‘LESS THAN LETHAL’?

THE USE OF STUN WEAPONS IN US LAW ENFORCEMENT

AMNESTY INTERNATIONAL

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Cover photo: A police officer aims a Taser at protesters opposing the demolition of 4,500 public housing units, City Hall, New Orleans, 20 December 2007.

CONTENTS

PREFACE

Methodology

This report contains the findings of a review by Amnesty International of deaths following CED use in the USA from June 2001 to 31 August 2008, some 334 cases. Amnesty International's sources included a review of autopsy reports in 98 cases and other materials, including media reports, information from families of the deceased or their attorneys, reports of official investigations and other data. Amnesty International also reviewed policies and practices on CED use by US law enforcement agencies and guidelines issued by standard-setting bodies.

Dr Sidsel Rogde, a professor of forensic pathology from Norway, co-reviewed autopsy reports for the organization and provided valuable insight and advice on aspects of forensic pathology. The Omega Research Foundation, which researches the global trade in military, security and police equipment and its impact on human rights, provided technical advice as well as information on transfers and deployment of CEDs to countries worldwide contained in Appendix D.

Terminology

In this document, use of the word Taser refers to one of more products of TASER International under the TASER® trademark. Other CED technology is also on the market, including products under the Stinger® trademark. The concerns documented in this report apply to all such weapons.

1. INTRODUCTION AND OVERVIEW

"This case may be the most unnecessary death I have ever had to investigate"

Coroner Dr Randolf Williams, speaking about the case of 21-year-old Baron Pikes, an unarmed man who was shocked repeatedly while in police custody in Winnfield, Louisiana. The first six shocks were administered as he lay handcuffed on the ground and failed to get up to walk to a police car. He was shocked again in the squad car and died before reaching the station. Cause of death was given as "cardiac arrest following nine 50,000 volt electro-shock applications from a conductive electrical weapon".

Thousands of US law enforcement agencies use Tasers: dart-firing electro-shock projectile weapons which can also be used close-up as stun guns. Tasers are among a class of weapon commonly described as "conducted energy devices" (CEDs).[1] They work by delivering a high voltage, low current, electrical charge designed to disrupt the central nervous system and cause uncontrolled muscle contractions, temporarily incapacitating the subject. The manufacturers of CEDs and the agencies deploying them maintain that they are safer than many conventional weapons in controlling dangerous or combative subjects and that Tasers have saved lives by avoiding the resort by officers to lethal force.

There has been ongoing controversy surrounding the potential lethality of CEDs, especially since the introduction in the past decade of more powerful new generation models.[2] Since June 2001, more than 330 people in the USA are reported to have died after being struck by police Tasers and 25 similar deaths have been reported in Canada.[3] In most cases coroners have attributed the deaths to other causes, such as drug intoxication or "excited delirium", a term often used to describe someone who is in an agitated or highly disturbed state. However, in at least 50 cases, coroners are reported to have listed the Taser as a cause or contributory factor in the death. Medical examiners' findings and the role of CEDs in deaths continue to be the subject of dispute.

Amnesty International acknowledges the importance of developing non-lethal or "less-lethal" force options to decrease the risk of death or injury inherent in police use of firearms or other impact weapons such as batons. Such measures are encouraged under international standards, which provide that non-lethal incapacitating weapons should be "carefully evaluated" and their use "strictly controlled".[4] However, Amnesty International has serious concerns about the use of electro-shock devices in law enforcement, both as regards their safety and potential for misuse.

Amnesty International believes that Tasers and similar conducted energy weapons are inherently open to abuse as they are easy to carry and easy to use and they can inflict severe

pain at the push of a button without leaving substantial marks. The capacity to use such weapons close- up as "touch stun" guns, often when individuals are already in custody, and to inflict repeated or prolonged shocks, makes them even more prone to abuse.

One of the organization's concerns – documented in this and earlier reports – is that many US law enforcement agencies deploy CEDs as a relatively low-level force option to subdue non-compliant or disturbed individuals who do not pose a significant threat.[5] As described below, such cases have included use of Tasers on schoolchildren; pregnant women; people who are mentally ill or intoxicated; elderly people with dementia and individuals suffering from the effects of medical conditions such as epileptic seizures.

Amnesty International considers that the use of electro-shock weapons in such circumstances is inconsistent with international standards which require police to use force only as a last resort, in proportion to the threat posed and in a manner designed to minimize pain or injury; in many instances, police actions appear to have violated the international prohibition against torture or other ill-treatment.

Amnesty International's report contains an analysis of deaths following CED deployment and a review of policies and standards for CED use. While not the main subject of the report, the organization also reiterates its concern about the sale of Tasers to the public, which is permitted in most US states without strict regulation or control. This report focuses on CED use in the USA. However, Tasers and other CED products are reportedly deployed or undergoing trials or evaluations in more than 40 countries worldwide (see Appendix D). Amnesty International opposes the transfers of CED weapons to countries where there is a substantial risk that the likely use of those weapons will facilitate torture or other cruel, inhuman or degrading treatment or punishment, or will be used for arbitrary force or to cause unwarranted injury.

Health risks regarding CED use: Amnesty International's review of deaths

Amnesty International is concerned that Tasers have been widely deployed before the results of rigorous, independent studies into their safety and potential health risks. Existing studies (many of them industry-funded) have found the risk of direct adverse effects from CEDs to be generally low in healthy adults, but they are limited in scope and have pointed to the need for more understanding of the effects of such devices on vulnerable subjects, including people under the influence of stimulant drugs or in poor health. While the electrical current from Tasers and similar devices has been described by the manufacturers as too low to trigger a direct fatal shock, some medical experts have suggested that the shocks can disrupt the heart rhythm if the current is applied close to the heart or at a critical point in the cardiac cycle. Recent independently-funded animal studies have found that CED shocks can cause fatal arrhythmias in pigs, raising further questions about their safety on human subjects. It was also recently reported that nearly 10 per cent of 41 Tasers tested in a study commissioned by the Canadian Broadcasting Corporation (CBC) delivered significantly more electrical current than the manufacturer said was possible, underscoring the need for independent verification and testing of such weapons.[6] An overview of existing scientific and medical research studies is included in this report.

The need for additional research was highlighted in an interim report published in June 2008 by the National Institute of Justice (NIJ). The report was issued as part of an ongoing investigation by the US Justice Department into deaths following CED use. While the interim report found "no conclusive medical evidence" of a high risk of death or injury from the direct effects of Tasers or similar devices, it stated that "Many aspects of the safety of CED technology are not well-known, especially with respect to its effects when used on populations other than normal healthy adults".[7]

The NIJ study noted that the risk of death or serious injury could be higher in certain populations, including children, the elderly, pregnant women, people with heart disease and other "at risk individuals".[8] It recommended that police officers should avoid the use of CEDs against these populations unless the situation excludes other reasonable options. The report also noted that many deaths are associated with prolonged or repeated CED discharges. While it found research in this area to be limited, and the role of the CED in such deaths to be unclear, it called on law enforcement officers to exercise caution in using multiple activations.

This report describes Amnesty International's ongoing concerns regarding fatalities following police CED use, based on information on reported deaths from June 2001 to 31 August 2008, including a review of more than 90 autopsy reports and other sources, including media reports, lawsuits and reports of official investigations. All of the reported cases involved the use of M26 or X26 Tasers. These findings update the concerns contained in Amnesty International's previous reports published in November 2004 and March 2006.[9]

Amnesty International's review is not a scientific study, nor is the organization in a position to reach conclusions regarding the role of the Taser in each case. It can be difficult to determine through autopsy alone whether Taser shocks caused or contributed to a fatal arrhythmia as there are often no direct pathological signs. Nevertheless, the autopsy findings, and the reported circumstances in which Tasers were applied, raise serious concerns about the safety of CEDs and highlight many of the potential risk factors cited in the NIJ interim report and other studies. The findings underscore the need for more research, as well as for much stricter limits on how such devices are deployed.

Amnesty International's key findings include the following:

- Most of those who died were agitated, disturbed and/or under the influence of stimulant drugs, and a significant proportion had heart disease: potential at-risk categories cited by ongoing studies. While similar factors are seen in custody deaths occurring without Tasers, this does not reduce concern that such individuals may be particularly vulnerable to adverse reactions from electro-shocks or that CED shocks may dangerously increase stress levels in individuals already compromised by exertion, ill-health or drug abuse;

- Many were subjected to multiple or prolonged shocks, often far more than the standard five-second cycle, despite warnings for several years of the potential health risks of such deployment;

- In most cases, the deceased are reported to have gone into cardio-respiratory arrest at the scene, shortly after being shocked. Some died at the scene and others were pronounced

dead later in hospital after failing to regain consciousness. The close proximity of Taser shocks to the deceased's cardiac arrest in many cases raises concern that the shocks may have triggered or contributed to the fatal collapse;

- In some cases the deceased had no drugs in their system or underlying health problems, and collapsed shortly after being shocked, raising further concern about the role of the Taser;

- In a significant proportion of cases (43 per cent of the autopsy reports reviewed) the deceased was shocked in the chest. Some cardiac experts have suggested that CED strikes to the chest may carry a higher risk of disturbing the heart rhythm;

- In many cases additional forms of restraint were applied, including methods known to impair breathing or restrict the flow of blood to the brain, creating a risk of death from asphyxia. They include hogtying (binding a subject's wrists and ankles together behind them), chokeholds (pressure to the neck), pressure to the diaphragm, and exposure to pepper spray (which affects the respiratory system). Amnesty International believes that CEDs should not be used in combination with other forms of restraint which can impair breathing, and that dangerous restraint holds such as chokeholds or hogtying should be avoided in all circumstances.

Amnesty International is further concerned that, while some individuals were highly disturbed and combative, the vast majority (around 90 per cent) of those who died were unarmed, and many did not appear to present a serious threat when they were electro-shocked and subjected to other force. They include people who continued to struggle while in restraints; who were intoxicated but not dangerous; or who walked or ran from officers during non-life threatening incidents. Several individuals were shocked for failing to comply with commands when they were already incapacitated from a first shock. Some were shocked by more than one officer at a time. Examples include a mentally ill teenager who died after being shocked repeatedly by four guards while he was lying naked and handcuffed on the floor of a jail. In another case, a medical doctor who crashed his car when he suffered an epileptic seizure, died after being repeatedly shocked at the side of a highway when, dazed and confused, he failed to comply with an officer's commands.

In some cases, the levels of force used by police or jail officers appears to have amounted to torture or other cruel, inhuman or degrading treatment, in violation of international law and treaties ratified by the USA.[10] Amnesty International believes that the levels of force deployed by law enforcement officials, as well as the effects of CEDs should form part of the government's ongoing review of such weapons.

In presenting its findings, Amnesty International recognizes that all weapons carry some risk of injury or death. However, the organization is concerned at the low threshold for deployment of electro-shock weapons in the USA. Even if the risk is relatively low – and that still needs to be evaluated, particularly in vulnerable groups – the organization believes that no death should occur from unnecessary levels of police use of force, or from weapons which are not thoroughly tested or controlled.

Amnesty International recognizes that law enforcement officials can face serious challenges when dealing with individuals who are disturbed or intoxicated, who resist arrest, are

combative, or who fail to comply with commands – all instances in which CEDs are commonly deployed in the USA. However, Amnesty International believes that the use of electro-shock weapons against individuals who do not pose an immediate threat of death or serious injury to themselves or others is a disproportionate use of force which can constitute ill-treatment. As the organization has noted in previous reports, measures such as stricter controls and training in the use of force and firearms, and in dealing with the mentally disturbed, have been found to be effective in reducing unnecessary deaths and injuries.[11]

Based on the concerns raised in this report, Amnesty International believes that governments and law enforcement agencies should either suspend using CEDS pending further studies or set a very high threshold for their use, with rigorous training and accountability systems. Amnesty International is calling on departments which deploy such weapons to limit their use to situations where officers are faced with an immediate threat of death or serious injury that cannot be contained through less extreme options, in order to avoid the resort to firearms.

All use of force by enforcement officials should be consistent with international standards set out under the UN Code of Conduct for Law Enforcement Officials and the Basic Principles on the Use of Force and Firearms, which require that force should be used only where "strictly necessary" and in proportion to the threat posed. Law enforcement authorities should also ensure that all officers' actions are consistent with the prohibition against torture or other cruel, inhuman or degrading treatment.

Amnesty International's detailed recommendations are contained at the end of this report.

2. BACKGROUND

2 (I) CED PRODUCTS IN US LAW ENFORCEMENT

More than 11,000 law enforcement and correctional agencies in the USA are reported to be deploying or testing Tasers.[12] Most are supplied to local and state police forces and jails. They are also used by federal agencies such as the US Marshall's Service and have been purchased by the US military authorities for use in Iraq and Afghanistan.[13] While some police agencies issue Tasers only to specialised units or supervisors, more than 4,000 departments provide them to every patrol officer, a trend which appears to be growing.[14]

The most widely used CED models in the USA are the Advanced TASER M26 and the TASER X26, produced by the Arizona-based company Taser International. They replaced earlier, lower powered models that were first introduced in the 1970s.[15] The M26 was introduced into US law enforcement in 1999 and the X26 model, which has slightly more power but is smaller and lighter, in 2003. They are hand-held, battery powered devices, shaped like handguns, which fire two darts (probes) propelled by compressed nitrogen from a replaceable cartridge. The darts have barbs on the end designed to attach to the target's clothing or skin; once fired, they remain connected to the handheld unit by thin wires which have a range of between 15 and 35 feet (4.5 and 10.6 meters).[16] When the trigger is depressed, short pulses of high-voltage, low amperage, electrical current pass down the wires to the barbs, delivering an incapacitating shock.[17] As noted above, the charge is intended to temporarily override the body's central nervous and skeletal system, causing the subject to collapse with uncontrollable muscle spasms.

Both the M26 and X26 Tasers are programmed to be activated in automatic five-second bursts, although the officer can stop the charge at any time by engaging the safety switch. The charge can also be prolonged beyond five-seconds if the trigger is held down continuously. The operator can also inflict repeated shock cycles with each pull of the trigger as long as both barbs remain attached to the subject. The only technical limit to the number or length of the electrical cycles is the life of the battery, which can be ten minutes or more.[18]

While the dart-firing function is designed to bring down subjects at a distance, Tasers can also be operated close-up by being pressed directly against the body in what is known as "touch stun gun" or "drive-stun" mode. Again, repeated or prolonged discharges can be applied. When used in stun gun mode, Tasers do not have the capacity to override the body's central motor system as they are applied to only a small area of the body and are thus used primarily as "pain compliance" tools.

Both the M26 and X26 models include a laser-beam function, to aid the officer in targeting the subject, avoiding obvious high-risk areas such as the head. Each stun gun also has a built-in computer chip which records the time and date of each discharge, which can later be downloaded onto a computer for analysis. The X26 model also records the duration of each firing cycle, a feature not available with the M26. Each cartridge has its own serial number

and confetti-like tags are released from the cartridge each time the darts are fired, with the serial number on each piece; this is intended to provide an "audit trail" which can be traced back to the officer or department. The X26 models can also be fitted with an audio-video recorder.

Another company, Stinger Systems (based in Tampa, Florida), has recently introduced a similar projectile stun gun to the US market: the S-200. It fires two darts and is reported to produce around 60% of the peak current of the X26 Taser; it can also be operated as a touch-stun gun. According to the Stinger Systems website, the trigger of the S-200 can be set so that the charge is controlled entirely by the officer or to deliver an automatic two or four-second charge. According to company press releases, S-200s have been purchased by police departments in various states, including Illinois, Missouri, Ohio, Texas, Washington and Wisconsin.[19]

Stinger Systems also produces other electro-shock products, including the "Band-It" stun belt, a remote-controlled electrified sleeve which can be placed on the leg or arm and is used for controlling prisoners during transportation or when they are in public places (such as a courthouse). According to the company's website, the belt "delivers an incapacitating electric shock" using a wireless remote up to 175 feet (50 metres) away and can be operated manually or be "set to go off automatically on movement".[20] According to the website, the Band-It has been used on "tens of thousands of prisoners nationwide" by local and federal law enforcement agencies, including the Federal Bureau of Prisons and the US Marshalls Service.[21] Amnesty International opposes the use of such devices as inherently cruel and degrading because the wearer is under constant fear of being subjected to an electric shock for the whole time the belt is worn.[22]

Taser International has developed another electro-shock projectile weapon, the Taser XREP Extended-Range Electronic Projectile (XREP), in which the electrodes are contained within a shell which can be fired wire-free from a standard 12-gauge shotgun.[23] When the shell hits the target, a probe pierces the skin or clothing and a wire falls from the capsule to create another point of contact which unleashes a 20-second cycle of the same electrical output as the TaserX26. The device was reportedly due to be piloted in 2008.[24] Amnesty International is particularly concerned by the 20-second default shock built into the XREP, given the potential adverse effects from prolonged CED exposure.

The company has also developed the Taser Shockwave, described as an "area denial system" which could be used for crowd control. The Shockwave, also due to be piloted in 2008, consists of a unit of six Taser cartridges on a stand which can be fired remotely from up to 100 feet away using a control box. Units can be stacked vertically, or linked to form "chains" – allowing an almost limitless number to be linked. Each unit can fire Taser cartridges singly or multiply and can hit several targets at once when fired into a crowd. The cartridges deliver a five-second electrical shock, which can be repeated at any time with the push of a button.[25] This multiple firing capacity, with its inherently indiscriminate effect, is also a cause for concern to Amnesty International.

2 (II) SALES OF TASERS TO THE PUBLIC

Because they use compressed nitrogen rather than gunpowder to propel the darts, Tasers are not classified as firearms by the US Federal Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE). They can therefore be sold to civilians without any controls, unless there is a state or local law to restrict such sales. At present, only seven US states and the District of Columbia prohibit the sale of Tasers to civilians, and several cities in other states have also issued ordinances banning their use.[26] Most of the 43 states which allow the sale of stun guns and Tasers to the public place no controls on such weapons.

