

LETHAL IN DISGUISE 2

How Crowd-Control Weapons Impact
Health and Human Rights

Water Cannons



WATER CANNONS

PROTEST AGAINST POLICE BRUTALITY AND RACISM AGAINST THE ISRAELI-ETHIOPIAN COMMUNITY, TEL AVIV, ISRAEL, MAY 3, 2015. YOTAM RONEN | ACTIVE STILLS

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.¹³⁶ 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.¹³⁷ 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.¹³⁸ 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

136 "White-Washing the Water Cannon: Salesmen, Scientific Experts and Human Rights Abuses," *openDemocracy*, August 27, 2014, accessible at <https://www.opendemocracy.net/en/opensecurity/white-washing-water-cannon-salesmen-scientific-experts-and-human-rights/>.

137 MA Berger, *Seeing through Race: A Reinterpretation of Civil Rights Photography*, (Berkeley: University of California Press, 2011).

138 Author redacted, "Medical Implications of the Use of Vehicle Mounted Water Cannon (Issue 2.0)," (Defence Science and Technology Laboratory UK, February 2004), 67, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445174/040201_DSTL_3_-_Feb_2004_-_TR08591_-_Ready_for_publication.pdf.

when this pressure is sustained and exerted over a wide surface area.¹³⁹

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.¹⁴⁰ 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.¹⁴¹ Some water cannons even

fire ultraviolet dyes to assist in the delayed identification and arrest of protesters.¹⁴²

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.¹⁴³ 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.¹⁴⁴ 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.¹⁴⁵

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>.

140 Anna Feigenbaum, "White-washing the water cannon: salesmen, scientific experts and human rights abuses," *openDemocracy*, 25 February 2014, <https://www.opendemocracy.net/en/opensecurity/white-washing-water-cannon-salesmen-scientific-experts-and-human-rights/>.

141 Agence France-Presse, "Hong Kong protests: police fire water cannon with blue dye as crowds defy ban," *The Guardian*, 20 October 2019, <https://www.theguardian.com/world/2019/oct/21/hong-kong-protests-police-fire-water-cannon-with-blue-dye-as-crowds-defy-ban>.

142 Anna Feigenbaum, "White-washing the water cannon: salesmen, scientific experts and human rights abuses," *openDemocracy*, 25 February 2014, <https://www.opendemocracy.net/en/opensecurity/white-washing-water-cannon-salesmen-scientific-experts-and-human-rights/>.

143 *Id.*

144 Patrick Strickland, "Israel Sprays 'Skunk Water' into Palestinian Homes," *The Electronic Intifada*, September 22, 2014, <http://electronicintifada.net/blogs/patrick-strickland/israel-sprays-skunk-water-palestinian-homes>.

145 Sue Surkes, "Indians unfazed by Israeli-made stink bomb," *The Times of Israel*, 30 July 2017, <https://www.timesofisrael.com/indians-unfazed-by-israeli-made-stink-bomb/>; and Margarita Antidze, "In new protests, foul-smelling substance interrupts Georgian assembly," *Reuters*, 12 December 2019, <https://www.reuters.com/article/us-georgia-politics-protests/in-new-protests-foul-smelling-substance-interrupts-georgian-assembly-idUSKBN1YG1ZT>.

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.¹⁴⁶ 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.¹⁴⁷ Case reports describe contusions,¹⁴⁸ skull fractures,¹⁴⁹ and lacerations¹⁵⁰ 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.¹⁵¹

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.¹⁵² 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

146 Dietrich Wagner, “‘People of Britain, Beware of the Water Cannon’: A Warning from Dietrich Wagner, Near-Blinded in Stuttgart,” February 21, 2014, sec. News, <http://www.telegraph.co.uk/news/uknews/law-and-order/10654956/People-of-Britain-beware-of-the-water-cannon-a-warning-from-Dietrich-Wagner-near-blinded-in-Stuttgart.html>.

147 Author redacted, “Medical Implications of the Use of Vehicle Mounted Water Cannon (Issue 2.0).”

148 See <https://twitter.com/NTarnopolsky/status/1287352851581284352>.

149 Samuel Osborne, “Woman left with fractured skull after being blasted with water cannon during Dutch lockdown riots,” *The Independent*, 29 January 2021, <https://www.independent.co.uk/news/world/europe/dutch-lockdown-riots-woman-fractured-skull-water-cannon-b1794374.html>.

