the hospital or to take staff to the scene. The location of the helicopter landing site (HLS) should be indicated in the plan. In most cases the local ambulance service will be the official operators of the HLS and should be informed about all air movements. The *Senior Security Officer* will need to ensure that access to the HLS is restricted in order to minimise the danger to untrained staff and bystanders.

MANAGEMENT SERVICES

There are a number of essential management services that should be directly controlled by the *Senior Manager*. These include catering, linen supplies, hospital transport, setting up and running of the press room, and the control and administration of the discharge and enquiries areas. Casualty documentation has been discussed earlier in the chapter.

Catering

Food and drink need to be provided for casualties, relatives and visitors. Normal hospital catering arrangements for other patients will need to be maintained. Staff will be working in long intense shifts and will need sustenance during breaks; the *Senior Catering Manager* will need to liaise with *Senior Nurses* and other key staff to find out the best times and places for refreshments to be served. Visiting staff (mostly emergency service personnel) should also be catered for, and consideration should be given to providing some refreshments to the press. Attention to detail such as this is essential if staff morale is to be maintained.

Linen

The provision of clean laundry throughout the incident will be the responsibility of the *Senior Linen Services Manager*. In most hospitals this will require the manager to release as much stock as possible in the early stages of the response, and to ensure that procedures are in place to clean soiled linen and clothing as quickly as possible. Where linen services are provided off-site this sort of service should be sought contractually.

Transport

There may well be a need for hospital transport during the response, and this should be controlled by the *Senior Transport Manager*. Duties may include collection and delivery of supplies (including blood), and movement of patients around the hospital site.

Press relations and VIPs

Prior to the widespread availability of mobile communications, hospitals usually set up a predetermined Press Room as an area for communications and briefings. Nowadays, the press are not reliant on fixed points and they will initially congregate around the ED. It will be impossible to exclude the press entirely from the hospital site and it is more sensible to 'corral' them in an area. This will allow them the opportunity to film as casualties arrive at the hospital and with appropriate help from the *Press Officer* to speak to discharged casualties and staff. Some casualties want to speak to the press, but many do not. An alternative exit for these patients should be sought. A *Press Room* may still be needed for a formal news conference although the trend is for this to be done outside the ED.

Press conferences must be arranged and should be attended whenever possible by senior members of the staff. It is essential that staff at all levels understand that all contact with the press is to be arranged via the *Press Officer*. This will help to ensure that a consistent overview is given at all times.

The press should not be allowed into clinical areas without the express consent of the patients and should certainly not be allowed access during the reception phase.

An appropriately trained and experienced *Press Officer* should be nominated and will be responsible for all dealings with the media. This is an important role and the individual nominated should have had media training.

The *Press Officer* should also assume responsibility for the inevitable VIP visits. These should be coordinated between the press, the VIP and the in-patient teams. Visits should be avoided during the reception phase of the incident as they are disruptive to the already stressed hospital. They should be planned for a later time. Patients should be asked if they wish to be visited and an appropriate itinerary agreed.

Despite the obvious difficulties of managing a VIP visit during the reception phase it is not unheard of for senior visitors to arrive within a matter of hours, and largely unexpectedly. The *Press Officer* should be made aware of this potential problem on their action card.

Enquiries and discharges

A hospital Enquiry Point should be set up in an appropriate location (with good access for relatives and others attending the hospital but separated from receiving areas). A *Senior Enquiries Officer* should be nominated to oversee the smooth running of this area, which will act as a focus for everyone who attends the hospital in person to enquire about casualties from the incident. The enquiry desk should be staffed by clerks used to dealing with the public, and must be kept up to date with details from the Hospital Information Centre. Staff must be trained to select bona fide enquirers and arrange for their safe escort to reunion and clinical areas as appropriate. People who attend the Enquiry Point whose relatives or friends are not in the hospital should be advised to phone the casualty bureau for further information.

Discharge area

Casualties awaiting discharge should be accommodated adjacent to the enquiry point in order to allow reunion with relatives and friends. The actual reunion area will inevitably become a target for the press and should therefore be selected so that it can be kept as secure as possible. A senior nurse should be in charge of this area and will have particular responsibility for ensuring that discharged patients are adequately followed up. A liaison district nurse should attend this area to facilitate adequate provision of community care.

Bereavement area

Some relatives and friends may attend in person only to find that the person about whom they are enquiring has died. Provision should be made to ensure that this sort of news can be broken in an appropriate private area by someone trained to deliver it. Staff at the Enquiry Point should be made aware of the procedure to be carried out if such a person attends. It is important that the bad news is broken as planned, and not implied by the arrangements put in place (for instance bereaved relatives should not be taken to a common area but to private rooms and should never be kept waiting). They should leave by a separate route avoiding the enquiries area.

Interpreters

The *Senior Manager* is responsible for the provision of interpreters as required. Most hospitals will keep lists of interpreters that can be used in both everyday practice and in major incidents. The plan should ensure that such lists are readily available.

OTHER SERVICES

Religious officers

The senior hospital *Chaplain* will be responsible for coordinating the multi-faith religious response. In these circumstances this can be a considerable support to both casualties and staff. Particular religious groups may have very definite requirements in such circumstances and the chaplains will be able to advise the best ways to provide it.

At a later stage of the incident the religious advisers may be helpful in the initiation of emotional counselling.

Crèche

Crèche facilities are frequently forgotten but are extremely important both for staff and relatives. It is essential that any internal crèche facilities that exist be set up as soon as the plan is activated. A great number of the hospital staff may not be able to attend immediately if suitable arrangements cannot be made for their children.

The service should be coordinated by the staff who normally run the facility and will provide places for children of both staff and relatives. Special arrangements for labelling and checking children who are not known to the staff will need to be set up. Extra staff may be necessary and are often available from paediatric areas or from local nursery nurse training schemes. Volunteers should not be allowed to work in this area.

Utilisation of volunteers

All major incidents will attract a large number of volunteers many of whom will attend the hospital. It is absolutely essential that a suitable response exists to contain, categorise and utilise this resource. A *Volunteer Coordinator* should oversee this aspect of the response; this will also usually be the person who oversees volunteers on a day-to-day basis.

Two basic rules must be followed: first, no volunteers are to be employed except by the *Volunteer Coordinator* and second, none are to be admitted to clinical areas unless they have an identifying volunteer badge. Sadly a number of the 'volunteers' will have their own agenda, and the volunteer plan should be designed to weed these people out if possible. If they do manage to get through the first stage they must have no access to the casualties.

The safest approach is to limit access to clinical areas to previously registered volunteers, and to task unknown volunteers with non-sensitive jobs such as non-critical portering.

SUMMARY

- The reception phase is the most difficult time in the management of a major incident.
- The hospital must react to a situation which, at least initially, it may know little about.
- This phase will be concentrated in the ED, emergency theatres, intensive care units and designated wards.
- These areas should have the highest initial priority for preparation and staffing.
- Clinical, non-clinical and management support of the primary function is essential.
- Careful thought about how the hospital will prepare for casualties, how the staffing will be organised and how the support services may contribute to the overall response is vital if casualty care is to be optimised.
- The overall control of the hospital response will be through the *Hospital Coordination Team*, comprising the *Medical Coordinator*, *Senior Manager*, *Senior Nurse* and *Senior Emergency Physician*.

CHAPTER

13

Triage

INTRODUCTION

In a major incident the aim of the emergency services is to provide the best possible care for the greatest number of patients. However, in the early phase of the response it is unlikely that there will be a sufficient number of trained staff to deal with all the casualties at the same time. If the best care is to be given to the greatest number of casualties then a method of assigning priorities is necessary. In order to achieve this goal both the severity of the condition of each casualty and their relative priority need to be assessed. This method of assigning priorities is termed triage.

Whenever the number of casualties exceeds the available resources triage will be necessary. Triage is therefore an essential part of major incident planning and preparation. However, not all major incidents will require formal triage to take place. A collapsed building, from which patients may be removed one at a time, is an example of a major incident at which pre-hospital triage may be unnecessary, as the capacity (of the health services) will accommodate the load (rate of casualties). This differs from incidents such as train crashes where many casualties may require simultaneous assessment.

HISTORY

Triage was first described in modern times by Baron Dominique Jean Larrey who was Napoleon's Surgeon Marshal. He introduced a system of sorting the casualties that presented to the field dressing stations. His aims were military rather than medical and the highest priority was given to soldiers who had minor wounds and who could therefore be returned quickly to the battle with minimum treatment. There is no English language record of the use of triage until the First World War. The official history of the United States Army in this conflict uses the word 'triage' when describing the physical area where sorting was done, rather than a description of the sorting itself. Triage has developed since then to be the cornerstone of military medicine. In more recent times, it has become a daily management tool within civilian Emergency Departments.

AIMS

The aims of triage, wherever it is done, are not only to deliver the right patient to the right place at the right time so that they receive the optimum treatment but also to ‘do the most for the most’, accepting that valuable medical resources should not be diverted to treating an irrecoverable condition. It can be deduced from this that triage principles should be applied whenever the number of casualties exceeds the skilled help immediately available.

TIMING

Triage must reflect the changing state of the casualty and is therefore a dynamic rather than a static process. Casualties may be re-triaged repeatedly at a given stage of care, and must be re-triaged whenever they enter a different stage of their care. Thus triage may take place a number of times: at the site of the incident, at the casualty clearing station, prior to transportation, at the front door of the ED and during definitive care in the hospital prior to discharge, theatre or in patient care.

It is essential that the current priority of a given casualty is known to the staff making decisions about interventions. To achieve this there must be an agreed method of indicating the priority. Triage labelling is one method used to achieve this as discussed later in the chapter.

PRIORITIES

The end point of the triage process is the allocation of a priority. This priority is then used in conjunction with other factors to determine optimum care.

The systems of priorities in common use are referred to as the ‘T’ (treatment) system and the ‘P’ (priority) system. These are shown together with their common associations in Table 13.1.

Table 13.1. Major incident triage categories

Category	Description	Colour	Priority system	Treatment system
Immediate	Casualties who require immediate life saving treatment	Red	P 1	T 1
Urgent	Casualties who require treatment within 6 hours	Yellow	P 2	T 2
Delayed	Less serious cases who require treatment but not within a set time	Green	P 3	T 3
Expectant	Casualties: 1. who cannot survive treatment 2. for whom the degree of intervention required is such that in the circumstances their treatment would seriously compromise the provision of treatment for others	Blue		T 4
Dead	Dead	White	Dead	Dead

The words describing the priorities and their associated colours are as or more important than the numbers from the two systems. In the past different words have been used to describe priorities, different triage criteria have been applied and different colours have been associated with the categories.

As can be seen from Table 13.1 the only difference between the T and the P systems is the additional category of expectant included in the former.

For the purpose of this text the P system will be used.

DEFINITIONS

It is essential that, at each stage, all staff involved in triage use the same criteria for categorising patients into defined priority groups. Failure to do this can lead to significant errors. An understanding of the definition of each of the various priority categories is therefore essential if triage is to be performed correctly. The definitions are deliberately couched in general terms since they need to be adaptable for use in many situations. The definitions are shown in Table 13.1.

It is important to note that the triage priorities given in Table 13.1 reflect the need for clinical intervention, not the severity of injury. For example, a shocked patient bleeding from a simple scalp wound may need urgent intervention (priority red) but the injury itself may be relatively minor. By prioritising such a patient in a high category a simple manoeuvre (application of pressure dressing) may save the casualty's life. Similarly a patient with a large burn to the extremities clearly has a severe, possibly life threatening anatomical injury, certainly worse than the patient with the scalp laceration. However, their prognosis may not be altered by receiving their care within the first few hours rather than minutes.

The expectant category. If the P system is in use then the use of a 4th category is very much a decision for the senior personnel involved (the incident officers at the scene and the *Hospital Coordination Team*). The decision must be based on an overall assessment of the situation: it must take into account both the patient load and the resources available. It must be emphasised that a failure to institute the use of this category as soon as it becomes necessary will result in a higher overall morbidity and mortality. Since this is the case, the undoubted difficulty in making the decision to leave seriously ill or injured casualties without treatment cannot be used as an excuse for not making it at all.

