Planning for major incidents involving children by implementing a Delphi study

Kevin Mackway-Jones, Simon D Carley, Joan Robson

Abstract
This paper provides a practical approach to the difficult problem of planning for a major incident involving children. It offers guidance on how general principles resulting from an expert Delphi study can be implemented regionally and locally. All phases of the response are covered including preparation, management of the incident, delivery of medical support during the incident, and recovery and support. A check list for regional planners is provided. Supplementary equipment is discussed and action cards for key roles in the paediatric hospital response are shown. Particular emphasis is placed on management of the secondary-tertiary interface including the special roles of paediatric assessment teams and paediatric transfer teams. A paediatric primary triage algorithm is provided. The important role of local interpretation of guidance is emphasised.

Keywords: major incident; Delphi study; planning; triage

Preparation
We have considered three aspects of preparation: planning, equipment, and training.

PLANNING
Regional planners should ensure that plans are in place for children at every receiving hospital, and that a realistic assessment and statement of the paediatric resources available has been made at each hospital. Units should also make realistic estimates of the number of seriously ill or injured children they are capable of receiving in one hour. Table 1 provides a checklist for hospitals that might receive children from a major incident.

Table 1 Planning checklist for hospitals that might receive children from a major incident

| Statement of paediatric resources and estimated capacity | Robust paediatric incident notification procedures |
| Paediatric incident activation procedures | Paediatric equipment provision |
| Paediatric incident coordination | Paediatric action cards |
| Paediatric coordinator | Paediatric assessment team(s) |
| Paediatric treatment team(s) | Paediatric transport team(s) |

Equipment
Planning should assume that at least 10–15% of major incident patients require paediatric equipment. Prehospital paediatric equipment should be available as a supplement to general equipment, either in the form of snatch bags or boxes. Paediatric equipment must be made available in each area receiving patients. Table 2 shows the minimum supplementary equipment for every 10 children expected.

Table 2 Minimum supplementary paediatric equipment for 10 children

<table>
<thead>
<tr>
<th>Item</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway and cervical spine</td>
<td>Airways 00–2, Endotracheal tubes 2.5–6.5 mm, Yankauer sucker (paediatric), Soft sucker 8–10 g, Semirigid cervical collars (paediatric)</td>
</tr>
<tr>
<td>Breathing</td>
<td>Child self inflating bag, Face masks 00–2, Oxygen masks (with reservoir) (paediatric)</td>
</tr>
<tr>
<td>Circulation</td>
<td>Venous cannulae 18–24 g, Intraosseous cannulae, Giving sets (paediatric), ECG electrodes (paediatric)</td>
</tr>
<tr>
<td>Other</td>
<td>Urinary catheters 8–10 g, Nasogastric tubes 8–10 g</td>
</tr>
<tr>
<td></td>
<td>with drug doses (Broselow tape or Oakley chart)</td>
</tr>
<tr>
<td></td>
<td>Spinal board (paediatric)</td>
</tr>
</tbody>
</table>

Four to five major incidents occur in the United Kingdom each year and many involve children. However, a recent survey showed that only 31% of hospitals make specific plans for the care of children involved in major incidents. The number of children involved in recent incidents has ranged from 6–67 (10–100% of all victims).

We have reported the results of an expert Delphi study examining the care of children in major incidents. This paper offers practical advice on how general guidance that resulted from the Delphi study can be implemented at regional and local hospital and prehospital level. We have not dealt with the care of children who are indirect victims of an incident (for example when main carers are injured or killed) as this is not primarily a health service responsibility.

Our guidance is intended to undergo local interpretation and to be incorporated as part of an overall major incident plan. In particular it seeks to use the expertise of tertiary and secondary paediatric services to support all phases of the major incident response when children are involved.

