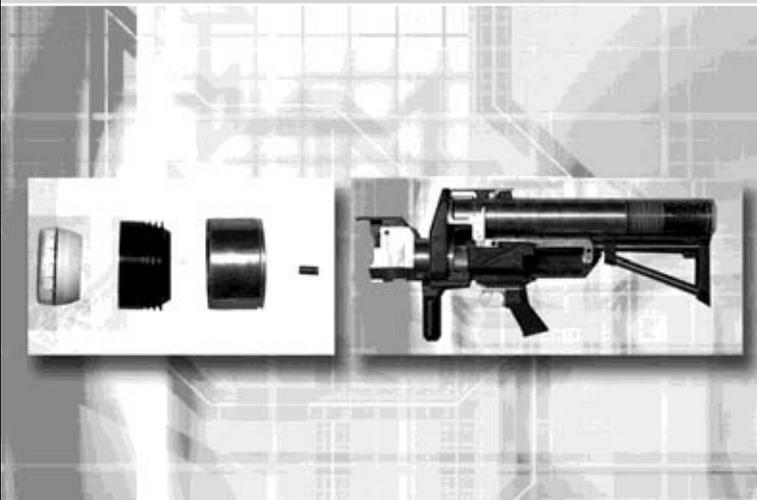




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Impact Munitions Use: Types, Targets, Effects

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## Impact Munitions Use: Types, Targets, Effects

This report is based on the authors' final report: *Impact Munitions: Data Base of Use and Effects* by Ken Hubbs and David Klinger, Washington, DC: U.S. Department of Justice, National Institute of Justice, February 2004, NCJ 204433.

Findings and conclusions of the research reported here are those of the authors and do not reflect the official position or policies of the U.S. Department of Justice.

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## ABOUT THIS REPORT

More and more law enforcement agencies are using impact munitions as part of their weapons arsenals. These less-lethal devices give police the means to subdue and arrest potentially dangerous individuals and to disperse unruly crowds with less chance of injury or death to suspects, innocent bystanders, or themselves. Unfortunately, little is known about the circumstances under which impact munitions have been used or the physical effects they have on individuals in the field. This study seeks to fill that knowledge gap.

### What did the researchers find?

A survey of law enforcement and corrections agencies yielded information from 106 agencies about 373 incidents in which impact munitions were used, with 969 projectiles fired. Impact munitions can help law enforcement officers effectively resolve potentially violent encounters in which deadly force might otherwise be used. More than 90 percent of the encounters studied were resolved without officers

having to resort to lethal force. However, because impact munitions are not 100 percent effective, officers need to have deadly force available to protect themselves and others. Training in the use and handling of impact munitions is crucial to their proper use. Impact munitions need to be clearly marked so they are not confused with lethal munitions. The continuing development of improved impact munitions should further reduce the risk of death or injury to police, suspects, or others.

### What were the study's limitations?

Information was sought from both law enforcement and corrections agencies, but no corrections agencies are represented among the 106 respondents.

### Who should read this study?

It will benefit law enforcement and corrections leaders, planners, and trainers; procurement officials; munitions manufacturers; and citizen review boards.

*Ken Hubbs and David Klinger*

## Impact Munitions Use: Types, Targets, Effects

As a dangerous and challenging part of their jobs, police, sheriff's deputies, prison guards, and other officers are sometimes called on to face riots, political demonstrations, prison uprisings, hostage situations, fleeing or barricaded suspects, emotionally disturbed individuals, or suicidal persons. Not only must officers disarm potentially dangerous individuals or disperse unruly crowds, but at the same time they must ensure their own safety and that of the general public. And they are expected to do so using reasonable force to resolve the incident.

To accomplish this, law enforcement agencies, the U.S. military, and private industry have worked together over the last several decades to develop weapons, munitions, and techniques that give officers alternatives to the use of deadly force. The result is a range of less-lethal devices that often allow law enforcement officers to subdue or arrest suspects or disperse crowds with significantly less likelihood of anyone being killed or seriously injured.

### Filling a gap in the weapons continuum

One limitation of many of these longstanding less-lethal devices is that to be effective, officers must be close to their intended target. This proximity increases the risk to officers and raises the possibility that an encounter might escalate to the point where deadly force is used.

As a result, in recent years, more and more law enforcement agencies have equipped their officers with impact munitions. These munitions can be fired at a greater distance from the target, thus reducing the risk to officers and the likelihood that they will resort to lethal force.

Impact munitions are designed to stun or otherwise temporarily incapacitate a suspect or dangerous individual so that law enforcement officers can subdue and arrest that person with less danger of injury or death for themselves and others. Impact munitions include foam rubber projectiles, wooden dowels, and small bean bags



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that are usually fired from 12-gauge shotguns or 37/40-millimeter gas launchers. At first, law enforcement agencies assigned impact munitions to their special weapons and tactics teams, who were called when patrol officers in the field were faced with situations they were not equipped or trained to handle. In recent years, however, more and more police agencies have given impact munitions to patrol officers as well.