Taser International introduced its first Taser projectile weapon into the US civilian consumer market in late 2004; this was the X26C which is similar to the police Taser X26, with a slightly lower output. It has a 15' (4.5 meter) range and can be triggered several times to create a 30-second cycle.[27] In 2007, the company started selling the "C2 Personal Protector", a smaller, cheaper, stun device designed to have wider consumer appeal. Shaped like a razor and small enough to fit into a handbag or pocket, the C2 comes in fashionable colours and fires darts which can deliver a 30-second shock. A further feature was added to the C2 in 2008 to incorporate an optional MP3 player and a leopard skin cover.

Amnesty International opposes the sale of electro-shock weapons to the public whose use of the devices cannot be strictly regulated or monitored.[28] There have been a number of reports of Tasers and older model stun guns being used by civilians in the commission of crimes, including cases of sexual assault and domestic violence.[29] At least two deaths, including that of a baby, have been linked in the past to stun guns used by civilians.[30] Amnesty International is concerned that mass marketing of stun devices such as the C2 could lead to further crimes.

2 (III) PAIN AND PSYCHOLOGICAL IMPACT OF ELECTRO-SHOCK WEAPONS

Although the peak voltage is high, the amount of electrical output delivered by CEDs is described as well below the threshold normally required to directly trigger a fatal electrical shock. While, as this report shows, serious questions remain concerning the safety thresholds of such weapons, it is undisputed from the testimony of those who have experienced even a short shock, including police officers, that they cause substantial pain.

One police chief, for example, who volunteered to undergo a two-second Taser shock during a training session while being physically supported by two other officers, described the experience as "very painful ...there are shock waves going through your body. It's a very scary feeling".[31] Another officer described the pain as "By far, the most excruciating pain anyone can feel".[32] A reporter who volunteered to be shocked said it was "like someone reached into my body to rip my muscles apart with a fork".[33] Most officers or others who volunteer to take a Taser "hit" are shocked for less than the minimum five-second charge usually applied in the field. Some departments have reportedly stopped requiring officers to take a shock during training, because of complaints about the effects and some injuries.[34] In many departments officers may now choose whether or not to be shocked during training.

The psychological effects of uncontrollable muscle contractions and collapse can be distressing and frightening as well as painful. Taser International's product warning bulletins acknowledge that use of the Taser can cause "pain, stress, and/or panic" and that anticipation of such exposure can cause "stress, trepidation, panic, and/or fear" which may

be injurious to some people.[35] These effects in Amnesty International's view make such weapons particularly inappropriate in the case of vulnerable individuals, such as children, people with mental illness, the elderly or pregnant women, unless officers are faced with an immediate threat of death or serious injury that cannot be contained by any lesser means. As described below, however, CEDs have been used against such individuals when they were reportedly not posing a serious threat.

2 (IV) CONCERN ABOUT THE LOW THRESHOLD FOR USE OF CEDS IN US LAW ENFORCEMENT

CEDs are promoted by the companies which market them as useful tools to control or incapacitate dangerous, combative or high-risk suspects. US police departments deploying them claim they reduce injuries and save lives by providing officers with a safer alternative not only to firearms but other uses of force liable to result in injuries, including batons and police dogs.

Tasers and similar devices are often promoted as being safer than many force options, including other "non-lethal" options such as pepper spray (the effects of which can be longer lasting and contaminate officers) or even hands-on force. Some departments report that merely arcing[36] or displaying the weapon causes suspects to become compliant without the need to discharge the CED. However, Amnesty International is concerned that this has led to Tasers being deployed unnecessarily and disproportionately. They are frequently used in situations where firearms or other weapons would not be an option and they have sometimes been used pre-emptively, at the first sign of even minor resistance. Far from preventing the escalation of force, the use of electro-shock weapons in relatively low-level encounters, as seen in many incidents, appears to have lowered the threshold at which force is used.

Such incidents include use of Tasers on unarmed individuals who do not comply immediately with instructions or who argue with officers; who struggle while being placed in handcuffs; who attempt to run or walk away from minor incidents or are intoxicated or verbally disruptive but not committing, or threatening to commit, a serious crime. According to reports received by Amnesty International, in many such cases the officers have not been found to violate their departments' policies.

The following are examples of reported Taser use in the past two years. Some of the incidents came to light and generated further inquiries after video-footage was shown on the news or internet websites.

In November 2006, video footage posted on YouTube website (www.youtube.com) showed University of California, Los Angeles (UCLA), student **Mostafa Tabatabainejad** being shocked by a police officer at least three times in the torso as he was escorted out of a university library for failing to show his ID card. He was shocked when he dropped to the ground and twice more as he lay screaming on the floor. A subsequent independent inquiry found that, while the university police policy permitted use of Tasers on "passive" resisters, the repeated shocks and failure to de-escalate the situation were unjustified.[37]

In September 2007 an officer from Warren, Ohio, was filmed shocking and kicking an unarmed woman, **Heidi Gill**. Heidi Gill had left a nightclub after an alleged altercation and was sitting in a car. The video showed the officer fire his Taser at her, causing her to fall out of the car, then repeatedly shock her and kick her as she

screamed and stumbled on the ground with the Taser darts attached to her body. He was seen shocking her again in "drive stun" mode, as she lay unresisting on the ground after hitting her head on the back of the car. The officer received a two-month disciplinary suspension in the case and was later dismissed over an unrelated incident. He was not charged for his ill-treatment of Heidi Gill, although the federal authorities are reported to be investigating the case. Charges against Heidi Gill of assaulting a police officer, resisting arrest, disorderly conduct and unauthorized use of a motor vehicle were later dismissed. [38]

University of Florida student 21-year-old **Andrew Meyer** was shocked by campus police when he resisted being removed from an auditorium after repeatedly questioning and interrupting US Senator John Kerry in September 2007. Video footage shows him being shocked as he lay on the ground. An investigation by a state law enforcement agency held that the police had acted appropriately because Meyer had resisted orders to leave the hall. The campus Taser policy was later changed to bar use of CEDs against "passive physical resistance" or "as a response to verbal dialogue", but it remained legal in cases such as Andrew Meyer's as he was deemed to be "physically resisting".[39]

In November 2007, a Utah Highway Patrol officer used his Taser on a man who refused to sign a disputed speeding ticket. The man released video footage of the incident from the police dashboard camera, which showed the officer fire Taser darts at him when he refused to put his hands behind his back. The officer was cleared of wrongdoing. The Utah Attorney General's Office later agreed to settle a lawsuit in the case, although it considered that the police officer had "acted reasonably to avert a volatile and potentially dangerous confrontation".[40]

Video footage shows New Orleans police officers use Tasers on several people inside a City Council meeting in December 2007; the meeting was due to vote on controversial plans to demolish public housing damaged by Hurricane Katrina. Those attending the public meeting were seen calling on council members to let more people in and pointing to empty seats. One African American man was shown being shocked several times while surrounded by officers; although he was verbally protesting, he was not seen to engage in violent or threatening behaviour.[41]

In January 2008, a sheriff's deputy in California reportedly fired his Taser at a man he had stopped for riding his bicycle without lights when the man jumped from his bike and tried to run away. Police said the officer's use of a Taser was justified.[42]

In February 2008, police officers from Oakland, California, are reported to have used a Taser on an unarmed 16-year-old high school student during a school walk-out protest. The student was reportedly shocked in stun mode and with Taser darts when he stepped between two officers who were trying to handcuff another student when she refused an order to return to the school. He was taken to hospital to have the darts removed.[43]

In July 2008, officers from Ozark, Missouri, used Tasers 19 times on a 16-year-old boy who was lying next to a highway, injured after apparently falling from an overpass; he was reportedly "refusing to cooperate" with officers and shouting. His parents said he was unable to comply because of his injuries, which were reported to be a broken back and heel. An investigation by the Missouri State Police and county prosecutor reportedly cleared the officers of any wrongdoing in their use of stun guns on the boy, who they believed was under the influence of LSD at the time.[44]

Tasers are increasingly authorized for use by police in US schools. The authorities have sometimes defended the practice by asking parents if they would rather their child was shocked or shot.[45] However, police officers do not routinely use firearms against schoolchildren, nor would they generally use weapons such as batons, pepper spray or police dogs to break up fights or to control other types of behaviour for which Tasers have been used in schools.

"In Florida, you aren't allowed to beat your kid, but they can be tased in schools"

Parent on learning that Tasers would be re-allowed in Duval County, Florida, schools in August 2006.[46]

In March 2008, an 11-year-old girl with a learning disability was reportedly shocked after she punched a police officer in the face; the officer had been called to the Orange County, Florida, elementary school after the child had become disturbed, pushing desks and chairs and spitting at staff.[47]

An 18-year-old Ohio student was shocked when he ran naked through his high school canteen covered in oil as a stunt; a police officer assigned to the school is reported to have fired his Taser twice, the second time when the student tried to get up off the floor.[48]

A 16-year-old boy in a Louisiana public school was shocked when he tried to retrieve his confiscated mobile phone after school and allegedly threatened a police officer.[49]

A school police officer in Monroe, Ohio, used his Taser on a 17-year-old girl after she refused to leave a classroom and remained at her desk; she was reportedly shocked several times when she started "wrestling" with the officer and resisted being handcuffed.[50]

In North Carolina, police threatened to use a Taser on a 16-year-old schoolboy after he allegedly used a profanity on the school grounds; and a 14-year old child with special needs was reportedly tasered four times after she threw an officer's radio on the floor and refused to return to her classroom.[51]

Amnesty International considers that the use of CEDs in circumstances such as those described above is contrary to international standards which provide that law enforcement officials should, as far as possible, apply non-violent means before resorting to the use of force and should use force only when strictly necessary and in proportion to the threat posed.

Amnesty International considers that the use or threat of painful electric shocks to subdue non-compliant individuals who do not pose a serious, immediate threat to themselves or others, is an unnecessary and disproportionate use of force which can sometimes amount to torture, or other cruel, inhuman or degrading treatment.

International treaty monitoring bodies have also expressed concern about the use of electro-shock weapons in law enforcement. In 2006, in its concluding observations on the consideration of the report on the USA's compliance with the United Nations (UN) Convention against Torture or Other Cruel, Inhuman or Degrading Treatment or Punishment, the Committee against Torture (CAT) raised concern about the "extensive use" of electro-shock devices by US law enforcement personnel and called for them to be used only as a substitute for lethal force weapons.[52]

The Human Rights Committee, reporting on the USA's compliance with the International Covenant on Civil and Political Rights (ICCPR), expressed its concern "about information according to which police have used Tasers against unruly schoolchildren; mentally disabled or intoxicated individuals involved in disturbed but non-life threatening behaviour; elderly people; pregnant women; unarmed suspects fleeing minor crime scenes and people who argue with officers or simply fail to comply with police commands, without in most cases the responsible officers being found to have violated their departments' policies".[53] The Committee called for such weapons to be used only in situations where "greater or lethal force would otherwise have been justified" and for all police use of force to conform to the UN Basic Principles.

In 2007, the CAT expressed concern about the acquisition of the X26 Taser by Portuguese police, commenting that use of the device "constituted a form of torture" by inflicting acute pain.[54]

2 (V) REVIEW OF US POLICIES ON CED USE

There are no binding national standards on the use of electro-shock weapons and US law enforcement policies vary. Although a number of departments have tightened their policies in recent years, most continue to permit Tasers to be used at a level of threat well below that at which officers would be authorized to use lethal force.

Amnesty International conducted a sample survey of more than 40 US law enforcement policies in March 2008, and has reviewed information from other studies and surveys.[55] Under most of the policies on which Amnesty International obtained information officers are allowed to use CEDs when they are faced with "active resistance" to a lawful attempt at control.[56] While the definition varies somewhat among departments, "active resistance" is generally understood to be physically evasive behaviour which includes such actions as "bracing, tensing or pushing away" from an officer: relatively low-level resistance that does not involve an act of assault or the threat of serious physical harm. While some policies now specify that there has to be a perceived threat of harm at the same time, this is not always a requirement. "Active resistance" generally falls at the low to mid range of the "use-of-force" scale, just above "passive resistance" and the level at which officers may use simple "hands-on" control. It is generally placed at the same level as Oleoresin Capsicum (OC) pepper spray.

Many departments now prohibit use of CEDs on "passive" resisters (non-violent individuals who refuse to comply with an officer's commands but do not physically resist in any way). Policy changes have sometimes resulted from concern generated by highly publicized cases, such as the case of two non-violent environmental protesters in the town of Brattleboro, Vermont, who were filmed in July 2007 being shocked by police when they refused to unchain themselves from a barrel in a vacant lot.[57] However, a significant minority of departments still reportedly authorize CEDs against "passive resisters" or people who merely "resist arrest", including individuals who are sitting down or refuse to obey a verbal command. Of more than 500 law enforcement agencies who responded to a recent survey, 19 per cent reported that Tasers were allowed in probe (dart-firing) mode in cases where non-compliant subjects were sitting down or refusing to comply with commands; 6 per cent of the responding agencies ranked CED use as a force option lower than "control holds".[58]

Of the policies reviewed by Amnesty International, less than a third placed the entry-level for CED use higher than "active resistance"; usually this was one step higher, at the level of "aggressive resistance" or "active aggressive resistance" to an officer, actions which involve some form of physical threat by the suspect (but not necessarily a threat of serious harm).

CEDs are often promoted as saving lives and reducing officers' need to resort to firearms; in some jurisdictions police shootings as well as injuries to officers and suspects are reported to have fallen after the introduction of Tasers, although such falls have not always been sustained.[59] Amnesty International acknowledges that there may be situations where CEDs could be effectively deployed in order to avoid the resort to firearms/lethal force. However, none of the policies seen by Amnesty International placed the entry level for Taser deployment at the level where officers would be authorized to use firearms and, as noted above, most place them well below this level. Several policies specifically stipulate that CEDs are not a substitute for deadly force, and some prohibit officers from using CEDs where a suspect is armed with a firearm.[60]

However, it appears that many departments authorize officers to use CEDs as an alternative to lethal force in situations judged appropriate. A study of 82 US police departments by the Police Executive Research Forum (PERF) in 2005 found that the large majority allowed officers to deploy CEDs as an alternative to deadly force in appropriate circumstances, including against a subject with a firearm or other potentially deadly weapon.[61] The study noted that, in most cases, the "tactical use of cover was a key factor in determining whether the CED would be used in a deadly-force situation".[62]

2 (VI) GENERAL SAFETY CONCERNS REGARDING CED USE: RECOGNIZED RISK FACTORS

There are a number of recognized risks associated with CED use, unrelated to the controversy surrounding the possible effects of CED shocks on the heart or respiratory system. Most departments prohibit aiming Taser darts directly at sensitive parts of the body such as the head or genitals or aiming the laser dot at the eyes.[63] Most also prohibit activation of CEDs around flammable substances, including alcohol-based OC (pepper) spray, because of the risk of ignition from the electrical spark.

It is also recognized that the strong muscle contractions from Taser shocks can cause injuries, including sprain-type injuries and compression fractures. Some of these concerns came to light when officers were injured during training, and warnings about such injuries are now included in Taser International's product warning bulletins. The warnings note that such injuries are more likely to occur in people with pre-existing conditions such as osteoporosis or muscle, bone or joint damage. [64] However, a recent report in the medical literature describes the case of a previously healthy 38-year-old police officer who suffered possibly permanent damage from spine fractures after receiving a five-second Taser discharge during training. The officer was supported by two other officers during the discharge to avoid his falling and he did not sustain a direct shock to the injured area, but he immediately experienced severe muscle spasms to his back. The article reported that the spine fractures almost certainly "directly related" to the muscular contractions caused by the electrical discharge.[65]

Some departments have introduced warnings against using CEDs on elderly people, except in extreme circumstances, in recognition of the heightened risk of bone fractures or other types

of injury described above.[66] However, there have been several reports of Tasers being used on people in their 80s or older who were not presenting a life-threatening risk, including on a man suffering from dementia who was stopped by police for urinating in a park.[67] Many departments place similar warnings or bar use of CEDs in the case of "young children", who may also be vulnerable to injury (there is also concern that children and people of small stature may also be more vulnerable to the effects of the shocks themselves, see reference to studies in Appendix C). In many of the policies seen by Amnesty International, an age limit is not specifically defined although several set a lower age limit as young as seven, and some restrict or ban use of Tasers on children under 14. Amnesty International has received several reports of CED use on children aged 12 or under who did not appear to pose a serious threat.[68]

Most departments now ban use of CEDs on "visibly" pregnant women or restrict their use to "exigent circumstances"; this appears to be mainly because of the risk of injury from the woman falling, although Amnesty International is concerned that there is also a lack of clear research on the effects of CED shocks on a fetus. A medical study concluded that exposure to shocks from an earlier Taser model caused a woman to miscarry in a US jail.[69]

Some of the risk factors cited above may not be apparent when police officers are dealing with individuals in the field. There have been cases where police have used Tasers on pregnant women but were reportedly unaware of their condition at the time. One woman suffered a stillbirth a few hours afterwards; although the exact cause of the fetal death was not conclusively established, the woman was awarded substantial damages in a subsequent lawsuit.[70] Other conditions such as heart disease, osteoporosis or prior injury, may not be evident at the time of a police encounter and, as shown above, even healthy individuals may suffer serious injury.[71] Amnesty International is concerned that the low threshold for use of CEDs in many policies could put individuals at risk of unnecessary harm.

In November 2007 a woman who had tried to leave her one-year old son at a police station in Trotwood, Ohio, was electro-shocked when she started to walk out of the station with the child. The officer is shown on a station video camera grabbing the woman by her coat and, after handing the child to another officer, forcing her onto her stomach and shocking her in the neck with a Taser. The officer said he feared for the safety of the child and did not know that the woman, who was wearing a large overcoat, was seven months pregnant. An internal police investigation concluded that the officer was justified in using a Taser as the woman resisted arrest, but that he violated policy by applying the shock to her neck and failing to get medical treatment or photographs of her Taser injuries.[72] The department's policy allowed officers to use their discretion when using Tasers on young children, elderly persons and pregnant women.

