

ASPR TRACIE Technical Assistance Request

Request Receipt Date (by ASPR TRACIE): 1 June 2020

Response Date: 1 June 2020; updated 6 June 2020, 22 October 2020, 4 August 2021; updated 5 May 2024; updated 10 June 2025

Type of TA Request: Standard

Request:

The requestor asked for resources related to protecting community hospitals and providing care during civil unrest.

Response:

The ASPR TRACIE Team reviewed existing resources and conducted a search online for relevant materials. Although not directly related to this technical assistance (TA) request, we would like to provide the requestor with three ASPR TRACIE Topic Collections for reference: [Mass Gatherings/Special Events](#), [Responder Safety and Health](#), and [Workplace Violence](#). The [Hospital Lockdown Resources](#) TA response document also provides useful resources related to hospital lockdown procedures for various types of events. Section I includes links to planning resources and lessons learned. Section II includes links to articles and other resources that examine the medical effects and treatment strategies for exposure to riot control tools (e.g., pepper spray, tear gas, and rubber bullets). Section III provides a list of symptoms and treatment strategies for individuals exposed to tear gas or pepper spray.

I. Planning Resources and Lessons Learned

ASPR TRACIE. (2021). [Issue 14: The Impact of Civil Unrest and Workplace Violence on Healthcare](#).

The articles in this issue focus on three categories: health care preparation for and response to local civil unrest; trends, policies, and protocols related to workplace violence; and strategies for preventing and responding to violence in the emergency department.

ASPR TRACIE. (2020). [Civil Unrest During a Pandemic-Notes from Minneapolis](#).

On May 25, 2020, in Minneapolis, George Floyd died after a police officer held his knee on Mr. Floyd's neck for close to nine minutes. Cellphone video footage of the death spread quickly, and protests began in Minneapolis, other cities across the U.S., and abroad. ASPR TRACIE's Senior Editor, Dr. John Hick, also serves as an Emergency Medicine Physician for Hennepin County Medical Center, located in downtown Minneapolis. We spoke with him and Seth Jones, Hennepin Healthcare system's Emergency Preparedness Program Manager, to better understand how days of civil unrest affected emergency management, the emergency department, emergency medical

services, and the community hospitals, and how this factored into the hospital's COVID-19 response.

Ballantyne, B. (2006). [Medical Management of the Traumatic Consequences of Civil Unrest Incidents: Causation, Clinical Approaches, Needs and Advanced Planning Criteria](#). Toxicological Reviews. 25(3):155-197.

This article addresses how hospitals can prepare for situations of civil unrest. It also describes the types of injuries that patients may present with at hospitals (e.g., eye and respiratory tract effects, bone injuries, and exposures to chemical agents). **NOTE:** This article is outdated but may provide useful pieces of information.

Bean, M. (2021). [DC Hospitals Treat 10 Involved in Capitol Riot: 6 Things to Know](#). Becker's Clinical Leadership.

The author provides information on casualties sustained in Washington D.C. in relation to the civil disturbance on the U.S. Capitol grounds on January 6th, 2021. The article includes information on fatalities, illnesses, and injuries treated at local hospitals that day.

Hospital Safety Center. (2020). [Hospital Preparedness, Security Paramount During the Baltimore Riots](#).

This article addresses hospital preparedness and response during the riots that occurred in Baltimore, MD in April of 2015 after the death of Freddie Gray. Four major hospitals within Baltimore city limits worked to determine alternate routes to get their staff to work and prepared for increasing security during this time of civil unrest.

Jenkins, J.L., and Mason, M. (2015). [A Long Night in the Emergency Department during the Baltimore, Maryland \(USA\) Riots](#). Prehospital Disaster Medicine. 30(4):325-326.

The authors of this article provide a firsthand account of how their hospital prepared for and responded to the 2015 riots that occurred in Baltimore, Maryland after the death of Freddie Gray.

Lavin, R., Veenema, T.G., Clavert, W.J., et al. (2017). [Nurse Leaders' Response to Civil Unrest in the Urban Core](#). Nursing Administration Quarterly. 41(2):164-169.

