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Fentanyl as a Chemical Weapon

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Fentanyl is a major topic in the news these days because of its significant contribution to the ongoing opioid epidemic in the United States. It clearly is a major counternarcotic challenge. But there also has been some reporting, including about congressional interest, as to whether fentanyl additionally should be considered a weapon of mass destruction (WMD) and whether U.S. Government chemical defense efforts should place greater emphasis on it.[1] This paper provides some perspective on fentanyl as a chemical weapon.

Fentanyl as a Pharmaceutical

Fentanyl and its analogues are synthetic opioids or narcotics. It was originally synthesized in 1959 by Paul Janssen in Belgium. It was found to have significant utility as an analgesic and as an anesthetic and was approved for medical use in the United States in 1968.[2] Fentanyl has become a mainstay of pain management for cancer victims, wounded soldiers, and others in acute pain.

Fentanyl is a solid (salt) at ambient temperatures, but can be disseminated as a liquid in solution or absorbed through the skin in conjunction with a solvent. Fentanyl pharmaceutical products include lozenges, lollipops, tablets, sprays, transdermal patches, and injectable formulations. Clandestinely produced fentanyl is available as a powder or in counterfeit tablets and is sold alone or in combination with other drugs, like heroin or cocaine.[3]

Fentanyl and its analogues are controlled in the United States under the Controlled Substances Act. Fentanyl, alfentanil, remifentinal, carfentanil, sufentanil, and thiafentinal have legitimate medical or veterinarian uses and are listed under Schedule II of the act. Illicit fentanyl analogues have no recognized legitimate uses and are controlled under Schedule I.[4]

Fentanyl as an Illicit Drug

Fentanyl has been abused as an illicit narcotic for decades but has become a crisis in recent years. It is far more potent than heroin and less expensive.[5] Those characteristics have made it a common additive to other illicit drugs and significantly increased the incidence of opioid overdoses and associated fatalities.

Much of the fentanyl and fentanyl analogues that are illicitly used in the United States are produced in China and

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sent directly to the United States or indirectly via Mexico or Canada. As with many other drugs, China is a widely used source of illicit supply, as its pharmaceutical industry is far less regulated than in the West. Efforts to cut off the illicit supply of fentanyl and its many variants have been frustrated by the number of producers and many different synthesis routes. The Chinese government has agreed to work with the United States to thwart the illicit trade, but the extent and effectiveness of that cooperation is in dispute.[6] The history of the illicit drug trade writ large indicates that where there is demand, there will be supply.

Fentanyl as an Incapacitating Agent

It is less well known that fentanyl and its analogues have been investigated as incapacitating agents by a number of countries. In the United States, the Department of Defense (DOD) and the Department of Justice conducted such investigations into the 1990s.[7]

Military and nonmilitary security entities, in the United States and abroad, long had an interest in effective forms of less-than-lethal force, including chemicals. Tear gas was used by numerous military forces before the Chemical Weapons Convention (CWC) and remains a mainstay of law enforcement around the world for riot control.[8] DOD produced an incapacitating chemical weapon in the early 1960s that utilized the psychoactive compound BZ (3-Quinuclidinyl Benzilate), but eliminated it by 1989.[9]

Tear gas and BZ did not meet the objectives of incapacitating agent research, which was to discover a chemical, or a cocktail of chemicals, that would *incapacitate* an adversary individual or unit—fast enough to preclude the target from resisting and long enough to enable the target to be disarmed or other objective to be achieved—without causing permanent harm. Tear gas compels an unprotected person to flee the area, while BZ can cause bizarre behavior.

DOD saw promise in fentanyl and some of its analogues, or a combination of such compounds, for incapacitation, but did not solve the *margin of safety* issue prior to the program's termination. Margin of safety refers to the difference between a dosage that will incapacitate and one that will kill a person. That difference or margin varies by individual. Unless the margin is sufficiently large, there can be no reasonable assurance that a dosage that is potent enough to reliably incapacitate a target population will not also kill an unacceptable percentage of that population. DOD never weaponized fentanyl compounds, but at least one other country did.