Many triage labelling systems do not include an expectant label and a local solution to this problem needs to be found. Standard approaches would be to use the green (delayed) category and ensure that the patients are placed in a separated area, or to use the red (immediate) category and mark the card 'hold'.

TRIAGE METHODS

Triage methods used for the assessment of a single casualty are not necessarily applicable to the assessment of many casualties. In the assessment of a single patient, sufficient time may be available for a relatively detailed clinical history and physical examination. If many casualties require rapid assessment then methods of triage which take time or require special equipment are of little value, as the time taken to assess a single casualty may delay and prejudice the care of other victims. The principal solution to this problem has been the development of objective triage scores.

Few UK pre-hospital care services routinely use any form of formalised triage score at the present time. Major incident triage in the UK will therefore usually be performed by personnel who may never have performed formal triage before. An objective, simple and quick method of assigning priorities is required.

Objective methods have the advantage that they are reproducible, require little in the way of clinical skills or experience, and can be quickly and reliably taught to personnel with minimal medical training. For experienced clinicians any additional information may be used in conjunction with an objective scoring system to reach a final triage categorisation.

If a triage scoring system is to be of use in major incidents then it must be:

- Quick
- Reproducible
- Easy to use (in the environment in which it is to be used)
- Able to describe major incident outcomes
- Dynamic

Of the many methods in use for a small number of casualties, the TRTS is the only score that satisfies such criteria. The score has been further modified by the Advanced Life Support Group for use within the environment of a major incident. The resulting method, the triage sieve/triage sort system, is described below.

Triage sieve

In the initial stages of a major incident a large number of triage decisions need to be made quickly. Typically this is at the scene of the incident itself but rapid triage may be needed at the Casualty Clearing Station, or at the hospital reception. The method used to triage the casualties must be fast, easy, safe and must give the same result whoever carries it out. Since the accuracy of any method depends upon the amount of information used to reach a decision and gathering information takes time, there is a trade-off between speed and accuracy. All patients will be retriaged and any necessary refinements can then be made.

The aim of the triage sieve is to convert the chaos of a large number of injured casualties into some sort of medical order. Since the greatest number of patients are likely to have minor injuries, the most effective first step in establishing order is the separation of the priority 3 (delayed) patients from the rest. At this stage it is reasonable to assume that patients who can walk do not require urgent or immediate treatment, and all such patients are therefore categorised as priority 3 (delayed). Once this has been done the state of the airway, breathing and circulation is considered as illustrated in Figure 13.1.

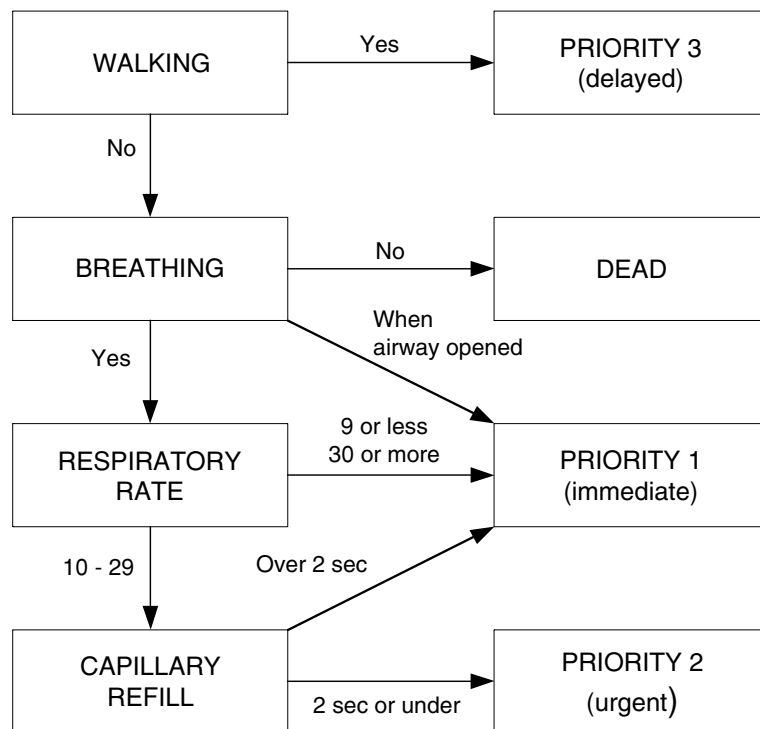


Figure 13.1. The triage sieve

Those patients who remain after the mobility sieve has been applied must be either priority 1 (immediate), priority 2 (urgent) or dead. They are sorted into the appropriate category by looking at simply assessed aspects of airway, breathing and circulation.

Airway patency (not security) is assumed in conscious patients and is assessed in the unconscious by performing a simple opening manoeuvre (chin lift or jaw thrust) and seeing if breathing occurs. Casualties who cannot breathe despite simple opening manoeuvres are dead. Patients who only breathe after their airway is cleared are priority 1 (immediate). Some patients may need a simple airway adjunct to maintain airway patency and this can be inserted at this stage.

Those who can breathe have their respiratory rate counted. If the rate is low (9 or less, or 30 or more) then the casualty is priority 1 (immediate). If the rate is 10–29 breaths per minute then an assessment of the circulation is carried out.

An assessment of circulation is difficult even within the hospital, and no single measure will reliably give an accurate overall picture. Despite this reservation the capillary refill time fulfils other criteria in that it can be measured simply and quickly in the nail bed. Pressure is applied over the quick of the nail for 5 seconds and then released—the time taken for the colour to return is the refill time. If this time is over 2 seconds then the patient is assigned priority 1 (immediate), and if it is 2 seconds or less then the casualty is priority 2 (urgent). If it is not possible to measure CRT then a pulse rate of greater than 120 can be used to determine priority 1 status.

The triage sieve should take no more than 20 seconds for each non-ambulant patient, and first look triage can therefore be done very rapidly. This broad-brush approach gives some urgently needed direction to the health service response which can then be focused on the care of the priority 1 patients. Since the sieve is so quick it is easily repeated at any stage of the response and should be applied whenever a large number of patients need to be rapidly assessed.

Triage sort

As triage decisions become more complex the triage methods become more refined. The triage sort is the next step up from the triage sieve and consists of a formal physiological appraisal of the patient. No anatomical descriptors of injury are sought at this stage since the treatment that is being considered (i.e. the need for resuscitation) does not depend on such information.

The triage sort is based on the TRTS as developed by Champion. It uses respiratory rate (RR), systolic blood pressure (SBP) and the Glasgow coma scale (GCS) to assign a score of between 0 and 12 for each patient (Table 13.2).

Table 13.2. The triage sort (revised trauma score)

	Measured value	Score
Respiratory rate	10–29	4
	>29	3
	6–9	2
	1–5	1
	0	0
Systolic blood pressure	≥90	4
	76–89	3
	50–75	2
	1–49	1
	0	0

Continued

Table 13.2. The triage sort (revised trauma score) (*Continued*)

	Measured value	Score
Glasgow coma scale	13–15	4
	9–12	3
	6–8	2
	4–5	1
	3	0

The coded values are summed to give a score of between 0 and 12. The TRTS can be used to assign triage priorities as shown in Table 13.3.

Table 13.3. Triage revised trauma score and priority

Priority	TRTS
P1	1–10
P2	11
P3	12
Dead	0

Although the TRTS was developed using death and anatomical injury as outcome measures, it is at present the best objective physiological scoring system available for major incidents. Table 13.4 shows the predicted outcome related to TRTS score and the triage priority.

Table 13.4. Predicted survival for triage categories

Triage priority	Triage revised trauma score	Probability of survival %
P 1	1–10	25–87.9
P 2	11	96.9
P 3	12	99.5
Dead	0	3.7

The TRTS (triage sort) is relatively quick to perform and yields consistent valid results. It compliments and extends the triage sieve method discussed earlier in that it uses one of the same measure values (respiratory rate), substitutes a more complex measure of circulatory function (systolic blood pressure) and introduces an assessment of conscious level. The need to measure both blood pressure and perform Glasgow Coma Scores increases the time needed to assess each patient; a skilled assessor should still be able to categorise a patient within 1 minute.

If the fourth (expectant) priority is used then a TRTS of between 1 and 3 should be used as its definition.

The triage sort described here is appropriate in situations where slightly more time can be spent in assessing each patient (either because there are less patients, because there are more people to carry out the assessment or because the speed of assessment is less important than the accuracy). The physiological measures used in this score are the same as those commonly measured when patients are being monitored. The triage revised trauma score is therefore doubly useful in that it serves both as a triage tool, and as a clinically useful tool for monitoring the patient’s condition. If anatomical information is required then the triage sort must be combined with some form of survey as described below.

Preliminary survey

Sometimes the patient's priority for treatment or intervention may depend on a description of the injury or illness, or on some other additional information. As was alluded to earlier in this chapter a full secondary survey to establish all injuries is time consuming and often inappropriate in the initial stages of a major incident. Examination and history should be limited to a preliminary survey specifically designed to elicit the relevant information.

The nature of the preliminary survey will vary depending on the exact information that needs to be obtained. For instance following a fire in an enclosed space there is the possibility of smoke inhalation. Casualties who have suffered this complication may take some time to develop physiological signs, but will benefit from early transportation to hospital. A history of exposure, together with the presence or absence of added respiratory sounds, might be used to categorise such patients as priority 2 (urgent). The preliminary survey would consist of a simple question and auscultation of the chest.

The specific questions and examinations that form the preliminary survey must be used in conjunction with the physiological information obtained during the triage sieve or sort to give a triage priority. Other descriptions of the injuries may also be available, for example a broad categorisation such as 'head injury' or 'burns', and may be used during parts of the decision making process. This sort of information does not affect the priority, however, and is not part of the triage process. The difference between triage priority and order of care is discussed later.

Primary and secondary surveys

Once the patient has reached hospital and initial resuscitation has been carried out, a full description of the injuries must be obtained in order to plan both the patient's treatment and its relative priority. A standard advanced life support approach should be taken. The primary survey will consist of a full assessment of A, B, C, D and E priorities together with appropriate resuscitative measures. In general only casualties categorised as priority 1 (immediate) by the triage sieve and triage sort methods will have any primary survey resuscitation requirements. Casualties who cannot be resuscitated through the primary survey will be categorised as priority 1 (immediate) for further treatment (surgery or intensive care).

Those patients who require no intervention during the primary survey or who are stable after initial resuscitation will undergo a thorough secondary survey. As usual this is a complete head to toe, front and back all system evaluation of the patient. At the end of the secondary survey the *Treatment Team* should have a comprehensive list of the problems of each ill or injured patient. The overall triage category will reflect the urgency of the worst injury discovered. Thus a patient with a closed isolated lower leg fracture which is placed in a back slab plaster would be categorised priority 3 (delayed) for further treatment, while a similar patient with an open fracture would be classified as priority 2 (urgent).

Each *Treatment Team* completing a secondary survey must report their findings to the *Senior Surgeon* or *Senior Physician* so that an overall management plan can be formulated.

Special incidents

Triage modifications for special incidents are discussed in Chapters 16–18.

SUMMARY OF TRIAGE METHODS

The discussion above has illustrated that a number of methods can be used to assess triage priority and that different methods are more appropriate to different stages of the response. A summary of these methods can be seen in Table 13.5.

Table 13.5. Summary of triage methods

Location	Treatment considered	Grade performing triage	Triage method
Site	Life saving first aid	Paramedic (Primary Triage Officer)	Triage sieve
Casualty Clearing Station	Life support	Paramedic/doctor (Secondary Triage Officer)	Triage sieve or sort
Casualty Clearing Station	Advanced Life Support	Doctor (Secondary Triage Officer)	Triage sort and preliminary survey
Hospital reception	Advanced Life Support	Senior Emergency Physician/Triage Nurse	Triage sieve and triage sort
Hospital	Life saving surgery	Senior Surgeon	Primary and secondary surveys

The quickest and easiest method is the triage sieve which looks at mobility and ABC; this method is appropriate to any situation in which large numbers must be sorted rapidly. The triage sort using the Triage Revised Trauma Score is the next step up; this again looks at physiological derangement and is relatively rapid. It is typically used in less frenetic environments and is an ideal monitoring tool for patients held at any stage of their care. The categorisation using these physiological methods can be supplemented by specific information sought during the preliminary survey. This survey is focused on relevant history and examination and is relatively quick. Finally, once more staff and time are available, standard advanced life support methods are used to obtain a full picture of the casualty's illness or injury.

