

# Paediatric Major Incident Preparedness: a cross-sectional study of London's Major Trauma Centres

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## Introduction

- A major incident (MI) requires an extraordinary response by the emergency services, in excess of the resources ordinarily available<sup>1</sup> and children often form a significant proportion of the casualties<sup>2</sup>.
- The UK threat level currently stands at 'severe' and in view of the changing nature of terrorist incidents<sup>3</sup>, it is critical that London is prepared for incidents that could result in multiple casualties and major trauma.
- London's Major Trauma System was formed in 2010 to allow a coordinated response to MIs<sup>4</sup>. It consists of four Major Trauma Networks covering the capital and the surrounding counties. A London MTC forms the heart of each network and is supported by local Trauma Units<sup>4</sup>. This allows ambulance trusts to transport patients to the most appropriate hospital based on their injuries, bypassing the local Emergency Department (ED), if necessary.
- The Civil Contingencies Act (2004)<sup>5</sup> places a legal obligation upon hospitals to ensure adequate planning for the event of a MI. In 1996, Carley and Mackway-Jones<sup>6</sup> examined the major incident plans and preparedness of UK hospitals and noted that only 4% of plans were fully compliant with health service guidelines and only 31% contained specific guidance on managing paediatric MIs. Following the 2005 London Bombings, Wong *et al.*<sup>7</sup> conducted a similar review and found that whilst there was increased training, many middle grade doctors were not clear on their role during a MI.

## Methods

The paediatric MI policy and response, the Resus setup and training and equipment availability was assessed at three London MTCs: MTC1, MTC2 and MTC3.

### Policy awareness

Staff awareness of the MTC1 MI policy and its location was assessed using an online survey. The survey was sent to all ED and Anaesthetic Department staff. Copies of the MTCs MI plans were obtained for analysis.

### Training and Logistics

ED staff were interviewed and questioned about the presence and type of training provided at the hospital. The availability of paediatric Resus treatment areas and equipment was assessed based on a list suggested by Mackway-Jones *et al.*<sup>1</sup>.

Ethical approval was provided by the St George's Research Ethics Committee.

## Results

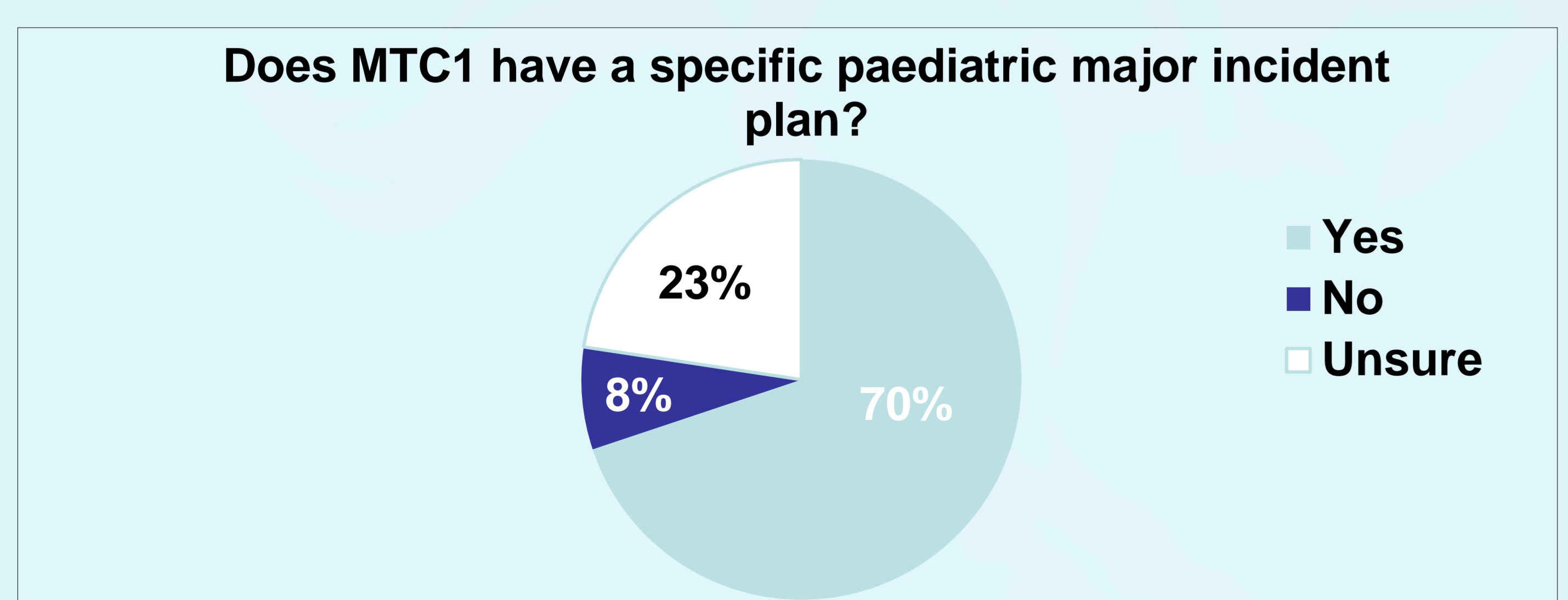


Figure 1: Pie chart showing proportion of staff who were aware of paediatric MI plan (n=59)

### Policy awareness at MTC1

59 staff responded to the survey, aged 18-64, encompassing consultants, junior doctors, registrars, ODPs and nurses of all grades. 70% of respondents were aware of the existence of a specific paediatric MI plan at MTC1, see figure 1, and 38% were aware of where the plan could be found, as shown in figure 2.