A civil rights lawsuit is pending in the case of **Malaika Brooks**, who a Seattle police officer shocked three times in rapid succession in 2004 when she refused to sign a citation for speeding in a school zone while taking her son to school. She was also seven months pregnant at the time. In ruling that the civil case against the officer could go to trial, a federal judge wrote that "The facts before this court show that Ms Brooks posed no threat to anyone".[73]

Some departments also warn officers against using CEDs in dangerous locations or situations where there is a strong risk of harm from the loss of control caused by the shocks, such as in the case of people in control of moving vehicles or in elevated positions. However, Tasers

have been used in hazardous circumstances. As described in section 4 of this report, there have been serious injuries, some resulting in deaths, from falls caused by CED strikes, and two men died from drowning after being shot with a Taser while they were in water. There have also been several reports of people catching fire after Tasers were used on them near flammable materials and at least two people reportedly died from the burns (see section 4 (vii) on deaths from secondary injuries, below).

2 (VII) PEOPLE SUFFERING FROM SEIZURES

Police have used Tasers and other force on people suffering from epileptic or diabetic seizures, sometimes after reportedly mistaking the symptoms for non-compliant, combative or intoxicated behaviour.[74] Amnesty International is concerned that use of electro-shocks in such cases, apart from being an inappropriate use of force, could cause serious harm. In several cases individuals suffering from seizures died after being shocked and subjected to other force (see death cases section below); other examples are given below.

In July 2007, a 16-year-old boy was reportedly shocked at least 12 times in "drive stun" mode by a Texas police officer, when he started flailing around while being strapped onto a stretcher. Paramedics were called after the boy had an epileptic fit while getting ready for a football match and started to panic after coming out of the seizure.[75] Photographs taken afterwards reportedly showed 24 separate burn marks from the Taser gun on his body. According to the police report provided to the boy's lawyer, the officer "drive stunned" the boy as he was being tied to the stretcher, and again in the ambulance, "to gain compliance".[76]

In Lakewood, Washington, a 63-year-old man was reportedly shocked twice with a police Taser when he refused medical aid and became "hostile" after coming round from an epileptic fit at the store where he worked as a clerk. A lawsuit he filed against the police department was settled out-of-court for $90,000 in January 2008, without the department admitting any wrongdoing.[77]

In February 2006, in Eulass, Texas, a diabetic man was reportedly sprayed with pepper spray and stunned three times with a Taser after he became hypoglycaemic in his car at the side of the road, and officers thought he was intoxicated. According to reports, the police did not realise he had low blood sugar until paramedics checked him later in jail.[78] Several similar cases have been reported elsewhere in the USA; they include a case in Ozark, Alabama, in November 2007, where police are reported to have fired Tasers three times at an unconscious truck driver who had pulled over after becoming ill and reportedly suffered a diabetic seizure.[79]

The Epilepsy Foundation of America has expressed concern about use of police force in such cases, noting that involuntary, aggressive behaviour is not unusual when someone is recovering from a seizure, and that "restraint of persons soon after a seizure may exacerbate or precipitate combativeness" as well as risk injury or even death.[80] The Foundation developed a training curriculum for police in the 1990s which warns against using restraints on individuals recovering from a seizure, with advice to leave the person to recover as calmly as possible. In September 2006, the Foundation reiterated a call for police and emergency services to undergo training and develop protocols, following concern about cases where Tasers and other force were used against people with seizure disorders.[81]

The Foundation expressed particular concern about the case of a Michigan man who was acting irrationally while suffering from a complex partial seizure.[82] Although the man was wearing a medical bracelet, police reportedly kicked his bag out of his hand, shocked him

with a Taser, hit him with batons and handcuffed him behind his back. The handcuffing itself was a dangerous procedure, according to the Foundation, as it can lead to further seizure-related agitation and struggling, "possibly causing asphyxiation or even cardiac arrest".[83]

2 (VIII) GUIDELINES DEVELOPED BY POLICE STANDARD-SETTING BODIES

The International Association of Chiefs of Police (IACP)[84] and the Police Executive Research Forum (PERF) [85] have drawn up guidelines for CED use in recent years. Although the guidelines are not binding on the more than 17,000 US law enforcement agencies, they represent what is considered among US law enforcement professionals to be best practice.

Both the IACP Model Policy for Electronic Control Weapons (ECWs)[86] and the PERF guidelines, [87] while differing somewhat in detail, include provisions which, in Amnesty International's view, are minimum standards necessary to increase the safety of CED use and protect against abuses. However, they would still permit use of CEDs at a lower threshold than the organization believes is desirable.

The IACP model policy contains a general provision that CEDs should be deployed only where necessary to control or subdue "violent or potentially violent individuals". However, it states that the devices are "generally analogous to oleoresin capsicum (OC) spray on the use-of-force continuum". Most departments consider OC spray to be an intermediate force option, at the level of "active resistance" which, as noted above, need not involve an imminent threat of serious harm by the subject. The PERF guidelines would also permit CED use at the level of "active resistance".

The IACP Model Policy contains provisions which forbid the use of CEDs:

- On a handcuffed or secured prisoner, except where there is "overtly assaultive behaviour that cannot be dealt with in any other less intrusive fashion";

- On any suspect who does not demonstrate "an overt intention (1) to use violence or force against the officer or another person, or (2) to flee in order to resist or avoid detention or arrest (where the officers would pursue on foot)";

- In any environment where there are flammable materials, or "where a subject's fall could reasonable result in death (such as water or on an elevated structure".

- The policy also states that "Officers should be aware of the greater potential for injury when using an ECW against children, the elderly, persons of small stature irrespective of age, or those who the officer has reason to believe are pregnant, equipped with a pacemaker, or in obvious ill-health"; and

- Advises that officers shall deploy the device "the least number of times" necessary to accomplish a legitimate objective and that, in determining the need for additional cycles, officers should be aware that someone who has already been subjected to a discharge "*may not be able to respond to commands during or immediately after exposure*". (IACP guideline C4, Amnesty International emphasis);

- Advises that the "center mass of the subject's back should be the primary target where reasonably possible", with the chest or legs secondary targets;

- Allows the device to be used in "touch-stun" mode, subject to the same deployment guidelines and restrictions as those of dart-firing deployments;

- Includes guidelines for aftercare, stating that "wherever reasonably possible individuals who have been incapacitated by an ECW should be taken to an emergency medical facility for evaluation";

- Requires that persons be taken to a medical facility for examination where the individual falls within a "potentially susceptible population" (as defined above); has been subjected to more than three ECW discharges, or a continuous cycle of 15 seconds or more, or has been subjected to more than one ECW in a given incident; has exhibited signs of extreme uncontrolled agitation prior to ECW exposure.

The PERF guidelines contain similar recommendations, with some additional safeguards, including restrictions in the case of fleeing suspects and use in stun gun mode, stating that:

- CEDs in dart-firing mode should be the "primary setting option", with the "drive stun" function generally used as a secondary option;

- A fleeing subject "should not be the sole justification" for police use of a CED and that the severity of the offence and other circumstances should be taken into account.

Other recommendations in the PERF guidelines include the following:

- Limiting the number of CED activations. The guidelines state that "*Training protocols should emphasize that multiple activations and continuous cycling of a CED appear to increase the risk of death or serious injury and should be avoided where practical*" (PERF guideline 4, Amnesty International emphasis).[88] They recommend that no more than one officer at a time should activate a CED against a person, and that officers should use a CED for one standard cycle only, after which they should stop to evaluate the situation. If subsequent cycles are necessary, policies should restrict the number and duration of those cycles to the "minimum activations necessary to place the subject in custody";

- Following a CED activation, "officers should use a restraint technique that does not impair respiration";

- "All persons exposed to a CED activation should receive a medical evaluation" and be regularly monitored thereafter while in custody; agencies should develop "appropriate police-medical protocols"; "Where possible, emergency medical personnel should be notified" when officers respond to calls where it is anticipated that a CED may be activated;

- The PERF guidelines provide detailed recommendations for reporting and monitoring CED use. These include requiring use-of-force reports for every CED use (including displaying a weapon where compliance was gained); and investigations outside the chain of command in cases of death or serious injury, multiple activations, use in the case of at-risk categories (such as young children, pregnant women or the elderly) and abuse complaints.

- They also recommend that each department conduct regular audits of the downloaded data from CEDs and provide detailed statistical information which should be "constantly analyzed and made publicly available". The guidelines list information which should be included in such analysis, including: time, date and location of each incident; the mode of CED use; the number of cycles and duration of each cycle; description of the suspect and level of aggression encountered; any weapons possessed by the suspect; the range at which a CED was used; point of impact of probes or stun gun use; medical care provided; injuries incurred and other data (PERF guidelines 44 and 45).

While some US law enforcement agencies report that their policies conform to the above national standards, surveys and case reports indicate that the policies and practice of many departments fall short of both the PERF and IACP guidelines. There continue to be regular reports of multiple and prolonged Taser applications, for example, (including repeated discharges when an individual may already be incapacitated and unable to respond immediately to a command, contrary to the IACP warning, above) although there are signs that some departments may be using more caution in this regard.[89] As noted above, Tasers have been deployed in hazardous circumstances and there are continued reports of their use against individuals fleeing minor incidents or who are only mildly resistive. While published statistical breakdowns are not always available, case reports suggest that Tasers continue to be routinely applied in "drive stun" mode, including against suspects who are already restrained to gain "compliance". There continue to be reports of individuals being placed in restraint positions that restrict breathing, both during and after use of CEDs.

All of the responding departments in Amnesty International's survey stated that they require officers to fill out a use-of-force report for each CED use, which is reviewed by a supervisor or higher up the chain of command. However, not all departments reported on whether they conducted detailed periodic audits of CED use based on information downloaded from the CED microchips. Several departments responded that they did not issue public reports giving statistical and other data on CED use. Often only minimal public information was made available, such as the number of incidents in which CEDs were used, without a breakdown of the number or duration of discharges, or the mode in which the weapon was deployed.

In June 2008, the National Institute of Justice (NIJ) published an interim report of its ongoing inquiry into deaths following police use of CEDs.[90] Although the NIJ interim report acknowledged the need for more research into the effects of such weapons, it stated there is currently no medical evidence that CEDs pose a "significant risk" for induced cardiac dysrhythmia when "deployed reasonably" and that law enforcement officials "need not refrain from deploying CEDs provided the devices are used in accordance with accepted national guidelines", citing the IACP guidelines as an example.

The interim report noted that "the purported safety margins of CED deployments on normal healthy adults may not be applicable in small children, those with diseased hearts, the elderly, those who are pregnant and other at risk individuals".[91] It recommended that "the use of a CED against these populations (when recognized) should be avoided" unless "the situation excludes other reasonable options". It also urged "caution" in using "multiple activations".

In discussing post-deployment medical care, the NIJ report stated that a medical evaluation "is not mandatory after all CED exposures". This is contrary to both the PERF and IACP current guidelines and some other policies, including the UK policy for CED use (where Tasers are deployed less frequently than in the USA). The NIJ report stated, however, that "Abnormal mental status in a combative or resistive subject may be associated with a risk for sudden death" and that "This should be treated as a medical emergency".[92]

Given that some at-risk factors for death or injury, including heart disease, osteoporosis and even pregnancy, may not be apparent at the time of use, Amnesty International believes that a medical evaluation should be a precaution after every CED use.

The NIJ interim report stressed that many aspects of the safety of CED technology are not well known and noted that further research was ongoing. In the meantime, Amnesty International believes that the NIJ interim findings, and its own findings described below, underline the need for law enforcement agencies to issue the strictest guidelines and limitations on CED use.

As noted above, Amnesty International considers that the current guidelines recommended by the IACP and PERF do not go far enough because they allow too low a threshold for CED use. However, many of their recommendations for regulating and restricting the use of CEDs are consistent with the warnings included in the NIJ interim report. Amnesty International is concerned that the policies of many US law enforcement agencies appear to fall short of these minimum recommended standards.

3. REVIEW OF DEATHS FOLLOWING USE OF CEDS

Keith Graff, a 24-year-old unarmed man, died in Phoenix, Arizona, after being shocked with a police Taser as he lay on the ground. The medical examiner ruled that he died from "excited delirium", a term often used to describe someone in a drug-induced psychosis or highly agitated state. Graff had relatively low levels of drugs in his system, however, and did not appear from the reported history to have been in a psychotic or agitated state. A subsequent investigation revealed that Graff had been shocked in the chest for 84 uninterrupted seconds, a finding Amnesty International believes cannot be discounted as a potential cause or contributory factor in his death.

Between June 2001 and 31 August 2008, 334 people are reported to have died in the USA after being shot with a police CED. All of the cases involved the use of M26 or X26 Tasers, which were the most widely used CED models during the period covered.[93]

Amnesty International does not suggest that Tasers necessarily caused or contributed to each of these deaths. However, the circumstances of many of the cases continue to raise serious concerns about the safety of such devices, and whether electro-shocks from CEDs can exacerbate medical distress in persons already compromised by drugs or ill-health, exertion or restraints. In most cases coroners or medical examiners[94] have listed causes of death unrelated to the Taser. However, in more than 40 cases coroners/medical examiners have found that Taser shocks caused or contributed to the deceased's fatal collapse, and in around a dozen other cases they could not rule this out (see below). Amnesty International continues to document reported deaths, pending further rigorous research into the safety of CEDs, because it believes the role played by the devices is often unclear, even where medical examiners have listed other causes; in some cases where medical examiners have listed other causes of death, Amnesty International believes that the available evidence suggests that the Taser may have played a role.

Cases where medical examiners or coroners cited a link between the Taser and death are summarized in an appendix to this report (Appendix A). A list of all reported deaths following CED use in the USA is published separately in conjunction with this report and is available on Amnesty International's website, see *Amnesty International, List of Reported Deaths Following Use of Stun Weapons in US Law Enforcement, June 2001 to 31 August 2008* (AI Index AMR 51/146/2008).

3 (I) SCOPE AND METHODOLOGY

The findings and statistical data on death cases for this report are based on information on the 334 reported deaths for the period 17 June 2001 to 31 August 2008. Amnesty

International's information comes from a range of sources, including media reports; information from family members and attorneys; and reports of official inquiries and investigations. Amnesty International also obtained copies of the autopsy reports in 98 cases, through public records requests to coroners or medical examiners offices or from lawyers representing the families of the deceased. Amnesty International also reviewed the transcripts of coroner's inquests in the deaths of William Lomax and Ryan Rich, both in Clark County, Nevada, in which medical examiners provided testimony about their autopsy findings.

Amnesty International requested copies of autopsy reports in all cases where medical examiners were reported to have cited the CED shocks as a cause or contributory factor in the death. The organization also sought autopsy reports in a similar number of cases where coroners attributed death to other causes or listed the cause of death as undetermined. The deaths occurred in various US jurisdictions and the sample was broadly representative of cases reported nationwide. Amnesty International received most of the reports it requested. However, some autopsy reports were not available because of pending litigation or criminal proceedings, or because they were not released by the families.

The amount of detail in the autopsy reports varied, and did not always give the full background to events leading to death (see below); often Amnesty International was able to supplement this from other sources cited above.

In addition to the case information, Amnesty International reviewed studies and medical testimony regarding the potential health risks from CEDs. These findings are referred to in the body of the report, where relevant, and summarized in Appendix C. Amnesty International also reviewed general statistical data on deaths in US police custody based on nationwide data collected by the Bureau of Justice Statistics.

3 (II) DEATHS IN US POLICE CUSTODY

Since 2000, the US Justice Department's Bureau of Justice Statistics (BJS) has been mandated to collect nationwide data on arrest-related deaths in custody. Its first report, published in October 2007, revealed that during the three year period from 2003 to 2005 around 300 people a year died in police arrest-related incidents, excluding deaths from police use of firearms.[95] Although there were gaps in the data, the figures indicate that the number of deaths annually during the period covered remained fairly constant, with no statistically significant increase or decrease nationally in the overall number of deaths in custody.[96] The data on the number of deaths from police firearms also remained constant for the period covered, despite the fact that Tasers have been promoted as saving lives and avoiding officers' resort to firearms. The most common cause of arrest-related death (in non-firearms cases) was reported as alcohol or drug intoxication; however 17 deaths were reported to be "caused by CEDs".

While the above report showed no apparent statistical change in the number of deaths nationwide after the introduction of Tasers, research indicates that many deaths in US police custody occur during police restraining procedures. There is longstanding concern that certain types of police restraint can increase the risk of death, including in people compromised by drug or alcohol abuse. The data does not affect Amnesty International's concern that CED use in certain circumstances may be associated with unnecessary custody

deaths. CED use may have replaced other potentially dangerous restraint techniques in some cases. More research, both nationally and in individual jurisdictions, is needed into how far CEDs, used appropriately, may have saved lives and whether CED use has led to any measurable decrease or increase in deaths at the hands of law enforcement officials.

3 (III) PROFILE OF THE DEATH CASES (CIRCUMSTANCES, AGE, RACE AND ETHNICITY)

Of the 334 people who died following CED use, 324 (97 per cent) were male and ten (2.7 per cent) female. Their ages ranged from 17 (three cases) to 63, with an average age of 36. Most of the deceased were shocked during the course of being taken into custody by police or sheriff's officers. More than 30 individuals died after being shocked in jails, where Tasers are also widely used, or in the booking area of police stations. The deaths occurred across many jurisdictions, with the states of California and Florida recording the most deaths (55 and 52 respectively). The county with the highest number of deaths nationally was Maricopa County, Arizona, with nine deaths. Las Vegas, Nevada, and Phoenix Arizona were the two cities with the most deaths, with five deaths each during the period covered. A break-down of deaths by jurisdiction is given in Appendix B.

The race or ethnicity of those who died was not always reported. However, in the 200 cases (60% of the total) where this information was available, 90 (45 per cent) of those who died were black, 74 (37 per cent) were white, 33 (17 per cent) were Hispanic, two (1 per cent) were Native American and one other was Haitian. African Americans are thus disproportionately represented among the dead compared to their numbers (12%) in the US general population. Amnesty International does not have sufficient information to extrapolate from this whether African Americans and other minorities are disproportionately subjected to CED use in any given jurisdiction compared to the rate of arrests. However, there are longstanding concerns in many US jurisdictions that racial minorities are disproportionately the victims of police ill-treatment, including excessive force and unjustified stops and searches.[97] Some jurisdictions have reported that racial minorities are disproportionately subjected to CEDs. An audit of CED use by the Houston Police Department, for example, found that, of 1,217 Taser deployments between December 2004 and June 2007, 67 per cent were used on African American suspects, although they constituted only about 25 per cent of the city's population; the study also found that African American suspects were "significantly more likely" to have a CED used on them than white or Latino suspects and that there was a correlation between race of the officer and suspect in CED use.[98] Several of the death cases have involved allegations of racism (see for example the case of Baron Pikes below).