Russia employed fentanyl analogues in a counterterrorism role in October 2002. Forty Chechen terrorists seized Moscow's Dubrovka Theater and more than 800 hostages, strung explosives around the theater, and threatened to destroy it and kill the hostages unless Russia agreed to end its military campaign in Chechnya. After several days of unsuccessful negotiations and the Chechens' threat that it would start killing hostages, Russian security forces pumped an aerosolized combination of two fentanyl analogues into the theater to incapacitate the inhabitants and permit the building to be stormed. The terrorists and approximately 130 of the hostages were killed. Most hostages died from exposure to a lethal dose of the fentanyl compounds (recall that margin of safety issue discussed earlier). Some of those hostages might have been saved had Russian security forces informed emergency response and hospital medical professionals of what the hostages had been exposed to, as there exists an effective treatment. Naloxone and other opiate antagonists can reverse the effects of an opioid overdose.[10] The Dubrovka Theater incident demonstrated or suggested a number of things:

- The Russian government had continued its fentanyl program after the United States had ended its own
- Russia's fentanyl program had proceeded to weaponization, or far enough along that the Russians were able to weaponize it during the crisis
- Russia's fentanyl program may have tolerated a higher percentage of anticipated fatalities for any given employment than the United States did
- Russia's use of fentanyl compounds as an incapacitating agent in a counterterrorism role exposed a gray area in the CWC.

Fentanyl and the CWC

The initial international reaction to Russia's use of chemicals to resolve the hostage situation was largely positive.

British Prime Minister Tony Blair called Russian President Vladimir Putin to congratulate him on resolving the crisis.[11] Context is important here. There was great concern that the Chechens would kill most of the hostages by blowing up the building. That only about 130 hostages died could be considered a win, given the circumstances. The crisis occurred only 13 months after 9/11, when the United States and some other Western countries were engaged in their own extraordinary actions to combat the terrorist threat. Western nations still considered Russia a friendly country.

Also important is the fact that the CWC, which had entered into force 5 years earlier, identifies law enforcement as a purpose not prohibited by the convention. While those who wrote the CWC's law enforcement exception probably had in mind riot control agents, like tear gas, the language does not clearly exclude other chemicals. Moreover, though about 130 hostages were killed by exposure to fentanyl compounds in Dubrovka, it is generally accepted that the Russians' intent was to incapacitate.

Only on further reflection and some internal debate within and among some Western countries have the potential implications of tolerating the use for law enforcement of chemicals with lethal capacity, like fentanyl compounds, come to be further appreciated. These include the humanitarian concern of putting innocents at such high risk of death, erosion of the norm against the use of chemicals as weapons, and the potential for CWC members to exploit the law enforcement exemption as cover to prepare for the use of chemical weapons in warfare.

In the last few years, the United States, with Australia and Switzerland, has been at the forefront of an effort to persuade a sufficient number of other states parties to the CWC to agree that the aerosolized use of central nervous system–acting chemicals, like fentanyl and its analogues, is not consistent with the law enforcement exception to the convention.[12] The phrases *central nervous system–acting agents* and *aerosolized use* were carefully chosen. The former distinguishes these chemicals from riot control agents, which do not act on the central nervous system as their main effect and are explicitly permitted and widely used for law enforcement purposes. The latter term distinguishes the mode of dissemination that is most likely to result in death—aerosolized use—from modes most associated with delivery of the chemicals for legitimate purposes—injection, lozenges, and patches. As a senior National Security Council official observed at the CWC Conference of States Parties in 2017, with reference to White House–issued safety recommendations for first responders when handling and encountering fentanyl, "if our first responders are at risk when they encounter illicit fentanyl, then how can our unsuspecting populations be safe when fentanyl is aerosolized and used as a law enforcement tool?"[13] This effort has generated broad-based support from across the membership of the Organisation for the Prohibition of Chemical Weapons, but there are important holdouts, including Russia.

Fentanyl as a Weapon of Mass Destruction?

Should fentanyl and its analogues be considered a WMD? It is the recent rise to public prominence of fentanyl as a cause of many deaths—not as a weapon but as an abused illicit drug—that has raised the question as to whether fentanyl also should be treated as a potential chemical weapon of mass destruction. This question has two parts, and each of these parts has at least two parts. First, should fentanyl compounds be *viewed* as potential weapons of mass destruction? Could an adversary weaponize a fentanyl compound to kill many people? How likely is it that an adversary would use fentanyl to that end? Second, should fentanyl compounds be *designated* as a weapon of mass destruction? What does it mean to designate a chemical as a WMD? What benefits or drawbacks would attend to such a designation? The term *designation* is used here because that term often arises in discussions of the issue and needs some illumination as to whether it is merely semantics or has real significance.