The authors of this article provide a list of 10 "musts" for nurses when planning for a crisis such as civil unrest. They provide examples of how hospitals responded in Ferguson, Missouri after the death of Michael Brown and in Baltimore, Maryland after the death of Freddie Gray.

Mitigation Dynamics. (n.d.). Hospital Response to Civil Unrest: Pre-Checklist. ([Email ASPR TRACIE](#) to request this file.)

This document provides a checklist for hospitals when preparing for civil unrest. It also includes an organizational chart that identifies staff positions which should be activated when responding to such an incident.

Northwest Healthcare Response Network. (2021). [Civil Unrest Tip Sheet](#).

This tip sheet can serve as a template for hospital emergency planners to use when preparing for civil unrest events in the community. It includes considerations for pre-planning and for when events occur with proximity to a health care facility.

U.S. Fire Administration. (2013). [Fire/Emergency Medical Services Department Operational Considerations and Guide for Active Shooter and Mass Casualty Incidents](#). Federal Emergency Management Agency.

This white paper includes checklists and step-by-step considerations for active shooter incident planning and response by pre-hospital providers, and references the framework suggested by the Hartford Consensus. **NOTE:** Although this document focuses on active shooter incidents, it provides guidelines for pre-hospital providers related to mass casualty incidents.

II. Resources on Injuries and Treatment Related to Riot Control Strategies

Centers for Disease Control and Prevention. (2018). [Fact Sheet: Facts About Riot Control Agents](#). U.S. Department of Health and Human Services.

This webpage provides information on the chemicals used in riot control agents such as tear gas. It describes how riot control agents work, immediate symptoms of exposure, long-term health impacts of these agents, and steps to take if exposed.

Dhar, S., Dar, T., Wani, S., et al. (2016). [Pattern of Rubber Bullet Injuries in the Lower Limbs: A Report From Kashmir](#). Chinese Journal of Traumatology. 19(3): 129-133.

This article covers orthopedic injuries suffered by 28 patients as a result of rubber bullets fired from riot guns. They listed fractures, nerve injuries, tendon injuries, infections, and lacerations as primary injuries and suggest providers treat them like other types of ballistic injuries. Photos and other graphics are provided.

Fernandez, L. (2020). [Infectious Disease Specialists Call for an End to Tear Gas During COVID-19 Pandemic](#).

Experts explain the effects of tear gas, including coughing and secretions, and other ways COVID-19 may be spread during a crowded protest.

Haar, R., Iacopino, V., Ranadive, N., et al. (2017). [Death, Injury and Disability From Kinetic Impact Projectiles in Crowd-Control Settings: A Systematic Review](#). (Abstract only.) BMJ Open. 7(12): e018154.

Kinetic impact projectiles (i.e., rubber or plastic bullets) are one tool used to control crowds. The authors reviewed 26 articles which included injury data on 1984 people (53 of whom died from their injuries). They found that strikes to the head and neck resulted in 49.1% of deaths and 82.6% of permanent injuries. Severe injuries to the skin and extremities were the most frequently reported (71%) among those who survived; the site of impact, firing distance, and access to medical care were correlated with injury severity and risk of disability. Several figures accompany the abstract.

Kaske, E.A., Cramer, S.W., Pino, I.P., et al. (2021). [Injuries from Less-Lethal Weapons during the George Floyd Protests in Minneapolis](#). The New England Journal of Medicine. 384(8).

The authors conducted a study on patients injured by less-lethal weapons who were treated in two large Minnesota hospital systems during the George Floyd protests. Results indicated that despite less-lethal weapons being used, a substantial number of patients were still evaluated with serious injuries, including many injuries to the head, neck, and face.

Krishnatreyya, H., Hazarika, H., Saha, A., and Chattopadhyay, P. (2018). [Fundamental Pharmacological Expressions on Ocular Exposure to Capsaicin, the Principal Constituent in Pepper Sprays](#). (Abstract only.) Scientific Report. 8(1): 12153.

