LETHAL IN DISGUISE 2

How Crowd-Control Weapons Impact Health and Human Rights

Water Cannons
Weapon profile

Streams of water are commonly used as CCWs. Typically referred to as water cannons, these weapons include various types of water hoses that are either connected to in-ground water supplies or mobile bladders (often on trucks) and are used to disperse crowds or limit access to certain areas. Water cannons were first used for crowd control in the 1930s in Germany, and by the 1960s were in frequent use in the United States during civil rights protests. Water cannons have been used as a crowd-control weapon in protests all over the world and continue to be used regularly, now most often as vehicle-mounted devices.

Mechanism of action

Water cannons function by propelling streams of water towards protesters. These can be either high-pressure streams aimed at pushing back crowds or low-pressure streams intended to douse. High-pressure water cannons can have flow rates (volume of fluid) of up to 20 litres of water per second, with an operating pressure of 15 bar (220 psi) and can stream water 67 metres away. By comparison, a typical residential showerhead has a pressure of 3 bar (40 psi). High-pressure, high-volume water cannons can knock individuals down and push them backwards with significant force, particularly

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when this pressure is sustained and exerted over a wide surface area.  

Recently, these weapons have evolved to include tear gas, coloured dyes, or other chemicals that are fired concurrently with the water. These additives increase the effectiveness of water cannons and also increase the likelihood of property damage or severe injury or death to protesters who are hit. The use of water cannons that include tear gas or other chemicals appears to be growing in popularity.

Coloured dyes, often semi-permanent and requiring several days and numerous cleanings with strong detergents to remove, have been used for more than 25 years in many places, including Hungary, India, Indonesia, Israel, Northern Ireland, South Africa, South Korea, and Uganda. Coloured dyes have been used to humiliate protesters. Coloured dyes have also been used to publicly mark protesters, including so they can be arrested later. Some water cannons even fire ultraviolet dyes to assist in the delayed identification and arrest of protesters.

Most modern water cannons can also be used with chemical irritants such as agent CS or OC, and chemical irritant manufacturers produce powdered versions for this purpose. Foul-smelling chemicals have also been used in water cannons in recent years, often coating not only individuals but also nearby homes and businesses in malodorous and difficult-to-remove chemicals of unknown toxicity. There are no publicly available guidelines on the appropriate use of water cannons, including details on minimum distance, water pressure, and use-of-force protocols. The 2016 LiD1 report found that foul-smelling chemicals were only used in the Occupied Palestinian Territories and in East Jerusalem. Since then, the purchase or testing of malodorants has been reported in a handful of other countries including Georgia and India, suggesting a rise in the use of this tactic and underscoring the expanding market for this new technology.

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139 "Turkey Protest Turns Violent, Headshot of a protester by a water cannon," Youtube (Turkey, 2013), accessible at: https://www.youtube.com/watch?v=ow8o9yxU0Gg.


143 Id.


Health effects

Because of the limited literature on water cannons and scarcity of medical literature on injuries, it was not possible to conduct a full systematic review of the injuries caused by water cannons. However, a review of articles identified in our systematic search of data published in secondary sources identified a number of cases of serious injury directly or indirectly caused by water cannons.

High-pressure water can cause direct injuries, such as trauma directly to the body or internal injuries from the force of the water stream. There are a handful of case reports that describe facial injuries such as blindness or eardrum rupture from the force of the water. The blunt force of high-velocity water cannons can cause indirect injuries from forced falls into the ground or obstacles. Case reports describe contusions, skull fractures, and lacerations secondary to water cannon strikes. Occupational injuries to law enforcement officers during training included accidental musculoskeletal injuries from close-range exposure. One article documented “reduced visual acuity bilaterally, extensive eyelid ecchymosis, subconjunctival haemorrhages, hyphema, iris sphincter rupture, transient increase in intraocular pressure” in three people with direct high-pressure water trauma to the face.