Unfortunately, systematic information on the circumstances under which impact munitions have been used or the physical effects they have on people in the field is limited—a significant knowledge gap for law enforcement officers and policy-makers considering when and how to use such weapons.

To begin filling that gap, researchers gathered data from U.S. and Canadian law enforcement agencies on their use of less-lethal weapons and impact munitions. They collected case-by-case information from the agencies about incidents where impact munitions were used—e.g., details about the types of munitions used, how they were used, and the subjects fired on and the injuries they sustained.

From these details, researchers created a database to sort the information and to provide a track record of the effectiveness and potential pitfalls of using impact munitions. The information lists characteristics of the subjects targeted, describes the encounters where impact munitions were used, catalogs the types of impact munitions used, and documents the injuries and fatalities that resulted from the use of impact munitions.

## **Distance a key factor in injuries**

A key predictor of injury in the cases studied was the distance between the subject and where the impact munition was fired. The main reason why people struck by impact munitions are not more seriously injured is that most projectiles rapidly lose velocity once they reach their maximum speed shortly after being fired. When impact munitions are fired from a distance of 10 feet or more, their capacity to cause serious injury is diminished. The study found that broken bones were the most likely serious injury to result from being hit by an impact munition. Most broken bones

*When impact munitions are fired from a distance of 10 feet or more, their capacity to cause serious injury is diminished.*

were suffered when an impact munition was fired from a distance of 10 feet or less. Almost 10 percent of the munitions fired at 10 feet or less caused broken bones, by far the largest fracture rate of any distance.

## Fatalities

In the 373 incidents reported, 8 individuals died as a result of being hit by impact munitions. Two additional deaths resulted not from impact munitions themselves, but from lethal rounds mistakenly fired by officers who intended to use impact munitions. (More on these two cases below.) Of the other eight deaths, two incidents did not include enough information to determine where the target was struck or the distance from which the weapons were fired. In the remaining six incidents, the subject died when hit by impact munitions fired from less than 30 feet. Five of those six were struck in the chest.

Of the 10 deaths, at least 3 died as a result of the impact munition causing one or more broken ribs that, in turn, pierced the heart or lungs, or both. At least five were hit

by bean bags, sometimes among other munitions fired. In one case, a target was struck by several munitions but died as a result of being hit in the neck by a bean bag. In another incident a bean bag penetrated a target's chest and punctured a lung. The individuals killed by impact munitions ranged in age from 18 to 68. All but one were males.

As mentioned above, 2 of the 10 deaths resulted when law enforcement officers fired what they thought were impact munitions. In one case, a man was killed by a 12-gauge, door-breaching round loaded into a shotgun by an officer who thought the round contained a bean bag projectile. In the other, an individual was struck in the chest by a barricade-penetrating projectile containing pepper spray that was mistakenly loaded instead of the intended bean bag round.

In addition to these 10 deaths, at least 26 other individuals for whom case reports were submitted as part of this study died when impact munitions failed to incapacitate them and police officers were then forced to intentionally fire lethal rounds.

## DATA COLLECTION

To learn which law enforcement agencies use impact munitions, the researchers obtained client lists from four of the largest manufacturers of impact munitions. From these lists, 685 police and corrections agencies were identified and sent information packets. Additional agencies were identified when they responded to articles in trade journals and newsletters and to notices posted on Web sites. Total responses yielded 373 case reports from 106 law enforcement agencies (no corrections agencies sent in reports). A total of 969 projectiles were fired in the 373 incidents. Of the 373 reported incidents, 284 came from municipal police departments, 80 from county sheriff's offices, and 9 from state police agencies. Although the earliest reported incident happened in 1985, most occurred between 1995 and 2000.

### The Targets

The study found that 181, or nearly half, of the reported 373 incidents involved emotionally disturbed persons who were armed and showed signs of suicidal intent. The reported incidents also included—

- Nonsuicidal but armed individuals in open areas who had refused police orders to drop their weapons (70 incidents).
- Persons barricaded inside buildings or vehicles (48 incidents).
- Hostage takers (9 incidents).

The data showed the characteristics of persons who were shot by law enforcement officers firing impact munitions.

- Most individuals were in their 30s, though ages ranged from 14 to 83.
- Nearly all were men (291 of 315 cases in which gender was recorded).
- Nearly two-thirds were white (200 out of 301 where information on race or ethnic group was included), followed by Hispanics (49) and African Americans (40).

### Armed and Dangerous

Subjects were armed in almost 90 percent of the 306 cases for which weapons data were available. (In the few instances where suspects possessed multiple weapons, the researchers counted only the most dangerous one.)

- Cutting instruments (knives, swords, axes, machetes)—50 percent of the 306 cases.
- Firearms (handguns, shotguns, rifles)—29 percent.

- Blunt instruments (bats, clubs, sticks)—6 percent.
- Other objects (rocks, bottles, Molotov cocktails)—4 percent.
- No weapon—11 percent.

### **Number of Shots Fired**

Law enforcement officers fired 1 to 141 shots at individual targets. Often, multiple shots were needed to subdue an individual because a single hit by an impact munition was not always immediately effective. In the overwhelming number of cases, however, the number of shots fired was few.