Practical advice is given for the preparation phase, for the management of the incident, the delivery of medical support during the incident itself, and for the recovery and support phases following the incident.
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Table 3  Paediatric coordinator action card

<table>
<thead>
<tr>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall control of the paediatric response</td>
</tr>
<tr>
<td>Staffing of senior key appointments</td>
</tr>
<tr>
<td>Liaison with tertiary hospitals regarding the need for specialist paediatric teams, personnel, or equipment</td>
</tr>
<tr>
<td>Ensuring that a safe level of provision is maintained for current inpatients</td>
</tr>
<tr>
<td>Control of the phasing of the stand down of the hospital paediatric response</td>
</tr>
<tr>
<td>Coordination of post-traumatic counselling of children and staff</td>
</tr>
</tbody>
</table>

Immediate action

Assume control of the paediatric aspects of the hospital response
Ensure that the following post is filled:
- senior nurse–children
  - if not filled then appoint a suitably senior member in the interim
- Liaise with the medical coordinator, the senior nurse–children, and the senior manager regarding the state of preparedness of the hospital to receive children, and the initial availability of appropriate staff
- Liaise with coordinators of the major incident responses in other receiving hospitals, to ascertain the initial requirements for paediatric teams, specialist personnel, and equipment
- Instruct consultant paediatric staff who are not already included in the plan as they arrive
- Continually liaise with the following senior key personnel:
  - medical coordinator
  - senior nurse–children
  - senior manager
- to receive reports on the situation as it develops, and to review the effect of the major incident response on the normal activities of the hospital

Decide at an early stage any limitations on normal hospital activities
Liaise with the senior manager regarding an initial press release
As the incident develops ensure that adequate arrangements are made for shift working to allow adequate rest for staff
As the surgical response develops liaise with the duty consultant surgeon and the duty consultant anaesthetist to ascertain the current availability of surgical resources
Liaise with senior key personnel regarding how to stand down the hospital response
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 major incident response

Priorities

Overall coordination of the paediatric response
Liaison with other receiving hospital coordinators regarding paediatric requirements
Monitoring and limitation of normal hospital paediatric activities
Liaison with the specialist anaesthetists and surgeons regarding the paediatric surgical response
Coordination of the phasing of the stand down
Coordination of post-traumatic counselling for children and staff

Medical management

Medical management includes command and control of the response, safety aspects, communications, and assessment. Only the command of the response will differ when children are involved.

Table 4  Paediatric assessment team action card

<table>
<thead>
<tr>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate total number of children in receiving hospitals who may need paediatric tertiary services</td>
</tr>
<tr>
<td>Liaison with paediatric specialist services to ascertain the level of provision available</td>
</tr>
<tr>
<td>Identify individual children suitable for transfer to tertiary services</td>
</tr>
<tr>
<td>Liaise with paediatric coordinators in receiving hospitals to arrange transfer</td>
</tr>
</tbody>
</table>

Immediate action

Proceed to lead paediatric hospital and report to the paediatric coordinator
Liaise with the paediatric coordinator to ascertain the number of children likely to be involved, the number of receiving hospitals, and the paediatric specialist services that may be required
Liaise with the relevant specialist paediatric services to ascertain preparedness and level of provision available
Proceed to the receiving units and liaise with the local paediatric coordinator to ascertain the number of children (if any) who need specialist provision
Estimate the relative need of each child for specialist provision
Match availability with need in each receiving unit
Arrange transfer of children who can be dealt with in the specialist units
Ensure that specialist units and receiving hospital staff have liaised regarding children who have not been transferred

Priorities

Estimation of the availability of specialist services
Estimation of the need for each specialist service within each receiving unit
Matching need with availability

TRAINING

All clinicians involved in the paediatric clinical response should be trained at least to the level of advanced paediatric life support (APLS) provider. In addition, those involved in managing the response and all who might be involved in the prehospital response should be trained in major incident management to the level of major incident medical management and support (MIMMS) provider or equivalent.

