



## Policies for managing emergency medical services in mass casualty incidents



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### ABSTRACT

*Introduction:* Diverse decision-making is needed in managing mass casualty incidents (MCIs), by emergency medical services (EMS). The aim of the study was to review consensus among international experts concerning policies of EMS management during MCIs.

*Methods:* Applicability of 21 EMS policies was tested through a 2-cycle modified e-Delphi process, in which 38 multi-disciplinary experts from 10 countries participated. Threshold for approving proposed solutions was defined as consensus of >80%. Policies that did not achieve the targeted consensus were reviewed to detect variability according to respondents' origin country.

*Results:* 16 policies were endorsed in the first cycle including collaboration between ambulance service providers; implementing a unified mode of operation; preparing criteria for ground versus aerial evacuation; and, developing support systems for caregivers exposed to violence. An additional policy which proposed that senior EMS officers should not necessarily act as on-site MCI commanders was endorsed in the second cycle.

Demographic breakdown of views concerning non-consensual policies revealed differences according to countries of origin. Assigning ambulances to off-duty team members was highly endorsed by experts from Israel and South Africa and strongly rejected by European respondents. Avoiding entry to risk areas until declared safe was endorsed by European, Asian and Oceanic experts, but rejected by Israeli, South African and North American experts.

*Conclusions:* Despite uniqueness of countries and EMS agencies, solutions to most dilemmas were applicable to all organizations, regardless of location or affiliation. Cultural diversity was found concerning readiness to implement military-civilian collaboration in MCIs and a rigid separation between work-leisure responsibilities.

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### Introduction

Managing emergency medical services (EMS) presents a complex challenge to healthcare managers in routine and even more so during mass casualty incidents (MCIs), due to the need to respond under uncertain conditions [1]. The need to provide an immediate response to expected and unexpected MCIs parallel to a potential shortage of vital resources [2,3] accentuate the importance of defining policies that direct the function of EMS managers

and practitioners [4,5,3]. The main challenges in MCIs include the need to immediately assess what happened, where, how many resources are available, the severities of the casualties and numerous additional complexities that impact on the capacity to respond. Although EMS organizations world-wide may differ in structure and mode of operation, many commonalities exist in their overall scheme of service provision during MCIs [5,1]. This is evident in all four phases of the disaster life cycle including planning, prevention, preparedness and response [3,6].

Diverse decision-making is needed in managing MCIs, resulting from numerous challenges and controversies that are encountered by EMS teams when responding to such events [4]. One of the most frequent challenges is decreasing response times, which directly impacts on patient survivability [5,1] while reducing management as well as operation costs [5]. Rapid reinforcement of EMS teams is

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a basic milestone in reducing staff shortages, but may necessitate the deployment of medical responders from communities that are not in the immediate inflicted zone or involvement of non-traditional first responders [7]. Another important component is the need for collaboration between different EMS providers (both public and private), as well as between them and other first responders, such as the police or fire brigades [5]. Integrating the interlocking roles of the various professional respondents in the plans and policies of all stakeholders and understanding their respective tasks and modes of operation, is vital to achieving a successful management of MCIs [8]. Collaboration mechanisms may also be vital in coordinating joint involvement of military and civilian responders [9].

A dilemma that is often encountered in MCIs, especially during terror or other violent events is the safety of EMS teams versus the need to provide speedy life-saving services to the injured, even before the site is declared as safe by the security forces [10]. The need to make a decision during an MCI between conflicting values that may impact on the ability to save lives, poses a great predicament in a situation which is already highly stressful [11].

Despite the development and implementation of various models designed to disseminate and test the wide-ranging modes of operation during MCIs, many of the above-mentioned challenges have as yet not achieved consensus [5,3,2]. For example, though modular surge levels were designed and classified into conventional, contingency and crisis capacities it is still unclear when and how EMS teams should switch from one mode to the other, in the midst of the MCI [7,12]. Many crucial, life-changing decisions that EMS officials are committed to make in dire and often chaotic situations, must not be initially faced during the MCI, but should rather be thoroughly debated among diverse disaster management experts and if possible, appropriate policies should be defined and mandated [11].