Ten or fewer rounds were fired in 98 percent of the 316 cases for which information was available, 5 or fewer in 93 percent, and 1 shot in 38 percent of the cases.

Respondents in 313 of the cases reported on the number of shots that struck their intended target, with the number of hits ranging from 1 to 13. In one case, the individual being fired at surrendered after the shots missed. Others surrendered when followup shots missed but the initial shots hit their target.

### **Type of Munition Used**

The type of impact munition used was identified in 962 of the 969 reported discharges of devices. Of the 21 different types of munitions used, bean bags shot from 12-gauge shotguns were the most common, accounting for 65 percent of all the projectiles fired. Plastic baton rounds were the second most common, used in 28 percent of the cases.

### **Where Struck**

Most often, targets were struck in the abdomen (34 percent) or the chest (19 percent), followed by the legs (15 percent), arms (14 percent), and back (11 percent). Only 2 percent of the impacts were on the head, and only 1 percent each in the groin and neck, the more vulnerable parts of a person's body. Of the 969 reported discharges of impact munitions, 782 resulted in injuries. Of those, more than 80 percent were bruises and abrasions, both relatively minor injuries that may not require medical treatment. Bruises accounted for 51 percent of the injuries, and abrasions added another 31 percent. More serious lacerations accounted for 5.5 percent of the injuries; broken bones accounted for 3.5 percent. Of the 782 injuries, there were 14 instances (1.8 percent) in which the impact munition penetrated the target's skin and caused a more serious injury.

Impacts to the head produced a greater proportion of nonfatal serious injuries than other areas struck. Of the 19 head impacts reported, 14 resulted in a laceration, bone fracture, or penetration wound.

*Training in the use and handling of impact munitions is crucial to their effectiveness and proper use in the field.*

## Lessons learned

Several conclusions and recommendations stem from this study. Perhaps the most important is that less-lethal impact munitions are usually effective in resolving potentially violent police encounters without making it necessary for officers to resort to deadly force. The study found that 93 percent of the reported incidents involving impact munitions were resolved without officers having to fire their guns. Because so many of the suspects were armed in the reported incidents, one has to assume that deadly force may have been used had impact munitions not been available.

Impact munitions cause fewer casualties and deaths than the lethal munitions typically used by law enforcement officers. With 8 deaths attributed to impact munitions among 373 cases where at least one projectile was fired, the death rate from impact munitions is low, particularly when considered against the alternative of standard police ammunition being used.

Nevertheless, less-lethal devices and impact munitions are not 100 percent effective. As a result, there are limits to how and when they should be used. The goal should be to arrest a suspect without resorting to lethal force, but law enforcement officers who decide to use impact munitions should ensure that deadly force is also available to protect themselves and others if less-lethal devices do not work.

Second, training in the use and handling of impact munitions is crucial to their effectiveness and proper use in the field. Two deaths, mentioned previously, occurred because law enforcement officers fired lethal munitions that were mistaken for impact munitions. Officers need better training to ensure that the projectiles they fire in circumstances where deadly force is not appropriate are indeed impact munitions.

Third, impact munitions should be clearly identifiable so that the likelihood of mistakes similar to those cited above is significantly reduced. A review of those two cases indicates that

lethal shotgun shells look very much like those containing impact munitions. Other lethal munitions can also be misidentified as impact munitions. Distinctive markings and colorings on the different shells would help to more reliably distinguish lethal from less-lethal ones.

Fourth, in deadly force encounters, law enforcement personnel are generally trained to aim for the “center of mass.” This is often the chest or abdominal area of the target. These are also the areas most often hit by impact munitions. The chest and abdomen have been successfully targeted the vast majority of the time, but users of impact munitions should be aware that individuals struck in these areas are also more susceptible to serious injury or death, especially at close ranges.

Fifth, the fact that eight people died as a result of injuries caused by impact munitions suggests the need for continuing research and development on even more effective and less dangerous less-lethal weapons.

In this regard, some newly developed munitions show promise. These include “pepper balls,” “super socks,” and “sponge rounds.” Pepper balls are modified paint balls designed to rupture on contact and release pepper spray. Super socks are bean bags that look more like cloth socks than the traditional square bags. Super socks are typically sewed or tied off in the middle and often have a streamer at the rear to stabilize their flight. Sponge rounds are, as their name implies, projectiles made of a spongy material that can be fired from long range with increased accuracy and consistency.

Finally, more information is needed on the use and consequences of less-lethal weapons and impact munitions in law enforcement. Too much of the information available now is anecdotal rather than based on hard data. Better information is needed to identify deficiencies in the manufacture of impact munitions and in the training and use of the weapons in real-life situations.

With more data, researchers, policymakers, and law enforcement and corrections agencies can better learn what works and what does not. They can compare their data with that from agencies in different cities or other parts of the country. In this regard, law enforcement and corrections agencies need to

keep better and more complete records. Such information will aid not only policymakers who have to decide whether and how to integrate impact munitions into their agencies' inventory, but also patrol officers who might have to use impact munitions in the field.



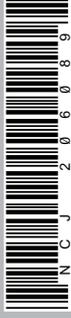


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