Children will be dispatched to hospital by the ambulance and medical incident providers. In addition, those involved in managing the response should be trained at least to the level of advanced paediatric life support (APLS), and in the prehospital response they should be trained in major incident medical management and support (MIMMS) provider or equivalent.
able to provide paediatric assessment teams (PATs) that can go to the receiving hospital to assess which children warrant transfer to specialist services. It is likely that PATs will be based on existing paediatric retrieval services. Table 4 shows an action card for a PAT.

Medical support
Medical support for children involved in major incidents includes triage, treatment, and subsequent transport.

TRIAGE
If only a few children are involved then standard triage sieve–triage sort methodology can be used, despite the fact that it is known to overtriage children. If there are more than five children aged 3 years or younger then the Eichelberger modification should be applied to both sieve and sort methods. Figure 1 shows a modified primary triage scheme (sieve).

Table 5 Paediatric treatment team

<table>
<thead>
<tr>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment and treatment of seriously ill or injured children as directed by the senior doctor in the receiving hospital to which assigned</td>
</tr>
<tr>
<td>Provision of specialist paediatric advice and practical help to casualty treatment teams in the receiving hospital to which assigned</td>
</tr>
<tr>
<td>Clinical documentation</td>
</tr>
</tbody>
</table>

Immediate action
On formation collect identifying badges and this action sheet
Proceed to the staff reporting area of the hospital indicated and report to the senior person in that area, and then to the appropriate clinical area
Assess and treat children indicated to you in order of priority
Report any changes in condition to the senior doctor
Record all examination and treatments on the clinical record card
Double check the identity of all children before treatment as many may only be identified by a major incident casualty number
Place all clothes and other items in a property bag marked with the correct major incident casualty number
Do not dispose of any of the child’s clothing or personal effects as these may be invaluable for identification
Do not move any children without informing the senior doctor and nurse
If children are moved, ensure a record of their destination is kept and given to the senior nurse

Priorities
Assessment and treatment of seriously ill or injured children
Provision of advice and practical help to others involved in the care of seriously ill or injured children

Clinical documentation

TREATMENT
It is most unlikely that individual receiving hospitals will be able to provide enough specialist paediatric staff to oversee the treatment of every child admitted during a major incident. Nor indeed will this be necessary as many emergency department staff will be well versed in caring for injured children. However, paediatric expertise should be available for seriously ill and injured children wherever they are. This can be achieved by forming paediatric treatment teams; an action card for such a team is provided in table 5.

TRANSPORT
If many children are involved, it is likely that only those identified by the PAT as requiring tertiary paediatric care will be transported from the primary receiving hospital. If few are involved then the decision to move may be made following normal referral mechanisms. However this decision is made, sick or injured children must be stabilised and transported by clinicians skilled in their transfer. Such personnel may be available from within the receiving hospital or may be made available by the tertiary paediatric centre. To facilitate these transfers, a paediatric transfer team should be formed; an action card for a paediatric transfer team is provided in table 6.

Recovery and support
Emotional support and counselling should be offered to children, families, and staff. Adequate provision must be made for this and maintained until no longer needed.

Audits should be done following a major incident to determine whether the care of children was optimal. Children’s hospitals should coordinate collation of a casualty incident profile (CIP) of the child victims of the incident. As a minimum, the CIP should include the following:

- age
- sex
- mechanism of injury (if any)
- injury description (AIS)/illness description (ICD)
- disposal.

Figure 1 Paediatric primary triage algorithm.
Once this has been done, a postincident meeting involving all hospitals concerned should discuss how the children were cared for.

**Conclusion**

We have provided a practical approach to the difficult problem of planning for the rare but potentially devastating occurrence of a major incident involving children. The principles we expound can be applied generally. Local decisions must be made on how to modify our approach to work in practice. Children’s emergency and inpatient provision changes, so local decisions to designate lead and receiving hospitals are essential. For this reason strategic (regional) planning teams must include a specialist with expertise in paediatric matters.

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