This hierarchy of triage methods balances the time needed to reach a decision against the relative accuracy of that decision. Furthermore it allows the person performing triage to use the fast method at any stage, and should therefore encourage frequent reassessment.

TRIAGE AND ORDER OF INTERVENTION

The triage priority of an individual casualty is only one of a number of factors that should be considered when the order of interventions is being decided. This point needs to be emphasised since the triage category is too often seen as an absolute guide to order. The other factors to be considered will vary according to the intervention that is being considered. Two situations are considered in more detail below.

Evacuation from the scene

A number of factors determine the order in which casualties may be evacuated from the scene to hospital. Clearly the triage priority is very important, but this is not the only consideration.

Box 13.1 Factors which Determine the Order of Evacuation**Resource factors**

Availability of Ambulances
 Availability of escorting staff
 Destination of individual ambulances

Patient factors

Need for sitting or stretcher
 Completeness of packaging for transport
 Need for transport to specialist centres

Thus, although there may be high priority patients at the scene it may be more appropriate to send minor casualties first, in order that the high priority patients are resuscitated enough to survive transportation. Similarly, priority 3 casualties can be transported sitting with a priority 1 casualty because space is available in the vehicle.

This does not mean that such patients are receiving a higher triage priority, but indicates that resources are being optimally used to provide the best possible care to all casualties. It also explains why hospitals must be prepared to receive casualties of all priorities at any stage.

Order of surgical intervention

The order in which surgery is performed is controlled by the *Senior Surgeon*. This surgeon needs to take an overview of both the demand for surgery and the resources available to provide it. Although surgical priority (based upon information from the primary and secondary surveys) is one factor in the decision, much more needs to be considered.

Box 13.2 Factors which Determine the Order of Surgical Intervention**Resource factors**

Availability of theatres
 Availability of skilled staff
 Availability of sterile supplies
 Availability of specialist equipment

Patient factors

Number of patients
 Priority of patients
 Operative time for each procedure

Patients for life saving surgery will always have the highest priority but, if the only surgical team capable of providing that surgery is already operating, and another theatre becomes available, it is appropriate to put a patient with a lower operative priority into that theatre with a different *Operating Team*. Again, this does not mean that this second patient has a higher priority, but indicates an efficient use of resources.

TRIAGE LABELLING

It is essential that everyone involved in the incident response is kept aware of the current triage status of the casualties. This simple measure will reduce needless duplication of effort and will ensure that the overall management plan (which will be heavily dependent on the triage status of the patients) does not go too awry.

In order to achieve this simple objective some form of labelling is required. An effective label will fulfil the criteria below.

- High visibility
- Conformity with national standards
- Category numbers
- Category names
- Category colours
- Easily and firmly secured
- Easily changed between categories

As with triage methods the label used can reflect the time available and the conditions. Thus during the triage sieve at the site a simple alternative to standard labels such as clothes pegs or coloured adhesive patches can be used. Similarly after secondary survey prior to definitive care triage labels may be dispensed with altogether in favour of clinical notes with care plans. At other times a specially designed and properly used triage label is invaluable.

Types

Two general formats of triage label exist—single card and multi-use. The relative merits are discussed below.

1. Single card

The single card system, as the name suggests, consists of a number of individual cards of appropriate colours marked with the priority markings. One of these cards is attached to the casualty once triage has been carried out; the form of attachment is frequently a piece of string (but many variations on this theme exist). This system is not easily reconciled with the need to carry out frequent triage reassessments. Changing between categories is relatively difficult as the first card must be removed prior to the new card being attached. This is a great problem if clinical notes have been made on the card. In such cases all the clinical information would need to be transferred to the new card or the casualty keeps both cards. If the latter occurs then confusion may arise as the casualty may appear to have two triage priorities.

The Mettag label is a variant of the single card system. It consists of a card with perforated strips on the lower edge; each strip accords to a different triage category and is coloured and marked appropriately. Once the triage priority has been decided the inappropriate strips are removed—leaving the correct strip at the bottom of the card. This card presents two problems: first, the patient's priority is not easily visible except at close range—this may be a problem if it is necessary to count patients from any distance. Second, since the tear-off strips are ordered such that a high priority is at the top, it is impossible to triage a patient to a lower category without issuing another card.

2. Cruciform cards

These cards are cross-shaped or concertinaed. In the former case folding the corners of the cross into the middle causes the card to become rectangular; the colour and markings that remain visible depend on the way in which the folds are made, thus the

card can show any priority. If the priority changes it is simply a matter of adjusting the card such that it shows the new appropriate colour and marking (Figure 13.2). In the latter case the card can be folded such that any of the priorities shows while the clinical notes are kept as a separate card. These systems elegantly overcome the problems inherent to dynamic triage in that category changes are simple, and clinical notes are secure since only one card is ever used for each patient. In addition there is no reason why the card initially placed on the patient during or immediately after the triage sieve cannot be used at all subsequent stages of triage, both in the pre-hospital and hospital settings.

Such cards are extremely useful, but since the categories are so easily changed, they are open to abuse both by patients and their relatives.

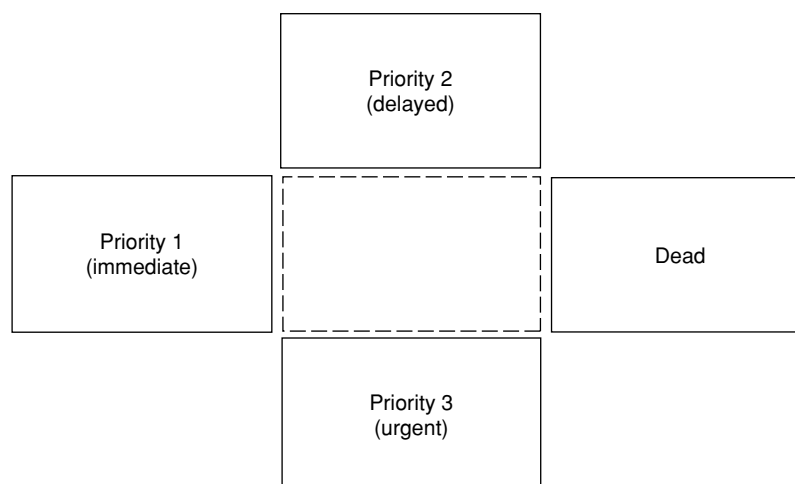


Figure 13.2. Cruciform label system

SUMMARY

- Triage is a key component of the major incident response
- Different methods of triage are used at different stages of the major incident response
- Triage should initially be based on a physiological assessment of the casualty (triage sieve/triage sort methods)
- Triage category is one of a number of factors that determine order of intervention
- Triaged patients should be clearly labelled

CHAPTER 14

The definitive care phase

The definitive care phase might be called the in-patient phase, as those casualties with minor injuries will have been seen and discharged from the Emergency Department (ED) during the reception phase and only those requiring in-patient care remain. The critically ill will require admission for life-saving surgery or intensive care immediately, while those with less severe injuries may need to wait for admission and be prioritised for treatment. This coordination of casualty flow is as important during this phase as during the reception phase.

The medical and surgical definitive care responses are considered separately below.

THE SURGICAL RESPONSE

The overall treatment of surgical casualties will be controlled by the *Senior Surgeon*. This surgeon not only has to supervise the surgical management during the reception phase, but also has to oversee the surgical aspects of definitive care. To do this they must have as full a picture as possible of the surgical requirements of the patients, the availability of staff and the state of the wards and theatres. This is achieved by proper delegation and liaison with surgeons in the two key areas of Pre-Op and Theatres.

Patients requiring immediate surgery will initially be concentrated in the Priority 1 and 2 areas. The number that can be moved directly from this area to a properly staffed and prepared operating suite will depend on the number of staff and theatres available. This in turn will depend on the time that the incident occurs. At night many theatres will be available but there will initially be no staff to use them; during the day there will be many staff and theatres but they will be used for list operations. The plan must address both these situations.

This issue of theatre availability must be assessed by a *Senior Surgeon Theatres* and *Senior Nurse Theatres* in the operating suite. This surgeon must be of sufficient seniority to be able to assess the priority of operations that are already occurring, and must be able to decide in exceptional cases whether any of these can be safely abandoned. In addition, the *Senior Surgeon Theatres* must also be able to decide how many of the listed cases need to proceed, and how many can be cancelled. At night, when

few cases are listed, the *Senior Surgeon Theatres* will have less immediate input since the main factor determining the availability of theatres is staffing. Once theatre availability and current usage have been assessed, the *Senior Surgeon* should be given an accurate picture of the likely physical facilities available for the immediate major incident surgical response.

In the early stages the *Team Coordinator*, *Senior Nurse Theatres* and *Senior Anaesthetist* will assist the *Senior Surgeon* by forming *Operating Teams* as required. In the later stages of the response the nature of these teams will vary depending on the surgery that needs to be carried out. In the early stages, when only life threatening surgical conditions are being treated, a generic team of a surgeon, an assistant, an anaesthetist and a scrub nurse will be able to perform most of the necessary procedures.

The surgeon and anaesthetists in these teams should be of as high a grade as possible.

As the response develops the *Senior Anaesthetist* and the *Specialist Surgeons* will advise the *Senior Surgeon* of any special anaesthetic or surgical needs—both in theatres in general and for specific patients.

As has been mentioned above the most critical time for the surgical response is early on—when the need for immediate treatment is highest, and staff and theatre provision is lowest. During this time some patients will be able to go directly to theatres, while others with equal need may have to be held in the pre-operative ward or ED until theatre and operating team availability improves. As well as these high priority patients other casualties initially thought to be of lower priority may deteriorate while being held on the pre-op ward. For these reasons it is desirable that a *Senior Surgeon Pre-Op* is present and available to both monitor resuscitation and continually reassess surgical priority. This surgeon must liaise directly with the *Senior Surgeon*.

In order to make the best decisions about the priority order of patients for surgery and the nature of the procedures to be undertaken, the *Senior Surgeon* must weigh up the various reports that he receives from the surgical areas. The factors to be considered were discussed in Chapter 13 and are repeated below in Box 14.1.

Box 14.1 Factors which Determine the Order of Surgical Intervention

Resource factors

- Availability of theatres
- Availability of skilled staff
- Availability of sterile supplies
- Availability of specialist equipment

Patient factors

- Number of patients
- Priority of patients
- Operative time for each procedure

It can be deduced that, in the early stages at least, the pressure of number of patients on limited resources may mean that surgery is not definitive. The priority in the early stages should be for life saving surgery. In cases not requiring such critical early intervention, surgery should still be limited to the minimum that is safe. This ensures that the highest possible number of patients receive a basic level of surgical care. It also ensures that, when the reception phase is finished and the facts start to become clearer, the surgical planning for all the patients will be better. Even with relatively few patients the initial operative phase may last many days.

NON-SURGICAL (MEDICAL)

Many incidents produce cases that do not require a surgical response (many plans fall into the trap of assuming that all major incidents will produce trauma cases only) and it is important to mirror surgical arrangements with non-surgical ones. The patients not requiring surgery will range from those requiring intensive care to others who have incidental minor illness. The non-surgical assessment and treatment of casualties will be controlled by the *Senior Physician* who will be either a senior acute physician or a senior intensivist depending on local circumstances. This doctor's responsibilities will exactly mirror those of the *Senior Surgeon*.

Depending on bed availability and an assessment of the overall requirements for critical care resources, some high priority cases will be transferred directly to ITU. The preparation of this area should be the responsibility of the *Senior Nurse ITU* and should be initiated early in the plan.

The *Senior Intensivist* in each receiving hospital (or a *Senior Nurse ITU*) must be made responsible for assessing ITU bed availability both within the hospital and elsewhere. This assessment needs to include both actual and potential beds, and should be directed through existing ITU clearing systems if they are in place. Most hospitals will have a low actual bed availability; the potential bed numbers will depend on the normal use of the beds—units with a high elective surgical workload may be able to free beds quickly by cancelling list surgical procedures. The ability to do this will vary depending on the time of day (once an elective procedure has started the bed is effectively used). The provision of beds in this way should not be assumed in the planning process. Although temporary high dependency areas can be set up as a holding measure, continued staffing of such areas will rapidly become impossible.