150 Amnesty International, “Hong Kong: Water cannons pose real danger in hands of trigger- happy police,” *Amnesty International*, 10 August 2019, <https://www.amnesty.org/en/latest/press-release/2019/08/hong-kong-police-water-cannon-danger/>.

151 D Landau and D Berson, “High-Pressure Directed Water Jets as a Cause of Severe Bilateral Intraocular Injuries,” *American Journal of Ophthalmology* 120, no. 4 (October 1995): 542–43.

152 Phil Robertson, “South Korea Activist Dies After Water Cannon Attack,” *Human Rights Watch Dispatches*, September 29, 2016, <https://www.hrw.org/news/2016/09/29/south-korea-activist-dies-after-water-cannon-attack#>.

other health issues.¹⁵³ 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.¹⁵⁴

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.¹⁵⁵ 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.¹⁵⁶ Years later, her case is still in the courts, and she has ongoing physical and mental disabilities.¹⁵⁷ 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.¹⁵⁸

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,¹⁵⁹ resulting in one death¹⁶⁰ 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 States¹⁶¹ and even in milder temperatures in Hong Kong.¹⁶² In Nigeria, there were reports of scalding hot water being used on demonstrators, causing several people to sustain thermal injuries and burns.

153 Constanza Hola Chamy, BBC Mundo, "Rodrigo Avilés, El Estudiante En Coma Por El Que Miles Se Movilizan En Chile," *BBC Mundo*, May 29, 2015, http://www.bbc.com/mundo/noticias/2015/05/150529_rodrigo_aviles_estudiante_coma_chile_ch.

154 Umit Unuvar et al., "Medical Evaluation of Gezi Cases - HRFT" (Human Rights Foundation of Turkey, December 2013).

155 See above n 138.

156 Reuters, "Dutch woman bloody and injured by police water cannon at Netherlands protest," *Youtube*, 27 January 2021, <https://www.youtube.com/watch?v=79PrfqkUHqs>.

157 Tom van der Meer, "Agent die met waterstraal in gezicht van Denisa spoot tijdens rellen in Eindhoven wordt vervolgd," *ad.nl*, 15 August 2022, <https://www.ad.nl/binnenland/agent-die-met-waterstraal-in-gezicht-van-denisa-spoot-tijdens-rellen-in-eindhoven-wordt-vervolgd~a4ee86b4/>.

158 "Knesset panel debates cops' use of water cannons at anti-Netanyahu protests" *The Times of Israel*, July 28, 2020. <https://www.timesofisrael.com/knesset-panel-debates-cops-use-of-water-cannons-at-anti-netanyahu-protests/>.

159 Interfax-Ukraine, "Ukrainian govt lifts restrictions on use of water cannons against rioters in cold weather," *Interfax-Ukraine*, January 22, 2014, <https://en.interfax.com.ua/news/general/187027.html>.

160 Kyiv Post, "Protester dies of pneumonia, allegedly caused by water cannons," *Kyiv Post*, January 30, 2014, <https://www.kyivpost.com/post/9370>.

161 Derek Hawkins, "Police defend use of water cannons on Dakota Access protesters in freezing weather," *The Washington Post*, November 21, 2016, <https://www.washingtonpost.com/news/morning-mix/wp/2016/11/21/police-citing-ongoing-riot-use-water-cannons-on-dakota-access-protesters-in-freezing-weather/>.

162 Julie McCarthy, "Protesters Hunker Down Inside A Hong Kong University," *National Public Radio*, November 19, 2019, <https://www.npr.org/2019/11/19/780713458/protesters-hunker-down-inside-a-hong-kong-university>.

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.¹⁶³ More recently, powdered OC in suspension and/or liquid CS has been confirmed to be used in water cannons in Chile,¹⁶⁴ Hong Kong,¹⁶⁵ Malaysia,¹⁶⁶ Thailand,¹⁶⁷ and Turkey,¹⁶⁸ among other countries. The addition of CS compound to water is particularly troubling given the propensity of the agent to cause contact chemical burns,¹⁶⁹ as has been reported in Chile¹⁷⁰ 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.¹⁷¹ To date, there is little research on health effects specific to this substance.

