



PART I

Introduction

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CHAPTER 1

Introduction

WHAT IS A MAJOR INCIDENT?

In Health Service terms a major incident can be defined as any incident where the location, number, severity, or type of live casualties requires extraordinary resources.

The number of casualties alone does not determine a major incident for the Health Services. Thirty minor injuries that self-evacuate from the scene may be managed effectively by one hospital without the requirement for additional pre-hospital or hospital resources. The same number of severely injured casualties will almost certainly require extraordinary resources. Certain medical resources may be very scarce (for example, intensive care beds) or regionalised (for example, burns surgery), and small incidents with relatively few casualties can therefore require early involvement of regional or national resources. Where there are large numbers of dead with few or no survivors, there is often no major incident for the Health Services. An incident in a remote or difficult to access location may also demand greater resources to effect the rescue of casualties. In a similar vein, a major incident for one emergency service may not be a major incident for all other services. Where fire or chemical spillage is the predominant issue, without risk to life, a major incident response will be required from the Fire and Rescue Service without the same level of response from other services. Where public disorder is the predominant problem, the principal response will be from the Police. The following examples illustrate this point:

On 2 September 1666 a fire started in a baker's shop on Pudding Lane; it lasted 4 days and left 80% of London's buildings in ruins. A disaster on such a scale is hard to imagine and would certainly overwhelm the resources of the modern Fire and Rescue Service. In fact, only a handful of people died in this, the Great Fire of London.

On 27 March 1977 a Boeing of the Royal Dutch Airlines (KLM) collided with a PanAm aircraft during take-off. All passengers and members of the crew died (total 583).

In January 1975, a large petrol tanker hit the Tasman Bridge, a major transport structure linking the suburbs of Hobart, Tasmania. Thirteen people died, no one was left injured.

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In April 1990 the passenger ferry *M/S Scandinavian Star* caught fire on the Swedish west coast. Most passengers were asleep and smoke inhalation caused the death of 158 people. The surviving passengers were mostly uninjured.

Local highlights: Major incident definitions

A major incident requiring extraordinary resources occurred three or four times per year in the United Kingdom (with a range from 0 to 11 incidents per annum) in the 30 years from 1966 to 1996.

CLASSIFICATION OF MAJOR INCIDENTS

It is convenient to classify major incidents in three ways.

1. Natural or man-made.
2. Simple or compound.
3. Compensated or uncompensated.

Natural incidents

A *natural* major incident is the result of a natural event such as an earthquake, flood, fire, volcano, tsunami, drought, famine, or pestilence (Table 1.1). To some extent, the natural disaster will be self-propagating: following a flood or earthquake those left homeless and starving will be vulnerable to the diseases associated with squalor.

Table 1.1: Natural incidents (number of injured not accurately known)

Date	Place	Estimated casualties
28 July 1976	T'angshan, China, earthquake	655,000 dead
February 1983	Australia, bushfires	76 dead, 1100 injured
19 September 1985	Mexico City, earthquake	40,000 dead
7 December 1988	Armenia, earthquake	55,000 dead
17 January 1995	Kobe, Japan, earthquake	6398 dead
27 June 1998	Adana-Ceyan, Turkey, earthquake	145 dead, 1500 injured
26 December 2004	Indian Ocean, tsunami	225,000 dead
12 May 2008	Great Sichuan, earthquake	69,000 dead, 375,000 injured
12 January 2010	Haiti, earthquake	220,000 dead, 300,000 injured
11 March 2011	Japan, earthquake and tsunami	21,000 dead, 5888 injured

Man-made incidents

The range of man-made incidents is huge, but certain patterns are clear. A major incident can occur whenever large numbers of people gather together to travel, to work, or for leisure. In some circumstances, the incident will be the result of deliberate terrorist activity.

Transport incidents

These are the commonest type of man-made major incidents. All forms of bulk transport of people are associated with an impressive list of incidents (Table 1.2). The worst ever road traffic accident occurred in the Salang tunnel in Afghanistan in 1982 when a petrol tanker exploded. Such was the degree of destruction that only an estimate could be made of the number of dead of between 1100 and 2700.

