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The New York Times

As Police Use of Tasers Rises, Questions Over Safety Increase

By ALEX BERENSON

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NAZARETH, Pa. — As the sun set on June 24, something snapped in Kris J. Lieberman, an unemployed landscaper who lived a few miles from this quiet town. For 45 minutes, he crawled deliriously around a pasture here, moaning and pounding his head against the weedy ground.

Eventually the police arrived, carrying a Taser M26, an electric gun increasingly popular with law enforcement officers nationwide. The gun fires electrified barbs up to 21 feet, hitting suspects with a disabling charge.

The officers told Mr. Lieberman, 32, to calm down. He lunged at them instead. They fired their Taser twice. He fought briefly, collapsed and died.

Mr. Lieberman joined a growing number of people, now at least 50, including 6 in June alone, who have died since 2001 after being shocked. Taser International, which makes several versions of the guns, says its weapons are not lethal, even for people with heart



Joe Cavaretta/Associated Press

Clay Winn of Taser demonstrates the Advanced M26. Since 2001, about 50 people have died after Taser shocks.

conditions or pacemakers. The deaths resulted from drug overdoses or other factors and would have occurred anyway, the company says

But Taser has scant evidence for that claim. The company's primary safety studies on the M26, which is far more powerful than other stun guns, consist of tests on a single pig in 1996 and on five dogs in 1999. Company-paid researchers, not independent scientists, conducted the studies, which were never published in a peer-reviewed journal. Taser has no full-time medical director and has never created computer models to simulate the effect of its shocks, which are difficult to test in human clinical trials for ethical reasons.

What is more, aside from a continuing Defense Department study, the results of which have not been released, no federal or state agencies have studied the safety, or effectiveness, of Tasers, which fall between two federal agencies and are essentially unregulated. Nor has any federal agency studied the deaths to determine what caused them. In at least two cases, local medical examiners have said Tasers were partly responsible. In many cases, autopsies are continuing or reports are unavailable.

The few independent studies that have examined the Taser have found that the weapon's safety is unproven at best. The most comprehensive report, by the British government in 2002, concluded "the high-power Tasers cannot be classed, in the vernacular, as `safe.'" Britain has not approved Tasers for general police use.

A 1989 Canadian study found that stun guns induced heart attacks in pigs with pacemakers. A 1999 study by the Department of Justice on an electrical weapon much weaker than the Taser found that it might cause cardiac arrest in people with heart conditions. In reviewing other electrical devices, the Food and Drug Administration has found that a charge half as large as that of the M26 can be dangerous to the heart.



Jeff Topping for The New York Times

Patrick Smith, left, and his brother Thomas Smith, X26 Tasers in hand, at the headquarters for Taser in Scottsdale, Ariz.

While Taser says that the M26 is not dangerous, it now devotes most of its marketing efforts to the X26, a less powerful weapon it introduced last year. Both weapons are selling briskly. About 100,000 officers nationally now have Tasers, 20 times the number in 2000, and most carry the M26. Taser, whose guns are legal for civilian use in most states, hopes to expand its potential market with a new consumer version of the X26 later this summer.

For Taser, which owns the weapon's trademark and is the only company now making the guns, the growth has been a bonanza. Its stock has soared. Its executives and directors, including a former New York police commissioner, Bernard B. Kerik, have taken advantage, selling \$60 million in shares since November.

Patrick Smith, Taser's chief executive, said the guns are safe. "We tell people that this has never caused a death, and in my heart and soul I believe that's true," Mr. Smith said.

Taser did not need to disclose the British results to American police departments, he said. "The Brits are extremely conservative," he said. "To me, this is sort of boilerplate, the fine print." In addition to Taser's animal trials, thousands of police volunteers have received shocks without harm, Mr. Smith said.

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But the hits that police officers receive from the M26 in their Taser training have little in common with the shocks given to suspects. In training, volunteers usually receive a single shock of a half-second or less. In the field, Tasers automatically fire for five seconds. If an officer holds down the trigger, a Taser will discharge longer. And suspects are often hit repeatedly.

Over all, Taser has significantly overstated the weapon's safety, say biomedical engineers who separately examined the company's research at the request of The New York Times. None of the engineers have any financial stake in the company or any connection with Taser; The Times did not pay them.

Relatively small electric shocks can kill people whose hearts are weakened by disease or cocaine use, said John Wikswo, a Vanderbilt University biomedical engineer. But no one knows whether the Taser's current crosses the threshold for those people, Dr. Wikswo said.

"Their testing scheme has not included the possibility that there is a subset of the population that is exquisitely sensitive," Dr. Wikswo said. "That alone means they have not done adequate testing."