Most of the deceased were under the influence of drugs or alcohol when they were shocked, although the concentrations were not always at highly toxic or fatal levels. A significant number were discovered at autopsy to have underlying health problems, such as heart disease (see below). However, some of the deceased had no underlying disease and tested negative for drugs or alcohol; in 20 (around 21 per cent) of the 98 autopsy reports reviewed by Amnesty International, the deceased had no illicit drugs or alcohol in their system when they were shocked. In the large majority of cases, the deceased went into cardiac and/or respiratory arrest at the scene, shortly after being shocked, and could not be resuscitated, although death was often pronounced later in hospital.[99] Other forms of police restraint were usually involved as well, including handcuffs, leg shackles, prone restraint (holding someone face-down); police batons and chemical spray (pepper spray).

21-year-old Baron Pikes died after being shocked nine times by a police officer in Winnfield, Louisiana. © Private

Baron Pikes: According to reports of the incident, which occurred in January 2008, Pikes started to run away after an officer spotted him walking down the street and tried to arrest him on an outstanding warrant for possessing drugs. He was quickly apprehended, taken to the ground and handcuffed behind his back. The officer shocked Baron Pikes six times when he failed to obey his command to get up off the ground and walk to the police car. Baron Pikes was then "drive stunned" in the chest while in the police car and shocked two more times as he was pulled from the car. The Winn County coroner, Dr Randolf Williams, said that it was possible that Pikes was already dead when the last two shocks were applied, as he was noted to have no movement after the drive stun to his chest.[100] The autopsy report listed cause of death as "cardiac arrest following nine 50,000-volt electro-shock applications from a conductive electrical weapon", with manner of death homicide.[101] Dr Williams said he obtained opinions from two independent forensic experts before reaching his conclusions, including Dr Michael Baden, Chief Medical Examiner of New York City, who reportedly described what was done to Pikes as "tantamount to torture".[102] The attorney for Baron Pikes' family said she thought that his treatment might have been racially motivated. Reports revealed that 12 of the 14 people against whom Winnfield police officers had used Tasers since they were adopted by the department were black.[103] In August 2008 the officer in the case was charged with manslaughter and "malfeasance while on duty", with the trial still pending at the time of writing.

3 (IV) CONCERNS ABOUT POLICE USE OF FORCE

Most of the 334 people who died following CED use were reportedly engaged in disturbed or agitated behaviour when police were called and some were allegedly violent, or at risk of self-harm. However, many did not appear to pose an imminent threat of death or serious injury when they were subjected to CED shocks. Only 33 (10 per cent) of those who died were reportedly armed with any sort of a weapon during the police encounter; of these, only four suspects were reported to have had a firearm and the weapons were not always being brandished at the time.[104]

Jarrel Gray, a 20-year-old unarmed African American man, died in November 2007 after being shocked twice in the chest with a Taser by a Frederick County, Maryland, sheriff's deputy. Deputies ordered Jarrel Gray and several other men to stop fighting in the street, to show their hands and to lie on the ground. According to the police account, Jarrel Gray was shocked when he refused to obey the command and turned away with his hands in his pockets. The police investigation report stated that, after he was shocked, "Gray's hands dislodged from his pants as he fell, but he landed face-down with his hands still out of sight beneath him".[105] Despite being immobilized from the first shock, he was shocked a second time for remaining "non-compliant" with the order to show his hands. Deputies pulled his hands out from under him to cuff him, and found him to be in

Jarrel Gray, 20, died after being shocked twice in the chest with a Taser by a sheriff's deputy from Frederick County, Maryland. © Private

medical distress. He failed to regain consciousness and was pronounced dead in hospital two hours later. Jarrel Gray's friends said that he had been drinking and was partially deaf and may not have heard the police commands. The medical examiner listed Gray's death as a sudden death associated with restraint (reportedly including the Taser) and alcohol intoxication, with the manner of death "undetermined".[106] In May 2008 a grand jury ruled that the officer was justified in using his Taser to subdue Gray because he did not obey the orders to show his hands. [107]

Although unarmed aggressive individuals may in some circumstances present a serious physical threat, many of those who died did not appear to be a significant threat when they were shocked. They include individuals who were shocked while attempting to resist arrest by running away from relatively minor incidents or failing to comply promptly with police commands, for example to lie on the ground or submit to handcuffing. Some people were shocked when they reportedly continued to struggle while in restraints. One man was shocked when, immobilized from an earlier shock, he was lying face-down on the ground and officers had difficulty pulling one of his hands from under his body to handcuff him.[108] 17-year-old Roger Holyfield, who was standing in the street holding a bible and screaming "I want Jesus", was shocked multiple times after he refused to comply with commands, resisted officers and carried on yelling; he collapsed at the scene and died the next day.[109]

Darryl Turner, aged 17, died in March 2008 after he was shocked by an officer from the Charlotte-Mecklenberg Police Department, North Carolina. The police officer was called after Darryl Turner, who worked in a grocery store, reportedly got into an argument with the store manager. A store video recording of the incident, made public after his death, showed Darryl Turner enter the store's customer service area and push an object off the counter. He walked out but came back into the room and pointed at the manager. Just afterwards, a police officer entered the room with his Taser which he immediately fired at Darryl Turner who was standing behind the counter with his hands at his side. The officer made no visible attempt to talk to the teenager or calm the situation. Darryl Turner is seen moving past the officer with the Taser probes in his chest, after which he reportedly collapsed out of view. Downloaded data from the officer's Taser showed that he held the trigger down for 37 continuous seconds until Darryl collapsed, and shocked him again when he was on the floor. Attempts to revive him were unsuccessful. The coroner ruled the cause of death to be a fatal disturbance of the heart rhythm due to stress and the Taser shocks. A police investigation subsequently ruled that the officer's initial decision to use the Taser was within departmental procedures, but that holding down the trigger was not justified. The officer was suspended for five days. [110]

Jails[111]

Some of the most disturbing uses of force occurred in jails. Frederick Williams, who died in May 2004 in Gwinnett County Jail, Georgia, is heard on a video tape saying "I can't breathe, don't kill me man, I've calmed down"[112] while being carried in restraints by five to six guards, flanked by other officers; he is then shocked several times while being held down by guards as he was strapped into a restraint chair; he became unresponsive at the scene and died later in hospital. Ray Austin died in similar circumstances in the same jail in September 2003. Tyler Marshall Shaw, a mentally disturbed 19-year-old, died in November 2005 after being repeatedly shocked with four Tasers in Asotin Jail, Washington, many of the shocks delivered simultaneously while he was lying naked and handcuffed on the floor. Jeffrey Turner, who was also mentally ill, died in Lucan

County Jail, Ohio, in January 2005 after he was subjected to multiple Taser shocks for repeatedly banging his head on his cell window. Two inmates died within a five month period in the Orange County jail system, California, after being shocked with Tasers and subjected to other force[113]; in June 2008 a grand jury criticized the running of the county's jails and called for restrictions in guards' use of Tasers.[114] Mark McCullaugh died in August 2006 after being allegedly stamped on by a guard, shocked with a Taser and saturated with chemical spray while kneeling in restraints in Summit County Jail, Ohio.[115] Amnesty International is concerned that Tasers are frequently used in US jails where, by definition, those subjected to the devices are already in custody and often restrained. Amnesty International has received reports of Tasers being used in some jails primarily for punishment or compliance.[116]

Amnesty International considers that use of the Taser and other force in many of the cases reviewed was unnecessary and/or disproportionate, in violation of international standards on the use of force by law enforcement officials,[117] and amounted in some cases to cruel, inhuman or degrading treatment or torture. The use of Tasers was often also contrary to guidelines for CEDs recommended by US standard-setting bodies such as the International Association of Chiefs of Police (IACP) and the Police Executive Research Forum (PERF), outlined under section 2 (viii) above. Many of the deceased were subjected to repeated or prolonged shocks, for example, and two or more officers sometimes discharged their weapons simultaneously. Tasers were also frequently used in "drive stun" mode, despite recommendations to limit such use in the PERF guidelines. These types of deployment have continued since the guidelines were developed in 2005. However, in most of the cases reviewed, the officers' actions were found not to have violated their departments' policies.

Shocked while suffering from a medical emergency

Many of the individuals who died were showing signs of mental or other illness, including drug-induced psychosis, and were not engaged in criminal activity at the time they were restrained; several were reportedly suffering the effects of seizures (see 4 (vi) below). Amnesty International recognizes that officers are often the first people called to a scene in cases where individuals are exhibiting disturbed or unusual behaviour and that such cases can sometimes present a risk to the safety of others as well as the individual concerned. However, Amnesty International believes that such cases should be treated as medical emergencies rather than situations requiring a purely law enforcement response. In some cases, police officers were the first responders to the scene despite specific requests by relatives for an ambulance. Emergency medical teams were often called to the scene only after the individual had gone into cardiac or respiratory arrest, when resuscitation attempts were too late. Amnesty International believes that the first response in such cases should have been to seek medical attention or, in the case of those who appear mentally ill, the assistance of "crisis intervention teams" where officers are specially trained to deal with mental health emergencies and have medical assistance as back-up.[118] Amnesty International supports the recommendation in the PERF guidelines that law enforcement agencies should develop "appropriate medical protocols" and, where possible, notify emergency medical personnel whenever officers respond to calls where it is anticipated that a CED may be activated.[119]

US law enforcement agencies should also ensure that their policies and practice conform to Article 6 of the UN Code of Conduct for Law Enforcement Officials, which states that "Law enforcement officials shall ensure the full protection of the health of persons in their custody

and, in particular, shall take immediate action to secure medical attention whenever required."

3 (V) CORONERS' FINDINGS: EXCITED DELIRIUM

The most common cause of death given by coroners or medical examiners (more than 30 per cent of cases where information was available) was heart failure caused by the ingestion of cocaine or other stimulant drugs, often together with a condition described as "excited delirium". [120] In some cases "excited delirium" alone was given as a cause of death. Other causes of death included fatal arrhythmias from heart disease, struggle or exertion, positional asphyxia (see below), CED use or a combination of factors, including drug use.

"Excited delirium" is not a diagnostic term formally recognized in the diagnostic schemes of the American Psychiatric Association (APA)[121] or the World Health Organization.[122] However, in the past few years the term has been used increasingly by medical examiners to explain sudden deaths in custody of individuals in a highly agitated state – usually under the influence of drugs or with some form of psychosis – who suffer a surge of adrenaline and collapse after struggle and police restraint. The signs and symptoms typically ascribed to "excited delirium" include bizarre or violent behaviour; hyperactivity; hyperthermia; confusion; great strength; sweating and removal of clothing; imperviousness to pain.[123] The stress resulting from states of agitation and delirium, including hyperthermia, and high levels of exertion, can produce life-threatening physiological changes, including changes in blood acidity and rhabdomyolysis (destruction of muscle cells), which can put the heart at risk.

However, the diagnosis of "excited delirium" as a cause of death is controversial and is disputed by some medical experts and others who have expressed concern that this is a "catch-all" term which may wrongly exclude other causes or contributory factors, such as dangerous restraint procedures or other inappropriate use of force.[124] Amnesty International shares these concerns and believes that other factors, including Taser shocks, cannot necessarily be excluded in such cases. A review of CEDs by Canadian Police Research Center looked at the issue of excited delirium and noted that the condition was not a single entity but rather a "symptom cluster".[125] The study suggested there was a need for further research in order to develop new medical protocols for dealing with the condition, and that a national or international standard of evaluation and information gathering would be the preferred method for obtaining such data.

The US Justice Department's National Institute of Justice is currently sponsoring several studies examining the effects of CEDs on the body, including on people under the influence of drugs or exhibiting behaviours associated with "excited delirium".[126] While the results of such studies have not yet been published, the Civil Rights Division of the US Justice Department, in a letter to the Orange County Sheriff's Office, Florida, in August 2008, pointed to a risk of CED deployment leading to sudden death in cases of "excited delirium". [127] It recommended that, pending more information about the effects of such devices on the human body, instructors should inform officers about the risks associated with CED deployment "specifically against subjects under the influence of drugs or exhibiting behaviours associated with 'excited delirium'".[128] It suggested a number of precautionary measures to minimize the risks involved (including notification of medical personnel when CED use is anticipated; minimizing the number of shocks and moving to alternative means of force).

David Glowscenski's parents called police for help because of his distraught and irrational behaviour. Officers alleged that they found the unarmed man walking down the street, screaming, although this is disputed by his family. At the time he was carrying his bible and was reportedly on his way to church. Four officers used pepper spray and at least nine Taser shocks to subdue him; he stopped breathing at the scene shortly after being shackled face-down. The Suffolk County medical examiner gave his cause of death as "excited delirium" due to "acute exhaustive mania due to schizophrenia". A second autopsy commissioned by the family, conducted by another medical examiner, cited "extensive evidence of excessive force" and gave her opinion that the repeated Taser shock cycles, blunt force injuries and exposure to pepper spray contributed to David Glowscenski's death; she found that his being handcuffed and having his ankles shackled while an officer knelt on his back also played a role.[129] A wrongful death lawsuit against the Village of Southampton Police Department was pending at the time of writing.

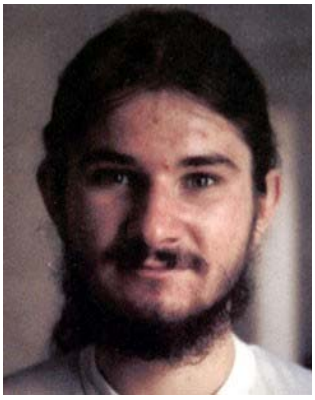


Photo of David Glowscenski, aged 35, who died in the custody of the Southampton Village Police Department, New York, in February 2004. © Private

3 (VI) MEDICAL EXAMINERS' FINDINGS LINKING TASER SHOCKS AND DEATHS

In 37 of the 98 autopsy reports and the two inquest transcripts reviewed by Amnesty International, medical examiners listed the use of a Taser as a cause or a contributory factor in the death. Such cases are not always clear cut, and one challenge for pathologists is that there are usually no obvious physical signs on a body to show the effects of electrical shocks from CEDs.[130] However, medical examiners tended to reach their decisions on the basis of various circumstances, including the proximity of the shocks to the fatal collapse; the toxicology findings; and whether the impact of restraining procedures, including CED shocks, could have contributed to cardiac or respiratory failure.

In 18 of the 37 cases, the Taser shocks were listed as a cause of death, usually along with other factors such as heart disease or physiologic stress.[131] They include the case of Ryan Wilson, a 22-year-old man who went into cardiac arrest immediately on being shocked in August 2006 in Lafayette, Colorado; no drugs or other restraints were involved and the coroner found the single six-second Taser shock to his chest, combined with a heart abnormality and extreme exertion, triggered a fatal arrhythmia.[132] Another case was that of Darryl Turner, a healthy 17-year-old who died immediately after being subjected to a 37 second shock to the chest (see 3 (iii) above); cause of death in his case was given as a lethal disturbance of the heart rhythm "precipitated by [his] agitated state and associated stress as well as the use of the conducted energy weapon".[133] Cause of death in the case of 19-year-old Tyler Marshall Shaw was given as "an arrhythmia following multiple blunt force injuries and use of electro-muscular incapacitation devices during a state of excited delirium"; four officers had used Tasers against him for a combined total of 109 seconds – nearly 22 times the standard five-second shock – in less than five minutes. Shaw, who was in jail at the time, had no stimulant drugs in his system.[134]

In the other cases the Taser shocks were found to be a contributory factor, increasing stress levels caused by drug intoxication or excited delirium, heart disease or struggle with police. In the case of Steven Spears, for example, cause of death was given as "cocaine induced excited delirium and its complications" with "physical restraint that included multiple

applications of the electromuscular disruption devices and handcuffing contributory".[135] In some cases CED shocks were found to have contributed to breathing difficulties caused by positional restraint (see, for example, the case of William Lomax, Appendix A).

There were also several cases where coroners cited a potential link between the Taser shocks and the cardiac or respiratory arrest or listed the shocks as a "significant other condition" but were unable to make a definitive determination. For example, in the case of Frederick Williams, who died in Gwinnett County Jail Georgia, in May 2004, cause of death was given as "hypoxic encephalopathy[136] due to cardiorespiratory arrest of uncertain etiology"; the coroner noted that "the close temporal relationship between the TASER deployment and the onset of the deceased's cardiorespiratory compromise would seem to imply the TASER to be at least partly responsible for this ultimately fatal medical condition. However, a definite cause and effect ... can be neither confirmed nor refuted by existing medical, pathological and circumstantial evidence".[137]

AI has identified at least 13 other cases where coroners or medical examiners are reported to have found Taser shocks caused or contributed to a death but where the organization was unable to obtain the autopsy reports (see Appendix A). This brings to at least 50 the number of cases where medical examiners are reported to have cited a link between CED shocks and death.

