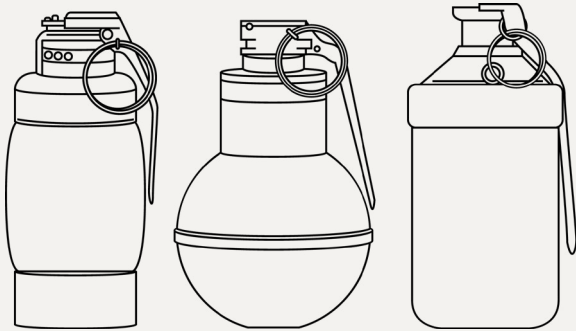


# CHEMICAL IRRITANTS

Chemical irritants (CIs), commonly known as tear gas and pepper spray, are used for crowd-control purposes by law enforcement worldwide. CIs are inherently indiscriminate and therefore the risk of exposing bystanders and individuals other than the intended targets, including vulnerable people, is high.

## How they work

CIs are potent sensory irritants that cause pain and inflammation via multiple mechanisms.



## Deployment mechanism

### GRENADE OR CANISTER

CS powder is combined with a pyrotechnic in a metallic case. Upon deflagration, burning CS produces a cloud of irritant smoke. Gas canisters—designed to be fired from grenade launchers at high speed—are sometimes misused as impact projectiles when shot directly at protestors.

### SPRAY

Aerosolized streams of irritants can be sprayed at distances of 8 – 12 feet in bursts, allowing for potentially higher doses of chemical agent directly striking targeted people or groups.

### OTHER SYSTEMS

CIs can also be dissolved in water to be used in water cannons or fire hoses, or contained as a powder inside a plastic impact projectile (“pepper-ball” guns, FN-303).

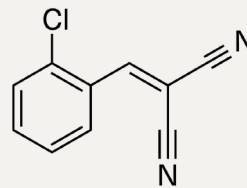


## Common types

### AGENT CS/TEAR GAS (2-CHLOROBENZALMALONONITRILE)

This solid white powder is mixed with a solvent and then aerosolized, heated, or exploded to disperse it into the air. On contact with moisture, CS dissolves into an acidic liquid that provokes lachrymation (tearing), burning pain and redness on contaminated skin, and an uncontrollable cough reflex.

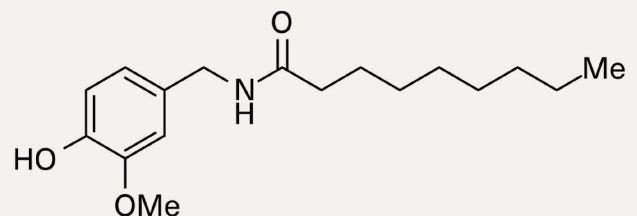
CS



### AGENT OC/PEPPER SPRAY (OLEORESIN CAPSICUM)

Agent OC / pepper spray (oleoresin capsicum) and its highly potent synthetic form, PAVA (pelargonic acid vanillylamide or capsaicin II), is the active chemical in cayenne peppers that makes them spicy. These agents work on pain and temperature receptors (TRPV1) to cause sensations of tearing, burning and severe pain.

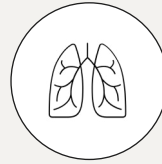
OC



## CHEMICAL IRRITANTS

### Health Impacts

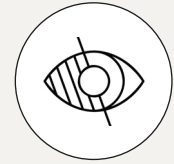
CIs cause injuries to many different body systems. The inflammatory response produced by contact with mucosal membranes and the skin can cause not only severe pain but also respiratory distress, nausea/vomiting, temporary blindness, and chemical burns of the skin, the eyes, the nasopharynx and lungs. Long-term effects of exposure to CIs are poorly understood; some case reports suggest adverse effects on menstruation, pregnancy and the fetus. Psychological panic caused by these weapons can trigger crowd crushes. Direct impact of canisters carrying tear gas causes severe blunt trauma and death.



RESPIRATORY  
DISTRESS



ADVERSE EFFECTS  
ON PREGNANCY



TEMPORARY  
BLINDNESS



PSYCHOLOGICAL  
PANIC



DEATH

### Variables that can exacerbate injuries

Using CIs against vulnerable populations (children, the elderly, those with diminished lung capacity).

Using CIs in crowded spaces or busy areas, which can impact unintended targets and bystanders.

Using CIs in enclosed spaces, or spaces with limited opportunities for egress (which can result in stampedes and higher dose exposure).

Using CIs over prolonged periods, e.g. repeatedly in one neighborhood.

Using CIs within other crowd-control weapons, such as projectiles or water cannons.

Delayed access to medical care, including overburdened medical facilities, checkpoints, delayed presentation because of fear of arrest or reprisal, or failure of medical personnel to recognize injury.



VULNERABLE  
POPULATIONS



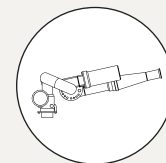
USE IN CROWDED  
SPACES



USE IN ENCLOSED  
SPACES



PROLONGED USE  
IN ONE AREA



USE WITH OTHER  
CCWS



DELAYED  
MEDICAL CARE

**Using CIs in enclosed spaces, or spaces with limited opportunities for egress can result in stampedes and higher dose exposure.**

### Policy recommendations

- » CIs, when deployed using canisters or grenades, are indiscriminate by nature. Caution should be used during deployment to stop the effect from spreading to unintended targets and bystanders.
- » Firing multiple canisters in the same spot or firing repeatedly must be avoided, as it produces higher concentrations of CIs, which can cause serious injury or even death.
- » Firing grenades or canisters containing CIs into closed spaces or open spaces where there is no safe egress should be prohibited.
- » Contextual factors must always be considered before making a decision to deploy indiscriminate CIs: geographical nature of the deployment site, wind patterns, and temperature, or the existence of homes, hospitals, schools, or dense, uninvolved populations in the vicinity.
- » Mixing more than one chemical agent or dissolving the agent into the liquid used in water cannons should be avoided, as its effects have not been properly studied.
- » Firing gas canisters or grenades directly into a crowd or towards individuals must be prohibited.