In recent years, personal reports on social media, as well as news reports, have highlighted the inherent dangers of water cannons. There are several documented cases of bone and musculoskeletal injuries and fatalities from falls and trauma secondary to the force of the water. Since the publication of our prior report, Baek Nam-Gi, a South Korean farmer, went into a coma after being knocked over by a water cannon and died of his injuries. In a similar case from May 2015, Chilean student Rodrigo Aviles suffered serious head injuries (subdural hematoma) after he was knocked over by water cannons fired from a distance of less than five metres. After being in a coma, Aviles finally recovered but still has seizures and...
other health issues. In 30 cases of injury from water cannons in Turkey, injuries varied in severity based on the pressure, distance, and duration of exposure as well as whether victims experienced collisions, falls, or being swept away by the force of the water.

There are also several videos on social media sites documenting water cannons directly hitting people, causing them to fall, rendering them unconscious, or causing traumatic injuries. In one notable example caught on video in 2021, a Dutch woman sustained a skull fracture and required sutures secondary to direct targeting by a water cannon, forcing her to hit a nearby concrete wall. Years later, her case is still in the courts, and she has ongoing physical and mental disabilities. In July 2020, a 19-year-old Israeli protester was hit by a jet of water on his head from a distance of a few metres during a mass protest against Prime Minister Benjamin Netanyahu in Jerusalem. The protester was knocked to the floor, lost consciousness, bruised his head and his eardrum was torn.

All water cannons douse protesters in water. In colder climates, this may cause hypothermia and frostbite; conversely, the use of scalding hot water may expose individuals to the risk of thermal injury, such as skin burns. During the 2014 Euromaidan protests in Ukraine, police employed water cannons in -10C weather, resulting in one death from pneumonia attributed to their use. Hypothermia was also reported when water cannons were used in subfreezing temperatures near the Standing Rock Indian Reservation in the United States and even in milder temperatures in Hong Kong. In Nigeria, there were reports of scalding hot water being used on demonstrators, causing several people to sustain thermal injuries and burns.

154 Umit Unuvar et al., “Medical Evaluation of Gezi Cases - HRFT” (Human Rights Foundation of Turkey, December 2013).
155 See above n 138.
The addition of chemical irritants to water cannons compounds the health risks, particularly because the lack of transparency regarding the type and quantity of chemicals used can make treatment challenging. Early reports of water cannons using an “ammonia solution” in Indonesia were accompanied by reports of chemical burns, presumably as a result of these chemicals. More recently, powdered OC in suspension and/or liquid CS has been confirmed to be used in water cannons in Chile, Hong Kong, Malaysia, Thailand, and Turkey, among other countries. The addition of CS compound to water is particularly troubling given the propensity of the agent to cause contact chemical burns, as has been reported in Chile and elsewhere.

Another type of preparation used in water cannons is water mixed with malodorant compounds that are thought to be ammonia produced in the fermentation of yeast and sodium bicarbonate. Those exposed have reported nausea, vomiting, and headaches. An additional concern is that the substance often persists for several days or more, raising the risk of longer-term toxicity. To date, there is little research on health effects specific to this substance.


Supreme Court ruling on “skunk water” in Israel

In August 2020, the Supreme Court of Israel made a ruling on one of the most notorious types of water cannon, which fires so-called “skunk water,” which has been used in Israel and reportedly is now being used in several other countries. Skunk water was developed by an Israeli company. It was first used against Palestinian protesters in the occupied territories, and since 2015 the Israeli police have used it mainly against Palestinian protesters in East Jerusalem and ultra-Orthodox Jewish protesters in Jerusalem. Its use in dense residential neighbourhoods leaves entire communities - shops, houses, streets - awash in a horrible, overpowering smell for several days. The smell has been described as the smell of sewage mixed with rotting corpses.

The Supreme Court heard a case brought by people who were either hit by skunk water while protesting or who run shops or live in houses next to protest areas that were filled with the odour of skunk water. The Court ruled that: “[t]he petition and the evidence attached to it presented a disturbing picture of the situation regarding the use of the skunk as a means of dispersing demonstration. . . . In particular, there seemed to be difficulty with the police spraying skunk on narrow, crowded residential streets, in a way that may cause significant damage to parties who are not involved in the demonstration at all.”

