



Opioid Attack and the Implications for Counter-Terrorism Medicine

Derrick Tin, MBBS;¹  Zachary Kallenborn, MA;² Alexander Hart, MD;³ Attila J. Hertelendy, PhD;⁴  Gregory R. Ciottone, MD⁵

1. Senior Fellow, BIDMC Disaster Medicine Fellowship; Department of Emergency Medicine, Beth Israel Deaconess Medical Center and Harvard Medical School, Cambridge, Massachusetts USA
2. Research Affiliate, Unconventional Weapons and Technology Division, START, University of Maryland; Policy Fellow, Schar School of Policy and Government, George Mason University, Fairfax, Virginia USA
3. Director of Research, BIDMC Disaster Medicine Fellowship; Department of Emergency Medicine, Beth Israel Deaconess Medical Center; Instructor, Harvard Medical School, Cambridge, Massachusetts USA
4. Faculty, BIDMC Disaster Medicine Fellowship; Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, Massachusetts USA
5. Director, BIDMC Disaster Medicine Fellowship; Department of Emergency Medicine, Beth Israel Deaconess Medical Center; Associate Professor, Harvard Medical School, Cambridge, Massachusetts USA

Correspondence:

Dr. Derrick Tin
Senior Fellow Disaster Medicine
Department of Emergency Medicine
Beth Israel Deaconess Medical Center and
Harvard Medical School
Cambridge, Massachusetts USA
E-mail: dtin@bidmc.harvard.edu

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Abbreviations:

CTM: Counter-Terrorism Medicine
CWC: Chemical Weapons Convention
LD50: Median Lethal Dose

Abstract

While the opioid epidemic engulfing the United States and the globe is well-documented, the potential use of powerful fentanyl derivatives as a weapon of terror is increasingly a concern. Carfentanyl, a powerful and deadly fentanyl derivative, is seeing a surge in popularity as an illegal street drug, and there is increasing congressional interest surrounding the classification of opioid derivatives under the Chemical Weapons Convention (CWC) given their potential to cause harm. The combination of the potency of opioid derivatives along with the ease of accessibility poses a potential risk of the use of these deadly agents as chemical weapons, particularly by terrorist organizations. Disaster Medicine specialists in recent years have established a sub-specialty in Counter-Terrorism Medicine (CTM) to address and research the unique terrorism-related issues relating to mitigation, preparedness, and response measures to asymmetric, multi-modality terrorist attacks.

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While the opioid epidemic engulfing the United States and the globe is well-documented, the potential use of powerful fentanyl derivatives as a weapon of terror is increasingly a concern.^{1,2}

Due to a thriving but under-regulated pharmaceutical sector, China remains a global source of illicit fentanyl, fentanyl precursors, and fentanyl analogues such as remifentanyl and carfentanyl, despite recent changes in regulatory legislation and multilateral agreements to thwart illicit supplies.^{3,4}

For the United States, illegal imports direct from China or via Mexico and Canada remain problematic, and in the first four months of 2021, the United States' border authorities seized 6,494 pounds of fentanyl, compared to 4,776 pounds in all of 2020.^{5,6}

Carfentanyl, a powerful and deadly fentanyl derivative, is seeing a surge in popularity as an illegal street drug. In September 2019, Canadian police seized 42 kilograms of carfentanyl, the largest volume ever seized in North America.^{7,8} While opioids have been extensively discussed in the past decade, particularly amongst counter-narcotic agencies, there is increasing congressional interest surrounding their classification under the Chemical Weapons Convention (CWC) given their potential to cause harm.⁹

Fentanyl and its analogues' use as possible incapacitating agents have long been investigated, however, issues around the margin of safety (optimum dosage to incapacitate but not kill) were never resolved and the project was subsequently abandoned by the United States Department of Defense (Virginia USA) in the 1990s. In 2002, Russia's Spetsnaz operators employed an aerosolized combination of fentanyl analogues in a counter-terrorism operation during the Moscow Theatre Siege, killing both perpetrators and approximately 130 hostages.^{10–12} While the operation at the time was hailed as a success by Russian law enforcement officials and subsequent investigation found no violation of

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Article 2 of the CWC, the incident highlighted the lack of collaboration between Russia's Federal Security Services (Moscow, Russia) and the medical emergency services.^{13–15} Medical workers were expecting to treat victims of gunshots and explosions, and delays in identifying the chemical culprit and administering the appropriate antidote to reverse the effects potentially cost lives. A chemical weapon toxidrome recognition algorithm has since been published by Disaster Medicine and Counter-Terrorism Medicine (CTM) specialists after identifying educational gaps in this area.¹⁶

The combination of the potency of fentanyl and its derivatives, along with the ease of accessibility, poses a potential risk of the use of these deadly agents as chemical weapons, particularly by terrorist organizations.⁹ The median lethal dose (LD50) for the fentanyls is not precisely known for humans, particularly for inhalation or dermatological exposure, which are the most likely exposure routes in a chemical terror attack. However, the high casualty rate in the Moscow Theatre Siege and low LD50 rate in rats suggest an overall high lethality.¹⁷ The accessibility of fentanyl is particularly significant for terrorist groups, because developing traditional chemical weapons agents such as sarin gas requires significant chemical engineering capabilities, specialized equipment, and the resources to put it all together. While Aum Shinrikyo's 1995 sarin gas attacks on the Tokyo subway and the Islamic State of Iraq and Syria's limited chemical weapons usage show the threat of chemical terrorism is real, these examples are outliers to date. The Executive Council for the Organization for the Prohibition of Chemical Weapons (The Hague, The Netherlands) recommended CWC members recognize central-nervous system agents, including fentanyls, as being included under existing prohibitions on chemical use in warfare, which would apply to the 165 CWC member states.¹⁸

Furthermore, the mass proliferation, increasing affordability, and capacity for home-modification of civilian drones increase

the threat of their use by terrorists as a chemical weapon delivery platform and is of significant concern.^{19,20} Agriculture crop spraying drones, riot control drones, and stadium decontamination drones now seen as a result of the COVID-19 pandemic could be easily repurposed to deliver chemical weapons in the form of opioids (aerosolized or in particle form) and induce a complex mass-casualty event.

While the risks associated with malicious drone use by rogue actors are being examined, the positive utilities of drones in disasters are also at the forefront of CTM discussions.^{21,22} In the case of chemical attacks, drones can be used to provide rapid aerial mapping of victims, monitor air quality and presence of harmful chemicals in warm zones, and provide rapid mass delivery of antidotes, such as naloxone in opioid attack, to first responders on the ground. Early studies of first responders have shown that they are interested in adding drones to their repertoire of tools.²³

While terrorist attacks have historically fallen under the man-made banner of Disaster Medicine, terrorist events are unique in their intentionality to kill and injure. Disaster Medicine specialists in recent years have established a sub-specialty in CTM to address and research the unique terrorism-related issues relating to mitigation, preparedness, and response measures to asymmetric, multi-modality terrorist attacks.^{24–26} The potential use of opioids as a weapon that can induce mass casualties requires on-going discussions: risk mitigation strategies need to be discussed, the health care implications of such an event should be anticipated, and the vulnerabilities of response plans need to be addressed, in particular, the need for stockpiling of naloxone at potential soft-target events, such as mass gatherings. This can best be achieved by strengthening regular collaborative discussions among disaster, tactical, and CTM specialists and experts in law enforcement and counter terrorism. While the risk of opioid attack is real, CTM strategies can mitigate and prepare for these potentially deadly events.

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