Major incidents in Britain over the past 28 years: the case for the centralised reporting of major incidents

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Abstract

***Study objectives*—To describe the incidence and epidemiology of major incidents occurring in Britain over the past 28 years.**

***Methods*—Major incidents were identified through a MEDLINE search, a hand search of journals and government reports at the Home Office Emergency Planning College, newspaper reports, a postal survey of ambulance emergency planning officers, and through requests for information posted on the internet.**

***Main results*—Brief incidents profiles from 108 British major incidents are presented. Most major incidents pass unreported in the medical literature. On average three to four major incidents occur in Britain each year (range 0–11). Sixty three of 108 (59.2%) of incidents involve public transportation. The next two largest groups are civil disturbance 22 of 108 (20.3%) and industrial accidents 16 of 108 (14.8%). Although incidents at sports stadiums are rare they produce large numbers of casualties. The data currently available on major incidents are difficult to find and of questionable accuracy.**

***Conclusions*—The lack of data makes planning for major incidents and exercising major incident plans difficult. Casualty incident profiles (CIPs) may assist major incidents exercises and planning. CIPs from future major incidents should be collated and made available to all major incident planners.**

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Health service major incidents have been defined as "an event that owing to the number and severity of live casualties requires special arrangements by the health service".[1] This definition is a broad one that may include incidents such as food poisoning or even mass gatherings. However, in terms of contingency planning for the emergency services and hospitals, major incidents are generally regarded as events such as train crashes. These are events that are unpredictable, sudden, and that result in a large number of injured or ill casualties presenting to the emergency services over a short period of time.

The point at which a major incident occurs is dependent upon the ability of health service resources at the time of the incident to cope with the patient workload.[2] Major incidents may therefore occur with comparatively small numbers of casualties if resources are scarce. The health services definition[1] also takes into account the severity of injury in its definition, as an incident resulting in a small number of casualties (10–20) may require a major incident response if they are all severely injured.

It has been shown on several occasions that the standard of preparation for major incidents in the UK is poor.[3–6] This may in part be because of the fact that major incidents are perceived to be rare events. If they are viewed as rare events planning and preparation may be accorded a low priority, yet planning and training have been repeatedly cited as essential components to a successful response to a major incident.[2 7 8]

Before this study the true incidence, type or size of major incidents in Britain was unknown. The aim of this study was to determine the true incidence and epidemiology of major incidents in Britain.

Methods

Data on major incidents was sought from the sources shown in table 1.

The search strategy excluded incidents occurring outside England, Scotland or Wales. Incidents occurring off the coast of Britain were included if the casualties were known to have been transported directly to a British hospital.

A major incident was considered to have occurred when 25 or more people had attended hospital, more than 20 had attended of whom six or more had suffered serious injury (ICU admission or multiple injuries) or when a major incident was known to have been declared by the ambulance or hospital services.

Where possible information on the number and type of casualties was sought in addition to information on the incident itself. Information on casualties was divided into those dead at the scene (dead), those requiring admission to hospital (serious) or those seen in the emergency department and sent home (minor).

Results

Nineteen (45%) of questionnaires were received from ambulance service emergency planning officers. Many officers reported that no formal record of major incidents were kept and that their returns were unlikely to be comprehensive.

