

# Haileybury MUN

## Research report



### General Assembly 1: Disarmament and International Security

#### The Question of the Use of Nerve Agents

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#### Definitions:

##### 'Nerve Agents'

Nerve agents, sometimes also called nerve gases, are a class of organic chemicals that disrupt the mechanisms by which nerves transfer messages to organs. The disruption is caused by the blocking of acetylcholinesterase, an enzyme that catalyzes the breakdown of acetylcholine, a neurotransmitter. Nerve agents are generally colorless to amber-colored, tasteless liquids that may evaporate to a gas and tend to be odourless.

#### Examples:

- Tabun (GA)
- Sarin (GB)
- Chlorosarin (GC)
- Soman (GD)
- Ethylsarin (GE)
- Cyclosarin (GF)
- GV.

#### The effects:

Initial symptoms following exposure to nerve agents (like **sarin**) are a runny nose, tightness in the chest, and constriction of the pupils. Soon after, the victim will have difficulty breathing and will experience nausea and salivation. As the victim continues to lose control of bodily functions, involuntary salivation, lacrimation, urination, defecation, gastrointestinal pain and vomiting will be experienced. Blisters and burning of the eyes and/or lungs may also occur. This phase is followed by initially myoclonic jerks (muscle jerks) followed by status epilepticus -type epileptic seizure. Death then comes via complete respiratory depression, most likely via the excessive peripheral activity at the neuromuscular junction of the diaphragm.

The effects of nerve agents are long lasting and increase with continued exposure. Survivors of nerve agent poisoning almost invariably suffer chronic neurological damage and related psychiatric effects. Including reduced brain volume, diminished mental function, eye problems, chronic fatigue, abnormalities in chromosomes of blood cells, damage to nerves outside the brain (peripheral nervous system), problems with balance, abnormal brain wave responses, diminished heart function, not to mention chronic depression, insomnia, and other severe psychological effects, which might also be related to posttraumatic disorder. Possible effects that can last at least up to 2–3 years after exposure include blurred vision, tiredness, declined memory, hoarse voice, palpitations, sleeplessness, shoulder stiffness and eye strain. Even extremely low-level exposure is sufficient to cause such serious and persistent medical problems, as seen by studying the health of subway workers and first responders three to seven years after the attack in Tokyo.

The toxic effects of low-level sarin (and insecticide exposure) are even more dire for children, because disrupting development and growth of the brain and body in early life can leave a permanent scar that results in diminished IQ, learning and memory impairment, and other disabilities. This issue remains a

strong concern of the EPA and the FDA from the standpoint of children being exposed to pesticide residues in food.

### Discovery:

The first class (The G-series) was first discovered in 1936 by accident in Germany as a pesticide. In attempt of perfecting insecticides, they discovered nerve agents, tabun, as they tested what they had intended for insects on humans. In 1935 the Nazi government had sent a sample of tabun to the chemical warfare part of the military. In 1938 sarin and in 1944 soman were discovered. Large amounts of these had been ordered to be produced during WW2 but they did not complete the order by the end of the war. These nerve agents were not used during the war and the allies only discovered them when they had captured the German laboratories.

### Methods of spreading:

Many methods exist for spreading nerve agents such as:

- uncontrolled aerosol munitions
- smoke generation
- explosive dissemination
- atomizers, humidifiers and foggers

### Ocean disposal:

In 1972, the United States Congress banned the practice of disposing chemical weapons into the ocean. 32 000 tons of nerve and mustard agents had already been dumped into the ocean waters off the United States by the U.S. Army, primarily as part of Operation CHASE. According to a 1998 report by William Brankowitz, there had been at least 26 chemical weapons dump sites in the ocean off at least 11 states. Due to poor records, they currently only know the rough whereabouts of half of them.

There is currently a lack of scientific data regarding the ecological and health effects of this dumping. In the event of leakage, many nerve agents are soluble in water and would dissolve in a few days, while other substances like sulfur mustard could last longer. There have also been a few incidents of chemical weapons washing ashore or being accidentally retrieved, for example during dredging or trawl fishing operations. This could cause even more severe issues in the future.

### Stats

- Organophosphate and carbamate toxicity affects over 10,000 people in the United States annually and over 3,000,000 worldwide.
- Up to 300,000 deaths per year are attributable to insecticides, herbicides, rodenticides, and chemical warfare agents like soman, sarin, tabun, and VX.
- On June 27, 1994 a Japanese terrorist group, Aum Shinrikyo, released sarin in Matsumoto, poisoning some 600 people; 58 of whom were admitted to hospitals, and seven victims died.
- The same Japanese terrorist group from the 1994 attack, then used Sarin again in the 1995 Tokyo subway attack killing 54 people and causing over 5000 casualties.
- March 1988 - On "Bloody Friday," the Iraqi air force attacks the northern Iraq town of Halabja with poison gases that were thought to include sarin, VX and other deadly compounds. Reports indicate that 5,000 people die in the attack. Countless others suffer eyesight loss, respiratory ailments and cancers.
- August 21, 2013 - A new alleged chemical weapons attack kills more than 1,000 people in the Syrian countryside outside its capital, Damascus. Hundreds of those killed are children.
- April 4, 2017 - An airstrike on a rebel-held town in northwestern Syria leaves 89 civilians dead, including children, from a suspected chemical attack, using sarin gas.

Useful Links:

<https://www.newshub.co.nz/home/shows/2018/03/nerve-agents-a-history-of-chemical-weapons.html> - History of the use of chemical weapons

<https://www.theatlantic.com/science/archive/2018/03/nerve-agent-poisoning/555143/> - How they work

<http://www.sciencemag.org/news/2018/01/how-defeat-nerve-agent> - How to defeat a nerve agent

<http://theconversation.com/new-antidote-could-prevent-brain-damage-after-chemical-weapons-attack-100236> - a possible new antidote

<https://www.sciencedirect.com/topics/neuroscience/nerve-agent>