Marking 30 Years since the Tokyo Subway Attack: Lessons and Looming Risks

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Summary

This article examines the legacy of the 1995 Tokyo Subway Sarin Attack and its role in accelerating global chemical disarmament through the CWC. It highlights ongoing risks from non-signatories and chemical misuse, stressing the need for stronger international enforcement and innovative tools like AI to address evolving threats.

Background

On 20 March 2025, Japan observed 30 years of the Tokyo Subway Sarin Attack (20 March 1995), which was one of the first cases of chemo-terrorism that the world had witnessed. Orchestrated by the Aum Shinrikyo cult under the leadership of Chizuo Matsumoto, the attack involved puncturing bags of sarin nerve agent with sharpened umbrella tips on three subway lines converging at Kasumigaseki, the heart of Japan's government district.[1] The attack claimed the lives of 13 people and caused more than 5000 others to seek medical care. This event marked a turning point in the dangers of chemical weapons attacks conducted by non-state actors, causing mass casualties. Three decades later, the incident remains etched in public memory about how chemical weapons remain a global threat. The 30th anniversary of the 1995 attack calls for a reassessment of existing non-proliferation frameworks, more so in the context of preventing access by non-state actors.

Impact on the Chemical Weapons Convention

The Tokyo incident underscored the urgency of adopting the CWC, which built upon the 1925 Geneva Protocol by not only banning the use but also mandating the destruction of chemical weapons. Though the CWC opened for signature in 1993, it only entered into force on 29 April 1997 through the Organisation for the Prohibition of Chemical Weapons (OPCW).[2] As of 2024, 193 states are party to the CWC seeking the elimination of chemical weapon stockpiles. States parties must submit declarations within 30 days of accession, detailing stockpiles, production facilities, and relevant chemical industries.

Furthermore, these state parties also have to comply with the inspection and monitoring of such facilities to ensure compliance and the eventual destruction of these facilities. The Convention categorised chemical weapon stockpiles into three groups: Category 1 (based on highly dangerous Schedule 1 chemicals like VX and sarin), Category 2 (based on other toxic chemicals such as phosgene), and Category 3 (unfilled munitions and related equipment).[3] The CWC also mandates the declaration of chemical weapons production facilities (CWPF) handling scheduled or relevant non-scheduled chemicals. Destruction timelines for Category 1 weapons were set in stages, aiming for total elimination within 10 years of the treaty's entry into force, i.e., by 29 April 2007.[4]

Given that the 1995 Tokyo Subway attack involved non-state actors, Article 7 of the CWC requires each State Party to adopt legal and administrative measures to bar prohibited activities within its jurisdiction, applying penal laws to nationals abroad, and ensuring safety and environmental protection.[5] States were to cooperate with one another and the Organisation, designate a National Authority for coordination, report implementation measures, and handle confidential information responsibly, and support the Organisation's functions, particularly the Technical Secretariat.[6] This was intended to strengthen anti-proliferation measures by the state to prevent non-state actors from obtaining chemical agents. As of 7 July 2023, the last declared stockpiles of chemical weapons was destroyed at the Bluegrass Chemical Agent Destruction Pilot Plant in Kentucky, where a final rocket was drained of its sarin nerve agent, which was later chemically deactivated and destroyed.[7] This brought the amount of declared chemical weapons that have been destroyed to around 70,000 tonnes, largely from the Cold War era.

The evolving Chemical Weapons threat

Despite broad adherence to the CWC, certain states have remained outside the framework – Egypt, Israel, North Korea, Syria, and South Sudan. Israel, despite being a signatory to the convention, hasn't yet ratified it. South Korean assessments suggest that North Korea holds between 2,500 and 5,000 tons of chemical agents.[8] Its chemical weapons program reportedly focuses on substances like mustard gas, phosgene, sarin, and the highly toxic VX nerve agent, the latter suspected to have been used in the 2017 assassination of Kim Jong Nam, the half-brother of Kim Jong Un.[9] Similar instances of the usage of chemical weapons in state-backed assassinations, such as the poisoning of Russian dissidents with Novichok in Europe, highlight how chemical agents are still used for targeted killings with near impunity.[10]