The aim of the study was to achieve consensus among international field and managerial experts concerning solutions to challenges and controversies in EMS operation during MCIs.

## Methods

Challenges and dilemmas that have preoccupied EMS practitioners and policy-makers in the last few years concerning preparedness and management of MCIs were delineated based on two main components: 1) an extensive literature review; and 2) lessons identified from the numerous MCIs that were managed in Israel in the last two decades, as identified in the After Action Reviews that were conducted following each event. Seven main areas were identified as controversial including: 1) maintaining a high level of alert while minimizing costs (2 items); 2) collaboration between different ambulance providers (7 items); 3) rapid accumulation of EMS teams during crisis (3 items); 4) deployment of operation centers (1 item); 5) on-site management during MCIs (2 items); 6) safety of EMS personnel (3 items); and, 7) cooperation between civilian and military health services during crises (3 items). Overall 21 controversies were identified and included in the study. Potential solutions to each challenge were proposed based on previous studies that were published as well as insights and lessons learned following experience that has been acquired in Israel in managing the numerous crises. To review the applicability and appropriateness of the proposed solutions to emergency medical services in different countries and settings, a 2-cycle modified Delphi process was conducted among 38 multi-disciplinary content experts from 10 countries. The Delphi methodology is well documented, validated and frequently used in emergency and disaster studies [13,14]. Decision making in emerging markets: The Delphi approach's contribution to coping with uncertainty and equivocality, 2015). The experts that

participated in the study were chosen based on expertise in EMS management, MCI management or scientific research of EMS during MCIs. To ensure that all required skills, competencies and expertise are represented, the content experts for inclusion in the Delphi process were identified by using a matrix. The columns listed the needed components including diversity of sectors/professions, variability of countries, expertise in MCI management, experience in EMS operation, diverse types of EMS systems/policies, and specialty in disaster management. The rows listed the names of prospective participants, identified through their publications in scientific or grey literature, membership in national or international professional bodies, participation in international conferences focusing on disaster management, and affiliation to academic/research organizations. As two physicians that were initially approached were unable to participate in the Delphi process (one reported that he will be not available for more than one cycle and the second did not respond), two alternative physicians were selected.

Involving professionals from the three areas of experience was in accordance with previous studies that stressed the advantage of involving "a heterogeneous group of experts with a wider understanding of the area in question" when striving to create broader policies [15]. In order to promote generalization of findings, experts from diverse professions, EMS structures and countries were identified and invited to participate. The characteristics of the participants in the Delphi are presented in Table 1. Comparison of the various content experts' skills and experience is presented in Table 2. The online platform for administrating the Delphi process was Survey Monkey Inc. (Palo Alto, California, USA; [www.surveymonkey.com](http://www.surveymonkey.com)). The study was exempt from an ethics

**Table 1**  
Demographic and professional distribution of participating experts (N = 38).

Variable	n	%
Gender		
Male	33	86.8%
Female	5	13.2%
Country		
Australia	1	2.6%
Canada	2	5.3%
China	1	2.6%
Finland	1	2.6%
Israel	6	15.8%
Italy	3	7.9%
Republic of Korea	1	2.6%
South Africa	1	2.6%
Sweden	5	13.2%
United States of America	17	44.8%
Profession <sup>a</sup>		
Physician	24	63.2%
Nurse	4	10.5%
EMT-P	8	21.1%
Disaster Management	15	39.5%
Other	8	21.1%
Years of experience in profession		
less than 5 years	2	5.3%
5–10 years	3	7.9%
11–15 years	1	2.6%
more than 15 years	32	84.2%
No. of times involved as a responder to a MCI		
Never	2	5.3%
Once	3	7.9%
2–5 times	15	39.5%
6 times or more	18	47.3%

<sup>a</sup> Answers do not sum up to 100% because experts could indicate more than one profession.

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