3 (VII) INDUSTRY CHALLENGES TO MEDICAL EXAMINERS' FINDINGS

Taser International has challenged in the courts some medical examiners' findings of a link between Taser shocks and deaths. The company has also reportedly tried to pressurize some medical examiners informally to change their rulings that Tasers caused or contributed to deaths.[138] In November 2006, the company filed a civil lawsuit against the Chief Medical Examiner of Summit County, Ohio, seeking a court order to change her office's rulings that Taser shocks had contributed to the deaths of three men: Dennis Hyde, Richard Holcombe and Mark McCullaugh.[139] Dennis Hyde and Richard Holcomb (aged 18) died in 2005 after being shocked multiple times; Mark McCullaugh, who had a history of psychiatric problems, died in 2006 following a struggle in his cell at a jail mental health unit, in which he was shocked with a Taser, saturated with pepper spray and allegedly beaten while in restraints. In May 2008, in an unprecedented ruling, visiting judge Ted Schneiderman ordered that references to the stun guns be removed from the autopsy findings in all three cases. He further ordered that the manner of death in the death certificates be changed from "homicide" to "accidental" in the cases of Dennis Hyde and Richard Holcomb and from "homicide" to "undetermined" in the case of Mark McCullaugh. [140]

Judge Schneiderman based his ruling on the evidence presented by experts for the plaintiffs, concurring that "There is simply no medical, scientific, or electrical evidence to support the conclusion that the TASER X26 had anything to do" with the deaths. He stated that "The multiple number of experts offered by the Plaintiffs in the area of sudden and unexpected death while law enforcement attempted to obtain custody provided overwhelming credible medical and scientific evidence to support their positions".[141] In the cases of Dennis Hyde and Richard Holcomb the judge cited the experts' evidence that they probably died "as a result of a fatal cardiac arrhythmia due to acute illicit drug intoxication, creating crazed states consistent with Excited Delirium Syndrome", with blood loss in Hyde's case a contributory cause. In the case of Mark McCullaugh, the judge stated that testimony from the

plaintiff's experts "demonstrated" that the Taser did not cause or contribute to the asphyxia, as found by the medical examiner, but was more likely due to an arrhythmia brought on by heart disease, his schizophrenia, the struggle and possibly a therapeutic injection.[142] A jail officer who had been facing murder charges in the case of Mark McCullaugh was subsequently acquitted in a non-jury trial at which some of the same experts testified.[143]

Lisa Kohler MD, the Chief Medical Examiner, said that she stood by her doctors' original autopsy findings.[144] An appeal against the ruling by the Summit County Medical Examiner's Office was pending at the time of writing.

There has been wide concern about the ruling among medical examiners. The President of the National Association of Medical Examiners described the case as "dangerously close to intimidation", stating that "at this point we adamantly reject the fact that people can be sued for medical opinions that they make".[145] Medical examiners have pointed out that the decision failed to take into account the difficulties of determining an exact cause of death from the pathology in many cases and how medical examiners make judgments after considering all the circumstances.[146]

Amnesty International is concerned that medical examiners may be subject to pressure by companies or other entities with an interest in protecting a product or reducing their liability in potential lawsuits. The organization believes that medical examiners must be able to operate independently within their professional competence free from interference from parties who have a vested interest in the outcome.

Amnesty International considers that the medical examiners' reports regarding the role of the Taser in deaths are an important source of information for studies reviewing the safety of CEDs. Many of the findings are consistent with recognized risk factors for restraint-related sudden death, in which multiple stressors may play a role in impairing cardio-respiratory function. Any review of such findings must be carried out independently of companies or any parties with a commercial interest in promoting the use of CEDs.

3 (VIII) MEDICAL CONCERNS ABOUT ADVERSE EFFECTS FROM TASER SHOCKS

"Many aspects of the safety of CED technology are not well-known, especially when used on populations other than normal healthy adults".

NIJ Study of Deaths Following Electro-muscular Disruption, Interim Report, June 2008

One of Amnesty International's principal concerns has been the lack of independent, comprehensive medical testing of the safety of CEDs. The M26 and X26 Tasers were introduced into the US market after only limited tests on animals conducted for the manufacturer (see Appendix C). While some studies since then have reported a low risk of direct adverse effects from CEDs when used on healthy adults in controlled conditions, they remain limited in scope and there is an acknowledged need for more research, especially on the effects of CED shocks on vulnerable populations, including those compromised by drugs, exertion or ill-health.[147] As the NIJ interim report into deaths following CED use recently stated, there may be populations who are more susceptible to adverse effects from CED shocks.[148] Research studies conducted for the United Kingdom's Defence Scientific Advisory Council (DSAC) have not excluded the possibility that factors such as drug or alcohol intoxication and pre-existing heart disease may modify the thresh-hold for cardiac

arrhythmias caused by Taser shocks.[149] The UK studies also raised the possibility that indirect responses to Taser shocks, such as through increased stress, may have an adverse effect on the heart.[150]

Several recent studies using animals have also challenged the findings of earlier theoretical and experimental studies that the electrical current from a CED discharge is too weak to directly disrupt the heart rhythm. Studies in Chicago and Toronto, for example, have shown that Taser shocks can stimulate the hearts of pigs, leading to potentially fatal arrhythmias, and have pointed to the need for more research into the cardiac effects of such devices on humans. The findings of these and other studies are summarised in an appendix to this report (Appendix C).[151]

A number of independent medical and scientific experts, testifying to a commission of inquiry in Canada (the Braidwood Inquiry) in May 2008, also raised concern about potential adverse effects of CED shocks on the human body, and the need for more research.[152] One concern, supported by animal studies, is that the intense muscle contractions caused by repeated Taser shocks may raise lactate levels in the blood, causing acidosis or contributing to a build-up of blood acid already caused by exertion or stress.[153] Another concern is that the contractions (which affect the respiratory muscles, such as the muscles of the diaphragm and the inter-costal muscles) may impair breathing, leading to respiratory and/or cardiac arrest if this is prolonged. Cardiac experts have testified that such risks would be greater in individuals with underlying heart disease, or in the case of repeated or prolonged shocks, or if CEDs were applied in conjunction with other restraints. According to some experts testifying to the Braidwood Inquiry, the intense pain caused by the electro-shocks may also contribute to dangerously elevated stress levels. It was pointed out that cardio-respiratory arrest in the above circumstances would not necessarily be immediate but could occur several minutes after the shock/s.[154]

Studies have shown that pigs stopped breathing during CED shocks, although the findings have not been replicated in human studies to date.[155] The NIJ interim report stated that "Research shows that human subjects maintain the ability to breathe during exposure to CED".[156] However, the published human studies to date have been conducted on healthy adult volunteers exposed to five or 15 second shocks in controlled circumstances, without the risk factors present in many of the fatalities.[157]

Given continued debate in this area, Amnesty International is concerned that in April 2008 Taser International modified its product warnings on using a Taser device. Specifically, it removed the warning contained in a June 2005 bulletin which stated that "Repeated, prolonged, and/or continuous exposure(s) to the TASER electrical discharge may cause strong muscle contractions that may impair breathing or respiration, particularly when the probes are placed across the chest or diaphragm".[158] The most recent law enforcement Taser product warnings on the company's website refer more generally to the possibility that the Taser can cause strong muscle contractions that may result in potentially serious "physical exertion or athletic/sports-type injuries", or various strain-type injuries.[159] They also contain a general warning to minimize repeated, continuous and/or simultaneous exposures. Amnesty International believes that, pending definitive studies, stronger warnings should be included in police training programs of the potential dangers of prolonged or repeated CED shocks, including impairment of respiration, and of potential risks involved in shocks to the chest (see below).

While the amount of current produced by a Taser shock has been described as too low to present a significant risk of causing a direct fatal arrhythmia in healthy adults, recent tests on some models showed that the output was significantly higher than the manufacturer's specifications in a proportion of cases.[160] There is also concern that the thresholds for fatal arrhythmias may be lower in the case of vulnerable populations. Several studies have also suggested there is an increased risk of cardiac arrhythmia if Taser darts are placed across the chest, close to the heart (see below). This has led to a number of experts recommending that officers should avoid shocking people in the chest and carry defibrillators in their vehicles. [161] However, as noted under 4 (iv) none of the CED policies seen by Amnesty International include a warning to avoid the chest area. Studies have also suggested that individuals of small stature, such as children, may be more susceptible to CED shocks.[162]

Some experts believe that Taser shocks have the potential to cause arrhythmias if the shocks strike the chest at a particular point in the heart's cycle. Dr Zian Tseng, a cardiologist and specialist in cardiac electrophysiology, has described how there is a vulnerable period during the cardiac cycle (where the heart is recovering for the next heartbeat) where a critically timed Taser shock could induce ventricular fibrillation (VF) [163] by disturbing or "capturing" the heart rhythm. He suggested that the risk of this happening, while low, would increase with prolonged or repeated shock, particularly in the case of individuals with increased vulnerability for VF due to cardiac disease, drug intoxication or acidosis.[164]

Several experts have also described how ventricular tachychardia (VT) (in itself a potentially dangerous condition constituting a marked increase in the rate of heartbeat, through, for example, stress, illness or exertion) can also develop into VF if not controlled, and that this could happen some minutes after a Taser shock.[165]

Advocates of CEDs claim that they can help to prevent sudden death in persons in the throes of a drug-induced psychosis or other psychotic episode by bringing them down quickly, without a prolonged struggle (and hence the risk of potentially fatal conditions such as acidosis) or the need for other restraint techniques. However, this is not borne out in the cases reviewed, where multiple force techniques were often used, including repeated and/or prolonged Taser shocks. In many of the cases the Taser was also used in "drive stun" mode, as a "pain compliance" tool, a particularly inappropriate use in persons who are reportedly resistant to pain. In some of the cases Amnesty International has reviewed, the CED shocks appear to have increased, rather than lessened, agitation.

3 (IX) PRODUCT LIABILTY AND/OR WRONGFUL DEATH LAWSUITS FILED IN TASER-RELATED CASES

Dozens of product liability lawsuits (including police training injury claims and wrongful death claims) have been filed against Taser International since the introduction of the M26 and X26 Tasers. Many of these claims have been dismissed.[166] Taser International has been vigorous in fighting such actions, and has stated that "Our policy is not to settle suspect injury or death cases" and that the company will "continue to aggressively defend any litigation filed against TASER International and pursue sanctions and costs against plaintiffs for frivolous litigation".[167]

However, in June 2008, a jury held Taser International partly liable on grounds of "negligence" in a wrongful death claim, finding that it had failed to warn police officers of the dangers of prolonged exposure to a CED. The case was brought by the parents of Robert Clark Heston, a mentally disturbed man who died at their home in the Salinas district of San Jose, California, in February 2005, after he was subjected to repeated Taser shocks by Salinas police. The jury found that, at the time of the incident, Taser International had failed to warn purchasers "that prolonged exposure to electric shock from the device potentially causes acidosis to a degree which poses a risk of cardiac arrest in the person against whom the device is deployed".[168] The jury found that Robert Clark Heston was 85% responsible for his own death because of his history of drug abuse. However, they awarded his parents $150,000 in compensatory damages against the company and $5 million in punitive damages. This was one of very few cases to proceed to trial and reportedly the first one in which the company had been found liable. A federal district court subsequently dismissed the award for punitive damages after Taser International appealed; however the company remained liable for the compensatory damages and the court denied Taser International's motion for a retrial.

In addition to the Heston case, an article in Bloomberg Business News in August 2007 reported that at least 10 of the 52 cases Taser International had referred to on its website as being "dismissed with prejudice" (meaning the plaintiff cannot sue again) had in fact been settled by the company, with settlements believed to involve monetary damages. [169] The plaintiffs in such cases included several police officers who allegedly sustained injuries as a result of Taser shocks during training.[170] A number of lawsuits against the company remain pending.

Wrongful death claims have also been filed against police or county authorities on behalf of relatives of people who died after being struck by police Tasers. Some of these cases have resulted in substantial settlements for the families of the deceased; many claims are pending. The family of Greg Saulsbury, for example, a mentally disturbed man who died in January 2005 after being shocked and subjected to other force, received $395,000 from the City of Pacifica, California, to settle a wrongful death lawsuit. The City of Phoenix settled a lawsuit brought against it in the death of Keith Graff in May 2005 for $2million.

3 (X) OBSERVATIONS ON AUTOPSY REPORTS REVIEWED BY AMNESTY INTERNATIONAL

As noted above, Amnesty International reviewed more than 90 autopsy reports in cases of deaths following Taser deployment. The amount of detail in the reports varied, and did not always give the full background to the events leading to death. Overall, however, the autopsy reports provided valuable information on the medical histories of the deceased, the use of force, the siting of Taser marks and on injuries and toxicology, which helped to inform the concerns raised in this report. Amnesty International also obtained an independent review of the autopsy reports by Dr Sidsel Rogde, a professor of forensic pathology in Norway, who has previously examined death cases following stun gun use for the organization.

While Professor Rogde did not have enough information to provide a definitive second opinion on the causes of death given by the medical examiners, she expressed the view that CED shocks could not be ruled out as a contributory factor in many of the cases examined.

Professor Rogde also questioned the conclusions on drug toxicity in some autopsy reports, noting that high blood concentrations post mortem may reflect a redistribution of drugs in the blood, particularly following resuscitation. She noted that in some cases where medical examiners had ruled the cause of death to be drug intoxication, the drugs concentrations were not very high, and were within the range commonly found in habitual drug users. While a low drug concentration of cocaine or methamphetamine in the blood would not necessarily rule out a toxic reaction or psychosis, in some cases medical examiners failed to take other likely factors into account. (Professor Rogde's comments on specific cases are included in the case summaries in Appendix A.)

Amnesty International noted that background information important for understanding the case was sometimes missing from autopsy reports. Several autopsy reports did not mention the use of a Taser and others failed to mention the number, timing or duration of shocks despite this data being available from the weapons' computer chips.[171] Amnesty International believes that it is important for medical examiners to have all relevant background, including the time-lines and the number and duration of CED shocks. It is particularly important to establish the circumstances in such cases, in the absence of specific pathological signs on the body in many cases of sudden death from arrhythmias, whether due to "excited delirium" syndrome, drug abuse, positional stress, CED shocks or a combination of factors.

In the case of Keith Graff, for example, the autopsy report stated that Graff, who died in May 2005 in Phoenix, Arizona, "became unresponsive after a fight with two police officers in which Tasers were used".[172] The 24-year-old man died after being shocked on a walkway after he tried to leave an apartment while being questioned by police. Downloaded data from one of the officers' Tasers showed that Keith Graff was shocked at close range in his bare chest for 84 uninterrupted seconds; police testimony in a subsequent inquiry revealed that it was during this time that he had become unresponsive. These facts were not noted in the autopsy report. In reviewing the report, Professor Rogde observed that the methamphetamine levels in Keith Graff's blood were fairly low and at a common level found in habitual users. It also did not appear from the history that Keith Graff had been engaged in a prolonged fight or that he had exhibited classic signs of psychosis or delirium.[173] Yet the cause of death was given as "excited delirium due to methamphetamine intoxication" with manner of death an "accident". While the autopsy report noted the position of Taser probes still in Keith Graff's chest at the time of autopsy, no mention was made of the duration of the shocks or the temporal relationship between this and his fatal collapse. Professor Rogde advised Amnesty International that, if Keith Graff did not have "excited delirium", then the remaining possible cause of death was the prolonged tasering. The lawyer for Keith Graff's family informed Amnesty International that Keith Graff's blood acid levels were very high, which suggested that he may have died as a result of metabolic acidosis caused by his body being "locked down" by the extensive contraction of the muscles through the Taser shock. Keith Graff's family received substantial damages in a wrongful death claim against the City of Phoenix which employed the officers.[174]

The reports of incidents provided to coroners are often based largely on police accounts, which may be contested later or provide only a partial version of events. For example, in the case of Frederick Williams (see 3V above), the investigative report accompanying the autopsy report, based on information provided by the jail, reported that Williams "was being

combative" in the jail when a stun gun was used.[175] However, a videotape of the incident, released later, showed that he was already restrained, barely struggling, and saying "don't tase me, I've calmed down" when he was shocked. The video shows that he apparently lost consciousness shortly after being shocked and a few minutes later was found to be in full cardiac arrest.

The initial autopsy report noted five Taser burns to Williams' chest; that he had no heart disease; and that toxicology reports were negative for alcohol and "common drugs of abuse". The medical examiner suggested several possible causes of death, including struggle and mechanical restriction of the chest, which could be "neither proven nor excluded by autopsy procedure", and that "the relationship of the Taser application to the decedent's cardiorespiratory arrest is uncertain". More than a year later, the medical examiner attached an addendum to the autopsy report after receiving new information, including the time-line of the incident constructed by the FBI from the videotape. This information, the addendum stated, "documents a very brief interval between the application of the TASER device to the decedent and the initial call for assistance". The medical examiner wrote that "The close temporal relationship between the TASER deployment and the onset of the decedent's cardiorespiratory compromise would seem to imply the TASER to be at least partly responsible for his ultimately fatal medical condition."[176] While the manner of death remained "undetermined", the final report raised a clear concern about the potential role of the Taser in the death, based on the circumstantial evidence which became available later.

In its June 2008 interim report on deaths following CED use, the National Institute of Justice (NIJ) noted that it was important that coroners and medical examiners should have access to data from multiple sources, including a time-line of all events; clarification of whether the CED was used in drive-stun or probe mode; information from the downloaded data from the officers' CEDs "with special emphasis on the number and duration of discharges over the time interval involved"; recent activities of the subject prior to activation and his or her emotional state; the subject's cardiac and medical history; a review of witness accounts as well as police reports; and "any videos, photographs or digital images of the events".[177]

4. OVERVIEW OF SAFETY CONCERNS ARISING FROM AMNESTY INTERNATIONAL'S REVIEW OF DEATH CASES

While more research is currently being undertaken into the safety of CEDs, Amnesty International's review of the deaths has highlighted the following areas of concern, based on autopsy reports and other information described under (3). Amnesty International hopes that the findings will be relevant to ongoing inquiries, including the Justice Department's study of death cases. Amnesty International believes that the concerns should also be taken into account in providing guidelines for restricting law enforcement policies on Taser use.

4 (I) TEMPORAL LINK BETWEEN TASER APPLICATION AND CARDIO-RESPIRATORY ARREST

In the vast majority of the 334 post CED fatalities documented by Amnesty International, the deceased went into cardiac or respiratory arrest at the scene; in some cases a pulse was regained but the subject remained unconscious and died later in hospital from brain damage; in other cases resuscitation attempts were unsuccessful and death was pronounced at the scene or on arrival at hospital.[178]

As noted above, the risk of CED shocks causing ventricular fibrillation (VF) -- the most common form of arrhythmia caused directly by electrical shock -- is considered to be low. It has been argued that, because many of the deceased were still conscious and struggling immediately after being shocked, they could not have died from VF as this would normally cause the subject to become unconscious and pulseless within seconds, with irreversible brain death occurring within minutes if resuscitation is unsuccessful. However, there is evidence in some cases that the deceased collapsed immediately on being shocked, as for example, in the case of Ryan Wilson, cited above (see 3V). The autopsy report in Ryan Wilson's case said that he "immediately collapsed, with reports of shaking or seizure-like activity, and was found to have no pulse or respirations; he could not be resuscitated despite transport to a local emergency department".[179] He had no illicit drugs or stimulants in his system.