With regard to the first question, could an adversary weaponize fentanyl compounds to kill many people? A current adversary, Russia, previously employed fentanyl compounds as a weapon and killed about 130 innocents, even if it was only seeking to incapacitate them. That would seem to answer the question as to whether fentanyl compounds could be used as a WMD. And is it likely that an adversary would use fentanyl compounds as a weapon with the intent to kill many people? That is a harder question to answer. While it is clear from the prevalence of fentanyl compounds in the large illicit drug trade that such chemicals are accessible to state and nonstate actors alike, there is lack of information in the public realm indicating that a specific adversary currently evinces

or demonstrates an intent to use fentanyl compounds as a chemical weapon. A reasonable conclusion would be that there is a risk but not necessarily a specific threat at this time of fentanyl compounds as a weapon.

As to the second question as whether to designate fentanyl compounds as WMD, what does it mean to designate a chemical as a WMD? Is it something done officially pursuant to statute or regulation, or is it just a statement of policy? While there are numerous definitions of WMD, the one used in international diplomacy defines a *weapon of mass destruction*, as concerns chemicals, as "lethal" chemical weapons. The DOD definition refers to chemical weapons capable of "causing mass casualties." Some other elements of the U.S. Government, particularly law enforcement, use a statutory definition that refers to "any weapon that is designed or intended to cause death or serious bodily injury through the release, dissemination, or impact of toxic or poisonous chemicals, or their precursors."[14] A chemical could be considered a WMD if it met the aforementioned criteria and does not require an explicit, official designation to that effect. As we have already established that fentanyl is a lethal chemical and has been used at least once as a weapon, then fentanyl would appear to be a candidate for WMD designation.

Under the CWC, toxic chemicals and their precursors are considered chemical weapons except where intended for purposes not prohibited under the treaty. The CWC does list specific chemical agents and their precursors in its Schedule of Chemicals for verification purposes under the convention. However, they reflect the traditional chemical warfare agents that existed at the time that the schedules were prepared and are not intended to exclude as chemical weapons other chemicals that meet the general definition discussed above. For example, the non-listed chemical chlorine constituted a chemical weapon when Syria used it as a weapon in its civil war because such use is prohibited under the CWC. Thus, while fentanyl compounds are not listed on the CWC Schedules, they still would be considered chemical weapons if used for purposes prohibited by the treaty. They do not have to be explicitly designated.

DOD has recognized for some years that pharmaceutical-based agents, which include fentanyl compounds, could pose a risk to the force and has invested in gaining a better understanding of their characteristics and how they might be countered.[15] DOD did not have to accord some separate designation of WMD to these agents; it required only a recognition that they could pose risks and that it would be prudent to further understand those risks.

Are there any significant benefits or drawbacks to explicitly designating fentanyl compounds as WMD, whether as an official matter under statute or regulation or only as a statement of policy? This would not appear to be the case for DOD, at least regarding force protection. It is not clear that it is the case for the Department of Homeland Security or other domestic U.S. agencies that operate under different authorities. Since fentanyl and several of its analogues are widely used for legitimate medical purposes, unlike traditional chemical warfare agents and some of their precursors, particular attention should be given to determining whether any explicit designation of fentanyl compounds as WMD would pose problems for the legitimate trade in fentanyl.[16]

Conclusion

It is not evident that there is any basis or need for, or net benefit to, officially *designating* fentanyl compounds as weapons of mass destruction, however that may be defined, at least for the Department of Defense. But it is clear that there is at least a risk that fentanyl compounds could be used as chemical weapons. To mitigate that risk, the CWC Conference of States Parties should adopt the position advanced by Australia, Switzerland, and the United States, among others, that the aerosolized use of central nervous system–acting agents, like fentanyl, for law enforcement is inconsistent with the Chemical Weapons Convention. The Department of Defense also should continue to advance its understanding of fentanyl compounds as potential chemical weapons and how to counter them and be prepared to produce and field material and nonmaterial countermeasures with U.S. forces at such time that the threat intelligence may merit.

Notes

1 For example, Bloomberg reported that Senator Edward Markey (D-MA) wrote both Secretary of State Mike Pompeo and former Acting Secretary of Defense Patrick Shanahan asking whether their agencies had devised strategies to deal with the potential weaponization of fentanyl. See Anna Edney, "Senator Seeks Strategy to Prevent Fentanyl Terror Attacks," *Bloomberg*, January 28, 2019, available at <www.bloomberg.com/news/articles/2019-01-28/strategy-to-prevent-fentanyl-terror-attacks-sought-by-senator>. In April, *Task and Purpose*

disclosed a February 22, 2019, memorandum from a Department of Homeland Security senior official that discussed plans to use Countering Weapons of Mass Destruction authorities against fentanyl. See Paul Szoldra, "Exclusive: DHS Is Considering Classifying Fentanyl as a 'Weapon of Mass Destruction," *Task and Purpose*, April 15, 2019.