11 (19%) respondents correctly identified the location of the paediatric MI bags and no one was aware that they would be required to report to the designated paediatric ward.

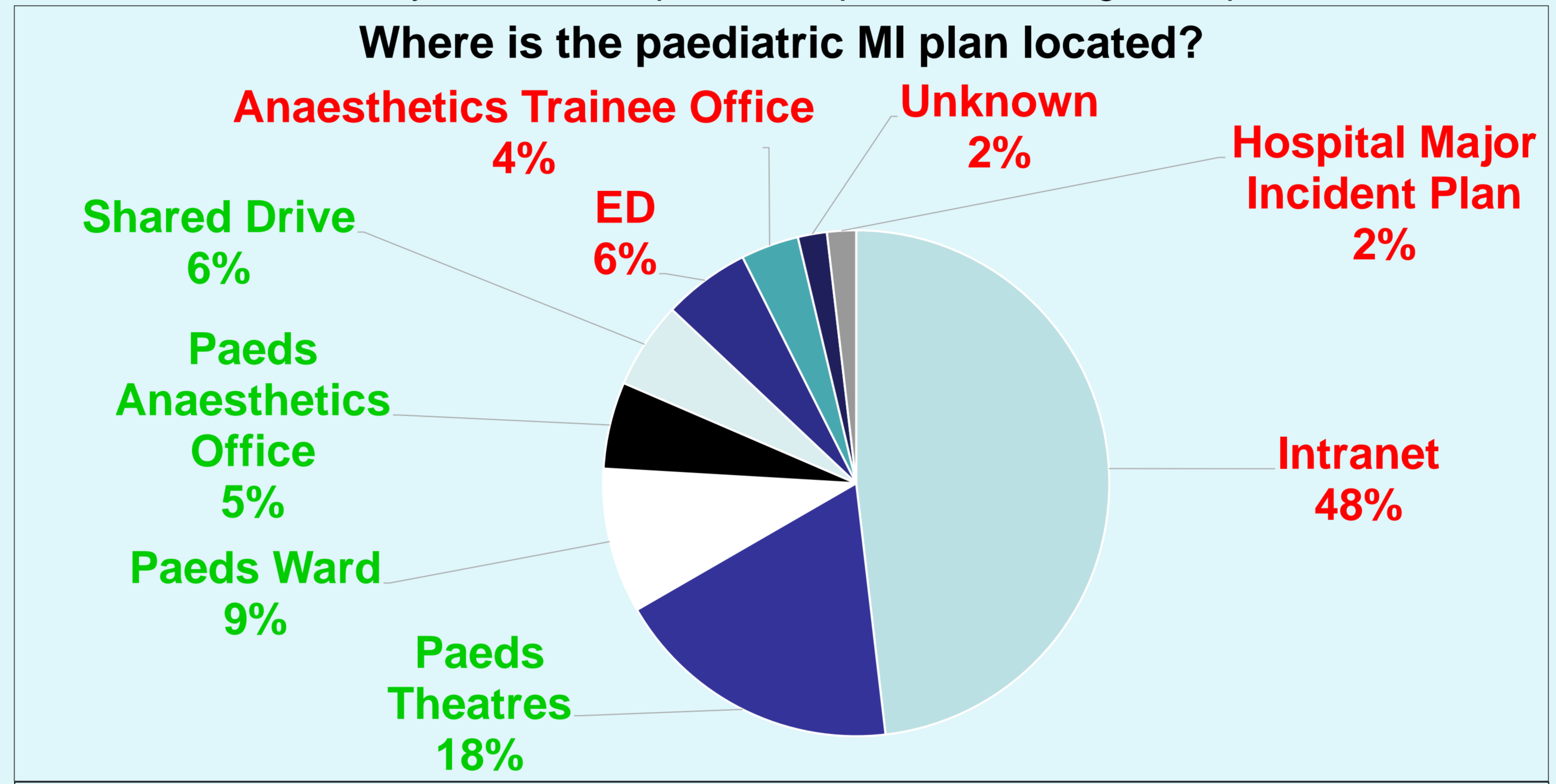


Figure 2: Pie chart showing proportion of staff who were aware of the location of the policy. Answers shown in green are correct. (n=59).