17-year-old Darryl Turner collapsed shortly after being shocked for 37 seconds in the chest. Cause of death in his case was given as "acute ventricular dysthythmia, specifically ventricular fibrillation, which further deteriorated to asystole from which the decedent could not be resuscitated".[180] The medical examiner noted that the lethal disturbance of the heart rhythm was "precipitated by the agitated state and associated stress as well as the use of the

conducted energy weapon". Turner had been involved in an argument before he was shocked but not, apparently, in a physical confrontation. The medical examiner found no sign of trauma or disease which could have contributed to his death, and he had no drugs in his system.

It is not always possible to determine from police or autopsy reports the exact time lapse between the CED discharges and collapse. However, there are cases where the decedent was noticed to have become unresponsive immediately or very shortly after being shocked, raising the possibility that the Taser shocks may have triggered the fatal collapse, although other factors cannot necessarily be excluded. For example, a police report in the case of Douglas Ilten, who died in January 2007, states that "immediately after the third Taser application, Mr Ilten was noted to be unresponsive. Fire rescue was called and he was found pulseless and not breathing."[181]

In some cases police noticed that the deceased was in medical distress only after restraints were put in place, a process that could take place within seconds. Jarrel Gray, for example, was shocked twice within 23 seconds, with the last shock being applied while he was lying face-down on the ground; police noticed he was in medical distress when they tried to handcuff him.[182]

In many cases, it appears that the CED shocks may have had a cumulative effect in increasing stress, leading to fatal arrhythmias. As noted above, collapse in such cases may not occur immediately, but after a continued struggle and possibly repeated or prolonged shocks. In some cases, there was a close proximity between the last shocks and the deceased's fatal collapse. For example, Robert Fidalgo Camba, who died in San Diego, California, in February 2005, was shocked six times with Taser darts as he thrashed around on the floor; he was then drive-stunned with no apparent effect but "approximately 30 seconds later he was noted to be pale, unresponsive and not breathing".[183] Emergency medical personnel managed to regain a pulse and he was placed on a hospital ventilator but never regained consciousness, and was pronounced dead two days later.

According to the coroner who investigated the death of Baron Pikes, who was shocked nine times over a 14 minute period, Pikes became unresponsive in the police car, possibly after the seventh shock. The coroner cited officers' accounts that Pikes had "no neuromuscular response" to two further shocks delivered after they dragged him from the car and it was "questionable" whether he was still alive when the last two shocks were applied.[184]. The emergency services who arrived at the scene found he had no pulse, blood pressure or vital signs and he was pronounced dead on arrival at hospital. As noted above, he had been otherwise healthy and there was reportedly no sign of recent drug use at autopsy; cause of death was given as cardiac arrest following electrical shock.

19-year-old Tyler Marshall Shaw died on 25 November 2005 after being repeatedly shocked with four Tasers in Asotin Jail, Washington. © Private

Another example is the case of Tyler Marshall Shaw who was shocked 21 times in jail in less than five minutes and was afterwards placed in a restraint chair where he was noted to have become pale together with "absence of a pulse or detection of only a weak pulse".[185] When the emergency

response team arrived some five to six minutes later, the initial EKG reading indicated VF and use of a defibrillator failed to revive him. According to the autopsy report, the restraint chair did not appear to have been a factor in impairment of respiration. The cause of death was attributed to "an arrhythmia following multiple blunt force injuries and use of electromuscular incapacitation devices during a state of excited delirium".[186]

As noted above, some studies have shown that the electrophysiological effects of Taser currents can provoke ventricular tachycardia (VT), which can degenerate into VF; death in such cases may not be instantaneous.

Amnesty International believes more research is needed into the circumstances in which CED shocks may trigger VF during police restraint. There is also concern that CED shocks may contribute to fatal arrhythmias through increasing stress or respiratory difficulties during police struggle and restraint (see medical concerns, 3 (vii) above). Given that there have been only limited studies on the effects of Taser shocks on humans, Amnesty International believes that law enforcement policies should continue to provide clear warnings of the potential dangers of CED shocks in increasing stress during struggle and restraint.

4 (II) MULTIPLE OR PROLONGED SHOCK

"Training protocols should emphasize that multiple activations and continuous cycling of a CED appear to increase the risk of death or serious injury"

(Police Executive Research Forum (PERF) Conducted Energy Devices Policy and Training Guidelines for Consideration, 25 October 2005)

There have been consistent warnings in recent years about the potential adverse effects from exposure to prolonged or multiple CED shocks. In recommending limits on the number of CED strikes, the Police Executive Research Forum (PERF) referred to a study it had commissioned of 118 deaths following Taser activations, noting that "the results indicated that multiple and continuous activations of CEDs may increase the risk of death or serious injury, and that there may be a higher risk of death in people under the influence of drugs".[187] Based on data provided by police departments in 2005, the PERF study found that, in the cases where people died, CEDs (Tasers) were activated for an average of 28 seconds in probe mode and 31 seconds in drive stun mode. They compared this to 662 non-fatal incidents involving CED use, where 88 per cent of the subjects were shocked for 15 seconds or less, with 45 per cent exposed to only one five-second cycle. The study found that the CED "proximity" death cases were also more likely than the non-death cases to involve multiple officers using a CED.[188]

A study commissioned by the US Department of Defense also suggested that if long periods of CED activation occurred, "the risk of unintended adverse effects such as cardiac arrhythmia, impairment of respiration or widespread metabolic muscle damage could be severe".[189] It further noted that "the effects of multiple simultaneous exposure" or "sequential exposure" to Taser shocks on the heart needed additional evaluation. A study by the Canadian Police Research Center in 2005 raised similar concerns.[190] Animal tests have shown that pigs exposed to repeated or prolonged CED shocks developed severe acidosis and potentially fatal cardiac arrhythmias.[191]

Although human studies have tested 15-second shocks on healthy (police) volunteers,

reportedly with no ill-effects, there remains a serious concern that prolonged CED exposure could have adverse effects on the heart or respiratory system, particularly on individuals whose health is already compromised by drug intoxication, physical restraint or heart problems.

Amnesty International does not have exact data on the number of Taser shocks in every reported fatality, particularly more recent cases where such data may not yet be available. Autopsy reports often provide information only on the number of probe or stun-gun marks, which would not necessarily show how many times the Taser is activated or whether the shock was prolonged. While data on the number of activations can be downloaded from both the M26 and X26 Taser models, only the X26 stores information on the duration of each firing. Police reports are not always available, and sometimes officers were found to have initially under-reported the number of Taser shocks (see for example the cases of Eric Hammock and Jesse Saenz, below).

Nevertheless, the available data shows that most of those who died were subjected to more than one Taser shock, and many were exposed to multiple and/or prolonged shocks. Amnesty International's information indicates that in 323 fatalities where the number of Taser shocks was reported, 234 (72 per cent) of the deceased were shocked more than once and 126 (39 per cent) were subjected to between three and 30 shocks.[192] The average number of shocks per person for the seven year period since June 2001 was 3.17 (this does not give the duration of shocks).

Cases include 21-year-old Patrick Aaron Lee, who was shocked up to 19 times by officers from Nashville, Tennessee, in September 2005, after he was found sweating and removing his clothes outside a nightclub and failed to obey police commands[193]; and Eric Hammock, shocked 25 times in April 2005 by police in Tarrant County, Texas, in probe and drive-stun mode following a relatively minor trespassing incident.[194] Both men went into cardio-respiratory arrest at the scene and could not be revived. Police had initially acknowledged shocking Hammock no more than six to nine times[195]. Tyler Martin Shaw was shocked 21 times with four Tasers for a combined total of 109 seconds in a Washington jail; as noted above, he died at the scene and the coroner found the Taser shocks were a factor contributing to his death. Jorge Trujillo, who died in San Jose, California in January 2006, was stopped by police for attempting to break into cars while bleeding from a serious head injury and was subjected to 20 applications of two Taser devices, totalling nearly two minutes of electrical pulse activation (his death was listed as being due to blunt force injuries, with the Taser shocks a contributory factor).[196] As noted above, there are also cases where officers administered a prolonged shock by overriding the 5-second default cycle by keeping their fingers depressed on the trigger. One example, cited above, is the case of Keith Graff, who was shocked for 84 seconds; another is the case of Ronald Hasse, who died in Chicago in 2005 after being shocked for 57 continuous seconds (see below).

While Amnesty International does not have full information on more recent cases, the data indicates that the proportion of deaths involving multiple shocks has decreased since 2003. This is a positive sign suggesting that officers may be using more caution in this regard. However, officers still applied multiple shocks in more than 50 per cent of the fatal cases reported in 2007 and 45 per cent of cases to 31 August 2008 (although the later figures are likely to be incomplete).[197] They include 23-year-old Jesse Saenz, an unarmed man who

died in New Mexico in November 2007 after being shocked 23 times. The police are initially reported to have said they shocked him only once; however data retrieved from the officers' guns showed that one officer had pulled the trigger 11 times and the other 12 times.[198] The medical examiner found cause of death to be excited delirium due to cocaine intoxication, with impairment of respiration due to prone restraint, not the Taser shocks, a contributory factor. Martin Mendoza died in San Diego, California, in February 2007 after being shocked by three officers using multiple probe and drive-stun applications for a total of 67 seconds over three minutes. [199] Disturbing cases of multiple or prolonged shocks have also been reported in 2008; they include Baron Pikes, who was shocked 9 times, and Darryl Turner, shocked for 37 seconds, followed by a further five-second shock.

Shocked again for failing to comply when already immobilised

Amnesty International is concerned that some people were subjected to repeated shocks after failing to comply with commands when they were already immobilized from a prior shock or shocks. This is illustrated by what happened to Jarrel Gray (see 3(iii) above), who was shocked again when he refused to show his hands after falling face-down on the ground from the first shock. In another example, a video-tape shows Frederick Williams being repeatedly shocked in the chest while restrained by six officers; the officers are heard saying "stop resisting" but Williams' only movement appears to be his involuntary jerking against the shocks.[200]

Use of repeated shocks in the manner described above is contrary to the International Association of Chiefs of Police (IACP) Model Policy for Electronic Control Weapons (ECWs) which states that "In determining the need for additional energy cycles, officers should be aware that an energized subject may not be able to respond to commands during or immediately following exposure".[201] In a background paper to accompany the policy, IACP notes that the effects of ECW exposure may include the suspect "feeling dazed for several seconds or minutes", and Taser International product warning bulletins describe how some people can be frightened or panic after being shocked (see 2 (vii) above). The PERF guidelines recommend that officers should stop and evaluate the situation after a first five-second shock.[202] In the United Kingdom, London Metropolitan Police Department officers trained in Taser use are instructed to keep their finger off the trigger after firing the first shock cycle and to hold the gun at their side; they are also trained to give verbal reassurance to the person who has been shocked and instructed that every trigger pull will have to be justified.[203]

Multiple or prolonged shocks are not the only potential CED-related risks in the death cases examined. Some people, such as Ryan Wilson, died after only one shock (see 3V above). However, Amnesty International believes that the increased stress from multiple or prolonged electrical exposure remains a serious and urgent concern. In the meantime, strict limitations on the circumstances in which CEDs can be used, and on the number and duration of shocks, should be incorporated into all departmental policies. As noted above, Amnesty International believes that, apart from health concerns, the capacity to inflict repeated and prolonged shocks renders CEDs particularly open to abuse.

Standard setting bodies such as PERF recommend avoiding repeated or continuous shocks (see 2(vii)). It has also been noted that even the five-second single standard cycle may not

always be necessary. In recommending restrictions on CED use to the Orange County Sheriff's Office in Florida, the Civil Rights Division of the US Justice Department advised that the department's policy should clearly state that "compliance can often be achieved two to three seconds into the deployment cycle, especially with an arrest team prepared to secure the subject".[204]

4 (III) HEART DISEASE

In 51 (52 per cent) of the 98 autopsy reports reviewed by Amnesty International the deceased were found to have cardiovascular disease, often severe. This is a significantly higher rate than found in the general population, particularly given the relatively young age group (average age 36). The findings are similar to those reported by emergency medical specialists who reviewed 37 autopsy reports in post-Taser deaths and found cardiovascular disease in 54.1 per cent of the cases.[205] The study noted: "As has been stated elsewhere, it is likely that such pre-existing disease, when combined with stimulant use, struggle against law enforcement, and definitive restraint maneuvers (Taser or otherwise), creates a high-risk situation for restraint-related fatalities".[206]

Cardiovascular disease was found to be the second most common cause of death or contributing factor after drug intoxication in the autopsy reports reviewed by Amnesty International. In a number of cases, no illicit drugs were present and the deceased's heart condition, along with the Taser shocks and struggle, appeared to be the most significant factors leading to cardiac arrest. In the case of William Teasley, for example, the medical examiner noted that his pulmonary, cardiac and vascular disease would have placed him at risk of arrhythmia, and that physical and emotional stress, with acidosis caused by partial airway obstruction, would have lowered the threshold for cardiac dysfunction, stating "The added stress of Taser shock ... was proximal to the cardiac arrhythmia and must be considered contributory".[207] Clever Craig had "no trace of recreational drugs in his system" but a history of coronary atherosclerosis which was noted in the final autopsy diagnosis; cause of death was given as "cardiac dysthrythmia during episode of excited delirium and following electrical shock from Taser", with manner of death homicide.[208] Jeffrey Turner also had no drugs in his system and cause of death was given as hypertensive heart disease, with significant conditions "altercation with jail personnel, including multiple shocks with Taser weapon".[209] A heart abnormality along with the Taser shock were found to be direct causes of death in the case of Ryan Wilson (see above).

Samuel Hair, aged 46, was shocked twice in the thigh by an off-duty police officer when he became disturbed in a hospital emergency room while waiting for a mental health evaluation in Fort Pierce, Florida, in February 2006. Samuel Hair was fitted with a pacemaker, and he reportedly suffered a heart attack shortly after being shocked; he died after being taken off life support three days later. Cause of death in Hair's case was given as "cardiac dysthythmia during physical struggle during police apprehension", with an enlarged heart a contributing factor; manner of death was listed as homicide.[210] He had no illegal drugs in his system and the medical examiner is quoted as saying the role played by the Taser shocks was "uncertain … and remains under study".[211] A wrongful death lawsuit filed by Hair's family claims that Hair told the hospital and police that he had a pacemaker and begged not to be stunned again after getting the initial shock.[212]

None of the law enforcement policies Amnesty International has seen contain specific warnings against using CEDs on people with heart disease, although some advise caution

when dealing with individuals who are "frail" or obviously "infirm" or have "pre-existing health conditions". The IACP model policy states that officers "should be aware of the greater potential for injury" when using a CED against "children, the elderly, persons of small stature irrespective of age, or those who the officer has reason to believe are pregnant, equipped with a pacemaker, or in obvious ill-health". As noted below, there is a recent case report where Taser shocks were found to have disturbed the heart rhythm of a man with a pacemaker (4 (iv) below).[213]

The June 2008 NIJ interim report into deaths following CED use, cited above, notes that the safety margins for CED use may not be applicable in the case of "at risk" individuals, including those with "diseased hearts", and that use of a CED in such cases should be avoided, unless other reasonable options are excluded.[214]

However, such conditions may not be apparent at the time of use. Amnesty International believes that greater restrictions generally on when CEDs are permitted would reduce the risk of unnecessary harm from such devices.

4 (IV) STRIKES TO THE CHEST

In at least 42 (43 per cent) of the 98 autopsy reports reviewed, the deceased had been shocked in the chest. Although the exact siting of the Taser barbs or probes was not always clear, these cases are of concern as several independent studies, as well as cardiac experts, have suggested that placing the electrical probes from a Taser or similar CED device across the chest, near to the heart, during discharge may increase the risk of a fatal disruption of the heart rhythm.[215] The interim report of the National Institute of Justice into CED deaths said "Research suggests that factors such as thin stature and dart placement across the chest may lower the safety margin for cardiac dysrhythmia".[216] As noted above, animal studies also indicate that placement of the darts across the muscles of respiration (diaphragm and intercostal muscles) may increase impairment of respiration.[217]

Some of the deceased reportedly collapsed immediately on being shocked in the chest, such as Ryan Wilson (see above), or after being subjected to repeated or prolonged shocks. The medical examiner in Ryan Wilson's case suggested that the death might be viewed as "similar to deaths where a physical blow to the chest, or in his case application of electrical current, causes fatal arrhythmia due to interruption of the cardiac cycle".[218] In April 2008, 24-year-old Kevin Piskura became unresponsive after being struck once in the chest with a Taser when he intervened as police tried to arrest his friend outside a bar in Oxford, Ohio; a video shows him rolling on the ground while being shocked for about ten continuous seconds. He did not regain consciousness and died after five days on a hospital life-support machine. The coroner ruled that the application of the CED device, together with other factors (including acute alcohol intoxication and exertion), caused his death.[219] An investigation by the police and county attorney concluded that the officer did not use excessive force or violate procedures in his use of a Taser on Kevin Piskura. [220]

Keith Graff died after being shocked at close range for 84 seconds in his bare chest; he reportedly became unresponsive during the shocks and when the emergency services arrived they found him pulseless; despite attempts at resuscitation he did not regain consciousness and was pronounced dead later in hospital. As noted above, the concentration of drugs in his system was fairly low, and there appeared to be little or no evidence to suggest extreme

exertion. Eric Hammock and Patrick Lee both suffered multiple Taser shocks, including strikes to the chest, before they collapsed (see 4(ii) above). Tyler Marshall Shaw died in jail shortly after being subjected to multiple and prolonged shocks; seven of the eight dart probes were still embedded in his bare chest at the time of autopsy. The autopsy report in the case of 17-year-old Darryl Turner described how he was shocked for 37 seconds in the chest before collapsing from ventricular fibrillation; he was reportedly previously healthy and had no drugs in his system. Baron Pikes, who died in Winnfield Louisiana in January 2008, may have gone into cardiac arrest after being "drive-stunned" in the chest while in the police car (see 3 (ii) above). He, too, was reportedly healthy with no sign of drugs in his system at autopsy.