Table 1 Source of information

Type of information	*Information source*	*Comments*
Index Medicus journals	MEDLINE Search (1966–1996)	Using the Mesh headings "disaster" or "paramedic" or "emergency medical services"
Non-Index Medicus journals	Hand search of journals at the Home Office Emergency planning centre	1 Journal of the British Association of Immediate Care 2 Scottish Emergency Planner
Government reports	Hand Search of official reports from: 1 Health and Safety Executive 2 Maritime Accident Investigation Branch 3 Her Majesty's Inspectorate of Railways 4 The Department of Energy 5 The Air Accident Investigation Branch 6 Department of Transport	1 Additional information was obtained as a personal communication from Her Majesty's inspectorate of railways on train crashes from 1992–1996 2 HMSO reports were searched by key word at the John Rylands Library in Manchester
Newspapers	The Times CDROM Index (1992–1995) The Times Index 1968–1992 (for specific incidents)	The Times newspaper is only searchable on CDROM from 1992 onwards. Before this date the index is only available in paper form. The paper index was only searched for specific incidents known to the authors
Ambulance Service	A postal survey was sent to all ambulance service emergency planning officers in Britain. The addresses of these officers were obtained by personal communication with the National Health Service Management Executive in Leeds	Individual officers were not identified. Survey forms were therefore submitted to generic post holder
Internet	A request for information on major incidents was placed on 2 internet mailing lists	1 CompuServe UK "doctors lounge" forum 2 International emergency medicine mailing list EMED-L

Table 2 lists the major incidents identified in chronological order.

Figure 1 shows the number of incidents occurring each year since 1968. In total 108 major incidents were identified. This represents three to four major incidents occurring in the Britain each year (range 0–11).

Figure 2 illustrates the types of major incidents occurring in Britain. Sixty four of 108 (59.2%) of incidents involved transportation accidents. Twenty two of 108 (20%) result from civil disturbances and industrial accidents account for 16 of 108 (14.8%). Sports stadiums and other miscellaneous incidents comprise the remainder.

It was possible to determine injury severity in 75 of 108 (69.4%). Figure 3 shows the mean casualty numbers for these incidents. It can be seen that incidents tend to produce much larger numbers of minor casualties compared with serious injuries and deaths. Although sports stadiums account for only three incidents in the 28 year period they seem to produce large numbers of casualties compared with other types of incident.

Figure 4 shows the range of serious casualties in different types of incident. It should be noted that stadium incidents have resulted in very large numbers of casualties requiring admission to hospital.

Table 3 shows the source of information from incidents in the period 1992–1995. Of the 21 major incidents identified during this time only two reached publication in a medical journal.

Discussion

This paper sought to identify the epidemiology and incidence of British major incidents for the period 1968–1996. An extensive search was