Table 1: A comparison of training and logistics at MTC1, MTC2 and MTC3

	MTC1	MTC2	MTC3	
Training	Induction training	✓	✓	
	Frequency of tabletop exercises	Monthly	Monthly	Annually
	Live exercises	✓	✓	✗
	Paediatric team safety huddles	✗	✓	✗
	Number of paediatric Resus bays	2	1	1
Logistics	Total Resus bays	8	10	16 (8 expandable to 16)
	Paediatric equipment for adult bays	6 MI bags and 1 restocking trolley	Colour coded MI boxes-, two per age group with equipment for one child	Trolley with 1 drawer per age group. MI boxes- inaccessible
	MI box location	Paediatric theatres	ED MI cupboard	ED MI cupboard

## Discussion

This project aimed to evaluate the response to a paediatric MI at 3 MTCs.

- MTC1 had a specific paediatric MI plan, whilst MTC2 and MTC3 rely upon guidance contained within the hospital MI plan.
- 48% of staff at MTC1 assumed that the paediatric MI plan was on the Trust Intranet, perhaps due to this not yet having approval from the Trust.
- All 3 MTCs were seen to have only 1-2 dedicated paediatric Resus bays and would be reliant on the use of adult bays.
- There was an assumption at all hospitals that sufficient paediatric equipment was available in the paediatric bays and in MI boxes to supply the adult bays, however at MTC2 and MTC3 only enough equipment to treat 2 children of the same age is held. Whilst this may be sufficient for a mixed MI, should a class of children all the same age be targeted, there would not be sufficient stores.
- The MTC3 ED store room was seen to have stocks of paediatric intubation equipment; staff at the MTC1 incorrectly assumed that the ED store room also contained paediatric supplies.
- MTC1 MI boxes are located in the paediatric theatres which could pose a problem, due to the significant distance between theatres and the ED and none of the paediatric MI action cards identifying who would be responsible for moving these. Storing the bags in the ED MI cupboard, could resolve this.
- MTC1 MI bags provide a range of paediatric supplies, however no means exist for estimating patients' weight. As such, inclusion of Broselow tapes, with standard anaesthetic drug dosing cards, as done at MTC2 could be useful.
- Whilst paediatric MI boxes are available at MTC3, these were inaccessible. The MTC3 adult MI boxes were noted to contain out of date equipment and the checking log had not been updated.
- The paediatric MI trolley in the MTC1 adult theatre cupboard was seen to contain out of date equipment. This trolley is essential in ensuring that adult theatres can be equipped for paediatric use. All theatres at MTC2 and MTC3 are routinely used for paediatric patients, thus are well equipped.
- MTC2 has updated and refreshed its MI plan and equipment in light of the Paris attacks. Daily safety huddles, together with a recent live exercise have helped the hospital review its response and modify this accordingly.
- As Wong *et al.*<sup>7</sup> found in 2005, our survey showed that staff awareness of major incident policies could be improved.

## Conclusion and Recommendations

It is vital that Major Trauma Centres are adequately equipped to deal with a paediatric MI. This study has highlighted that it would be difficult for a single MTC to simultaneously treat 10 paediatric patients for a multitude of factors including the variability between plans, the regular changeover of junior doctors and the availability of resources. Our recommendations include:

- Advising the ambulance services to distribute patients across the London Major Trauma System should a MI produce 10+ paediatric casualties.
- London MTCs to work together and agree on best practice to create a London, or a national, standard MI plan to minimise the effect of rotating junior doctors.
- Greater emphasis to be placed on training, and interdepartmental working (ED, Paediatrics, theatres, radiology and ITU) ideally through use of live exercises.
- MI boxes should have contents listed, be easily accessible, contain Broselow tapes and be regularly checked.

Adopting these changes will allow MTCs to have the best chance of creating order from the chaos that will inevitably ensue when a paediatric MI is declared.

## References:

1. Carley S, Mackway-Jones K. Advanced Life Support G. Major incident medical management and support: the practical approach in the hospital. Malden, Mass.: BMJ Books; Blackwell Pub.; 2005. Available from: <http://www.cditc.com/uk/downloads/network-work-doctors-mass-casualty-response.pdf>  
2. Mackway-Jones K, Carley SD, Robson J. Planning for major incidents involving children by implementing a Delphi study. Archives of Disease in Childhood. 1999 May 1; 1999;80(5):410-3.  
3. BBC News. Paris attacks: 'I exposed Abasoud' says witness London 2016. Available from: <http://www.bbc.com/news/world-europe-35491904>  
4. London Major Trauma System. Part London Major Trauma Networks Response to Mass Casualty Incident 2016. Available from: <http://www.cditc.com/uk/downloads/network-work-doctors-mass-casualty-response.pdf>  
5. Civil Contingencies Act 2004. Chapter 36. 2004. London: Stationery Office.  
6. Carley S, Mackway-Jones K. Are British hospitals ready for the next major incident? Analysis of hospital major incident plans. BMJ. 1996; 11-16. 08:00:00:313(7057):1242-3.  
7. Wong K, Turner PS, Boppana A, Nugent Z, Colman T, Cosker TDA, et al. Preparation for the next major incident: are we ready? Emergency Medicine Journal. 2006 September 1; 2006;23(9):709-12.

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