Simulation Under Fire: Rapid Implementation of a Full-Scale Mass Casualty Incident Simulation During Armed Conflict

Hadas Katz-Dana MD[1,3], Eran Netzer MD[2], and Ehud Rosenbloom MD[1,3]

[1]Department of Pediatric Emergency Medicine, Meir Medical Center, Kfar Saba, Israel
[2]Simultech Center for Medical Simulation, Clalit Health Services, Kfar Saba, Israel
[3]Gray Faculty of Medical and Health Sciences, Tel Aviv University, Tel Aviv, Israel

KEY WORDS: disaster, emergency-medicine, mass-casualty-incident, simulation, trauma

IMAJ 2026; 28: 258–259

In June 2025, amid an escalating military conflict between Israel and Iran, hospitals across Israel were required to reassess and reinforce their emergency preparedness. Civilian populations in central Israel faced direct threats, including missile strikes on residential areas. In response, hospital leadership at Meir Medical Center, a secondary hospital in the center of Israel, issued a directive for an immediate mass casualty incident (MCI) simulation to be designed and executed within 48 hours. The objective was to test the hospital's operational readiness under real-time wartime conditions, stress key interfaces between pediatric and adult emergency services, and identify latent system vulnerabilities.

Simulation exercises, particularly those conducted iteratively and on a hospital-wide scale, have consistently demonstrated value in uncovering hidden system failures. Such simulations support continuous refinement of disaster response protocols and contribute to staff preparedness, as documented in both observational research and simulation-based studies [1].

Unlike standard MCI drills that are routinely planned this simulation was unique in its urgency, scope, and contextual relevance [1,2]. The simulation scenario–a missile strike on a residential building–was informed by actual events from the previous 24 hours in nearby hospitals, enhancing its realism and relevance.

In this report, we describe the design, execution, and outcomes of this rapidly deployed simulation, highlighting critical insights into system-level performance, interdisciplinary coordination, and frontline preparedness.

DESCRIPTION

Within 48 hours of receiving a directive from hospital leadership, a full-scale MCI simulation was developed and implemented. The scenario was designed to reflect a direct missile strike on a residential building.

The exercise was conducted on 19 June 2025, and included 80 participants from a wide range of hospital departments, including adult and pediatric emergency medicine, trauma surgery, general surgery, orthopedics, anesthesiology, otolaryngology, radiology, intensive care, blood bank, transport, and hospital emergency management teams.

Fifteen simulated casualties were used in the exercise, eight of whom were classified as moderate to severe, two of whom as critically injured and subsequently died, and seven with mild injuries. The scenarios were derived from real-life injury patterns observed in Israeli hospitals just 24 hours prior to the exercise. Casualties were portrayed either by high-fidelity simulation mannequins or by high school student volunteers from a nearby school.

Each moderate-to-severe casualty was accompanied by a trained simulation operator to ensure scenario fidelity and consistency. Five trained observers were stationed throughout critical sites to document team performance, system bottlenecks, and logistical challenges in real time, using a structured observation tool. Following the simulation, two debriefing sessions were held: an initial short hot debrief with all participants and a more structured debrief with site leaders and senior staff.

Key observations and lessons were compiled into a formal report and submitted to hospital leadership and the emergency preparedness committee.

The simulation involved 80 multidisciplinary participants and tested all hospital MCI sites, including adult and pediatric emergency departments, trauma bays, radiology, operating rooms, and ancillary services. The drill proceeded as planned, with participants reporting high realism and emotional engagement.

Key system-level issues identified included:

- **Patient flow disruptions:** Examples of patients being rerouted or returning to treatment sites due to unclear flow protocols and signage
- **Communication gaps:** Challenges in maintaining real-time situational awareness and information flow between treatment zones and the command center
- **Equipment accessibility:** Delays in locating critical resuscitation equipment and supplies due to unfamiliarity with the emergency department layout
- **Family communication:** Issues with directing relatives to information sites and the lack of visible reunification areas near the emergency department

COMMENT

This case demonstrates the feasibility and value of a mass casualty simulation under active conflict conditions, executed with less than 48 hours of lead time. While large-scale MCI drills are common, few are prompted by real-time geopolitical threats, and even fewer integrate both adult and pediatric populations in a unified, high-fidelity scenario [2,3].

The simulation revealed operational strengths, including rapid collaboration across departments, effective volunteer recruitment, and scenario realism based on real injury patterns. Participants reported heightened urgency and realism, enhancing both cognitive and emotional learning. It also served as a system-level stress test.

However, critical vulnerabilities were exposed. Patient flow disruptions highlighted the need for stricter controls, while difficulties in maintaining real-time casualty tracking underscored the need for integrated systems. Radiology bottlenecks and the lack of post-imaging decision protocols pointed to the need for role assignments and interdepartmental coordination. Family communication challenges, particularly the absence of an accessible reunification area, could increase emotional distress in a real scenario [4,5].

Despite the short planning window, the simulation led to actionable insights. Changes such as signage revisions, command role clarifications, and new protocols for family reunification are already being implemented.

CONCLUSIONS

This case illustrates that large-scale, high-fidelity MCI simulations can be rapidly deployed during active conflict, providing both clinical training and valuable system-level insights. Key gaps identified underscore the role of simulation in exposing latent vulnerabilities. Even with minimal planning time, such exercises enhance preparedness, guide operational improvements, and strengthen overall health system resilience in times of crisis.

Correspondence

Dr. H. Katz-Dana
Dept. of Pediatric Emergency Medicine, Meir Medical Center, Kfar Saba 4428164, Israel
Email: hadaskat@gmail.com

References

1. Tallach R, Schyma B, Robinson M, et al. Refining mass casualty plans with simulation-based iterative learning. *Br J Anaesth* 2022; 128 (2): e180-9.
2. McElroy JA, Steinberg S, Keller J, Falcone RE. Operation continued care: a large mass-casualty, full-scale exercise as a test of regional preparedness. *Surgery* 2019; 166 (4): 587-92.
3. Joseph MM, Mahajan P, Snow SK, Ku BC, Saidinejad M, American Academy of Pediatrics Committee on Pediatric Emergency Medicine, American College of Emergency Physicians Pediatric Emergency Medicine Committee, and Emergency Nurses Association Pediatric Committee. Optimizing pediatric patient safety in the emergency care setting. *Pediatrics* 2022; 150 (5): e2022059673.
4. Hugelius K, Becker J, Adolfsson A. Five challenges when managing mass casualty or disaster situations: a review study. *Int J Environ Res Public Health* 2020; 17 (9): 3068.
5. Ali S, Maki C, Rahimi A, et al. Family caregivers' emotional and communication needs in Canadian pediatric emergency departments. *PLoS One* 2023; 18 (11): e0294597.

The actions of men are the best interpreters of their thoughts.
John Locke (1632–1704), English philosopher and physician

We are all poets or babies in the middle of the night, struggling with being.
Martin Amis (1949–2023), English novelist, essayist, memoirist, screenwriter and critic