2 Ananya Mandal, "Fentanyl History," available at <www.news-medical.net/health/Fentanyl-History.aspx>.

3 Drug Enforcement Administration (DEA), *Drugs of Abuse: A DEA Resource Guide* (Washington, DC: DEA, 2017), 40, available at <www.dea.gov/documents/2017/06/15/drugs-abuse>.

4 Ibid., 15–24.

5 "Fentanyl vs. Heroin: The Similarities and Differences Between Two Powerful Opioids," reviewed by Marisa Crane, American Addition Centers, updated June 17, 2019, available at https://americanaddictioncenters.org/fentanyl-treatment/similarities.>

6 "China Says Has Only 'Limited' Cooperation with U.S. in Fentanyl," Reuters, September 3, 2019, available at <www.reuters.com/article/us-usa-china-fentanyl/china-says-has-only-limited-cooperation-with-u-s-on-fentanyl-idUSKCN1VO0AD>.

7 Erika Kinetz and Paisley Dodds, "Deadly Drug Fentanyl Has Been Tested as Chemical Weapon by Military for Decades," *Global News*, October 8, 2016, available at <https://globalnews.ca/news/2991712/deadly-drug-fentanyl-has-been-tested-as-chemical-weapon-by-military-for-decades/>. Scientists working at the U.S. Army's Edgewood Chemical Biological Center published a number of papers on their incapacitant work with synthetic opioids and obtained at least one related patent (U.S. Patent Number 5,834,477, Opiate Analgesic Formulation with Improved Safety, November 10, 1998).

8 Anna Feigenbaum, "100 Years of Tear Gas: A Chemical Weapon Drifts Off the Battlefield and into the Streets," *The Atlantic*, August 16, 2014, available at <www.theatlantic.com/international/archive/2014/08/100-years-of-tear-gas/378632/>.

9 Robert Windrem, "BZ: Its History, Symptoms, Effects," *NBCNews.com*, October 24, 2003, available at <www.nbcnews.com/id/3340693/t/bz-its-history-symptoms-effects/#.XYvJ10ZKiUk>.

10 A detailed account of the siege and its resolution is from Andrei Soldatov and Irina Borogan, "The Nord-Ost Siege: The Investigation Is to Reopen," *Agentura*, February 25, 2011, available at <www.eurasiareview.com/25022011-the-nord-ost-siege-investigation-to-be-reopened/>.

11 Steven Lee Myers, "Hostage Drama in Moscow: Russia Responds; Putin Vows Hunt for Terror Cells Around the World," *New York Times*, October 29, 2002, available at <www.nytimes.com/2002/10/29/world/hostage-drama-moscow-russia-responds-putin-vows-hunt-for-terror-cells-around.html>.

12 Organisation for the Prohibition of Chemical Weapons, C-22/NAT.5, "Aerosolisation of Central Nervous System-Acting Chemicals for Law Enforcement Purposes," November 28, 2017, available at <www.opcw.org/sites/default/files/documents/CSP/C-22/national_statements/c22nat05_e_.pdf>.

13 "Statement by Andrea Hall, Senior Director for Weapons of Mass Destruction and Counterproliferation, National Security Council, Delegation of the United States of America to the 22nd Session of the Conference of States Parties, Organisation for the Prohibition of Chemical Weapons," C-22/NAT.7, November 27, 2017.

14 W. Seth Carus, *Defining "Weapons of Mass Destruction,"* CSWMD Occasional Paper 8 (Washington, DC: NDU Press, January 2012), 1–2, 5, 29, appendix A, available at <https://wmdcenter.ndu.edu/Portals/97/Documents/Publications/Occasional%20Papers/08_Defining%20Weapons%20of%20Mass%20Destruction.pdf>.

15 For example, the U.S. Army Combat Capabilities Development Command Chemical Biological Center, "Reports Published by the Technical Released Office FY19, Final Report," lists a number of technical reports pertaining to defensive investigations on fentanyl compounds.

16 Even a designation that was no more than a statement of policy might be problematic. Anecdotal evidence suggests that the Director of National Intelligence's observation in public testimony in 2016 that new genome editing technologies could become a concern for bioweapons led some commercial firms to reconsider working with the Defense Department in this area. See James N. Clapper, *Worldwide Threat Assessment of the Intelligence Community*, Statement for the Record to the Senate Intelligence Community, February 9, 2016, 9, available at <www.dni.gov/files/documents/SASC_Unclassified_2016_ATA_SFR_FINAL.pdf>.

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