

## The Importance of Healthcare Sector Preparedness against Terrorist Incidents with Chemical Weapons of Mass Destruction: Recommendations

Zoha Dorri <sup>1</sup> , Samaneh Mirzaei <sup>1</sup> , Leila Mohammadinia <sup>2, 3</sup> 

1. Department of Health in Disaster and Emergencies, School of Public Health, Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran
2. Emergency & Trauma Care Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
3. Department of Health Policy and Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

### ARTICLE INFO

#### *Letter to the Editor*

Received: 13 Jul 2025

Accepted: 07 Sep 2025



#### Corresponding Author:

Leila Mohammadinia

dr.mohammadinial@gmail.com

#### How to cite this paper:

Dorri Z, Mirzaei S, Mohammadinia L. The Importance of Healthcare Sector Preparedness against Terrorist Incidents with Chemical Weapons of Mass Destruction: Recommendations. J Community Health Research 2025; 14(1): 225-227.

### Introduction

In the present era, threats of terrorism involving chemical weapons have emerged as a critical security (1) and public health issue (2). Healthcare services proved vital to protecting lives and handling disasters following the 1995 Tokyo subway sarin gas attack (3, 4). The healthcare sector of multiple countries, including developing nations, continues to battle essential preparedness issues. The preparedness of this sector remains an ongoing issue for many developing and non-developing countries.

#### *The need to prepare the health system*

The medical industry maintains an essential position during responses to chemical attack incidents (5-7). The essential elements determining outcomes when managing emergencies and disasters include proper training, sufficient equipment, an early warning system, and effective coordination (8-11). Medical staff and patient safety are damaged when healthcare facilities do not prepare adequately for chemical attacks, which decreases their ability to provide treatment (8, 12, 13).

#### *Current challenges*

Current health system preparedness for chemical attacks faces a critical limitation due to inadequate specific training for emergency responders, together with hospital personnel (9). Many healthcare workers lack adequate knowledge of chemical agents, safe exposure practices, and related treatment protocols (2, 9). Limited knowledge about dealing with toxic materials leads to delayed interventions, which results in higher casualty numbers while putting medical staff at risk. Insufficient medical equipment, including protective gear, rapid testing devices, and detoxification systems, limits a treatment center's capacity to handle chemical incidents properly (2, 12, 14). Equipping selected treatment centers with standard facilities to address exposure to chemical agents is a priority for the health system.

Additionally, the insufficient interagency planning combined with missing coordinated protocols results in operational coordination and confusion when response protocols must be executed (15-17). Enhanced preparedness emerges

from relevant agencies such as emergency services collaborating with hospitals, fire departments, and security agencies through joint operational scenario practices (18, 19). On the other hand, the lack of a system for assessing and recording the preparedness of treatment centers means that existing weaknesses in infrastructures and processes are not identified and corrected promptly. A nationwide monitoring and ranking system for hospital and healthcare centers' chemical threat preparedness is a practical approach to maintaining continuous improvement.

#### **Key recommendations**

The effective management of challenges linked to chemical incidents requires detailed plans established on national and local scales. Healthcare staff must join continuous learning opportunities, combining actual exercises with simulation-based scenarios. Furthermore, personal protective equipment must be supplied to selected centers. A database of hazardous chemicals and their treatment protocols should be created and accessible to healthcare staff. The health system can deal effectively with one of this century's most challenging biological and chemical threats using established evidence-based methods.

#### **Conclusion**

The health system is a key pillar of national security against chemical terrorist threats. To prevent human and societal catastrophes caused by such incidents, an active, anticipatory, and evidence-based approach is essential. Effective collaboration among healthcare, security, and relief

agencies can make this crucial matter possible.

#### **Acknowledgments**

The authors express their gratitude to those who assisted them in the research.

#### **Conflicts of interest**

The authors declared no conflict of interests.

#### **Funding**

No specific funding was received for the preparation or publication of this editorial.

#### **Ethical considerations**

This editorial did not involve any studies with human participants or animals performed by the author. All ethical standards, including proper citation and acknowledgment of sources, were fully observed.

#### **Code of ethics**

Not applicable.

#### **Authors' contributions**

The authorship criteria for each author were met according to the recommendations of the International Committee of Medical Journal Editors, which read and approved the final version.

#### **Open access policy**

JCHR does not charge readers and their institution for access to its papers. Full text download of all new and archived papers are free of charge.

#### **Keywords**

Preparedness, Terrorist incidents, Chemical weapons of mass destruction.