The majority of hospitals will not be able to accommodate all the patients requiring intensive care, and transfer of critically ill patients will therefore be necessary. Selection of patients will depend on a number of factors and close liaison between the *Senior Physician*, the *Senior Surgeon*, the *Senior Intensivist* and the *Team Coordinator* will be necessary. Once a patient is selected for transfer and a bed has been identified for them a *Transfer Team* should be allocated. This team will need to liaise with the *Treatment Team* that is looking after the patient and should also liaise with the unit that has accepted the transfer. These teams will have the same structure and responsibilities as teams used for transfers of critically ill patients within the hospital. Wherever possible the principles of good transfers (*Safe Transfer and Retrieval: The Practical Approach*, BMJ Books) should apply.

Some casualties may require admission without needing either surgery or intensive care (for example patients with smoke inhalation who are symptom free). They should be accommodated in an admissions ward overseen by a senior physician; this doctor will have to liaise with the *Team Coordinator* if it becomes necessary to carry out any further assessment and treatment. If there is limited space and the casualty load is not high it may be possible to place these patients in either the Pre-Op or Post-Op wards discussed earlier. It is important that such patients are formally overseen by a senior physician in any case.

A number of patients will present during the major incident response with medical conditions precipitated or exacerbated by the incident. In addition, patients uninvolved in the incident may still present to the ED. This will particularly be the case in more isolated areas where it will not be possible to redirect ambulances to adjacent hospitals. All major incident plans must accommodate the management of these types of patients. Once the major incident plan has been activated all patients should be treated as though they were part of the major incident. They should receive major incident documentation and follow the same casualty flows as if they were from the incident itself.

CLINICAL AND NON-CLINICAL SUPPORT SERVICES

Beyond the medical and surgical services nearly every other group within the hospital will need to support patient care. Those essential groups required early during the response should have individual action cards (e.g. radiology). Those groups who will only become involved later (e.g. occupational therapy) will not need specific action cards.

SUMMARY

- Those patients requiring care in addition to that received in the emergency department will enter the definitive care phase of the incident.
- This phase may last for days or weeks and can produce significant disruption to the day to day running of the hospital.
- Patients will be broadly subdivided into those requiring surgical or medical care.
- The overall coordination of these patients will be the responsibility of the *Senior Surgeon* and *Senior Physician*.

CHAPTER 15

The recovery phase

There are three parts of the recovery phase which are discussed in detail in this chapter; they are:

1. Resolution
2. Reflection
3. Audit

RESOLUTION

Following all but the smallest of major incidents there will be a significant period of disruption to the day-to-day workings of the hospital.

Most hospitals are working to achieve management targets for elective and emergency care, and in particular elective surgery. It is very likely that the elective work of the hospital will be disrupted such that elective admissions may need to be postponed. The problems arising from this are predictable and should be managed appropriately. This is often referred to as business continuity planning.

The cancelling of individual patients is unlikely to cause complaint as most members of the public will understand the dramatic impact of a major incident on a hospital. However, such understanding will be soon lost if the hospital fails to communicate effectively with patients to rearrange early admission.

An estimate of the period of hospital disruption should therefore be made soon after the incident. This may then be used to formulate a plan to restore the hospital to normal activity. This should be agreed by senior nursing, medical and management staff.

Clinicians and managers must meet to decide on the priorities for cancelled patients. Clearly, there may be patients requiring urgent procedures (e.g. cancer surgery) whose priority may almost match that of patients involved in the incident itself. A list of such patients should be identified by each surgical directorate and submitted to the *Senior Surgeon* and senior management team who can then plan for the care of these patients.

The resolution plan should take account of the following:

1. Staffing levels (as staff may have attended during the reception phase, thereby leaving subsequent staffing numbers deficient whilst they rest)

2. The need for further surgical procedures
3. The number of beds occupied by major incident patients
4. The number of ITU beds occupied by major incident patients
5. Equipment resupply

Once an appraisal of likely disruption has been made, solutions may be found and on some occasions additional funding sought.

REFLECTION

Following a major incident there is a need for debriefing of staff and for the post-traumatic counselling of casualties and relatives. This will involve a wide range of agencies. In addition both the medical care provided and the operation of the plan itself need to be audited.

Staff debriefing

Staff debriefing is essential after a major incident. Both operational issues (the operation of the plan and the care given to the patients) and psychological issues should be addressed.

All the staff involved must be operationally debriefed by their head of department before leaving the hospital. This can be done either individually or in groups and should be designed to allow immediate reporting of matters concerning the response itself. These reports may highlight issues that can be changed immediately, or may bring up matters that warrant further discussion.

Further informal debriefings of staff in small groups should be undertaken in the week following the incident. These sessions may be coordinated by a Lead Counsellor, who may come from a psychiatric, psychology or counselling background depending on local circumstances. As well as providing a forum for the discussion of the incident, they are designed to allow the counsellors to identify staff in need of further post-traumatic counselling.

It is important not to enforce formalised counselling sessions onto all staff. This is often seen as intrusive and many people find speaking to a stranger about their experiences unnatural. A lot of informal counselling takes place following an incident between colleagues at work or on informal social occasions, and good peer group support is probably the most effective form of counselling. Despite this there will be a number of staff who will need additional help in the form of formalised psychological support. These staff may present themselves if the opportunity for counselling is widely known and advertised. However, not all staff will identify that they are struggling and senior staff should watch for and identify any persons who appear to be affected by the incident.

It is a mistake to assume that the only people affected during a major incident will be the young or inexperienced. Very few staff will have experience of the stresses of a major incident and even individuals in senior positions may suffer. All staff, but particularly those in more senior positions, may feel that there is some stigma attached to requesting help, and sadly there often is. Help should therefore be offered as a confidential service.

Post traumatic counselling of patients

Patients admitted to the hospital will be counselled on the wards by social workers, chaplaincy, psychiatric and other staff as appropriate. One agency must take the lead and coordinate this—this will depend on local circumstances.

As with members of staff, patients will gain much support from their peers who have had the same experiences. Some patients may be reluctant to talk to people whom they see as having no experience of the incident itself. To this end, patients from the major incident should be cared for in the same area if possible. This will allow some peer support whilst in hospital. A similar phenomenon is seen following hospital discharge in the formation of many survivor or victim groups based around a particular incident. These groups act as a focus for support and claims for compensation. Patients should not be kept apart from each other as this is likely to have a negative effect.

Patients who have been discharged must be followed up and counselling offered. It is essential that all patients discharged early in the response are offered the chance of counselling, and to this end, a leaflet should be given to each casualty explaining how they can obtain help. The leaflet should contain general advice and a contact telephone number. A *Senior Social Worker* will usually coordinate the out of hospital counselling service.

AUDIT

Any major incident is an opportunity to assess and improve future practice. A thorough debrief of the events of the incident and the hospital's ability to cope should be conducted. No response will ever be perfect as it is impossible to plan all the details in advance of an incident occurrence.

The care delivered to the casualties should be audited and the results presented to the hospital staff within 1 month of the incident occurrence. This will serve to highlight any clinical deficiencies, and will also help staff understand the outcome of their response.

The Major Incident audit must involve all those involved in the hospital response and must not concentrate entirely on the clinical care of patients. Liaison with other agencies (e.g. ambulance service) is important for the mutual exchange of information and learning points. The audit should be explicitly 'blame free'; if it is to be effective the approach should be as independent and open as possible. Traditionally, individuals and organisations are reluctant to admit any errors during major incidents, yet this is unlikely to improve practice. Clearly an open appraisal is most beneficial to those involved although the press is likely to focus on any early admission of a mistake.

The rarity of major incidents means that the early dissemination of any lessons learned has national benefit. Care must be taken to keep advice on a generic basis. Altering plans to cope with the peculiarities of the last incident is not to be recommended as the next incident is likely to be quite different. An all-hazard approach must be maintained.

SUMMARY

- A major incident will severely disrupt a hospital's daily working practice.
- Following the initial phases of the incident senior staff should appraise the likely disruption and plan for managing the period of resolution.
- It is vital that the incident itself is debriefed to learn lessons and to ensure that the staff have the opportunity to personally reflect on the events.
- Some staff and patients will require psychological support and this should be available.
- A formal, impartial audit should take place within a month of the incident to identify any problems and to disseminate any lessons learned to a wider audience.

PART
V

SPECIAL INCIDENTS

CHAPTER 16

Incidents involving hazardous chemicals

INTRODUCTION

Chemical incidents are relatively frequent and require special consideration as both the risks to the health service staff and the clinical response are different. They have occurred during chemical processing, manufacturing, storage and transportation and from the disposal of toxic waste, and have resulted in the contamination of air, food, water and soil. Acute and/or chronic health effects have been caused in local populations.

Table 16.1. Recent significant chemical incidents

Major incident	Year	Country	Number of casualties (number of dead)
Explosion at Flixborough chemical works	1974	UK	>250 (28)
Bhopal	1984	India	10 000 (3800+)
Industrial explosion at Poole, Dorset	1988	UK	19 (0)
Explosion at International Biosynthetics	1991	UK	35 (0)
Explosion, Hickson & Welsh, Castleford	1992	UK	>56 (2)
Chlorine gas leak	1993	Sweden	33 (0)
HazMat Chemical truck fire, Sydney	1996	Australia	60 (0)
Fertilizer plant explosion, Toulouse	2001	France	650 (37+)

The management and investigation of chemical incidents depend on the rapid assessment of the toxic risk to the local population and to those presenting at the Emergency Department (ED). Therefore, incidents leading to acute exposure of the public to toxic substances are an important concern for emergency physicians. In addition, there is a need for appropriate investigations and the development of monitoring and surveillance

programmes of those exposed much of which requires support from services outside the ED, such as Public Health Departments.

Few physicians have been trained in managing such events or have recourse to the resources required for identification, investigation, mitigation or prevention of health effects in humans which can arise from chemical incidents. Indeed recent surveys point to the need for training and clear guidance in this area.

In the UK, the medical toxicological information for managing these incidents is accessed via the Chemical Hazards and Poisons Service (CHaPS) of the Health Protection Agency (HPA). This service responds to toxicological emergencies and is available to medical professionals and emergency services on a 24 hour basis, usually by telephone. It compiles and assesses medical toxicological information and confidential product and chemical intermediates data from manufacturers, distributors and importers. The unit aims to:

- Provide information and advice related to the diagnosis and management of poisoning
- Identify and evaluate toxic risks to the community with a view to taking measures to reduce or eliminate these risks

Local Highlights: Information sources for chemical incidents

RESPONSE

The response to an incident involving chemicals, like the response to all major incidents, is based on three key elements shown below:

1. Preparation
2. Medical management
3. Medical support

Preparation

Preparation involves adequate planning, selection and maintenance of equipment, and training.

Planning

In the United Kingdom there is some guidance about the response to chemical incidents. This guidance, together with local knowledge, needs to be incorporated into an easily executable local plan. It is absolutely essential that any such plan should mesh seamlessly with the local major incident plan so that the overall 'all-hazard approach' to major incident planning is maintained. Unfortunately plans for dealing with chemical incidents are all too often left on the shelf until such time as an incident occurs. Planners can overcome this problem in two ways, first those staff who are involved in the plan can be made aware of its existence and tutored in its content. Second, the individual actions of staff involved in the plan should be described in easily assimilated action cards for use during the episode.

Local Highlights: Guidance on response to chemical incidents

Equipment

Equipment needs to be considered in detail. Three areas must be considered.

- The protection of staff
- The decontamination of the casualties
- Specialist medical supplies

Personal protective equipment. Personal protective equipment for Health Service Staff responding to a chemical incident must protect the head, the face and eyes, the ears, the body, the hands and the feet, and it must do so against unknown chemicals. This is quite different from the situation in a chemical production plant where the likely chemical hazards are known or can be predicted. Health service HazMat PPE must be of the highest standard and give a significant protection time within the warm zone.

Safety officers must be familiar with the performance HazMat PPE and must urgently check with appropriate officers the actual nature of toxic chemicals and compare this with protection levels. Filter change times must be monitored as must any symptoms experienced by staff.

