

U.S. Department of Justice, Office of Justice Programs, National Institute of Justice - NIJ.gov

Assessing the Safety of Conducted Energy Devices

NIJ has funded several studies to help law enforcement and corrections agencies make decisions to improve their policies and practices for using conducted energy devices (CEDs):

- **Researchers conclude CEDs not likely to cause cardiac complications.** A team of doctors reviewed 1,201 instances of CED use in the field and found no evidence of cardiac problems, even when the probes hit suspects in the chest area. Approximately 15 percent of the cases involved incidents in which an electrical charge likely affected the heart area. The researchers did not find any sudden death events suggestive of cardiac dysrhythmias in this group, or in the group as a whole. They concluded that fatal cardiac incidents are unlikely to occur when CEDs are used to subdue suspects. The NIJ-funded study was published in the *Journal of Emergency Medicine*.[11](#)
- **Deaths following electro-muscular disruption.** NIJ's leading study on CEDs was done by a panel of doctors who conducted mortality reviews of deaths that followed CED application. The medical panel examined incident data from police reports. Police data were combined with findings from an autopsy, toxicological analysis, medical records of symptoms the subjects exposed and care received afterward. The panel was charged with addressing whether CEDs can contribute to or be the primary cause of death, and, if so, by what mechanisms. The panel concluded that the risk of a CED-related use-of-force incident is less than 0.25 percent and that it was reasonable to conclude that CEDs did not cause or contribute to death in the large majority of cases. The study contained a number of policy recommendations to reduce the risk even further. Among them were:
 - Minimize or avoid exposing an individual to a CED multiple times or for a prolonged period.
 - Do not discharge a CED for longer than 15 seconds.
 - Constantly monitor the medical condition of the individual during and after discharge regardless of the duration of exposure.
 - Do not repeat use of CEDs in a pain compliance mode, if there is little initial effect on an individual.
 - Minimize or avoid the use CEDs on at-risk individuals, such as, but not limited to, children and the elderly.

Find out more information about this study and information about care received afterward in the report [Study of Deaths Following Electro-Muscular Disruption \(pdf, 77 pages\)](#).

- **Comparing agencies that use CEDs with agencies that do not.** The Police Executive Research Forum used a quasi-experimental study that compared seven agencies that use CEDs with six agencies that do not. They found consistently strong effects for CEDs in increasing the safety of officers and suspects when the devices are used properly. The researchers also noted that officers can often deescalate a situation without using any force and should always use the least amount of force necessary.
 - Read the full report [Comparing Safety Outcomes in Police Use-of-Force Cases for Law Enforcement Agencies That Have Deployed Conducted Energy Devices and a Matched Comparison Group That Have Not: A Quasi-Experimental Evaluation \(pdf, 101 pages\)](#).
- **Evaluation of police use of force, Tasers and other less-lethal weapons.** Researchers examined use of force incidents in American law enforcement agencies and explored the role of less-lethal technologies, especially CEDs and pepper spray. The study found that most encounters between police and suspects do not involve use of force. When officers did use force, injury rates to citizens ranged from 17 to 64 percent. Officer injury rates ranged from 10 to 20 percent. The use of physical force and hands-on control increase the risk of injury to officers and citizens alike. Most injuries were relatively minor, involving cuts and bruises. The researchers found that the use of CEDs can reduce injuries to suspects and officers alike when used properly. To learn more read:
 - The Research in Brief [Police Use of Force, Tasers and Other Less-Lethal Weapons \(pdf, 28 pages\)](#).
 - The full report [A Multi-Method Evaluation of Police Use of Force Outcomes: Final Report to the National Institute of Justice \(pdf, 173 pages\)](#).

- **Reconstructing the chain of events surrounding an incident.** NIJ is augmenting medical data through a detailed reconstruction of fatal incidents. NIJ is collaborating with the International Association of Chiefs of Police (IACP) to conduct field research to support the reviews. The IACP is examining the incidents, reconstructing the chain of events that occurred before the deaths.
- **CEDs effects on internal organ systems.** A study at the University of Wisconsin is assessing the effect of electrical current as it moves through the body. The study models the effects of a CED on internal organs, including the heart. In a related effort, the University of California in San Diego and New Jersey Medical School are studying CEDs effects on metabolic pathways in the body, as well as the cardiac and respiratory systems.
- **CEDs effects on cognitive functions.** Researchers at Arizona State University will examine the extent to which CEDs influence cognitive functioning and the consequences of those effects for the constitutionality of Miranda waivers. A pilot test will be conducted to examine the cognitive effects of the TASER on the ability of 20 police officers to complete three cognitive tests, as well as the Comprehension of Miranda Rights-Recognition instrument. The participating officers will complete the tests at various time intervals. The research team will also conduct a randomized controlled trial on a sample of student volunteers to test the effects of TASER exposure on cognitive functioning, using a repeated measures design.
- **Less-lethal monitoring system.** Wake Forest University piloted a monitoring system where NIJ-funded researchers and medical personnel accompanied suspects following exposure to a CED when they went to a hospital. Researchers gathered information for each case.
 - [Read an overview of findings: Monitoring Police Use of Conducted Energy Devices.](#)
- **Examining "excited delirium."** NIJ has two on-going studies examining a state of extreme excitement or stress sometimes called "excited delirium" that people can experience following CED application. Read more about these studies:
 - [EXCITATION Study: Unexplained In-Custody Deaths: Evaluating Biomarkers of Stress and Agitation.](#)
 - [Stress Biomarkers Among Patients Undergoing Treatment for Excited Delirium and Severe Pain in the Emergency Department.](#)

These projects are part of a larger NIJ-funded research effort looking into the potential for the physiologic and metabolic effects of stress to be a cause for otherwise unexplained in-custody deaths. This research effort seeks to: (1) clarify the fatal mechanisms that might be associated with stress resulting from being subdued or restrained, by any means and not limited to CEDs; and, if such mechanisms can be demonstrated, (2) identify post-mortem markers that can inform death investigations.

- [Read about NIJ's study of in-custody deaths following CED exposure.](#)

Police departments sometimes conduct independent studies on less-lethal device use and safety. [See the results of a study on the use of Tasers by the Seattle Police Department](#) [Exit Notice](#).

[Next section: Publications on Less-Lethal Technologies.](#)

Note

[1] Bozeman, William P., Eric Teacher, and James E. Winslow, "Transcardiac Conducted Electrical Weapon (TASER) Probe Deployments: Incidence and Outcomes," *The Journal of Emergency Medicine* (June 2012).

[Read the abstract](#) [Exit Notice](#).

Date Modified: October 8, 2014