#### **References**

1. Okoro OI, Oluka NL. Weapons of mass destruction and modern terrorism: implications for global security. *Asian Social Science*. 2019; 15(3): 1-13.
2. Dudley JP. New challenges for public health care: Biological and chemical weapons awareness, surveillance, and response. *Biological research for nursing*. 2003; 4(4): 244-50.
3. Cavalcante SFdA, Simas AB, Barcellos MC, et al. Acetylcholinesterase: The “hub” for neurodegenerative diseases and chemical weapons convention. *Biomolecules*. 2020; 10(3): 414.
4. Seyedin H, Moradimajd P, Bagheri H, et al. Providing a chemical events and threatâ s preparedness model for hospitals in the country: A qualitative study. *Journal of military medicine*. 2022; 23(3): 220-7. [Persian]
5. Amiresmaili M, Talebian A, Miraki S. Pre-hospital emergency response to terrorist attacks: A scoping review. *Hong Kong Journal of Emergency Medicine*. 2022; 29(1): 56-62. [Persian]

6. Marzaleh MA, Rezaee R, Rezaianzadeh A, et al. Emergency department preparedness of hospitals for radiation, nuclear accidents, and nuclear terrorism: a qualitative study in Iran. *Iranian Red Crescent Medical Journal*. 2019; 21(5). [Persian]
7. Miraki S, Molavi-Taleghani Y, Amiresmaeli M, et al. Design and validation of a preparedness evaluation tool of pre-hospital emergency medical services for terrorist attacks: a mixed method study. *BMC emergency medicine*. 2022; 22(1): 154. [Persian]
8. Farhat H, Alinier G, Chaabna K, et al. Preparedness and emergency response strategies for chemical, biological, radiological and nuclear emergencies in disaster management: a qualitative systematic review. *Journal of Contingencies and Crisis Management*. 2024; 32(3): e12592.
9. Mehri S, Habibi Soola A, Mohammadi M-A, et al. Exploring managers' experiences of hospital disaster preparedness: A qualitative study. *J Qual Res Health Sci*. 2022; 11(3): 156-63. [Persian]
10. Qzih ES, Ahmad MM. Hospital-based preparedness measures for CBRNE disasters: A systematic review. *Environmental Health Insights*. 2024; 18: 11786302241288859.
11. Aminizadeh M, Farrokhi M, Ebadi A, et al. Hospital preparedness challenges in biological disasters: A qualitative study. *Disaster Medicine and Public Health Preparedness*. 2022; 16(3): 956-60. [Persian]
12. Baikmohammadi S, Amirheidari B, Dehesh T, et al. A qualitative study on barriers and strategies to hospital preparedness against chemical, biological, radiological, and nuclear incidents. *Journal of Education and Health Promotion*. 2024; 13(1): 3. [Persian]
13. Balachandar KG. Management of chemical terrorism and chemical disasters. *International Journal of Disaster Management*. 2021; 4(3): 51-64.
14. Miraki S, Sabet HR, Farahmandnia H. Design and Validation of Prehospital Emergency Preparedness Evaluation Tool for Terrorist Attacks in Iran: A Study Protocol. *Health Management & Information Science*. 2023; 10(3): 139-47. [Persian]
15. Zibasokhan S, Teymouri F, Sharififar S, et al. Factors Influencing the Integrated Management of Chemical Terrorist Incidents. *Iranian Journal of War and Public Health*. 2024; 16(4): 309-17. v
16. Mohammadi S, Aminisaman J, Karimpour H, et al. Assessing of preparedness for disasters and crisis in centers of trauma and accidents of Kermanshah university of medical sciences in 2016; 2017. [Persian]
17. Keshvari M, Shirdel A, Taheri Mirghaedi M, et al. Challenges in the optimal management of human resources in hospitals: A qualitative study. *Journal of Qualitative Research in Health Sciences*. 2018; 7(4): 349-60. [Persian]
18. Phattharapornjaroen P, Carlström E, Atiksawedparit P, et al. The impact of the three-level collaboration exercise on collaboration and leadership during scenario-based hospital evacuation exercises using flexible surge capacity concept: a mixed method cross-sectional study. *BMC Health Services Research*. 2023; 23(1): 862.
19. Farhat H, Laughton J, Gangaram P, et al. Hazardous material and chemical, biological, radiological, and nuclear incident readiness among prehospital care professionals in the State of Qatar. *Global Security: Health, Science and Policy*. 2022; 7(1): 24-36.