Local Highlights: Specifications of HazMat PPE

Decontamination of patients. Decontamination of patients, either at the scene or in hospital, is a health service responsibility. It is hoped that the majority of decontamination of casualties will occur at the scene, though on many occasions this will not be possible. In addition patients may self-evacuate to hospital, presenting in a contaminated state at the doors of the ED. All hospitals with EDs should therefore have facilities to decontaminate casualties.

Some hospitals have a patient decontamination area in the Emergency Department; such areas should incorporate an adequate delivery system for water and adequate support for the patient and a method for safe collection of contaminated water that is used during the decontamination process. If resuscitation is to be carried out in the same areas then the room should be equipped with oxygen, suction and waterproof electrical points.

Inflatable units have been provided for all departments in the United Kingdom. These (the NHS Decon Unit) can be erected in 10–15 minutes and can support the decontamination of 8–10 stretcher casualties per hour.

Medical equipment. In general the equipment needed for the treatment of contaminated casualties is the same as that for non-contaminated casualties. However, once used, the equipment itself may become contaminated and need disposal. The decision to keep specific equipment for use in chemical incidents (i.e. disposable items) will be made on the basis of the likely risk.

Antidotes for common contaminants should be held in all departments, but those for less common problems can be held centrally so long as their location is known to all and they can be rapidly obtained.

In the UK equipment has been purchased initially and is available for use via designated ambulance services. Antidotes to a number of agents are available either in the equipment pods or via the National Blood Service.

Local Highlights: Regional and national equipment provision

Training

The final part of preparation is training and this needs to be carried out on a number of levels. Individuals should be fully aware of their part of the plan and how to use their personal protective equipment. There should be a minimum level of acceptable competence before people are allowed to take part in the hazardous activity. Other aspects of the response require training in groups. For example, teams such as the *Chemical Decontamination and Treatment Team* and the *Chemical Assessment Team* should train together with their equipment in the appropriate areas of the hospital. Finally the whole plan can be practiced either using live casualties or as a tabletop exercise.

Medical management

Medical management of a chemical incident involves the command of the incident, a vigorous approach to safety and a thorough assessment from a medical viewpoint.

Command

Emergency Department. An ED receiving casualties will need to institute the incident plan for chemicals. Depending on the number of casualties the main part of the major incident plan may also need to be activated. However, with only one or two casualties the main problem is decontamination and the response may be limited to decontamination alone.

The command of this response should rest with the *Senior Emergency Physician* who will perform triage and run the reception phase. They will be assisted in the running of the department by the *Senior Nurse Emergency Department* and by a *Chemical Assessment Team*. Action cards for these roles are shown at the end of this chapter (Tables 16.2–16.4).

The Chemical Assessment Team will draw on existing skills in all hospitals such as those of Clinical Biochemists, Laboratory Managers and Occupational Health Physicians.

The actual treatment of decontamination will be carried out by a *Casualty Decontamination and Treatment Team*. This action card is shown in Table 16.5.

Safety

It should be remembered that once contaminated casualties have entered a department, part of that department will then become contaminated. This is usually referred to as the dirty area. Part of the plan should ensure that entry and exit from this area are strictly controlled. The *Senior Emergency Physician* needs to ensure that logs are kept of all staff and patients entering the area. This health and safety measure is an essential part of the command of these incidents.

The safety of casualties, staff and others should be assured at all times. Part of this requirement will be addressed at the planning stage when both personal protective equipment and staffing levels are decided. In addition, it is essential that the *Chemical Assessment Team* within a hospital continues to monitor safety matters both in terms of identification of chemicals and in terms of identification of risks arising from the institution of the plan. As an example it would be foolish to allow the venting of contaminated gases from the ED into the air intake of other wards.

All wastes (clothing, equipment and liquids) need to be safely stored and disposed of, and the *Chemical Assessment Team* must ensure that dirty areas are thoroughly decontaminated before being returned to normal use.

Assessment

Chemical incidents range from a single casualty contaminated with CS gas to a major industrial or chemical warfare agent release. In order to facilitate assessment (and thereby ensure that the response matches the severity of the incident) all but the smallest incidents will require early input from the Health Protection Agency (both Local and Regional Services and Chemical Hazards and Poisons Services).

Local Highlights: Agencies aiding assessment

Medical support

Medical support can be thought of as consisting of triage, treatment and transport. Triage always precedes treatment and treatment in general precedes transport.

Triage

On occasion the sheer number of casualties and the need for rapid decontamination may mean that the worried will need to be separated from the ill and injured. This step has been referred to as the 'triage sift' and involves self-triage by casualties ('are you well?'). The health service decontamination facilities are thus able to concentrate on the ill and injured (particularly the immobile) while other approaches can be taken to those who are contaminated but well.

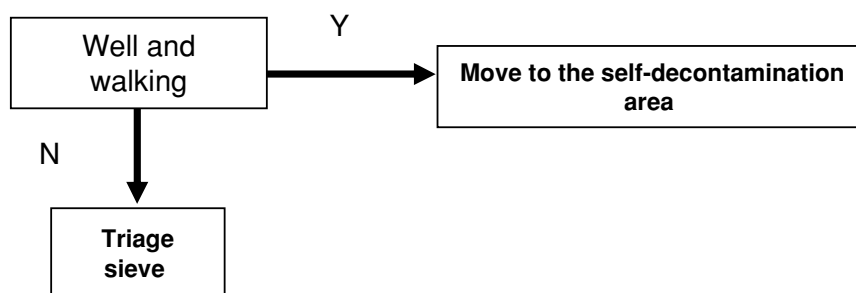


Figure 16.1. Triage sift

The standard approach to initial triage (the triage sieve and the triage sort methods) can be applied to chemical casualties although some have suggested that circulatory assessment is unnecessary in pure chemical incidents.

This structure is shown below.

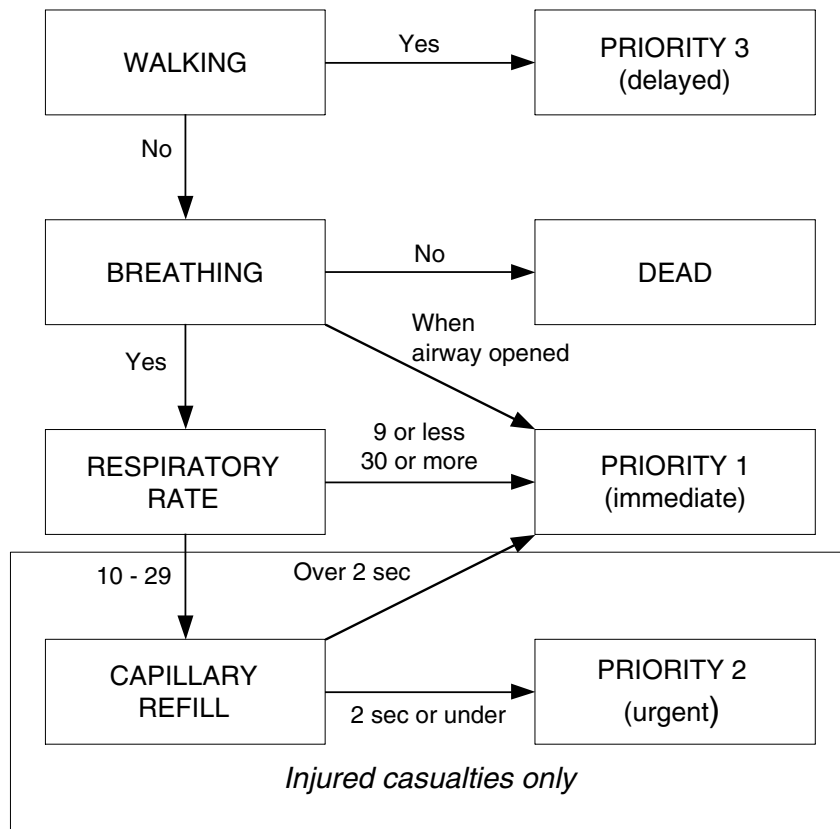


Figure 16.2. Modified triage sieve

Treatment

The degree of treatment that can be given at any stage will reflect the skill of the available rescuers, their level of protection and the availability of equipment. In general more advanced therapies will take longer to arrange. Some care may be instituted immediately—usually by bystanders and by other victims. There are obvious risks to unprotected rescuers and this may generate more casualties. Once trained personnel are on scene, steps should be taken to ensure that adequate personal protective equipment is worn. Although clinical needs may be great it is important that, for example, rescuers do not give unprotected mouth-to-mouth resuscitation to contaminated casualties since they may then become casualties themselves. Decontamination is the first skilled step in treatment as it removes the injurious agent.

Decontamination The rinse-wipe-rinse approach is recommended as it is both simple and effective. It is summarised in Box 16.1.

Box 16.1 Rinse-Wipe-Rinse Procedure

Rinse-wipe-rinse method of casualty decontamination

The following equipment is required:

- Scissors, for cutting clothing
- A clean, preferably warm, water supply

- Buckets (10 litre capacity)
 - Decontaminant: detergent 10 ml—approximately three squirts—added to a 10 litre bucket of water
 - Sponges or soft brushes
1. Having exposed the patient, rinse the affected areas. This first rinse helps to remove particles and water-based chemicals, such as acids and alkalis. Wash from top downwards
 2. Wipe the affected areas with a sponge or soft brush using the decontaminant solution. This first wipe helps to remove organic chemicals and petrochemicals that adhere to the skin
 3. Rinse for a second time. This second rinse removes the decontaminant solution and residual chemical

This process should take no longer than 3–5 minutes.

Repeat steps 1 to 3 only if skin contamination remains obvious. It may not always be possible to guarantee that a casualty is totally decontaminated at the end of this procedure. Remain cautious and observe for ill effects in both the patient and the staff.

It has to be assumed that casualties are safe to move once decontaminated.

Life saving first aid During decontamination only airway opening, cervical spine stabilisation, bag-valve-mask ventilation and haemorrhage control are possible. In some cases subcutaneous or intramuscular injections may be administered using autoject devices at this stage.

Advanced life support Advanced life support should be given as per standard protocols. This will occur after decontamination and outside the warm zone.

Specific therapies Specific therapies cannot be given until the chemical has been identified. This can be done by liaising with the emergency services (to identify the products either using the UN product numbers or the contact numbers on the various chemical recognition signs), or by recognising the symptoms that chemicals cause. The CHaPS may be able to help with the identification of chemicals from the symptoms (the toxidrome). They can also give detailed treatment advice both at the scene and to the hospital if the chemical is known and can be useful in determining the easiest source of antidote and arranging their supply.

Local Highlights: Source of treatment advice

Transport

Transporting chemical casualties presents several problems.

Risks to staff during transfers If there is a vapour or gas hazard, the accompanying staff must be adequately protected during the journey. This presents problems as it is dangerous to drive using full respiratory protection. If the cab is both adequately ventilated and physically separated from the patient transport compartment, then full respiratory protection can be avoided.

Dirty vehicles Ambulances leaving the scene of a chemical incident may themselves become contaminated. If this is the case then receiving units need to think about setting up both dirty and clean circuits within the hospital. This ensures that dirty ambulances do not themselves contaminate roadways which need to be used by other ambulances. Such a system is shown diagrammatically in Figure 16.3.

Once a circuit has been set up it is important that due consideration is given to the dirty to clean transfer area and that staff in such areas are adequately protected.