Mr. Smith said Taser would eventually run more tests. "In a perfect world, I'd love to have studies on all this stuff, but animal studies are controversial, expensive," he said. "You've got to do the reasonable amount of testing." Comparing Taser's tests with the studies conducted by makers of medical devices like pacemakers is unfair, he said.

Dr. Andrew Podgorski, a Canadian electrical engineer who conducted the 1989 study, said he was certain that Tasers were dangerous for people with pacemakers. More research is needed to determine if other people are vulnerable, he said.

"I would urge the U.S. government to conduct those studies," Dr. Podgorski said. "Shocking a couple of pigs and dogs doesn't prove anything."

In More Officers' Hands

Many police officers defend the Taser, saying the weapon helps them avoid using deadly force and lowers the risk of injury to officers. Tasers let police officers subdue suspects without wrestling with or hitting them, said David Klinger, a former police officer and a criminology professor at the University of Missouri at St. Louis. And Tasers are surely safer than firearms.

"I think it is appropriate for deployment in the field," Mr. Klinger said. "You trust this guy or gal with a gun, you should be able to trust them with a less lethal device."

But human rights groups say the police may be overusing the Taser. Because the gun leaves only light marks, and because Taser markets it as nonlethal, officers often use it on unruly suspects, not just as an alternative to deadly force, said Dr. William F. Schulz, the executive director of Amnesty International USA. In recent incidents, officers have shocked a 9-year-old girl in Arizona and a 66-year-old woman in Kansas City.

"We think there should be controlled, systematic independent medical studies," Dr. Schulz said. "We would like to see these weapons suspended until these questions are answered."

A study by the Orange County, Fla., sheriff's office showed that officers used pepper spray and batons much less after getting the guns. But the use of Tasers more than made up for that drop, and the department's overall use of force increased 58 percent from 2000 to 2003. Last week, several police departments in Orange County agreed to restrict the use of Tasers to situations where suspects are actively resisting officers. The sheriff's office is not part of the agreement and says it is still studying the matter.

State and federal agencies do not keep tabs on Taser use, so no one knows how many times officers have fired the weapon. Officers have reported close to 5,000 uses of the M26 Taser, but the company says the actual number is much higher.

Little evidence supports the theory that Tasers reduce police shootings or work better than other alternatives to guns, like pepper spray. Because of their limited range, Tasers are best in situations where an officer using a Taser is covered by another with a firearm, officers say.

A 2002 company study found that nearly 85 percent of people shocked with Tasers were unarmed. Fewer than 5 percent were carrying guns.

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In Phoenix, which has equipped all its officers with Tasers, police shootings fell by half last year. Taser trumpets that statistic on its Web site. But last year's drop appears to be an anomaly. This year, shootings are running at a record pace, according to the Phoenix police department.

A 2002 study in Greene County, Mo., found that Tasers were only marginally more effective than pepper spray at restraining suspects. Pepper spray worked in 91 percent of cases, while the Taser had a 94 percent success rate.

The largest police departments have been slow to embrace the Taser. The New York Police Department owns only a handful of Tasers, which are used by specialized units and supervisors, a spokesman said.

'Gold in Those Hills'

The M26 was introduced only five years ago, but the technology is much older. John Cover, an Arizona inventor, created the Taser in 1969. Its name stands for "Thomas A. Swift Electric Rifle," an allusion to the Tom Swift series of science fiction novels.

Engineers have known for generations that relatively small electric currents cause painful and uncontrollable muscle contractions. Tasers operate on that principle, firing barbs that are connected by wire to the gun and flood the body with current. The gun can deliver its shock even if the barbs do not break the skin because its current can jump through two inches of clothing.

Weak currents are not inherently dangerous if they stop in a few minutes. But stronger shocks can disrupt the electrical circuitry of the heart. That condition, ventricular fibrillation, causes cardiac arrest in seconds and death in minutes, unless the heart is defibrillated with an even larger shock.

The exact current needed to cause fibrillation depends on technical factors like the current's shape and frequency, as well as the heart's condition, said James Eason, a biomedical engineering professor at Washington and Lee University. But because fibrillation is so dangerous, scientists can conduct only limited human trials. They must estimate the threshold of fibrillation from animal trials and computer models.

Still, the broad parameters for fibrillation are known, and the first Taser from Mr. Cover had a large safety margin. In 1975 the Consumer Product Safety Commission concluded that weapon, which was 11 percent as powerful as the M26, probably would not harm healthy humans.