Table 1.2: Transport incidents

Date	Type	Place	Casualties
28 February 1975	London Underground crash	Moorgate, UK	43 dead, 74 injured
18 January 1977	Rail crash/bridge collapse	Granville, NSW, Australia	83 dead, 213 injured
2 June 1980	Rail crash	Storsund, Sweden	11 dead, 40 injured
22 August 1985	Aircraft fire	Manchester, UK	55 dead, 80 injured
6 March 1987	Ferry capsize	Zeebrugge, Belgium	137 dead, 402 injured
22 December 1988	Aircraft bomb	Lockerbie, UK	270 dead
8 January 1989	Aircraft crash	Kegworth (M1), UK	47 dead, 79 injured
December 1989	Bus collision	Cowper, NSW, Australia	35 dead, 41 injured
27 December 1991	Aircraft crash	Gottröra, Sweden	34 dead, 115 injured
4 October 1992	Aircraft crash	Amsterdam	34 dead, 7 injured
28 September 1994	Ferry <i>Estonia</i> sunk	The Baltic	860 dead, 137 injured
3 June 1998	Train accident	Eschede, Germany	101 dead, 88 injured
13 July 2005	Train accident	Sindh Province, Pakistan	127 dead, 800 injured
20 August 2008	Aircraft accident	Madrid Airport, Spain	154 dead, 18 injured

Industrial incidents

The mining industry has been the site of a series of serious industrial major incidents (Table 1.3), but perhaps the most frightening incident to date has been the explosion of a nuclear reactor at Chernobyl on 5 April 1986, which left much of Europe contaminated with radioactive material. Around 40,000 inhabitants of Chernobyl were exposed to phenomenal levels of radiation for 6 days. The official toll of 31 dead, 1000 injured, and 6000 losing their lives to cancer in the subsequent 70 years seem likely to be gross underestimates.

To some extent, the consequences of an industrial incident can be predicted. Local and national guidelines should exist for emergency planning at fixed chemical and nuclear installations and for the management of contaminated casualties.

Table 1.3: Industrial incidents

Date	Type	Place	Casualties
14 October 1913	Explosion	Senghenydd coal mine, Wales	439 dead
21 October 1966	Land slide (slag heap)	Aberfan, Wales	147 dead
3 December 1982	Methyl isocyanate leak	Bhopal, India	8000 dead, 170,000 injured
6 July 1988	Explosion	Piper Alpha rig, North Sea	164 dead, 25 injured
2 August 1993	Chlorine gas leak	Stockholm, Sweden	0 dead, 33 injured
February 1996	Chemical truck fire	Sydney, NSW, Australia	0 dead, 60 injured
13 May 2000	Blast, fireworks factory	Enschede, Netherlands	17 dead, 947 injured
23 March 2005	Explosion, oil refinery	Texas City, USA	15 dead, 100 injured

Mass gathering incidents

'Mass gathering' is difficult to properly define – but a working definition of the presence of a crowd in excess of 1000 people is in general use. Some of the worst tragedies have occurred at football stadia around the world (Table 1.4). Precipitating factors have included an overfilled stadium (Bolton, UK, 1946; Hillsborough, UK, 1989; Johannesburg, 2001), a crowd surge back into the stadium with a last-minute goal (Moscow, 1982), and a rush for shelter to escape a hailstorm (Kathmandu, 1988).

Events involving football fans prompted reviews of the safety of stadia and the statutory medical cover for such events. Reports have been published that give practical guidance for planning such events.

Local highlights: Guidance for event planning

Table 1.4: Football stadia incidents

Date	Type	Place	Casualties
24 May 1964	Crush	Lima, Peru	318 dead, 500 injured
2 January 1971	Crush	Glasgow, UK	66 dead, 100 injured
20 October 1982	Crush	Moscow, Russia	340 dead, unknown injured
11 May 1985	Fire	Bradford, UK	55 dead, 200 injured
29 May 1985	Crush	Brussels	41 dead, 437 injured
March 1988	Crush	Kathmandu, Nepal	100 dead, 300 injured
15 April 1989	Crush	Sheffield, UK	96 dead, 200 injured
13 January 1991	Riot	Orkney, South Africa	40 dead, 50 injured
16 October 1996	Crush	Mateo Flores, Guatemala	84 dead, 150 injured
11 April 2001	Collapse	Johannesburg, South Africa	43 dead, 155 injured
9 May 2001	Crush	Accra, Ghana	123 dead, unknown injured
29 March 2009	Crush	Abidjan, Ivory Coast	22 dead, 130 injured