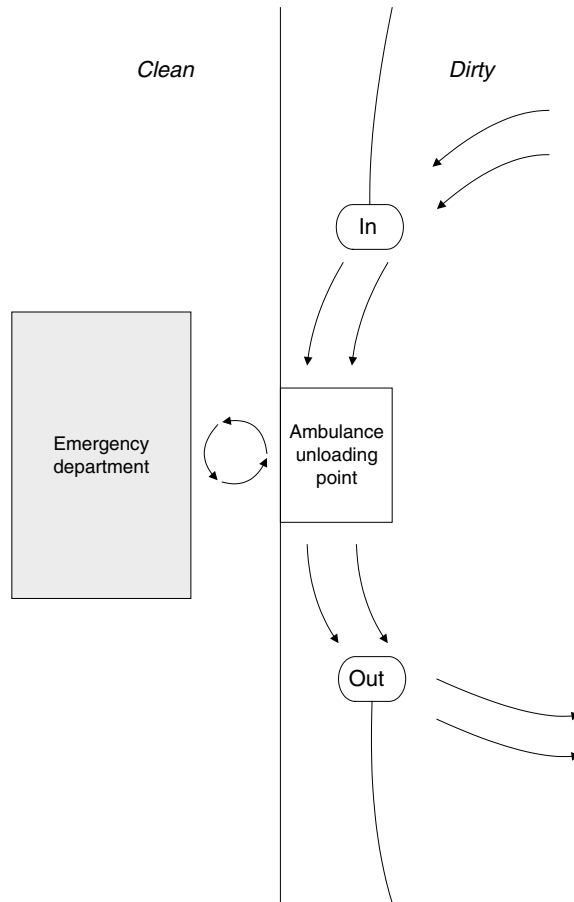


Figure 16.3. Dirty clean circuit

AFTER THE INCIDENT

As with all major incidents a debrief and audit of the response will be required.

Debriefing and counselling

Particular problems may arise following an incident involving chemicals, there is considerable fear about the short and long term effects of chemicals, and many staff will consider that the risks they were exposed to during the incident will not cease at the point of stand down.

Counselling may be offered to both in-patients and out-patients, both to explore the emotional effects of the incident and to explain (as far as it is known) the likely long term risks of exposure. Written information is especially helpful.

Staff should be debriefed in groups with the same aims—those at risk should be identified at an early stage.

Physical follow-up

In addition to the emotional follow-up it is essential that there is a physical follow-up of both staff and patients. The lead agency for staff should be the Occupational Health departments whilst that for patients should be the Health Protection Agency.

Local Highlights: Agency responsibility for follow-up of staff and patients

Table 16.2. Senior Emergency Physician action card

<p>Senior Emergency Physician: Hazardous Materials Incident</p> <p>Responsibilities</p> <ol style="list-style-type: none"> 1. Supervision of the assessment and treatment of casualties who are potentially contaminated with hazardous chemicals 2. Liaison with Consultant in Health Protection to assess the chemical health hazard 3. Liaison with the <i>Chemical Assessment Team</i> 4. Liaison with the Emergency Services 5. Ensuring the safety and adequacy of protection of staff treating the casualties 6. Ensuring the safety of other patients and staff 7. Ensuring that all staff are kept informed 8. Ensuring that operational and emotional debriefing of staff takes place 9. Liaison with the Consultant in Health Protection to decide the timing of the hospital stand down <p>Immediate action</p> <ol style="list-style-type: none"> 1. On being informed of an incident which potentially involves hazardous chemicals proceed to the Emergency Department 2. Rapidly assess the situation taking into account the number of casualties, degree and nature of contamination (if known) and the degree of injury 3. If the number of casualties is high consider activating the Major Incident Procedure 4. Where possible ensure that contaminated casualties are kept within the dirty area, and are dealt with by staff wearing the appropriate personal protective equipment 5. Where this is not possible (for instance in incidents with a large number of injured, contaminated patients) make a rapid assessment of the relative risks to patients and staff, and act accordingly 6. Liaise with the Consultant in Health Protection to assess the level of chemical health hazard 7. Continue to monitor the incident with the advice of the Hazard Assessment Team 8. Ensure the decontamination of staff leaving the dirty area 9. Liaise with the Consultant in Health Protection regarding the timing of the Hospital stand down 10. Ensure that the dirty area is thoroughly assessed and decontaminated prior to normal work restart <p>Priorities</p> <ol style="list-style-type: none"> 1. Assessment, decontamination and treatment of casualties 2. Safety of patients and staff 3. Assessment of the level of health hazard (with the Consultant in Health Protection) 4. Clean up and stand down 5. Ensuring operational and emotional debriefing of staff involved in the response
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Table 16.3. Chemical Assessment Team action card

<p>Chemical Assessment Team</p> <p>Responsibilities</p> <ol style="list-style-type: none"> 1. Identification of hazardous chemical contaminants 2. Assessment of the levels of hazardous chemical contaminants 3. Assessment of the risks to patients and staff from the hazardous chemicals 4. Assessment of the adequacy of decontamination of patients and staff 5. Assessment of the degree of contamination of the dirty area, and advice on its return to normal working <p>Immediate action</p> <ol style="list-style-type: none"> 1. On being informed of an incident which potentially involves hazardous chemicals inform to the Emergency Department 2. Liaise with the <i>Senior Nurse Emergency Department</i> to assess what is currently known about the hazardous chemicals 3. Ensure that the dirty area is correctly marked, isolated and policed 4. Advise regarding the level of personal protective equipment necessary. In particular advise regarding the adequacy of the PPE against the specific chemicals involved—give times as necessary 5. If necessary put on appropriate PPE and assess the casualties and staff within the dirty area 6. Liaise with appropriate bodies regarding the nature of the hazardous chemical, and specific requirements for treatment and decontamination 7. Advise the <i>Senior Emergency Physician</i> and the Consultant in Health Protection regarding risks to staff 8. Assess adequacy of decontamination of patients. Ensure that, unless there is an overriding clinical need, casualties do not leave the dirty area until they are clean 9. Ensure the adequacy of decontamination of staff leaving the dirty area 10. After the hospital stand down assess the dirty area, and supervise its decontamination and return to normal working <p>Priorities</p> <ol style="list-style-type: none"> 1. Assessing the nature and risks of the hazardous chemicals 2. Ensuring the safety of patients and staff 3. Ensuring the limitation of the area of the hospital contaminated 4. Collating information regarding decontamination and treatment of casualties 5. Assessing the degree of staff contamination 6. Assessing the degree of contamination of the hospital 7. Supervising decontamination of staff and the hospital
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Table 16.4. Senior Nurse Emergency Department action card

<p>Senior Nurse Emergency Department</p> <p>Responsibilities</p> <ol style="list-style-type: none">1. Departmental call-in2. Preparation of the department for the reception of casualties contaminated with hazardous chemicals3. Supervision of the issue of personal protective clothing to <i>Treatment and Decontamination Teams</i> as necessary4. Liaison with the <i>Senior Emergency Physician</i> <p>Immediate action</p> <ol style="list-style-type: none">1. On being informed of an incident which potentially involves hazardous chemicals inform all staff in the Emergency Department2. Ensure that all patients who are currently in the area designated to be dirty are moved immediately3. Ensure that the area for the reception and management of contaminated casualties is properly marked with signs and tape4. Ensure that the initial Casualty Decontamination and Treatment Team is formed from Emergency Department staff on duty and is wearing the appropriate level of personal protective equipment5. Appoint one member of staff to keep a log of staff entering the dirty area6. Liaise with the <i>Senior Emergency Physician</i> regarding further action <p>Priorities</p> <ol style="list-style-type: none">1. Preparation of the department2. Safety of patients3. Safety of staff4. Departmental call-in

Table 16.5. Casualty Decontamination and Treatment Team

<p>Responsibilities</p> <ol style="list-style-type: none">1. Assessment and treatment of casualties.2. Decontamination of casualties.3. Personal protection.4. Limitation of departmental contamination. <p>Immediate action</p> <ol style="list-style-type: none">1. On being appointed to a Casualty Treatment and Decontamination Team liaise with the Senior Emergency Physician, and the Senior Nurse Emergency Department to establish the appropriate level of personal protective equipment. If in doubt wear the highest level possible.2. Put on the appropriate equipment and check it.3. Proceed to the dirty area and receive the casualty allocated to you.4. Assess ABC and treat as appropriate. (Do <i>not</i> give mouth to mouth ventilation).5. Remove the patients clothing and place in an appropriately marked bag.6. Decontaminate the patient using the R-W-R method.7. On no account remove the casualties identifying wrist band.8. On leaving the dirty area carefully remove protective outer garments, taking care not to contaminate inner clothing. If this becomes contaminated <i>remove it</i>.9. Be assessed by the Chemical Assessment Team before leaving the area completely. <p>Priorities</p> <ol style="list-style-type: none">1. Safety2. Casualty assessment and treatment.3. Casualty decontamination.4. Clinical Documentation.
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CHAPTER 17

Incidents involving a large number of burns

INTRODUCTION

Burns major incidents share the characteristics of special incidents because a small number of casualties may rapidly overwhelm available services resulting in decompensation. A number of major incidents have resulted in a significant number of burns casualties (Table 17.1).

Table 17.1. Major incidents known to have involved a significant number of burn casualties

Major incident	Year	Country	Number of casualties (number of dead)
Boston Coconut Grove fire	1942	USA	~700 (491)
Osaka gas explosion	1970	Japan	507
Los Alfaques disaster	1978	Spain	Unknown but many
Summerland fire	1973	IOM, UK	150 (48)
Woolworth's store fire, Manchester	1979	UK	48 (10)
Cardowan coal mine disaster	1982	UK	40
Grand Hotel Brighton	1984	UK	30 (5)
Bradford stadium fire	1985	UK	256 (52)
Barcelona bombing	1987	Spain	66
Ramstein air disaster	1988	Germany	150 (70)
Piper Alpha oil rig fire	1988	UK	228 (167)
Kings Cross fire	1988	UK	91 (31)
Southall Train crash	1997	UK	180 (6)
American Embassy bombing	1998	Kenya	1700 + (224)
Disco fire in Gothenburg	1998	Sweden	313 (63)
Mont Blanc Tunnel fire	1999	France	30 + (35)
Bomb explosion at Moscow flats	1999	Russia	150 (17)
Paddington rail crash	1999	UK	227 (31)

The pressures on burns services are illustrated by the UK situation. In 2002 there were 24 burns units in the UK with a total of 429 beds. The number of burns ITU beds is more

difficult to determine as these are commonly general ITU beds co-located with a burns unit. Bed occupancy in the UK for ITU beds is extremely high and there is little spare capacity. As a result few UK hospitals are staffed or equipped to deal with more than a few seriously injured burns patients. As UK burns units are geographically scattered and not always co-located with an Emergency Department (ED), it is unlikely that casualties from a burns major incident will always go directly to a specialist centre.

Local Highlights: Number of burns units and burns ITU beds

Treatment of burns casualties can involve a wide variety of specialists, from burns surgeons and intensive care specialists to bacteriologists and psychiatrists. This complexity of care required in a burns major incident and the coordination of responding services and specialities call for careful preparation.

PREPARATION

Three aspects of preparation are considered:

1. Planning
2. Equipment
3. Training

Planning

Regional planners should ensure that plans for the management of an incident involving burns should be in place for all hospitals, ambulance services and burns units. These plans should be an addition to the basic major incident plans already in place. All services should realistically appraise their capacity to receive burns patients. Table 17.2 shows a checklist for emergency planners.

Table 17.2. Planning checklist for burns major incidents

- Statement of burns resources and typical occupancy rates (local, regional and national)
 - Robust burns incident notification procedures
 - Burns incident activation criteria and procedures
 - Burns equipment availability (pre-hospital and hospital)
 - Burns incident coordination (local, regional and national)
 - Burns incident action cards (hospital)
1. *Senior Emergency Physician: Burns incident*
 2. Burns Assessment Team (BAT)
 3. Burns Treatment Teams
 4. Burns Transport Teams

Equipment

Planning must assume that a burns major incident may occur in any area. Equipment provision must reflect this, and appropriate equipment levels should be available in all

hospitals. Hospitals should be able to provide equipment to initially deal with up to 20 burns casualties. It should be noted that such equipment need not be stored specifically for burns major incidents, but it should be available and its locations known. Specific equipment for burns major incidents is shown in Table 17.3. Standard resuscitation equipment to support a standard structured approach to trauma protocols is also required.