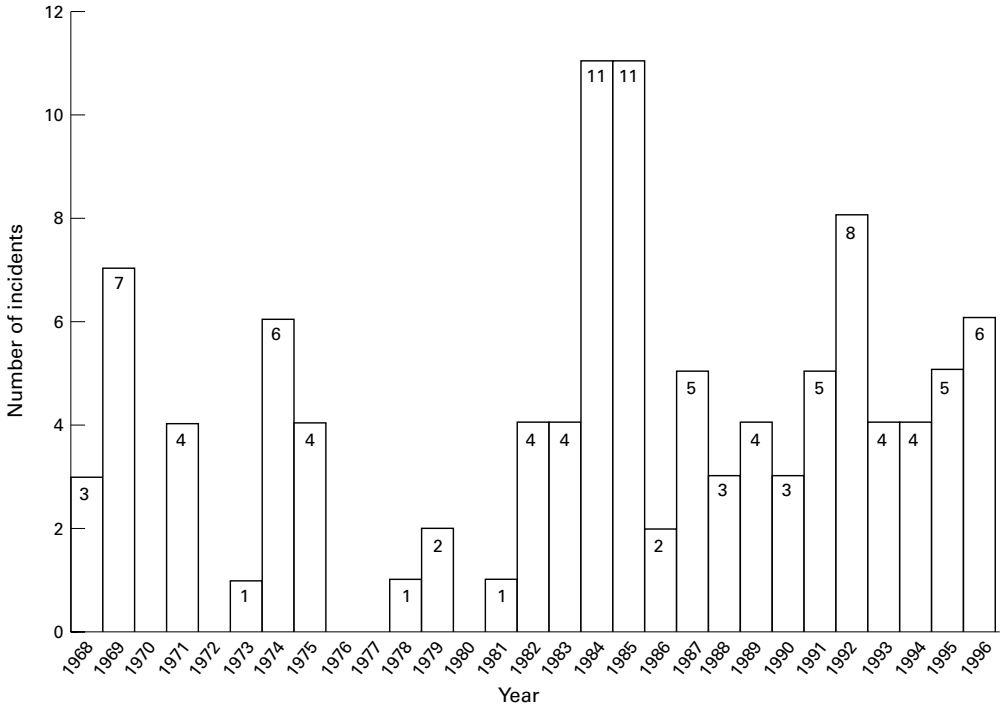

Figure 1 Incidence of UK major incidents 1968–1996.

*Table 2 British major incidents**

Incident number	Year	Incident	Dead at the scene	Admitted to hospital	Seen and discharged from emergency department	Not classifiable	Total injured and dead
1	1968	Ronan point tower block collapse[11]	4	3	14		21
2	1968	Train crash at Hixon level crossing[11]	11	15	27		53
3	1968	Train crash at Smethwick[11]	0	2	34		36
4	1969	Air crash, Fernhill[11]	49	15	1		65
5	1969	Durham coach crash[11]	14	4	16		34
6	1969	Multiple rta Northampton[11]	2	11	31		44
7	1969	Multiple rta Blackhill[11]	6			24	30
8	1969	Train crash Yeovill[(11)]	0	12	46		58
9	1969	Train crash at Morpeth[11]	7			69	76
10	1969	Train crash at Brook farm[11]	4	0	11		15
11	1971	Coach crash, Helmsley, Yorkshire[14]	8			30	38
12	1971	Crowd crush Rangers11 stadium Glasgow	12	36	103		151
13	1971	Clarkston chemical explosion[11 20]	1	34	20		54
14	1971	Multiple rta M1 motorway[11]	7	17	20		44
15	1973	Fire at Summerland complex, IOM[21]	48	16	86		150
16	1974	Explosion at Flixborough chemical works[22]	28	36	>200		>250
17	1974	Old Bailey bombing[23]	0	18	142		160
18	1974	Tower of London bombing[24]	0	19	18		37
19	1974	Tavern in the Town pub bombing, Birmingham[25]	11	33	56		100
20	1974	Mulberry Bush pub bombing, Birmingham[25]	10	13	17		30
21	1974	Horse & Groom pub bombing, Birmingham[25]	5	24	36		62
22	1974	Hebden Bridge coach[19] crash, Yorkshire	32	14	?		46
23	1975	Explosion at Appleby colliery[26]	4	11	7		23
24	1975	Moorgate train crash[27]	43	16	56		115
25	1975	Nuneaton train crash[28]	5	3	28		36
26	1978	Mine incident, Bentley colliery[29]	7	4	52		63
27	1979	Shetland airport crash[30]	17	2	28		47
28	1979	Explosion at Colborne colliery[31]	3	11			14
29	1981	Bombing in Chelsea, London[8]	2			72	74
30	1981	Bombing in Hyde Park, London[8]	3			22	25
31	1982	Gas explosion, Jersey, Channel Islands†		10			10
32	1982	Bombing in Regents Park, London[32]	6	11	10		27
33	1982	Explosion at Cardowan mine, Wales[33]	0	33	7		40
34	1983	Air crash at Aberdeen airport[34]	0	10	8		18
35	1983	Bombing at Harrods, London[8]	5			90	95
36	1983	Coach crash, M5 motorway[35]	1	24	6		31
37	1983	Refinery fire, Pembrokeshire†		6			6
38	1984	Explosion at Abbetstead, Lancashire[36]	8	8		28	44
39	1984	Train crash at Wembley, London[8]	6			18	24
40	1984	Refinery explosion, Pembrokeshire†	4	16			20
41	1984	Brighton bombing[37]		6	17		34
42	1984	Armorique ship fire, Cornwall[38]	1	11	67		79
43	1984	Heathrow airport bombing[10]		5	20		25
44	1984	Liverpool St station train crash, London[8 10]		5	35		40
45	1984	Train crash in Falkirk[10]	13		>60		>73
46	1984	Oxford Circus underground fire[10]		15		unknown	>15
47	1984	Train crash at Salford, Greater Manchester[10]	2			77	79
48	1984	Multiple rta, M25 motorway, Surrey[10]	10			>10	>20
49	1985	Air crash at Manchester airport[39]	52	15	60		137
50	1985	Coach crash on M6 motorway[19 40]	3			42	45
51	1985	Coach crash on M61 motorway, Preston[19]	9	19	24		52
52	1985	Football stadium fire, Bradford[41]	52	75	181		308
53	1985	Train crash at Battersea, London[8]	0	14	96		105
54	1985	Tottenham riots, London[10]	1			70	>70
55	1985	Ship explosion at Milford Haven, Wales[42]	3	13			16
56	1985	Riot at Luton Town football ground[34]				47	47
57	1985	Riot at Birmingham City football ground[10]	1			70	71
58	1985	Riots in Brixton, London[10]				>50	>50
59	1985	Train crash at Haywards Heath[10]		13	37		50
60	1986	Train crash at Beverely[10]	9			39	47
61	1986	Train crash at Stafford[10]	2			76	78
62	1987	Kings Cross underground fire, London[8 10]	31			60	91
63	1987	Multiple rta, M61 motorway[19]	12	4			>16
64	1987	Hovercraft collision, Dover[43]	4			39	43
65	1987	Mass shooting, Hungerford[44]	16	16			32
66	1987	Multiple rta, M4 motorway[10]	4			74	78
67	1988	Clapham train crash[17]	35			88	123
68	1988	Industrial explosion at Poole, Dorset*		19			19
69	1988	Piper Alpha oil rig explosion[45]	165			63	228
70	1989	Air crash near Kegworth[46 47]	47	73	5		126
71	1989	Crowd crush at Hillsborough stadium, Sheffield[9]	81	90	69		240
72	1989	Riverboat sinking, London[8]	51			80	131
73	1989	Train crash at Purley[8]	5			88	93
74	1990	Train crash at Reading[28]		10	35		45
75	1990	Carr Lane explosion, Peterborough[48]	1	14	93		107
76	1990	Train crash at Hyde Junction.[28]			29		29
77	1990	Victoria station bombing[49]	1			50	51
78	1991	Cannon Street station train crash[8 28]	2	33	507		542
79	1991	Train crash at Newton[28]	4		22		26
80	1991	Train crash in the Severn Tunnel[28]		5	180		185
81	1991	Explosion at International Biosynthetics[50]		10	25		35
82	1992	City of London bombing[8]	3			93	96
83	1992	Coach crash at Enfield, London[19]				22	22
84	1992	Coach crash at Carrick-Fergus[19]	5	10	19		34
85	1992	Multiple rta, Doncaster[19]	3			23	26
86	1992	Coach crash, Pembrokeshire†		20	24		34
87	1992	Dimmocks Cote railcrash[28]		13	32		45