The authors examined the ocular effect of pepper spray and found that acute eye irritation, the bovine corneal opacity and permeability assay, corneal fluorescein staining, and indirect ophthalmoscopy were “useful in assessing capsaicin induced ocular irritation. Photos, figures, and microscopic images accompany the abstract.

Schenck, C., Lokeshwar, S., Riedel, M., et al. (2021). [Penetrating Deep Pelvic Injury Due to “Less-Lethal” Beanbag Munitions: A Case Report and Policy Implications](#). Trauma Surgery & Acute Care Open. 6(1).

The authors report that less-lethal munitions can cause severe injury, though their long-term impact on health is not well understood. In this article, the authors discuss a case where a beanbag munition caused a penetrating injury that led to a pelvic abscess. The authors also examine the implications of these munitions on public health and policy.

Tidwell, R.D. and Wills, B. (2023). [Tear Gas and Pepper Spray Toxicity](#). StatPearls.

The authors provide information on pathophysiology, clinical evaluation, prognosis, complications, and treatment of patients affected by pepper spray or tear gas. They include information on the epidemiology of these agents, information on how they affect the respiratory tract in animal studies, and the history of their use.

Venkatesan, S. and Maksimenko, Y. (2020). [The Riot Trauma: What Injuries Should You Expect from Non-Lethal Police Weapons and Protests?](#) EM Resident.

Emergency physicians can use the information in this article to prepare for responding to and treating injuries due to tear gas, pepper spray, Taser, rubber bullets, and Molotov cocktails. For each cause of injury, the authors provide background and information on symptoms, treatment, and disposition.

Yeung, M. and Tang, W. (2015). [Clinicopathological Effects of Pepper \(Oleoresin Capsicum\) Spray.](#) (Abstract only.) Hong Kong Medical Journal. 21(6): 542-552.

The authors synthesized the information from 15 studies and listed symptoms related to exposure to pepper spray.

III. Symptoms and Treatment for Individuals Exposed to Tear Gas and/or Pepper Spray

The following information was taken from Tidwell and Wills (2020; cited in this document). The majority of those exposed to tear gas/pepper spray experience mild reactions (e.g., burning/inflammation of the eyes, skin, and respiratory tract and coughing, headache, and/or dizziness). While these reactions can typically be managed by the individual; some with more serious injuries/reactions may present to health care facilities for medical care.

Reactions

More serious **respiratory** reactions may occur in people exposed to higher concentrations or in areas with minimal ventilation, and include bronchospasm, hemoptysis (coughing up of blood or blood-stained mucus), and chemical pneumonitis.

Regarding **ocular** injuries, mild symptoms may include lacrimation, redness, blepharospasm (twitching of the eyelid), photophobia, conjunctivitis, and periorbital edema. More serious injuries can include hyphemia, uveitis (redness, pain, and blurred vision), necrotizing keratitis, coagulative necrosis, secondary glaucoma, cataracts, traumatic optic neuropathy and even loss of sight.

Skin injuries may include erythema, rashes, purpura, desquamation (i.e., peeling), vesicles, blistering, up to 3rd-degree burns, scaling and subcutaneous edema. Moisture aggravates these injuries. Some experience delayed dermal effects, including allergic contact dermatitis and acute generalized blistering.

Suggested Treatment

Most **respiratory** symptoms dissipate after 20 minutes. Health care providers may have to suction patients with significant secretions. Steroids and beta agonists can be used to treat bronchospasm. In very rare cases (e.g., patients with asthma, bronchitis, or other similar diseases), intubation and ventilation may be necessary.

Water or saline can also be used to flush the eye(s) and treat **ocular** irritation/injury; it is imperative that individuals remove contact lenses prior to flushing. Should individuals seek medical treatment, providers can use a topical anesthetic on the eye to minimize unintentional blinking and facilitate flushing.

Typically, those exposed to these types of agents can treat themselves by wiping their **skin** before washing, flushing skin with copious amounts of water and soap, or using saline if the skin has been significantly affected.