Table 17.3. Specific equipment for burns major incidents

Item	Number
Water and cooling preparations (e.g. water gel)	40 sets
Cling film	5 rolls (100 m)
Heaters	10
Lund and Browder charts	40
Burns Fluid Calculator (Parkland formula)	10
Escharotomy equipment	2

Local Highlights: Equipment

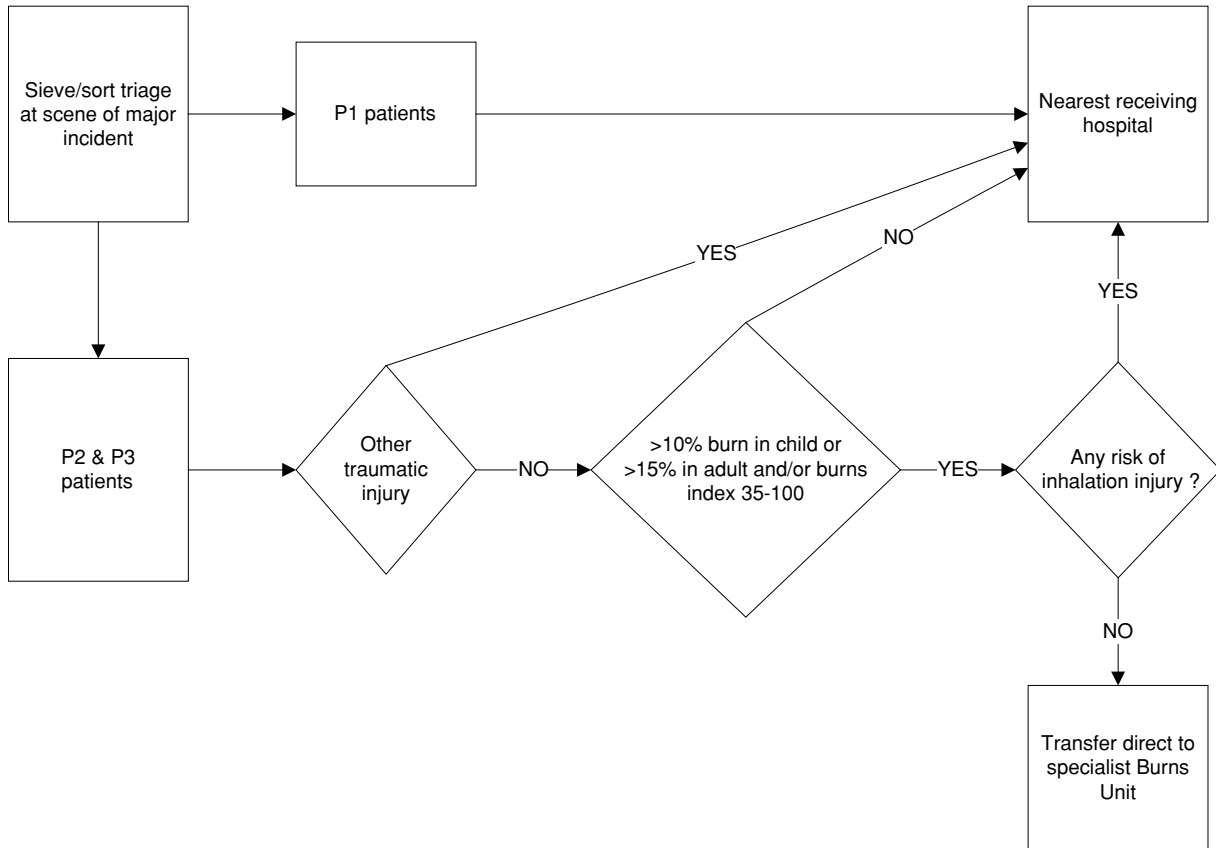
Training

Burns triage and management should be incorporated into paramedic training. Additional burns training (such as the *Emergency Management of Severe Burns* course) should be given to ED and burns staff wherever possible.

Local Highlights: Training

PRE-HOSPITAL PHASE

Planners should consider the potential of direct transfer algorithms (such as the one shown in Figure 17.1) and implement where appropriate.



Caveats for direct transfer to Burns Centre

1. Contact Burns Coordinator before considering direct transfer.
2. If too far away distance may be impractical.
3. Long transfers may result in low availability of ambulances for other patients.
4. Accurate assessment of burn area at the scene may be difficult.
5. The Burns unit must have a co-located Emergency Department.
6. Casualties are transferred to the co-located ED, not the burns wards/unit.

Figure 17.1. Algorithm for the consideration of direct transfer to specialist burns centres

RECEPTION PHASE

The reception phase of the major incident should be controlled locally by the *Senior Emergency Physician* and coordinated at the Regional Burns Unit by the *Burns Coordinator*. Action cards for these roles are shown in Tables 17.5 and 17.6.

Triage. A physician or nurse with experience in the assessment of burns should assist with initial triage decisions. All patients should have an assessment of their burn injury using a Lund and Browder chart. All patients should be considered for carbon monoxide poisoning or airway injury by heat, vapour or smoke.

An important function of burns triage is the identification of those patients for whom there is no chance of survival. It is generally accepted that when the sum of the percentage burn plus the patient's age exceeds 100 then the chances of survival are very low indeed; if the patient has additional injuries (particularly an inhalation injury) then the prognosis is even worse.

Those with respiratory/inhalation burns should ideally be identified at the scene and sent to a hospital with intensive care facilities.

Treatment. All patients should be treated using standard resuscitation guidelines. The Parkland formula should be used to guide initial fluid resuscitation. Patients requiring fluid resuscitation should be catheterised to guide future fluid requirements. All patients at risk of inhalation injury must be assessed by a physician competent in burns airway assessment.

The care of patients treated in hospitals without resident burns cover may be assisted by a visiting *Burns Assessment Team* (BAT).

Transport. It is very likely that some patients will require secondary transfer to specialist burns units. This decision should be made by liaison with the BAT and the receiving units. Transport may be required to other regions necessitating long transfer times. It is essential that patients are transported in as stable a condition as possible by staff experienced in inter-hospital transfer. Such personnel may be available from within the referring hospital or may need to be requested from the tertiary centre.

The role of Burns Units

Burns units must play a key role in the preparation and response to a major incident of this type. It is likely that more than one tertiary unit will be affected by any incident.

Burns units must make plans for the rapid expansion of facilities through local measures or via liaison with other tertiary units. Burns units should be able to provide a BAT to receiving hospitals. Complementary arrangements between tertiary centres to provide mutual support during major incidents should be in place.

On being informed of a major incident involving burns the tertiary centre should appoint a *Burns Coordinator* as noted above.

RECOVERY AND SUPPORT

It should be recognised that a burns major incident will have long term ramifications. Arrangements to provide the predicted increased rehabilitation capacity should be made early. In addition specific psychological support may be required by both burns victims and the staff treating them.

The response to the major incident should be audited to determine whether patient care was optimal.

SUMMARY

- Although burns major incidents are rare their effect may be devastating.
- Good planning and preparation are essential if optimal casualty care is to be delivered.
- All hospitals with Emergency Departments and all tertiary burns units should plan for a major incident involving burns.

Table 17.4. Senior Emergency Physician action card

<p><i>Senior Emergency Physician: Burns incidents</i></p> <p>Responsibilities</p> <ol style="list-style-type: none">1. Overall control of the reception phase2. Control of the coordination and phasing of the receiving response for burns casualties <p>Immediate action</p> <ol style="list-style-type: none">1. Liaise with the <i>Medical Coordinator</i> and <i>Senior Nurse</i> to assess the hospital's capacity to receive burns casualties2. Coordinate the resuscitation of burned casualties in the Emergency Department3. Liaise with the <i>Burns Coordinator</i> in the tertiary burns unit4. Ascertain the location, capacity and current resources of the tertiary burns unit5. Determine the need, and if required, request the <i>Burns Assessment Team</i> to attend the hospital6. Instruct and coordinate Emergency Department staff to deliver optimal care to burns patients <p>Priorities</p> <ol style="list-style-type: none">1. Overall control of the reception phase2. Liaison with tertiary units3. Determination of the need for specialist teams to attend the receiving hospital (Burns Assessment Teams)

Table 17.5. Burns Coordinator action card

<p>Burns Coordinator</p> <p>Responsibilities</p> <ol style="list-style-type: none"> 1. Control of the Burns Unit response 2. Staffing of the Burns Unit 3. Liaison with receiving hospitals 4. Liaison with other Burns Units 5. Ensuring that a safe level of care is provided to current inpatients 6. Control of the phasing down of the incident response <p>Immediate action</p> <ol style="list-style-type: none"> 1. Assume control of the Burns Unit response 2. Liaise with the <i>Senior Burns Nurse</i>, intensive care staff and other senior nurses to assess current Burns Unit capacity and the potential for expansion of burns beds 3. Inform the <i>Senior Manager</i> on duty 4. Liaise with receiving hospitals to assess the potential need for specialist burns services 5. Liaise with receiving hospitals to identify the need for a <i>Burns Assessment Team</i> (BAT) 6. Identify staff suitable for a <i>Burns Assessment Team</i> to travel to receiving hospitals 7. Liaise with other burns units to ascertain their current and projected capacity 8. Instruct other staff on their arrival 9. Continuously liaise with the <i>Senior Burns Nurse</i> and <i>Senior Nurse</i> (hospital) 10. Ensure that adequate staffing is available in a 24-hour shift pattern 11. Liaise with senior key personnel regarding the stand down of the response 12. Liaise with the appropriate services regarding provision of post-traumatic counselling of major incident casualties admitted to the hospital, and of staff involved in the burns unit response <p>Priorities</p> <ol style="list-style-type: none"> 1. Overall coordination of the Burns Unit response 2. Liaison with receiving hospitals regarding specialist burns services 3. Liaison with other tertiary Burns Units 4. Provision of a Burns Assessment Team 5. Coordination of the Burns Unit stand down 6. Coordination of post-traumatic counselling for patients and staff

Incidents involving a large number of children

INTRODUCTION

For many individuals in the health service the prospect of dealing with a major incident resulting in a large number of injured children is daunting. For this reason alone such incidents are special. Such incidents do occur both in the UK and abroad (Table 18.1). Although major incidents can arise from a variety of causes, children are not excluded from any particular type of incident.

Table 18.1. Major incidents known to have involved a significant number of children

Major incident	Year	Total number of casualties	Number of paediatric casualties
Martinez coach crash (USA)	1975	51	50
Mass lightning strike (USA)	1977	47	47
Bologna bombing (Italy)	1980	291	27
M5 coach crash (UK)	1983	31	27
Chemical gas leak, Arizona (USA)	1987	>67	67
Enniskillin bombing (NI)	1987	65	6
3 Rivers regatta accident (USA)	1990	24	16
Newton train crash (UK)	1991	26	7
Dimmocks Cote train crash (UK)	1992	45	12
Avianca plane disaster (USA)	1993	92	22
York coach crash (UK)	1994	41	40
West St. bus crash, Glasgow (UK)	1994	33	33
Abbeyhill junction train crash (UK)	1994	47	10
Oklahoma bombing (USA)	1995	759	61
Warrington coach crash (UK)	1996	51	50
Manchester bombing (UK)	1996	217	30
Dunblane mass shooting (UK)	1996	30	28
Beslan siege (Russia)	2004	>700	>335

Difficulties in the management of children during a major incident have been documented at all stages of the incident response. In the pre-hospital phase problems have been identified in determining triage and transport priorities. In the hospital reception phase difficulties have arisen in mobilising staff experienced in the management of children and in obtaining adequate amounts of paediatric equipment. In the surgical phase of a major incident concern has been expressed at the standard and choice of surgical procedures performed by non-paediatric surgeons.

Few hospitals are staffed or equipped to deal with any more than a few seriously injured children, with well-documented shortages of paediatric surgical and intensive care unit beds. Specialist services for children are geographically scattered and confined to specialist hospitals which are not always co-located with Emergency Departments (ED). This distribution of specialist services may make it difficult to get children to specialist centres during a major incident.

Major incident planning should follow an all-hazard approach and that must include the provision of services for children. In the UK the need to specifically plan for the needs of children is a key component of government guidance.

Local Highlights: National guidelines for the needs of children in major incidents

PREPARATION

Planning

An incident involving a large number of children may require a regional or multi-regional response. Health authorities must ensure that all hospitals in the region have adequate plans for the management of children in major incidents. Mechanisms for alerting and supporting specialist centres must be in place. Close liaison between pre-hospital, receiving hospital and specialist children’s services must take place.