Some of those who were shocked in the chest had pre-existing heart disease. Ronald Hasse, who died in Chicago in February 2005, collapsed several minutes after being tasered twice in the chest, with one of the Taser shocks reportedly lasting for 57 seconds; the coroner found cause of death to be electrocution due to Taser application, with methamphetamine intoxication a significant contribution. The autopsy report also noted that he had coronary artery disease.[221] Another example is the case of Nicholas Mamimo, who died in April 2006 in Collinsville, Illinois, where cause of death was given as cocaine-induced excited delirium and prone restraint, with "other significant conditions" Taser puncture wounds to the chest and abdomen and "moderate to severe" coronary atherosclerosis.[222]

Another disturbing case is that of Uywanda Peterson, an African American woman who died Baltimore, Maryland, in April 2007 after being struck with a police Taser. According to police accounts cited in the autopsy report, Ms Peterson was shot in the chest with a Taser after she jumped out at an officer who was pursuing a drugs suspect in an unrelated case, and began struggling with him. She then ran approximately 90 feet (30 meters) and collapsed face-down. She did not regain consciousness and was pronounced dead in hospital about half an hour later.

The autopsy report notes that the officer deployed his Taser for 23 seconds and that Uywanda Peterson's "initial cardiac rhythm on arrival of emergency medical personnel at the scene was ventricular fibrillation".[223] At autopsy both Taser probes were still embedded in her torso, one in the upper chest just below the nipple. One of the Taser probes was bent and had penetrated through the anterior chest wall, superficially into the left upper lobe of the lung and the anterior heart. The autopsy report stated that, as microscopic examination failed to reveal thermal effect on the internal tissues, this suggested that the heart and lung did not receive current.[224] Cause of death was given as cocaine and heroin intoxication associated with police altercation and pursuit. The medical examiner stated that "The relative contribution of the drug intoxication, mild heart disease, restraint method (Taser), and stress induced by a struggle with and pursuit by the police cannot be determined with certainty. Therefore the manner of death is best certified as undetermined".

Professor Rogde, who reviewed the autopsy report for Amnesty International, said that the case did not look like a drug death because the cocaine level was comparatively low and people who died from heroin or methadone intoxication would lapse into unconsciousness rather than run. It seemed feasible that her fall caused the probes to penetrate the chest wall and both heart and lung. In Professor Rogde's opinion, the VF might have been a result of the CED effect on the chest wall or even of the mechanical damage to the conductive system of

the heart.

There is also a recent case report of a man with a pacemaker, who was shot in the chest with a Taser and later suffered chest pains. The man survived but examination of the pacemaker data revealed that the Taser strikes had disturbed the heart rhythm.[225] This case provides further grounds for caution and the need for further study into the health risks involved in CED strikes to the chest and in deploying such weapons on individuals fitted with pacemakers.

Although there may be no clear pathological signs of electrical shock to the heart at autopsy, some experts have suggested that this can be deduced from the circumstances, for example, if the main finding is a fatal arrhythmia, the current passes across the heart, and there is a close temporal relationship between the shock and collapse. [226]

One research study into the effects of CED strikes to the chest concluded that all use of Tasers during training should be aimed at the back.[227] Cardiac experts such as Dr Zian Tseng have also recommended avoiding applying Taser current across the chest, and avoiding repeated shocks on the ground that this may increase the risk of capture of the heart during a vulnerable part of the cardiac cycle.[228]

Under the IACP guidelines, the centre mass of a suspect's back is the preferred aiming point for a CED strike, as there is less possibility of the darts coming into contact with sensitive or vital body areas, such as the eyes or groin.[229] In a UK training session observed by Amnesty International, officers were trained, where possible, to strike the back and/or the leg for as these are large muscle groups where the CED is likely to be most effective. However, none of the law enforcement policies Amnesty International has seen specifically warn against striking the chest area, and indeed, the IACP guidelines state that it may not be possible to target the back without another officer's assistance and that "a suitable alternative, and often more reasonable aiming point is the center body mass of the suspect's chest or legs".[230]

In its earlier product liability warnings for citizens, instructors and volunteers, Taser International advised against deploying a Taser device at a known location of pre-existing injury, including "the chest area on persons with a known history of previous heart attack".[231] However, its most recent product warnings give no specific warning of a need to avoid the chest, stating only that "when practical, the preferred target areas are the subject's torso (center mass) or legs".[232] As noted above, the company has removed past warnings in its law enforcement training bulletins about a potential risk of breathing impairment from Taser shocks when CEDs are applied to the chest, despite continuing concerns by some medical professionals that this might be a risk, particularly if the muscles of the diaphragm are affected (see 3 (vii) above).

Amnesty International realises that if an apparently violent individual is facing or advancing towards an officer and no back-up is available, it may not be feasible to aim a CED device at the back. However, the organization believes that clear warnings of the potential dangers of striking the chest should be included in police CED training programs and policies, and that all reasonable precautions should be taken to avoid targeting the chest. This could include, for example, targeting the leg area and requiring appropriate backup through the presence of other officers when it is believed that CED deployment may be necessary.

4 (V) IMPACT OF OTHER RESTRAINTS

In many of the 334 post-CED deaths, the deceased were subjected to multiple restraint techniques in addition to Tasers. Amnesty International is concerned that such methods frequently included restraint holds which can dangerously restrict breathing and have been associated with deaths in custody from "positional asphyxia". Such positions include prone (face-down) restraint, pressure to the neck and restriction or compression of the chest wall and diaphragm. More than 30 of the deceased were found to have gone into cardiac or respiratory arrest after they were placed face-down in handcuffs or other restraints, sometimes with officers' bodyweight on them as well. Some were reportedly held in "chokeholds", including "carotid" and "lateral vascular" restraints, both of which involve applying pressure to the arteries at the side of the neck, and are known to carry a risk of death or injury.[233] At least 16 of the deceased were placed in the "hog-tie" position, which is a potentially life-threatening procedure, especially if someone is left face-down.[234] Standard-setting bodies discourage use of hogtying and urge that departments avoid holding anyone in restraints, even handcuffs, in a face-down position.[235] Ten of the deceased were strapped into restraint chairs after they were shocked, a procedure associated with a number of deaths.[236]

While the above restraint procedures alone may cause death in some cases, Amnesty International is also concerned that CED shocks may contribute to death from restraint asphyxia in certain circumstances. This is supported by the medical examiner's findings in the case of William Lomax, whose cause of death was given as a combination of drugs, restraining force and use of Taser. At the inquest hearing, the medical examiner described how the muscle contractions caused by the Taser shocks would have further restricted Lomax's capacity for breathing which was already compromised by his obesity and being placed face-down with pressure on his diaphragm; the drugs in his system, while not at an extremely toxic level, would have also raised his metabolism.[237]

While Amnesty International does not have information on the cause of death in all cases, it has identified at least 34 cases where medical examiners found that the manner of restraint directly caused or contributed to the death; in some cases "positional asphyxia" was found to be the main cause of death. In several cases, Taser shocks were found to have contributed to restraint-related deaths. For example, in the case of Nicholas Cyrus, who died in Waukesha County, Wisconsin, in July 2006, the medical examiner found sudden death occurred as a result of his prone restraint and struggle with officers and "multiple electronic control weapon discharges"; toxicology reports in his case were negative.[238] In the case of Gregory Saulsbury, who died in January 2005 in Pacifica, California, the cause of death was given as "agitated state ... due to cocaine intoxication, with sequelae of struggles, forcible restraints, and Taser Stun Gun applications"; the diagnosis noted agitated state "associated with cocaine intoxication and with forcible restraints, including Taser Stun Gun applications, "bear hugs", "lying over", and handcuffs".[239]

Many of the deceased were also subjected to pepper spray.[240] Pepper spray (oleoresin capsicum/OC spray) is an agent derived from cayenne peppers which inflames the mucous membranes and can temporarily paralyse the larynx, causing gagging and choking. Amnesty International is concerned that pepper spray, particularly when used in conjunction with other restraints, or on individuals with certain health problems, may increase a risk of respiratory failure.[241] At least one individual who died after being shocked with a Taser and pepper sprayed suffered from asthma,[242] and others had histories of heart disease.

Police in de Soto County, Mississippi, reportedly used a whole can of pepper spray as well as Taser strikes on Darren Faulkner, who was involved in a street fight, in November 2006; he stopped breathing at the scene. He had hypertensive heart disease and his cause of death was reportedly given as "heart failure".[243] Mark McCullaugh died in Summit County Jail, Ohio, in August 2006 after being shocked with a Taser and saturated with a 16-oz can of pepper spray (normally used for riots) while he was restrained in his cell; the medical examiner testified that burns to his windpipe as well as the Taser shocks would have impaired his respiration.[244]

Pepper spray was mentioned as a possible contributory factor in two of the autopsy reports reviewed by Amnesty International. In the case of Jose Angel Rios, who died San Jose, California, in November 2005, cause of death was given as "cardiopulmonary arrest following violent struggle with acute cocaine intoxication", with contributory cause "status post-tasering and pepper spraying, obesity, cardiovascular disease". However, the report stated that as "no existing scientific studies of Taser or Pepper Spray have shown association with sudden or delayed death, the effect of these methods on persons with "excited delirium" is unknown" ... and that "... the manner of death is undetermined".[245] The cause of death in the case of Nicholas Mamino, who died in April 2006, is given as asphyxiation resulting from hogtie restraint in a prone position during a cocaine-induced excited delirium, with manner of death an accident. Taser, puncture wounds to abdomen and OC spray were listed as "other significant conditions".[246]

In its guidelines for CED use, the Police Executive Research Forum recommends that, following the application of a CED, officers should "use a restraint technique that does not impair respiration".[247] Amnesty International believes that this guideline should be introduced into all law enforcement department policies for CED use, with specific warnings against the use of CEDs in conjunction with procedures such as the use of pepper spray, prone restraint and the restraint chair. There should also be warnings of the potential danger of handcuffing someone behind their back following use of a CED and the need for strict vigilance in such cases. Dangerous forms of restraint such as hogtying and carotid or vascular neck chokeholds should be prohibited in all circumstances.

4 (VI) DEATHS OF INDIVIDUALS SUFFERING FROM SEIZURES OR OTHER MEDICAL CONDITIONS

A number of the people who died after being shocked had underlying health problems such as asthma or epilepsy. Amnesty International is concerned that such medical conditions may make individuals more vulnerable to adverse reactions to electro-shock.[248] Asthma sufferers, for example, may be more prone to difficulties when subjected to restraint procedures which could increase stress or impair respiratory function. In several cases Tasers and other force were used against individuals who had reportedly suffered a seizure, contrary to recommended procedures in such cases (see below).

Emily Mary Delafield, a 56-year-old woman with severe disabilities, including a history of schizophrenia, was shocked ten times for 121 seconds by police from Green Cove Springs, Florida, in April 2006 while she was sitting in her wheelchair wielding a hammer and knife. She had a history of respiratory problems and used an oxygen tank which was attached to her wheelchair. She went into cardiac arrest shortly after being shocked and died some 90 minutes later in hospital. The associate medical examiner who performed the autopsy found the main cause of her death to be hypertensive heart disease, but said that Taser shocks were a

contributing factor which could have impacted on her breathing. [249] While the death was ruled a homicide (ie resulting from police actions), an investigation by the State Attorney's office ruled that the officers' deployment of Tasers was justified because of the threat posed by Delafield at the time. The two officers involved said they fired their Tasers when Delafield raised the knife as if to throw it; however a relative claimed that her medical problems severely limited her range of motion and that she presented no real threat of using the knife. [250]

In at least six cases, Tasers were used on individuals during or shortly after they had suffered a seizure; in most of these cases it was apparent at the time that the individual was suffering from seizure activity. As noted above (see 2 (vii), involuntary aggressive and combative behaviour is not unusual when someone is recovering from a seizure and "restraint of persons soon after a seizure may exacerbate or precipitate combativeness".[251] Guidelines issued by the Epilepsy Foundation advise officers to maintain a calming, non-confrontational approach where possible and to avoid use of restraints.[252] Amnesty International is concerned by the force used in the following cases, including electro-shocks and additional use of positional restraint in some cases.

- In January 2008, **Ryan Rich**, a 33-year-old medical doctor, crashed his car onto the side of a Nevada highway after suffering an epileptic seizure. According to information provided by the District Attorney at a subsequent inquest, an officer from the Nevada Highway Patrol, on failing to get Dr Rich's attention, smashed a side window to remove the car keys, then pulled Dr Rich from the car to handcuff him. At this point, Dr Rich, who had been sitting motionless at the wheel, became "combative" and the officer used his Taser "multiple times to try to get him in compliance".[253] Dr Rich was noticed to be "turning blue" after he was handcuffed; an ambulance was called and CPR administered. Dr Rich did not regain consciousness and died shortly afterwards in hospital. The Clark County medical examiner testified that Dr Rich's immediate cause of death was "cardiac arrest due to arrhythmia combined with restraining procedures". While he gave his opinion that the seizure had caused Dr Rich's heart to beat unevenly, he could not say that this alone caused the death, describing the cause of death as "multifactorial". He said that the restraining procedures "would not have helped" Dr Rich to recover from the seizure and "probably contributed" to his death.[254] Dr Rich had no alcohol or recreational drugs in his blood, only medication for his epilepsy. The inquest jury ruled that Dr Rich's death was "excusable" after hearing testimony from the officer that he had deployed his Taser as the safest option to prevent Dr Rich from going into traffic and that he had not known that he was epileptic. However, Amnesty International considers that deploying a CED in the case of a man who was "unresponsive" after crashing a vehicle was an inappropriate and disproportionate use of force.[255] Instead of calling an ambulance right away, the officer appears to have precipitated danger by dragging Dr Rich from the car and shocking him at the side of the highway. The officer himself testified that at one point Dr Rich fell backwards into the travel lane after he shocked him at close range in the chest.

- **Trent Yohe**, who suffered from epilepsy and had gone into convulsions, was pushed to the ground and shocked at least four times in drive stun mode when he reportedly started "throwing punches" and kicking as Spokane Valley police removed him from his trailer in May 2007. He was placed in a "hogtie" restraint and went into cardiac arrest at the scene. He did not regain consciousness and died 12 days later after being removed from a

respirator. The medical examiner listed the cause of death as lack of oxygen to the brain due to cardiac arrest, methamphetamine use and restraint stress, with cardiovascular disease a contributory factor.[256]

- **Eddie Alvarado** was shocked five times in drive-stun mode after he was observed to have seizure activity and continued to "thrust and kick" as he lay prone on the floor handcuffed behind his back; moments later (after being placed in hobble restraints)[257] he was found to be in cardiopulmonary arrest.[258]

- **Byron Black** was shocked and pepper sprayed when he allegedly fought with officers who were trying to remove him from his jail cell for medical attention after he had apparently suffered a seizure; he collapsed at the scene and was pronounced dead in hospital. [259]

- Police officers found **Johnny Lozoya** on a sidewalk suffering a seizure and frothing at the mouth after possibly falling from a roof; he was shocked with a Taser in drive-stun mode when he became combative while restrained on a board during transportation to hospital and went into cardiac arrest while still in the ambulance.[260]

- **Glenn Leyba** was shocked three or four times by officers as he lay flailing on the ground after apparently suffering a drug-induced seizure. One paramedic stated in his report that the shocks only appeared to make him more agitated. According to the paramedic's report, he became limp and unconscious and stopped breathing after the last shock.[261]

Three of the people who died suffered from sickle cell disease, an inherited blood disorder characterized by defective hemoglobin, a protein in red blood cells that carries oxygen to the body's tissues. Sickling of the cells (where the cells take on an abnormal shape) can be life threatening if this blocks the flow of blood supplying oxygen to vital organs such as the lungs or brain. In all three cases the deceased reportedly had cocaine or other stimulant drugs in their systems and coroners attributed death to this, together with the sickle cell condition, rather than the CED shocks. However, Amnesty International is concerned that CED shocks may contribute to stress in such cases, increasing the risk of a fatal outcome. Amnesty International is particularly concerned by the case of Michael Clark, described below. [262]

- **Michael Clark**, aged 33, died in Austin, Texas, in September 2005. The autopsy report noted a history of the decedent "losing consciousness while being taken into custody, while resisting, involving multiple uses of pepper spray and Taser stun guns, during middle of the day in record heat".[263] The medical examiner concluded that Clark died "as a result of the consequences of massive intravascular sickling associated with extreme physical activity due to PCP and cocaine-induced delirium." A report of the police investigation into the case, prepared six months after the autopsy, described how Michael Clark was in a partially caged area in the back of a patrol car when his speech became slurred and the officers (from the Austin Police Department) decided he needed a medical evaluation. When they tried to handcuff him, he resisted, saying he was too hot (the temperature was 108°F/42°C at the time). Officers eventually fired pepper spray into the caged area, pulled him out of the vehicle and shocked him three times with Tasers, twice in the chest; he immediately slumped to the ground in medical distress. Nearly 15 minutes elapsed before emergency medical personnel arrived and they could not revive him. A grand jury later cleared the officers of any criminal responsibility for Michael Clark's death. However, Amnesty

International is concerned by the degree of force used against Michael Clark, who was reportedly confused and in physical distress. The medical examiner ruled out the CED shocks as a cause of death on the ground that Clark's "initial cardiac tracing showed normal sinus rhythm, degrading to asystole, never showing VF or VT"; however, this does not address whether the CED shocks (and pepper spray) could have increased his stress levels and contributed to the sickling.

4 (VII) DEATHS FROM SECONDARY INJURIES

Ten of the 334 deaths reportedly resulted from secondary injuries following the decedent's collapse caused by the Taser shocks. Two of the deceased died from drowning after they were shocked while in water.

- **Charles Keiser** died in Michigan in November 2004 after being shocked several times while struggling with officers in a foot of swampy water. Two autopsies were performed both of which concluded that he had died as a result of drowning in muddy water; the report of the second autopsy (conducted at the request of Charles Keiser's family) found that the use of the Taser while immersed "would have enhanced the drowning process".[264]

- **Muszack Nazaire** died in Florida in March 2007 after Collier County sheriff's deputies tried to stop him for driving with a suspended licence. He drove off and tried to swim away after crashing his car into a canal. One deputy reportedly fired his Taser at Nazaire while he was swimming but it malfunctioned. Nazaire then reportedly swam back towards the bank, but was shocked by another deputy when he failed to obey commands to come ashore. He was standing waist-deep in water at the time and immediately collapsed face-down under the water. By the time a deputy reached him a few minutes later, he was dead. The cause of death was reportedly given as "acute cocaine intoxication and intense physical exertion in an asthmatic incapacitated by a CED resulting in drowning."[265] The officer who fired his Taser was later exonerated by the sheriff's office, with a spokesperson saying that the officer was trying to "effect an arrest with the least amount of possible force".[266] An investigation by the State Attorney's office also cleared the officers of wrongdoing.

