What Are Chemical Weapons and How Would Syria Use Them?

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The impacts would be horrifying, but Assad probably can't employ them effectively on a large scale -- yet.

Chemical weapons disable, injure, or kill by disrupting the normal physiological processes of their victims. They include lethal nerve, blister, blood, and choking agents; nonlethal incapacitating agents that induce temporary paralysis in their victims; and tear gas. Their means of delivery include missiles, tube and rocket artillery, aerial bombs, spray dispensers, and mines.

Although chemical weapons are usually classified as weapons of mass destruction, their destructive potential is significantly less than that of nuclear and biological weapons. Chemical agents must be used in massive quantities in order to attain lethal concentrations over broad areas. Their effectiveness depends on having the appropriate delivery means and the right atmospheric conditions (such as wind speed and air temperature).

Because the impact of chemical-agents can be significantly reduced through countermeasures, such as protective masks and overgarments, these types of attacks are most effective against military organizations or civilian populations that lack such protection.

Chemical weapons were first used on a widespread basis by both sides during World War I and were subsequently used by the Japanese in Manchuria in the 1930s; Egypt in Yemen in the 1960s; and, in the 1980s, by Iraq during the Iran-Iraq War, by Libya in Chad, and by the Iraqi government against Kurdish insurgents and civilians.

The United States and Russia retain what are probably the largest inventories of chemical-warfare agent in the world, although both countries are currently in the process of eliminating their stockpiles, in accordance with their obligation under the Chemical Weapons Convention. At present, there at 188 state parties to the CWC. Israel and Myanmar have signed, but not ratified the CWC, while Angola, North Korea, Egypt, Somalia, and Syria have not joined the convention. Several of these countries, including Syria, North Korea, and possibly Egypt, are believed to

maintain chemical weapons stockpiles.

Until the early 1990s, Iraq had one of the largest chemical-warfare programs in the developing world. As a result of the 1991 Gulf War, the efforts of United Nations weapons inspectors in the decade following the war, and the decision of the Iraqi government to join the CWC in 2009, nearly all of Iraq's known chemical-warfare capabilities have been destroyed.

Iraq's use of chemical weapons during the Iran-Iraq War provided much of what is known today about chemical warfare and its long-term health effects. Experience during that war showed that large concentrations of agent are generally required to cause heavy loss of life, though even small amounts can injure thousands. Some 10,000 Iranians, half of them civilians, were killed by chemical weapons during eight years of fighting, and another 50,000 suffered moderate to severe injuries. More than 45,000 Iranians continue to suffer the long-term health effects of exposure to chemical agents, including skin, eye, and respiratory ailments, birth defects, cancer, and post-traumatic stress.

Two of the best-known Iraqi chemical attacks on civilian targets are the bombings of the Iranian town of Sardasht in June 1987 and the Iraqi Kurdish town of Halabja in March 1988. (The 25th anniversary of the latter attack was marked earlier this week.) In Sardasht, Iraqi aircraft dropped seven 250-kilogram bombs filled with mustard, killing about 100 people and injuring 4,500. In Halabja, more than 50 aircraft dropped some 200 bombs filled with mustard and nerve agents, killing some 5,000 immediately and injuring several thousand more.

It took Iraq several years of trial and error before it was able to effectively employ chemical weapons on the battlefield, and its successes were due in part to the fact it used them against human wave attacks and troop concentrations--ideal targets for chemical weapons.

With the dismantling of Iraq's chemical weapons program, Syria is now believed to possess the largest chemical weapons arsenal in the region. Syria has reportedly produced artillery rockets filled with the blister agent mustard, as well as aerial bombs and missile warheads filled with the nerve agents sarin and perhaps VX.

Despite the reputed size and sophistication of this stockpile, it is unclear at this point that the Assad regime could kill many more insurgents or civilians with chemical weapons than it is already killing by conventional military means, for several reasons. Syria lacks experience in the use of chemical weapons and is unlikely to use them effectively against military targets, at least initially. This is due, at least in part, to the fact that the armed opposition tends to operate in relatively small, dispersed formations, making them less than optimal targets.

And Syria may lack sufficient artillery and air power to consistently deliver the type of concentrated, sustained bombardments that produced the kind of mass casualties experienced in Halabja and during combat in the Iran-Iraq War. (For instance, Syrian government airstrikes rarely involve more than a lone aircraft against a single target.) Furthermore, the Assad regime is likely to initially use chemical weapons in a measured fashion, in ways that could be difficult to verify, in order not to provoke an American military response. Indeed, the alleged use of what may have been a chemical munition this week by Syrian government forces may represent the beginning of such a strategy of incremental use, in order to gauge the international response.

Syria could probably kill many scores of people in individual chemical strikes--about as many as it has killed in conventional airstrikes on civilians waiting in queues at gas stations and bakeries--and produce thousands of casualties that would need immediate medical attention as well as long-term care. While such strikes are unlikely, in the long run, to fundamentally alter the military balance between the Assad regime and the armed opposition, their psychological impact could be devastating, leading to mass refugee flows into neighboring countries, further exacerbating Syria's humanitarian crisis. And the long-term medical effects could be horrific. And while conventional weapons are the true weapons of mass destruction in Syria, the use of chemical weapons might just

bring about a significant increase in international military support for the Syrian opposition -- if not overt military intervention on their behalf.

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