Equipment

As mentioned above, children are involved in many major incidents and equipment is widely available. Specific arrangements may need to ensure supplementation of hospital supplies from specialist children hospitals. As discussed in Chapter 5 pre-arranged picklists may assist resupply of disposables; one possible list for children is shown in Table 18.2.

Table 18.2. Resupply picklist for disposable equipment needs per 10 children

PaedExamGown	Gown	10	Venflon20	Box (50)	1
OxMask (Paed)	Mask	20	Venflon18	Box (50)	1
POPSlab 7.5	Box	1	Jelco20	Box (50)	1
Transpore 2.5	Box (12)	1	Sucker (Paed8)	Each	20
Paratulle	40 m	1	Sucker (Paed10)	Each	20
Velband 7.5	Box (12)	2	CentLine (Paed)	Each	5
TractKit (Paed)	Each	10	UrinCath8	Each	5
Airway 0	Airway	10	UrinCath10	Each	5
Airway 00	Airway	10	SwivConn	Packet (10)	1

Table 18.2. Resupply picklist for disposable equipment needs per 10 children (*Continued*)

Airway 1	Airway	10	UltiporSQ405	Packet (6)	1
Airway 2	Airway	10	Gloves (StSm)	Pair	30
Nebuliser (Paed)	Each	5	Gloves (StM)	Pair	30
ETT 2.5	Tube	5	Gloves (StL)	Pair	30
ETT 3	Tube	5	Gloves (NStSm)	Box (100)	1
ETT 3.5	Tube	5	Gloves (NStM)	Box (100)	1
ETT 4	Tube	5	Gloves (NStL)	Box (100)	1
ETT 4.5	Tube	5	Tap3Way	Each	5
ETT 5	Tube	5	ABGSyr	Each	20
ETT 5.5	Tube	5	Tourniquets	Each	2
ETT 6	Tube	5	NGT8	Tube	5
ETT 6.5	Tube	5	NGT10	Tube	5
DefibPads	Pairs	5	Yankauer (Paed)	Each	20
ECGElectr	Bag (25)	1	Syringe 2 ml	Box (100)	1
ECGElect (Paed)	Box (120)	1	Syringe 5 ml	Box (100)	1
Stethoscope	Each	3	Syringe 10 ml	Box (100)	1
Penlight	Each	3	PerDialCath	Each	2
Scalpel 15	Box (10)	1	Clipboard	Each	2
Giving Set (Paed)	Set	20	Pens: black	Each	25
Cath Bags	Each	10	Pens: red	Each	25

RECEPTION PHASE

Command

When an incident involving children has been declared it is vital that the *Hospital Coordination Team* (HCT) makes an early assessment as to the capacity of the hospital to deal with the paediatric casualties. This is facilitated by the appointment (if available) of a *Senior Paediatrician* who can advise the HCT on paediatric issues. An action card for the *Senior Paediatrician* is shown in Table 18.4 at the end of this chapter.

Triage

The Triage Sieve and Triage Sort are based upon adult physiological values. As children have higher pulse rates, higher respiratory rates and lower blood pressures (Table 18.3) they will usually be overtriaged using these methods.

Table 18.3. Normal values for children

Age	Respiratory rates	Pulse rates
<1	30–40	110–160
1–2	25–35	100–150
2–5	25–30	95–140
5–12	20–25	80–120
>12	15–20	60–100

In incidents involving a small number of children this is unlikely to be a significant problem as there may be practical and humanitarian reasons to remove children from the scene at an early stage. However in incidents involving a large number of children, this systematic over-triage may adversely affect the overall response as no effective prioritisation will occur. To compensate for this inherent flaw, a Paediatric Triage Tape has been

developed that modifies the triage sieve according to children's normal physiological variables.

The Paediatric Triage Tape uses the concept that between the ages of 1 and 10 years length is directly proportional to age, weight and vital signs: from this, a series of modified Triage Sieve algorithms have been produced using the best available guidelines for normal ranges of vital signs. These algorithms are arranged in boxes on a linear waterproof tape that is laid next to the child. Where the child's heel touches the tape there will be the corresponding algorithm for that length of child (Figure 18.1).

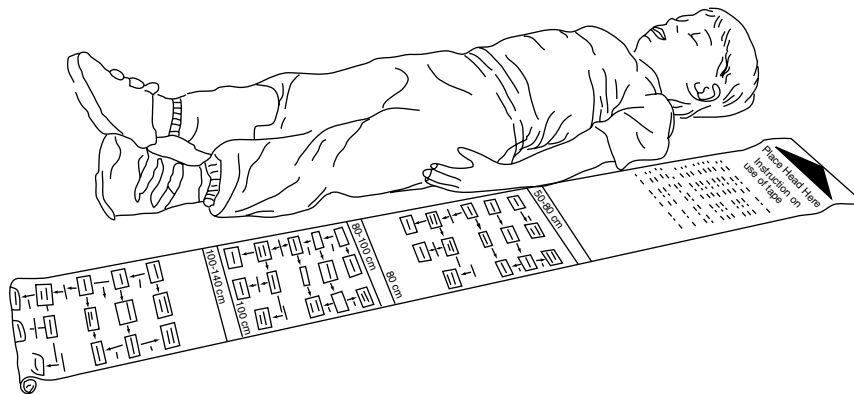


Figure 18.1. Paediatric triage tape

This system means that *Triage Officers* can more accurately assess the physiological derangement in children and in addition there is no need to remember all the variables as they are written on the tape. This system does rely on the availability of the tape.

Many clinicians perceive difficulties in the assessment of injured or ill children. Certainly, those unfamiliar with the assessment of children may get triage wrong. The clinical judgement used in the preliminary, primary and secondary surveys should be aided by the *Senior Paediatrician* whose responsibility is to coordinate the care of children.

Treatment

Many adult clinicians find dealing with children difficult. In particular they may be unfamiliar with the normal physiological and psychological responses of children to illness or injury. In addition they may be unskilled in specific resuscitation skills such as intravenous access. If possible it is good practice to assign a member of the paediatric staff to assist *Treatment Teams* in the ED with these difficulties.

A number of other issues may complicate the response:

- *Families:* Major incidents may involve more than one family member. Ideally members of the same family should be kept together though this may not always be possible if the patient's injuries require specialist care.
- *Media:* A very high level of media interest is to be expected in any incident involving children.

In hospitals with little or no on-site paediatric support the mobilisation of a *Paediatric Assessment Team* from a specialist centre should be considered at an early stage. An action card for this team is shown as Table 18.5 at the end of this chapter.

Definitive care

It is highly likely that an incident involving a large number of children may require additional help from regional services such as Paediatric Intensive Care Units (PICU)

and paediatric surgical units. Hospital planners must liaise with these groups to agree on a method for support during an incident.

The role of specialist children's services

It is very likely that regional paediatric services will be stressed during a major incident. This will result from an increase in the need for intensive care beds (which are usually in short supply) and in the need for transfer of critically ill or injured patients. These are both specialist areas requiring skilled and specifically trained staff.

Specialist regional paediatric services should plan for how they are going to support their own and other hospitals. Support will be needed in terms of:

- Resuscitation of children in the reception phase
- Selection of patients for specialist care
- Transfer of high dependency patients
- Paediatric surgery
- PICU

A major incident may require more than one region to provide this assistance.

The care of children involved in a major incident may be improved by the presence of *Paediatric Assessment Teams* (PAT) to provide assistance to the receiving hospitals of a major incident. The PAT is based around a PICU retrieval team.

Action cards for the PAT should be circulated to potential members prior to an incident to ensure individual preparation. Members of the PAT should be encouraged to attend courses on major incident management.

The role of the PAT should be clear to the receiving hospital.

Recovery phase

Incidents involving children are more likely to result in psychological morbidity than incidents involving adults. All people involved in the response must be alert to such problems in themselves and their colleagues.

Table 18.4. Senior Paediatrician action card

<p>Senior Paediatrician</p> <p>Responsibilities</p> <ol style="list-style-type: none">1. Coordination of the provision of paediatric services2. Paediatric staffing3. Operational debriefing of paediatric staff involved in the Major Incident Response <p>Immediate action</p> <ol style="list-style-type: none">1. Assume the role of <i>Senior Paediatrician</i>2. Determine available paediatric facilities—contact ward, PICU etc.3. Liaise with <i>Senior Nurse Paediatrics</i>4. Find <i>Senior Physician</i> and <i>Senior Emergency Physician</i> and determine the need for Paediatric Assessment Team from regional paediatric centre5. Identify a suitable Paediatric Triage Officer6. Proceed to the Emergency Department and advise on the management of children7. Liaise and task PAT on arrival (with <i>Medical Coordinator</i>) <p>Priorities</p> <ol style="list-style-type: none">1. Provision of paediatric services at receiving hospital2. Consider need to call for <i>Paediatric Assessment Teams</i>3. 24-hour rostering of radiological staff as necessary

Table 18.5. Paediatric Assessment Team action card

<p>Paediatric Assessment Team</p> <p>Each team will consist of:</p> <ol style="list-style-type: none"> 1. <i>Paediatric Intensivist</i> 2. <i>PICU nurse</i> 3. <i>Paediatric surgeon (if injured children)</i> 4. <i>General paediatrician (if none at receiving hospital)</i> <p>Responsibilities</p> <ol style="list-style-type: none"> 1. Paediatric support to the receiving hospital 2. Direction of transfer teams for critically ill/injured children <p>Immediate action</p> <ol style="list-style-type: none"> 1. Call out procedure—transfer by ambulance 2. Determine bed state for PICU/specialist/general number of beds in the region 3. Determine the need at receiving hospital on the basis of information received: <ul style="list-style-type: none"> ● Number of casualties ● Number of paediatric casualties ● Type of casualties (e.g. injuries/illness) 4. On arrival at receiving hospital find <i>Medical Coordinator</i>, liaise with on-site senior personnel as shown below: <p>Senior surgeon</p> <p>Senior nurse</p> <p>Senior Emergency Physician</p> <p>Senior Paediatrician</p> <ol style="list-style-type: none"> 5. Identify patients in need of specialist services 6. Determine the need for transfer of surgical teams 7. Assist in the resuscitation and management of injured children 8. Determine who and how inter-hospital transfers will be safely conducted 9. Discuss patients with regional centres <p>Priorities</p> <ol style="list-style-type: none"> 1. Paediatric support to the receiving hospital 2. Direction of transfer teams for critically ill/injured children

■ GLOSSARY ■

ALS	Advanced Life Support
APLS	Advanced Paediatric Life Support
ATLS	Advanced Trauma Life Support
BAT	Burns Assessment Team
CAT	Chemical Assessment Team
CHaPS	Chemical Hazards and Poisons Service
CRT	Capillary refill time
CSCATTT	Command Safety Communication Assessment Triage Treatment Transport
CSSU	Central Sterile Services Unit
DH	Department of Health
ED	Emergency Department
GCS	Glasgow Coma Scale
HCT	Hospital Coordination Team
HLS	Helicopter landing site
HMIMMS	Major Incident Medical Management and Support: the practical approach in the hospital
HO	House Officer (first year of qualification)
HPA	Health Protection Agency
ITU	Intensive Treatment Unit
MC	Medical Commander
MIMMS	Major Incident Medical Management and Support
MIO	Medical Incident Officer
MLSO	Medical Laboratory Scientific Officer
MMT	Mobile Medical Team
MST	Mobile Surgical Team
NHS	National Health Service
NI	Northern Ireland
ODP	Operating Department Practitioner
PAT	Paediatric Assessment Team
PHEC	Pre-hospital Emergency Care
PHPLS	Pre-hospital Paediatric Life Support
PHTLS	Pre-hospital Trauma Life Support

GLOSSARY

PICU	Paediatric Intensive Care Unit
PNeoSTaR	Paediatric and Neonatal Safe Transfer and Retrieval
PPE	Personal protective equipment
P1	Priority 1 (immediate)
P2	Priority 2 (urgent)
P3	Priority 3 (delayed)
RR	Respiratory rate
SBP	Systolic blood pressure
SHO	Senior House Officer (doctor undergoing general hospital training)
SpR	Specialist Registrar (doctor undergoing specialist training)
STaR	Safe Transfer and Retrieval: the practical approach
TRTS	Triage revised trauma score
UN	United Nations
VIP	Very important person
WRVS	Women's Royal Voluntary Service

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