Table 2 continued

Incident number	*Year*	*Incident*	*Dead at the scene*	*Admitted to hospital*	*Seen and discharged from emergency department*	*Not classifiable*	*Total injured and dead*
88	1992	Explosion, Hickson & Welsh, Castleford[51]	2	4	>50		>56
89	1992	Coach crash at Grantham, Lincs†	1			44	45
90	1993	Warrington bombing†	2	28	>125		>155
91	1993	Coach crash M2 motorway[19]	9	22	14		44
92	1993	Coach crash , York[52]	1	15	42		58
93	1993	Littlewoods store fire, Chesterfield[53]	2			30	32
94	1994	West Street coach crash, Glasgow[54]	5	4	24		33
95	1994	Abbeyhill Junction railcrash[28]		3	44		47
96	1994	Coach crash at Bristol[19]	1			45	46
97	1994	Train crash at Newton Abbot[28]		2	29		31
98	1995	Coach crash, West Lothian[19]			50		50
99	1995	Catamaran grounding, Jersey[55]		33	22		55
100	1995	Coach crash, Gwent, Wales[19]	8	7	25		40
101	1995	Coach crash, Avon[19]	10	11	?		>21
102	1995	Train crash at Wanstead Park[28]		3	28		31
103	1996	Manchester bombing[16]		17	200		217
104	1996	Warrington coach crash[19]		13	38		51
105	1996	Canary Wharf bombing[19]	2			>200	200
106	1996	Watford Train crash[19]	1	15	57		74
107	1996	Stafford train crash[56]	1	2	19		23
108	1996	Dunblane mass shooting[19]	16	16			32

