# Technological advances could reduce effectiveness of the Chemical Weapons Convention

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Technological advances within the chemical industry could erode the effectiveness of the Chemical Weapons Convention's provisions for verification and compliance.

That assessment is offered by Tuan Nguyen, the Herbert York Fellow at Lawrence Livermore National Laboratory's Center for Global Security Research, in a paper to be published in the Aug. 12 edition of the journal Science. (The York Fellowship honors the Laboratory's first director, who is now director emeritus of the Institute on Global Conflict and Cooperation at UC San Diego).

Because of the threat of chemical warfare and its use, the Chemical Weapons Convention was signed in 1993 to ban the stockpiling, production and usage of chemical weapons. This treaty, now signed by 170 nations, includes intrusive verification procedures that far exceed those of other treaties banning weapons of mass destruction.

However, in recent years the world's chemical industry has been developing micro-reactors that range in size from a credit card to the dimensions of a notebook to replace large batch reaction vessels. For the chemical industry, this change permits safer processing, better chemical yields and a reduction in overall costs.

"The key issue with these advancements in science and technology is that

it's going to make it more difficult to monitor and verify compliance of the Chemical Weapons Convention," Nguyen said.

In his paper, he noted: "The inherently small physical size of the equipment and small space required make it attractive for clandestine operations. The ability to produce chemicals of interest in a safer and more feasible manner, with little signature produced, could encourage their application for malicious intent."

Although the full chemical synthesis potential of micro-reactors is not yet clear, several lethal chemicals – hydrogen cyanide, phosgene and methyl isocyanate – have already been produced using this system, according to Nguyen. In China, nitroglycerine has recently been produced using microprocess technology at a maximum rate of 10 kilograms per hour.

Another danger created by the growing usage of micro-reactors is that chemical weapon precursors could be synthesized rather than purchased, making it more difficult to discover the preparation of chemical weapons.

In Nguyen's view, while the need for control and verification must not hinder the development of these chemical industry technologies, the security challenges should not be ignored.

"To address these issues, the Organization for the Prohibition of Chemical Weapons should begin by partnering, not only with industry experts, but also with innovators of this technology to identify and characterize immediate threats associated with these advancements, he said."

Another step that could be taken, Nguyen notes, would be to fully implement United Nations Security Council Resolution 1540, which

calls on nations to adopt legislation to criminalize proliferation activities and to develop and implement appropriate, effective export controls.

Source: Lawrence Livermore National Laboratory