Then, in March 1976, the Bureau of Alcohol, Tobacco and Firearms claimed it had jurisdiction over the weapons because gunpowder propelled their barbs. The firearms bureau essentially outlawed them for civilian use; no federal safety standard was ever created.

But the original Tasers were bulky and often ineffective. For almost two decades, they remained a niche product used by a few police departments.

That began to change after 1993, when Mr. Smith and his brother Thomas created a company to market electric weapons to civilians. Patrick Smith, who had just graduated from the University of Chicago business school, saw enormous potential for an alternative to firearms.

"I just figured I'm going to go to out to Arizona, and I'm going to scratch and sniff and dig, and figure there's going to be gold in those hills," Mr. Smith said in an interview.

In January 1995, the Smiths introduced their first electric gun, which was powered by compressed nitrogen. As a result, the weapon was not regulated by the firearms bureau and could be sold to civilians.

For the next several years, the company struggled, as concerns over the gun's power kept sales slow. By 1999, the company, now known as Taser International, was near bankruptcy, with only \$50,000 in the bank and \$2.7 million in debt.

"It was pretty humiliating," he said. "We had completely wiped out my parents financially."

Testing

Hoping to stay afloat, the company introduced the Advanced Taser M26 in December 1999. The weapon closely resembled a handgun, a feature many police officers liked, and was very powerful.

According to Taser, the gun produced 26 watts of power, four times the power of the earlier model. A field test in 2001 by the Canadian police showed that the M26 was even stronger, with an output of 39 watts.

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(Stun gun power is usually gauged in watts, a measure of electrical energy, even though the biological effects of electricity are more closely related to current strength, measured in amperes. Electrical engineers often compare the flow of electricity to a river: amperes are like the river's speed, while watts are the amount of water flowing by each second. As watts increase, amperes rise, but more slowly.)

Taser's sales rose as officers learned about the new gun. At meetings with police officers, company representatives encouraged them to receive a half-second shock to feel the weapon's power for themselves. "These guys would leave just absolutely evangelical about the product because we would just drop them all," Mr. Smith said.

In its marketing, the company touted the safety of the M26, saying it had been extensively tested.

But Taser had performed only two animal studies before introducing the M26.

In 1996, Taser hired Robert Stratbucker, a Nebraska doctor and farmer, to test the weapon. Dr. Stratbucker, who is now Taser's part-time medical director, shocked a pig 48 times with shocks as large as those from the M26. The pig suffered no heart damage.

Three years later, the company hired Dr. Stratbucker and Dr. Wayne McDaniel, an electrical engineer, for an animal test at the University of Missouri. The scientists shocked five anesthetized dogs about 200 times with the M26. The dogs did not suffer cardiac arrest, although one animal had changes in its heartbeat, according to a report.

Taser has repeatedly said the studies proved that the M26 was safe. But the biomedical engineers who reviewed the gun's safety for The Times said Taser should have conducted far more research.

"I don't think there has been a definitive study saying that yes it can contribute to death or no it cannot," said Dr. Raymond Ideker, an electrophysiologist and a professor in the cardiology division at the University of Alabama at Birmingham. Taser must test more animals and vary the shocks they receive to find the gun's safety margin, Dr. Ideker said.

In addition, while Taser claims that its Missouri study proves that the gun is safe for people who have used cocaine, it never tested animals dosed with cocaine. Because cocaine substantially increases heart attack risk, and Tasers are used on people who have taken cocaine, that omission is a serious flaw, said Dr. Wikswo of Vanderbilt.

The company should also examine risks other than fibrillation, some scientists say.

Dr. Terrence Allen, a former medical examiner in Los Angeles who examined cases in the late 1980's when people died after being shocked with earlier-model Tasers, said he was sure the weapons could be lethal. Taser is misrepresenting the medical evidence, said Dr. Allen, who has consulted for people who have sued the company.

Dr. Mark W. Kroll, a Taser director and the chief technology officer of St. Jude Medical, one of the largest pacemaker manufacturers, said Taser had adequately tested its weapons and they were safe. External pacemakers deliver much larger charges and do not cause fibrillation, he said.

Dr. Ideker countered that pacemakers and Tasers could not be easily compared, because the Taser's shock is very short and powerful, while a pacemaker delivers its charge over a much longer period.

Although Taser has performed only rudimentary studies of the M26, it has more closely studied the X26, the gun it introduced last year. In a 2003 study at the University of Missouri, Taser found that a shock roughly 20 times that of the X26 caused a healthy, anesthetized 85-pound pig to fibrillate.

Mr. Smith cites the 2003 Missouri study as proof that all Tasers have a safety margin of 20-to-1 or more. But the new gun puts out a charge only one-fourth as large as the older model, a fact Taser does not generally advertise.