*Including the Channel Islands. †Information based solely on personal communication from ambulance service.

Table 3 Source of information on incidents in the period 1992–1995

Source	*Number*
The Times Newspaper CDROM Index	9
Official Government reports	7
Personal communication from the ambulance service	3
Journal article	2

conducted using a variety of information sources. However, the results of this retrospective methodology are unlikely to be comprehensive. Although very large incidents (such as the Hillsborough disaster[9]) are unlikely to be forgotten for many years to come, this is not the case for the smaller incidents. The figure of three to four major incidents per year is the average number of incidents occurring over the full 28 year period. However, this is unlikely to represent the true number of incidents occurring in Britain. This is apparent from figure 1, which seems to show a paucity of major incidents in the 1970s. This is most probably because of the failure of contributors and authors to remember incidents that occurred many years ago.

An estimate of the true number of incidents can be made by looking at recent years (searchable through the Times CDROM index) and the period 1984–1988 during which data was prospectively collected by Walsh.[10] The Times index is unlikely to miss significant British major incidents but has questionable coverage for Scotland and Wales. At the present time it represents the most sensitive means of identifying British major incidents although the quality of data available are usually limited and of questionable accuracy. The average number of incidents occurring during these time periods is 6.25. This may be

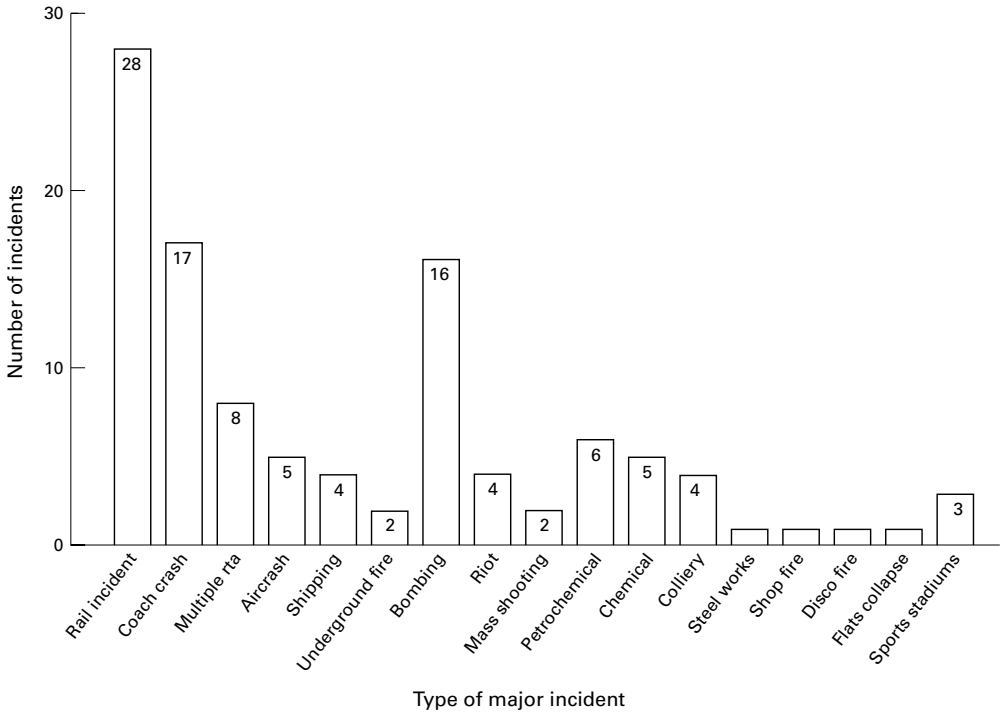

Figure 2 Types of major incidents.