Unfortunately, the petition did not lead to a ban on the use of skunk water in residential areas, but only to its limitation. The police revised regulations limiting the use of skunk water in residential areas, “only after considering the effects of its operation on an innocent population and the possible environmental damage to be caused.”

172 High Court of Justice 5882/18, Kroiss v Israel’s Police (19.8.2020).
While evidence on the health impacts of water cannons suggests the possibility of serious injury, there are also significant practical, legal, and human rights concerns. Practically, the water cannon is a truck-mounted machine operated from inside a closed, elevated cab, making it difficult to communicate with protesters, hear their responses, and assess imminent danger.\textsuperscript{173} The imposing size and shape of water cannons may intimidate protesters, perhaps purposefully, causing increased panic and, potentially, stampedes.\textsuperscript{174} Because the vehicles are large, the use of multiple vehicles at once can also block roadways and deter demonstrators from egress. Water cannons are inherently indiscriminate, particularly at longer distances. The added collective punishment of utilising chemical irritants, coloured dyes, ultraviolet marker pigments, or malodorants only serves to highlight the potential for abuse of water cannons. In the context of a public demonstration, this large weapon cannot be used discriminately against disruptive individuals and has a high likelihood of harming bystanders. (For specific recommendations on water cannons, see the Recommendations Section.

What has changed?

In recent years, the use of water cannons has expanded in many countries around the world, as has the number of reported cases of injuries. The use of malodorants, dyes and chemical irritants also appears to be expanding beyond the few countries that used these measures in our 2016 report. The rise of Twitter and other social media platforms has facilitated greater awareness of the use of water cannons and the damage they can do, including through videos and other testimonies coming directly from victims. Although it is possible that greater awareness may lead to great opprobrium and increased regulation of water cannons, for now, their use appears to be growing unchecked.

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On 15 September 2020, Independence Day in Honduras, a massive demonstration called by trade unions, students and other sectors of society gathered in Tegucigalpa’s Central Park to protest against corruption and mismanagement of public funds with regard to the COVID-19 pandemic. The demonstrators intended to read a proclamation against the policies of the then president Juan Orlando Hernández. They also demanded to know what had happened to the five young Afro-descendants that had disappeared three months before. The National Police fired tear gas canisters at demonstrators and used water cannons to disperse the crowd.

The Office of the United Nations High Commissioner for Human Rights in Honduras condemned the use of force against citizens by the police. It found that these actions constituted a violation of fundamental rights in the midst of a suspension of constitutional guarantees dictated in Honduras by the then President Juan Orlando Hernández, who had established a state of emergency and a curfew in the whole country. This decree nullified guarantees as broad as freedom of thought, freedom of movement, and freedom of association, allowing the State to detain citizens for an indefinite period of time and to search private homes.

Several protesters were injured during the repression and had to be taken to the hospital. Among them was Cristian Espinoza, a 26-year-old artist who was hit in the eyes by a jet of high-pressure water mixed with chemicals.

Cristian testified in court that while he was in the park, the police began to break up the demonstration. Some demonstrators responded by throwing stones at police officers, while people were being arrested and others started running away. Cristian was trapped at the center of the park; he moved back looking for a way out and then saw a blue water cannon tank with tinted windows. The water cannon fired a jet of high-pressure water at him. The water hit him violently in the eyes and detached his eyelids. The pressure was so strong that he lost sight and fell to the ground. Some people came to his aid and carried him on their backs when Cristian fainted. He regained consciousness in the emergency room of the Hospital Escuela Universitario (HEU), where he was told that the retina of his right eye was detached, and that he would need surgery to have both eyelids repaired.


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The first surgery took place that same night. Espinoza remained in hospital for eight days due to the severity of his eye injuries which almost rendered him blind. In the following months, he went through a difficult recovery; his vision was affected both by artificial light and sunlight, and he suffered strong headaches. This prevented him from working as a craftsman and circus performer. He underwent two more surgeries to recover his sight.

Cristian points out that he was always committed to political activism, but that after what happened in 2020, on that September day, everything changed; it was not just him who was affected, but also his family, mainly his mother.