The study said nothing about the M26, or about hearts stressed by disease, drugs or physical activity. "I think another test is warranted," Dr. Ideker said.

Taser did not test the older gun, which is associated with nearly all the deaths, because "we believed that the M26's safety record and prior testing speaks for itself," Mr. Smith said. "Could it be done? Absolutely. There's time and expense involved."

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The X26 has become Taser's biggest seller, based mainly on the company's claims that it is even stronger than the M26 despite its small size and lower power. The company says the new gun enables electrical current to enter the body more efficiently.

No independent agency has tested the guns side by side, and in Taser's patent on the M26, Mr. Smith himself argued that weaker guns were often ineffective because they do not deliver enough current to incapacitate suspects. But neither deaths nor concerns about effectiveness have dampened police support and investor enthusiasm for Taser International. Stock analysts predict Taser will have \$15 million in profits on sales of \$60 million in 2004. Investors have bid up the company's shares 60-fold since last February, giving Taser a value of \$1.2 billion.

The Smith brothers and their father, Phillips, have sold \$46 million in Taser shares since November, according to federal filings. They still own \$130 million worth of shares. Other Taser executives and directors have sold \$14 million in stock. Mr. Kerik, the former New York police commissioner and a director, has sold \$900,000 in stock. Mr. Kroll of St. Jude Medical has sold \$1.7 million.

"It's been great," Patrick Smith said of the company's recent success. But making money is not his main goal, he said. "If we could get a Taser on every officer's belt," he said, "it would save hundreds of lives or thousands of lives a year."

Deaths and Questions

Meanwhile, the number of Taser-associated deaths is rising. In June alone, at least six people died, the most ever in one month: Eric B. Christmas, James A. Cobb, Jacob J. Lair, Anthony C. Oliver, Jerry W. Pickens and Mr. Lieberman.

The circumstances of the deaths vary widely. Among the six, Mr. Pickens was the only one hit with the X26.

Mr. Cobb fought for several minutes after being shocked, which suggests that fibrillation could not have caused his death. Some of the other men collapsed immediately, according to news reports and witnesses. Some of the men were fighting with the police when officers shot them. Others simply refused to obey orders.

Mr. Pickens was one. On June 4, in Bridge City, La., the police were summoned to help calm him after an argument with his 18-year-old son, Taylor Pickens. Jerry Pickens confronted the police in the family's front yard.

"My dad, he had been drinking, and he was kind of hostile toward the police," Taylor said. "He kept trying to go back inside the house, and they said, 'If you're going to go back into the house we're going to Taser you.' " Mr. Pickens who was unarmed, began to walk inside, Taylor said.

"They counted down three, and then they shot him in the back," Taylor said. "My dad stiffened up, and fell back." Mr. Pickens hit his head on a cement walkway and began foaming at the mouth, Taylor said.

Sharon Landis, Taylor's mother and Mr. Pickens's wife, said officers did not need to shock her husband. "They could have pepper-sprayed him, they could have grabbed him," she said. "He's 55 years old, and these are big burly cops."

Mr. Pickens was pronounced brain-dead that day and removed from life support three days later, Ms. Landis said.

Toxicologic tests on Mr. Pickens are being conducted, said Gayle Day of the Jefferson Parish coroner's office. A spokesman for the sheriff's office said he could not comment on a continuing investigation. Mr. Smith said he could not comment on Mr. Pickens's death.

Three weeks later, Kris Lieberman died in Pennsylvania. The officers who shocked him were the only witnesses to his death, which the Pennsylvania State Police are investigating. But Mr. Lieberman's parents said the state police told them that their son was shocked twice and collapsed afterward. [Stan Coopersmith, chief of the Bushkill Township Police, whose officers responded to the call, said he could not comment on the incident until the state police finish their investigation.] But Taser said that the police chief had told the company that Mr. Lieberman fought briefly after the shocks and that an automatic defibrillator used by the officers indicated Mr. Lieberman was not fibrillating when he collapsed.

"I would suspect the autopsy will find a cause of death that does not include the Taser," Mr. Smith said.

Mr. Lieberman's parents say that he was troubled but that he did not use drugs. Police officers searched Mr. Lieberman's home after the shooting and did not find drugs, his parents say. Toxicologic tests are pending, the Northampton County Coroner said.

Mr. Lieberman's father, Richard, a plain-spoken farmer, said he had not decided whether to hire a lawyer. He simply wants to know if the gun caused his son's death. "If he was the problem, we have to accept it," Mr. Lieberman said. "If they were the problem, they have to accept it."

Eric Dash contributed reporting from New York for this article.