163 Sue Lloyd-Roberts, “British arms help Jakarta fight war against its own people,” *The Independent*, March 27, 1997, <https://www.independent.co.uk/news/world/british-arms-help-jakarta-fight-war-against-its-own-people-oveyr-2-1275264.html>.

164 Ministerio del Interior y Seguridad Pública, “Circular 1832: Uso de la fuerza: actualiza instrucciones al respecto,” *Biblioteca del Congreso Nacional de Chile*, March 4, 2019, <https://www.bcn.cl/leychile/navegar?idNorma=1129442>.

165 Chan Chi-chuen, “LCQ18: Coloured water sprayed by specialised crowd management vehicles,” *The Government of the Hong Kong Special Administrative Region*, November 13, 2019, <https://www.info.gov.hk/gia/general/201911/13/P2019111300485.htm>.

166 Celine Fernandez and James Hookway, “Malaysian Police Fire Tear Gas on Protesters,” *The Wall Street Journal*, April 28, 2012, <https://www.wsj.com/articles/SB10001424052702304811304577371110260111368>.

167 Amnesty International, “Thailand: ‘My face burned as if on fire’: Unlawful use of force by Thailand’s police during public assemblies,” *Amnesty International*, July 2, 2021, <https://www.amnesty.org/en/documents/asa39/4356/2021/en/>.

168 Hurriyet Daily News, “14 tons of water mixed with tear gas used in May Day crackdown by Istanbul police,” *Hurriyet Daily News*, May 26, 2013, <https://www.hurriyetaidailynews.com/14-tons-of-water-mixed-with-tear-gas-used-in-may-day-crackdown-by-istanbul-police-47656>.

169 Tsang et al., “Health risks of exposure to CS gas (tear gas): an update for healthcare practitioners in Hong Kong,” *Hong Kong Medical Journal* 26, no. 2 (April 2020): 151-3 <https://www.hkmi.org/abstracts/v26n2/151.htm>.

170 Daniela Silva, “Expertos advierten en comisión de DD.HH. del Senado que carro lanzaguas está provocando graves quemaduras a manifestantes: ‘Si afectan a un niño o a un adulto mayor, pueden ser mortales,’” *La Tercera*, December 9, 2019, <https://www.latercera.com/nacional/noticia/expertos-advierten-comision-dd-hh-del-senado-carro-lanza-agua-esta-provocando-graves-quemaduras-manifestantes-afecta-nino-adulto-menor-pueden-mortales/931860/>.

171 Anne Suci, “Ending the Use of Skunk Spray in East Jerusalem,” 24 November 2011, <http://www.acri.org.il/en/wp-content/uploads/2015/05/EJ-Skunk-Spray-Letter-Nov-14.pdf>.

Sidebar

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

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.¹⁷³ The imposing size and shape of water cannons may intimidate protesters, perhaps purposefully, causing increased panic and, potentially, stampedes.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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173 Reuters, "Around the World; Frankfurt Police Charge Crowd at Banned Protest," *The New York Times*, October 6, 1985, sec. World, <http://www.nytimes.com/1985/10/06/world/around-the-world-frankfurt-police-charge-crowd-at-banned-protest-crowd.html>.

174 "Stampede in Cambodia Kills Hundreds, Government Says," accessed October 23, 2015, <http://www.cnn.com/2010/WORLD/asiapcf/11/22/cambodia.festival.deaths/index.html?hpt=T2>.

Case study

Long-term ocular injuries from water high pressure cannons

Honduras

On 15 September 2020, Independence Day in Honduras,¹⁷⁵ 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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See <https://www.dw.com/es/honduras-onu-condena-violencia-en-manifestaci%C3%B3n-social/a-54940397>.



CRISTIAN ESPINOZA UNDERWENT SEVERAL SURGERIES DUE TO THE EYLID AND RETINA INJURIES SUSTAINED FROM A WATER CANNON BLAST TO THE FACE DURING THE SEPTEMBER 2020 ANTI-GOVERNMENT PROTESTS IN TEGUCIGALPA, HONDURAS. PHOTO COURTESY OF COMITÉ DE FAMILIARES DE DETENIDOS DESAPARECIDOS EN HONDURAS (COFADEH)

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.