Terrorist incidents

The number of people killed or injured in the last two decades by terrorist bombs is so large that in some areas (e.g. Iraq, Afghanistan) the toll is inestimable (Table 1.5). Secondary devices are frequently targeted at the emergency services, including the Health Service. Hospitals have also been the primary target. Any involvement of the health services that reduces the capability to manage the injured will result in a *compound* major incident (see below).

Table 1.5: Terrorist incidents

Date	Place	Casualties
8 November 1987	Enniskillen, Northern Ireland	11 dead, 60 injured
26 February 1993	World Trade Centre, USA	5 dead, 1000 injured
20 April 1995	Oklahoma, USA	300 dead
30 July 1997	Jerusalem, Israel	15 dead, 170 injured
7 August 1998	American Embassy, Tanzania	5 dead, 72 injured
11 September 2001	World Trade Centre, USA	7700 dead, unknown injured
12 October 2002	Kuta, Bali	202 dead, 209 injured
11 March 2004	Madrid, Spain	191 dead, 1800 injured
7 July 2005	London, UK	52 dead, 700 injured
13 May 2008	Jaipur, India	63 dead, 216 injured

Simple versus compound incidents

In a *simple* incident the infrastructure, that is the roads, the hospitals and the lines of communication, remain intact. When this infrastructure is damaged then the incident is said to be *compound*. The reasons for a compound major incident include:

- Damaged lines of transportation: roads disrupted by flood, earthquake or public disorder; poor weather preventing support helicopters from flying.
- Damaged lines of communication: radio or cellular telephone 'black spot' at the scene; disruption of fixed communication lines.
- Ineffective health services: services damaged by natural incident, as a result of terrorism or secondary contamination from casualties of a chemical incident.

In December 1974, in Darwin, a remote city in the far north of Australia, cyclone Tracy wiped out major infrastructure: electricity, telecommunications, and most buildings; 65 died, 650 were injured.

Compensated versus uncompensated incidents

A *compensated* incident is one in which the casualties can be dealt with by mobilising additional resources; that is, the 'load is less than the extraordinary capacity'.

In the Manchester bombing in 1996 the 212 injured were managed by paramedics and hospital mobile medical teams at the scene and transported to a number of hospitals for definitive treatment.

An *uncompensated* incident occurs when the additional medical resources mobilised by instituting major incident plans are still inadequate to cope with the number of casualties; that is, the ‘load exceeds the extraordinary capacity’. This frequently occurs after *natural* major incidents such as an earthquake or flood (and these incidents are also often *compound*). *Man-made* incidents may occasionally be of such a magnitude that they exceed the capacity of the health resources.

The terms ‘major incident’, ‘disaster’, and ‘catastrophe’ are used interchangeably by some agencies and the media. Using the terminology discussed here, a ‘disaster’ or ‘catastrophe’ is synonymous with an *uncompensated* major incident.

Key point

In an *uncompensated* incident, the load of live casualties is greater than the surge capacity of the system.

INCIDENTS INVOLVING CHILDREN

Most major incidents involve a proportion of children and some predominantly involve children (Table 1.6). It is critical that major incident plans make appropriate provision for the effective triage, treatment, and distribution of injured children to appropriate facilities.

Table 1.6: Incidents involving children

Date	Place	Casualties
25 January 1990	Avianca plane, USA	73 dead, 159 injured
13 March 1996	Dunblane, Scotland, UK	18 dead, 15 injured
24 March 1998	Jonesboro, USA	5 dead, 15 injured
30 October 1998	Dance hall, Sweden	60 dead, 170 injured

SUMMARY

- A major incident has occurred for the Health Service when the location or number, severity, or type of live casualties requires extraordinary resources.
- Major incidents can be natural or man-made, simple or compound, and compensated or uncompensated.
- Most major incidents in developed countries are man-made, simple, and compensated.