Despite acceding to the CWC in 2013 and cooperating with the OPCW-UN mission to destroy its declared chemical weapons, Syria has continued to use chemical agents throughout its ongoing civil war, often targeting civilians. The UN Resolution 2118 (2013) called for the verifiably complete destruction of its weapons programme.[11] Although all declared stockpiles were removed and destroyed, doubts remain about the completeness of Syria's disclosure. Notably, Syria has conducted major chemical attacks even after its 2013 pledge, including in Ghouta (2013), Khan Sheikhoun (2017), and Douma (2018).[12]

Following the outbreak of the Russo-Ukrainian conflict on 22 February 2022, there have been allegations of the use of chemical weapons in Ukraine, including riot control agents like tear gas and the toxic choking agent chloropicrin.[13] The 1995 Tokyo subway attacks served as a reference

point for the 2001 anthrax attacks in the United States, which occurred in the post-9/11 period and triggered a significant public health emergency due to bioterrorism.

The use of chemical weapons in global terrorism is becoming increasingly evident, particularly since 2001. There has been a marked shift in the types of chemical agents used. Choking agents like chlorine and vesicants such as mustard gas have become more common, while the use of blood agents (e.g., cyanide) and nerve agents (e.g., sarin) has significantly declined. A paper published in 2021 states that blood agent incidents fell from 32.6 percent before 2001 to 13.6 percent after, and nerve agent use dropped from 9.3 percent to 1.2 percent.[14] Meanwhile, choking agent use rose from 7 percent to 48.1 percent, and vesicants increased from 2.3 percent to 6.2 percent.[15] Riot-control agents have also seen a decline in use. To enhance preparedness, it is critical to focus on protecting vulnerable groups like civilians and schools, improve responses to blast-related injuries, and prioritise training in handling incidents involving choking, vesicant, and caustic agents.

Responses to emerging threats

To address the growing threats posed by chemical weapons, it is crucial to enhance preparedness through stronger civilian protection, better medical responses to chemical exposure, and targeted training for handling contemporary chemical agents. The 1995 Tokyo subway sarin attack remains a key reference point in the global campaign against chemical weapons, highlighting the need for sustained international cooperation, robust national legislation, and vigilance against both state and non-state actors. Supporting this effort, institutions like the Australia Group play a vital role in aligning export controls with the goals of the CWC by maintaining lists of dual-use chemicals, precursors, and related technologies that could be diverted for chemical weapon development. Additionally, UN Security Council Resolution 1540, adopted under Chapter VII of the UN Charter in April 2004, officially delineates the proliferation and possession of weapons of mass destruction (WMD) by non-state actors as a threat to international peace and security.[16]

In a forward-looking step, the OPCW launched the Artificial Intelligence Research Challenge in July 2024 with support from the EU and the UK, partnering with four research institutions to explore AI's potential in detecting and responding to chemical threats.[17] AI's integration with chemistry presents a classic dual-use dilemma: while generative models can accelerate drug discovery and pesticide optimisation, they can also be exploited to design toxic chemical agents.[18] A recent study demonstrated how AI repurposed for harm generated 40,000 virtual toxic molecules, raising alarms about speed and accessibility rather than immediate feasibility.[19] Non-state actors, despite limited expertise, might misuse AI to lower barriers to synthesis and dissemination, while state actors could conceal chemical weapons development under civilian research fronts. Policymakers face the challenge of balancing innovation with regulation, especially among vulnerable Small and Medium-Sized Enterprises (SMEs), while reinforcing arms control regimes like the CWC, UNSCR 1540, and the Australia Group. Some industry leaders downplay the risks, but the potential for misuse underscores the need for close monitoring, prudent regulation, and international cooperation.[20]

Conclusion

Three decades after the Tokyo attack, the incident became a catalyst for strengthening international and national proliferation

frameworks and the use of chemical weapons. Although progress has been made under the CWC, challenges remain in terms of compliance measures by state parties and use by non-state actors. Despite the robust framework of the Chemical Weapons Convention and the near-complete destruction of declared stockpiles, incidents involving both state and non-state actors highlight ongoing vulnerabilities. The Tokyo attack remains a grim reminder of how easily chemical agents can be weaponised with devastating impact, and why continued international vigilance, cooperation, and adaptation to emerging technologies, like AI, are critical. Strengthening enforcement mechanisms, addressing non-compliance, and expanding efforts to monitor technological proliferation remain vital to upholding the global chemical weapons non-proliferation regime.

Endnotes:

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