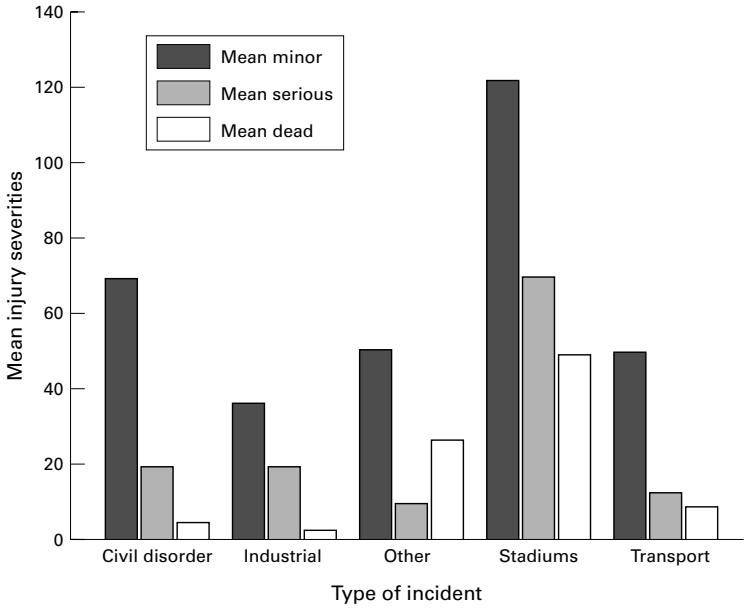

Figure 3 Mean injury severities in different types of major incidents.

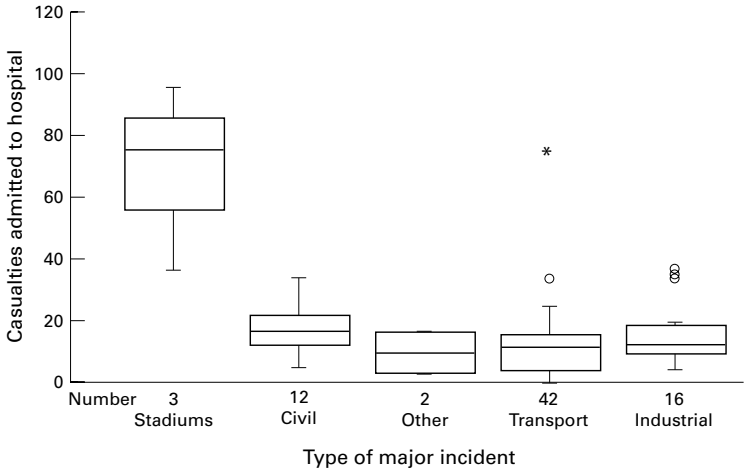

Figure 4 Casualties admitted to hospital in British major incidents.

a more accurate estimate of the mean number of major incidents occurring in Britain annually.

This paper focuses on those incidents that affect the hospital based health services. Clearly major incidents may occur that affect the ambulance or public health services that do not require special procedures by hospitals.[2] The particular focus of this paper is on incidents resulting in large numbers of live casualties to which the hospital services must respond. Our findings are therefore of most use to hospital and ambulance service emergency planners.

The quality of information on patient numbers and injury severities is also in doubt. On occasion several reports on the same incident were obtained (for example, Cannon Street train crash 1991) and these showed marked differences in casualty estimations. This poor quality of data has hampered other investigators.[8] Casualty numbers, in particular for the minor injured, should therefore be treated with caution. The differentiation of

KEY POINTS

- An average of three to four (range 0–11) major incidents occur annually in Britain.
- The quality of information available on British major incidents is poor at the present time.
- The response to future major incidents could be improved by a centralised reporting mechanism.

casualties into dead, serious, and minor follows the system adopted by Rutherford in 1972[11] and is the only means of retrospectively differentiating the injury severity among casualties. Defining serious casualties as those requiring hospital admission, however, is only a crude indicator of injury severity. Other methods of trauma scoring are widely used in other areas of epidemiological trauma research that can be used to compare anatomical injury,[12] physiological injury[13] or a combination of both.[14 15] Ideally such trauma scoring data could be collected close to the time of a major incident. With these cautions noted, an examination of the casualty numbers shown in figure 3 shows that major incidents tend to produce large numbers of minor casualties compared with serious injuries.

No attempt was made to correlate data from incident reports with police or hospital records. This would represent an enormous task on the part of the authors for which time and resources were not available.

For hospital planners it is important to know the number of casualties requiring hospital admission. Figure 4 shows that in most major incidents the clearance of one hospital ward (approximately 30 patients) for admissions would probably suffice. The exception is in stadium incidents where the number of patients requiring admission represents two to three typical hospital wards. Hospitals located near stadiums should plan accordingly. We would suggest that few hospitals could respond to a stadium incident in isolation and that hospitals located near stadiums should therefore adopt a multi-hospital response to a stadium incident.

Transportation disorders and civil disturbance represent the largest number of major incidents occurring in Britain. Incidents such as these occur predominantly along lines of communication and within large cities. This should be recognised by emergency planners in these areas.

The only practical method of identifying major incident reports for most emergency planners is through the use of a computer database such as MEDLINE. This paper has demonstrated that a search in MEDLINE will rarely identify reports on British major incidents. Although major incidents may be reported in the letters or news sections of journals these are rarely indexed in MEDLINE. Few major incident planners will have the time or inclination to conduct a search similar to the one presented here. Unless information is

presented in an indexed format it will be lost together with any lessons learned from the response.

At present there is no centralised system for reporting major incidents in Britain. A prospective collation of information on major incidents could improve our knowledge regarding their true incidence and also improve the quality of data available on patient characteristics and injuries. We have previously published an example of a Casualty Incident Profile (CIP), and have proposed that a CIP be constructed for all major incidents as a mechanism for disseminating information and lessons learned from past major incidents.[16]

CIPs based on real major incidents would also assist the exercising of major incident plans for all emergency services. For example, local planners could use CIPs to assess the impact on human, equipment, and transport resources. In particular the CIPs could be used to conduct credible table top exercises, triage exercises, and PEWCs (Practical Exercises Without Casualties[2]).

Although this paper has concentrated on patient characteristics there are also lessons to be learned regarding the management and coordination of services within major incidents. Such information could then be used by emergency planners at national and local level to tailor major incident plans accordingly. Furthermore, research into major incident management would be aided by such a database. The lead organisation for such a database would need to be centrally based, ideally within the Department of Health.

Dissemination of incident reports is important to avoid the repetition of mistakes, an example being the repeated difficulties experienced between hospitals and ambulance services with regard to alerting procedures in major incidents.[8 17 18]

Conclusion

Information on the incidence and epidemiology of British major incidents is difficult to find and of questionable accuracy. At least three to four major incidents occur each year in Britain although the true figure may be in excess of six major incidents. Data from major incidents could be used to improve the design, testing, and execution of major incident plans. However, the data available at present are insufficiently detailed to draw all but the most broad of lessons.

A system of major incident reporting could be used to further our understanding of major incidents and to improve the response to future incidents. To ensure that such data are of high quality they must be collected prospectively. We propose a centralised reporting system for health service major incidents to be administered by the Department of Health.

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Conflicts of interest: none.

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