In six of the secondary injury cases, the decedents apparently died from injuries resulting from being shocked and falling to the ground. Cecil Valenzuela died in May 2007 of head injuries sustained when police from Bakersfield, California, shot him with Tasers while he was riding a bicycle, causing him to fall and strike the pavement. Although the PERF guidelines state that CEDs should not be used against suspects in physical control of a vehicle in motion, including bicycles, the officers in the case were cleared of wrongdoing.[267] In October 2006, Michael Templeton died after being shocked by sheriff's deputies from Craighead County, Arkansas, responding to complaints that he was playing loud music in his trailer; he was shocked twice and fell onto a piece of metal machinery and then a concrete floor.[268]

In other cases, CEDs do not appear to have been used in particularly hazardous situations. However, the cases illustrate the potential dangers from falls in any location and further underscore the importance of having strict controls on the use of such weapons. Amnesty International is concerned that, as in the above cases, most of the deceased did not appear to present an immediate threat that could not be contained by less extreme measures when they were shocked. Jerry Pickens died in June 2004 after being shocked by officers from

Jefferson Parish, Louisiana, responding to a domestic violence complaint; he was shocked when he allegedly ignored police commands to put his hands behind his back and turned to walk back into his house; he fell onto a concrete walkway and suffered a fatal head injury.[269] Walter Heller, aged 55, died of a skull fracture in California in April 2007, after falling backwards and hitting his head on concrete when two officers fired their Tasers at him simultaneously; the Tasers were used when he refused to put his hands on his head and reportedly came towards them in a "fighting stance". Anti-coagulant drugs he was taking reportedly caused him to bleed during emergency surgery and he slipped into a coma and died two days later. Although Walter Heller was unarmed and had not attacked or directly threatened the officers, the District Attorney ruled that the officers had acted lawfully to effect his arrest.[270] Roy Hamner, aged 59, died in April 2007 in Mississippi following surgery for a brain injury reportedly sustained when he fell onto a pavement after being shocked by a Taser.[271] Samuel Baker died in October 2007, reportedly from a spinal cord fracture sustained when he fell to the ground after being shocked by a sheriff's deputy from Brookes County, Georgia.[272]

There have also been two reported deaths from burns sustained by individuals who caught fire when Tasers were used against them near flammable materials. In April 2006, Richard McKinnon, aged 52, died as a result of burns he sustained after being shocked by sheriff's deputies from Cumberland County, North Carolina, in October 2005. Richard McKinnon is reported to have crashed his car after leading police on a brief chase when they stopped him for a broken rear light and on suspicion of carrying stolen concrete. When he resisted arrest, deputies used a Taser against him, igniting a can of gasoline on the front seat. It appears that no officer was disciplined in the case.[273] In June 2007, police officers from San Angelo, Texas, were called to the home of 47-year-old Juan Flores Lopez who had a history of mental illness and was reportedly threatening to kill himself. He had reportedly doused himself with gasoline and caught fire when they used Tasers on him, dying from the burns two days later.[274]

5. CONCLUSIONS AND RECOMMENDATIONS

This report shows that serious concerns remain regarding the safety of CEDs and their potential for abuse, despite their growing use among US law enforcement agencies as a "non-lethal" or "less-lethal" weapon.

In earlier reports, Amnesty International noted a lack of independent research into the safety of Tasers and similar devices, and the potential for such devices to be used for abuse or to sometimes result in death. It called for authorities to suspend the deployment of such weapons pending the results of rigorous independent studies into their use and effects, and for those departments which refused to suspend them to limit their use to situations where in accordance with UN standards officers would otherwise be justified in using lethal force. A number of independently funded studies have been undertaken since then, and others are ongoing. While some studies to date have suggested that the risk of adverse effects of CEDs is relatively low when used on healthy adults in controlled circumstances, there remains serious concern about the effects of such weapons on vulnerable groups and the inadequate rules and practices regarding deployment of such weapons. As noted in the interim report of the National Institute of Justice (NIJ) study, vulnerable populations include small children and persons of small stature, people with diseased hearts, the elderly, pregnant women "and other at-risk individuals". There is also concern, supported by various studies, that the mode of deployment can increase the risk of death or injury, in particular the use of repeated or prolonged shocks. Independent studies have shown that CEDs can produce fatal arrhythmias in pigs, raising further questions about the safety and reliability of such weapons.

Amnesty International's research underscores these concerns and indicates that CEDs are potentially harmful in a range of circumstances, including when used against members of the population (such as those disturbed through drugs or mental illness) who commonly come into contact with law enforcement officials. Its review of death cases suggests that CED shocks may exacerbate cardio-respiratory problems in individuals whose health is already compromised by drug abuse, exertion, heart disease, psychosis or positional restraint. Some of those who died had no underlying disease or drugs in their system, but collapsed after being subjected to repeated or prolonged shocks and/or shocks to the chest, heightening concern that these factors may increase a risk of death or injury, even in relatively healthy individuals.

Most inquiries to date have noted the need for further studies into the effects of CEDs, something Amnesty International fully supports. Various research studies are now underway, including studies sponsored by the US Justice Department. There are, at the same time, obvious ethical problems in testing the devices on vulnerable groups. Based on the findings of this report, Amnesty International considers that enough information is already available to

indicate that such devices are potentially lethal and that any use of CEDs must be very strictly regulated and controlled and limited to situations where the only alternative would have been the use of lethal force or firearms.

As well as safety concerns, the organization considers that electro-shock stun weapons are particularly open to abuse as they can inflict severe pain at the push of a button without leaving substantial marks and can be used to inflict repeated and prolonged shocks. Amnesty International is further concerned that CED projectile models used in the USA and elsewhere can also be used close-up as stun guns when an individual is already effectively under control or in custody and where the mode of control is through pain compliance. The infliction of severe pain on someone who is already incapacitated or otherwise under the control of a law enforcement officer breaches the international prohibition on torture or other cruel, inhuman or degrading treatment or punishment.

Amnesty International recognizes the importance of law enforcement officials having a range of tools and options at their disposal in order to carry out their duties while minimizing the risk of injury to themselves or others. It is self-evident that CEDs are in most cases less injurious and less lethal than firearms. The primary function of a CED projectile weapon in causing instant incapacitation of a subject at a distance, suggests that such weapons may be effective, in some circumstances, to avoid the resort to police firearms. However, in practice CEDs are rarely used as an alternative to firearms in the USA and most departments allow them at a much lower level on the "force scale".

Based on the concerns raised in this report, as regards both the safety and the potential for abuse of such weapons, Amnesty International believes departments should either cease using CEDs or limit their use to situations where they can be effectively used to avoid the resort to lethal force or firearms. Electro-shock weapons, which have a high physical impact and cause extreme pain, should never be used as a general force tool. Where CEDs are authorized under the limited circumstances recommended above, they should be deployed only by specialist officers who are subject to rigorous training and accountability systems which conform to UN standards on the use of force. Amnesty International supports further independent studies to provide more information on the effects of such weapons, including in the case of vulnerable populations, and believes that any department or authority not prepared to restrict the use of CEDs as outlined above should, at the very least, suspend all use pending the outcome of such studies.

Under international standards, law enforcement officers are authorized to use firearms only in response to an "imminent threat of death or serious injury, to prevent the perpetration of a particularly serious crime involving grave threat to life, to arrest a person presenting such a danger and resisting their authority, or to prevent his or her escape, and only when less extreme measures are insufficient to achieve these objectives. In any event, intentional lethal use of firearms may only be made when strictly unavoidable in order to protect life" (Principle 9 of the UN Basic Principles on the Use of Force and Firearms).

Amnesty International believes that, as a "less lethal" alternative to firearms, CED deployment should be subject to a similar standard, in that their lawful use should be limited to situations where, in accordance with UN standards, officers are faced with an imminent threat of death or serious (potentially life-threatening) injury which cannot be contained by less extreme options. This would allow appropriately trained officers to deploy such weapons

as a last resort at or just before the point at which they would otherwise be justified in resorting to firearms. The primary objective of the use of a CED would be to protect lives and avoid unwarranted injury.

Amnesty International makes the following recommendations to federal, state and local authorities.

1. Governments and law enforcement agencies should suspend the use of CEDs pending further studies or limit their use to situations where they are immediately necessary to avoid or reduce the likelihood of recourse to firearms.[275] The arbitrary or abusive use of CEDs should be punished as a criminal offence in law.[276]

2. Law enforcement departments should have in place specific guidelines, rigorous training and accountability systems for the use of CEDs that are consistent with UN standards on the use of force before such weapons are deployed. The training curriculum and programs should be independent of any company or commercial interests involved in the manufacture and marketing of such weapons.

3. Law enforcement officials should be trained to use all force strictly in accordance with the standards set out under the UN Code of Conduct for Law Enforcement Officials and the UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials. These require officers to use force only to the minimum extent necessary to achieve a lawful objective, in proportion to the threat posed and in a manner designed to minimize damage or injury.

4. All use of force training programs should include regular conceptual and operational training on international human rights standards, including the absolute prohibition against torture and other cruel, inhuman or degrading treatment.

Amnesty International makes additional recommendations for departments which deploy CEDs. They are not an exhaustive list of policy, training or operational guideance for law enforcement agencies but are minimum standards the organization considers necessary to safeguard against abuse or injury in the deployment of Tasers and similar devices, provided the above conditions are met:

1. Officers should give a clear warning to the subject, bystanders and other officers, where practicable, before activating a CED, unless to do so would place another person at risk. Officers should be instructed that drawing, "arcing" ("sparking") and placing of a laser sight red dot onto a subject constitutes the use of a CED and should only be used when it may be reasonably necessary to fire the weapon.

2. There should be strict guidelines to avoid repeated, multiple, or prolonged shocks. In particular:

> **a.** Officers should be trained to apply only one shock of five seconds or less[277] in order to allow officers to bring the subject under control through a safe restraint method. Officers should be instructed that a subject may not be able to comply with verbal commands while incapacitated by the muscle contractions or other immediate after-

effects of the electric shock. Policies should also state that less than one five-second standard cycle contained in current models is often sufficient to incapacitate a subject sufficiently to bring the person under control.[278]

b. Any additional shock should generally be avoided and applied only under the same standard as the first shock (ie when immediately necessary to protect life or prevent serious injury), and the justification for each shock should be given separately in a use-of-force report.

c. Departments should introduce guidelines which prohibit the application of continuous shocks beyond the five-second maximum default charge permitted by current models.

d. No more than one officer should activate a CED against a person at a time.

e. The use of CEDs on children, persons of small stature, pregnant women, the elderly, people with heart disease and other "at risk" populations should be avoided in all circumstances unless officers are faced with an immediate threat to life which cannot be contained by less extreme options. Law enforcement agencies should be trained to be aware that "at risk" populations include people suffering from the effects of drugs or mental illness who are highly agitated, delirious and/or struggling violently; people with pacemakers or other implanted electrical devices; people suffering from epileptic seizures; people with respiratory problems such as asthma or who are obviously physically frail or in poor health.

3. Where officers have reason to believe that an individual is acting in a disturbed, violent or threatening manner as a result of mental illness, all possible efforts should be made to involve mental health specialists in dealing with that person before resorting to CEDs or other forms of force. If there is no alternative to the use of CEDs in such a case, steps should be taken to ensure that the mentally ill or disturbed individual receives appropriate treatment by mental health professionals at the earliest opportunity afterwards.

4. Departments should prohibit the use of CEDs in the case of fleeing suspects and on individuals who are handcuffed or in other restraints unless they pose an immediate threat of death or serious injury that cannot be contained by less extreme measures. A similar prohibition should be placed on the use of CEDs in situations where the location or other circumstances may cause a heightened risk of death or injury, including individuals in elevated positions, near flammable materials, in or near water or in physical control of a vehicle in motion, including cars, trucks, motorcycles and bicycles.

5. Officers deploying CEDs should be trained to avoid targeting the subject's chest, where feasible. CEDs should not be aimed at the head, neck or genitals of a subject unless wholly unavoidable nor should the laser sight be aimed at the eyes.

6. As a "less lethal" incapacitating weapon, Tasers and similar devices should be deployed primarily in dart-firing mode. Use of such weapons in drive stun mode should be authorized only when strictly necessary and under the same deployment guidelines and restrictions as the dart-firing mode, i.e. only when no lesser options are available to an officer and there is

an immediate threat of death or serious injury. The stun gun function of a CED projectile weapon should never be used to force a person to comply with an order given by an officer where there is no immediate threat to the life of safety of the officer or others.

7. CEDs should not be used against individuals in custody unless they present an immediate threat of death or serious injury and no lesser options are available. CEDs should not be issued routinely to jail or prison staff, nor should they ever be used in prisons, jails, custody suites or police stations solely for compliance or control purposes.

8. CEDs should not be used in conjunction with other restraint procedures that restrict breathing, such as chemical irritants, pressure to the chest, placing a suspect face-down. Following a CED activation, officers should use a restraint technique that does not impair breathing. Dangerous restraint procedures such as "hogtying" and carotid choke-holds should be prohibited in all circumstances.

9. All persons who have been exposed to a CED activation should receive a medical evaluation as soon as possible and should be closely monitored while in custody. If the person to whom a CED has been applied is believed to have a pacemaker or other implanted device in place, immediate referral should be made to a hospital. Similarly, if the subject is found to have any other pre-existing medical condition that might lead to increased medical risk immediate referral to a hospital should be considered. In all cases, where possible, barbs should be removed by personnel with medical training, especially when penetrating sensitive locations (head, genitals, close to vital organs etc) or where there is a risk of organ penetration, or where higher power XP cartridges with longer darts are used.

10. Federal, state and local agencies should ensure strict reporting by the departments concerned on each use of a CED weapon, with detailed investigations, auditing and monitoring. Every CED use of force report should include downloaded data from the CED used, photographs of all relevant evidence, including impact points of the probes before and after removal of the subject, and information from the AFID "confetti" from the cartridge.

11. The use of force report should include a record of each display, "arcing" and training of the "red spot" laser light on a suspect,[279] whether the CED activation was in dart-firing or "drive stun" mode and the reasons why the device was deployed in any of the uses listed above. The number of cycles and duration of shock (where recorded), and the reason for each cycle, should be reported in each instance. The age, race and gender of each person against whom a CED is deployed should also be reported.

12. Each department should provide a detailed break-down of its CED use in regular, publicly available reports. Such reports should include the data in aggregate form given under 11. The statistical information provided in such audits and public reports should also include the data listed under the PERF guidelines (guidelines 44 and 45).

Export/Transers of CEDs to other countries

Transfers of CED weapons should be prohibited where there is a substantial risk that the likely use of those weapons will facilitate torture or other cruel, inhuman or degrading treatment or punishment, or be used for excessive or unwarranted force, or will be used for

arbitrary force or to cause unwarranted injury.

Private sale/use of CEDs

Tasers and electro-shock weapons should not be permitted for sale to members of the public whose use of the device cannot be effectively monitored, constrained or accounted for. In jurisdictions where authorities refuse to ban their sale, all Tasers and electro-shock weapons sold to the public should be registered with local officials. The same restrictions on firearms purchased by convicted felons or individuals convicted of domestic violence, should apply to electro-shock weapons sales.

APPENDIX A: CASE STUDIES

1. CASES WHERE CORONERS AND MEDICAL EXAMINERS FOUND TASERS CAUSED OR CONTRIBUTED TO DEATHS (AUTOPSY REPORTS REVIEWED BY AMNESTY INTERNATIONAL)

The quotes included in the case summaries given below are from the autopsy reports reviewed by Amnesty International unless otherwise sourced. All the cases described below involved the use of either the M26 Advanced Taser or the Taser X26, which were the most commonly used CED models during the period covered. The number and/or duration of shocks are listed only where this information was available from the autopsy reports or other sources.

Byron Black, 39, died on 27 November 2004 in Lee County Jail, Florida

Deputies reportedly tried to remove him from his cell for medical attention after believing he had suffered a seizure; when he began to fight and kick, they used a Taser in drive-stun mode and pepper spray. He collapsed at the scene and was pronounced dead in hospital. Cause of death: fatal cardiac arrhythmia, seizure, delirium tremens and coronary arteriosclerosis, with contributing conditions "exertion due to struggle, restraint and Taser application". Manner of death homicide. Toxicology reports were negative for illicit drugs.

James Borden, 47, died on 6 November 2003 in Monroe County Jail, Indiana

James Borden was arrested in a confused and disoriented state. He was drive-stunned three times in the buttocks and lower abdomen, according to guards after he refused to step out of his shorts and was "combative and uncooperative"in the jail's booking area. He was noticed to be unconscious shortly after the last shock, after he was pinned to the floor; he was transported in full cardiac arrest to hospital where resuscitation was unsuccessful. Cause of death was given as "cardiac dysrhythmia, secondary to hypertropic cardiomyopathy (abnormal thickening of the heart muscle), pharmalogical intoxication and electrical shock", with manner of death accidental.

Monroe County subsequently agreed to settle a wrongful death lawsuit filed by Borden's family for $500,000, without admitting liability. A similar claim against Taser International was dismissed after the company challenged the Medical Examiner's finding of a link between the death and the Taser shocks. While the Medical Examiner conceded in a deposition that other factors, including Borden's extensive medical history, could have placed him at risk for sudden cardiac failure without use of a Taser, he stood by the conclusion in his autopsy report "with reasonable certainty" that the painful stressors caused by Taser shocks contributed to the fatal arrhythmia.[280]

Robert Fidalgo Camba, 45 died 12 February 2005, San Diego, California

Police were called to a hotel where Robert Camba was resident on 10 February 2005. Camba, who had a history of schizophrenia and was unable to walk properly following a fall in 2004, was reportedly naked, yelling, threatening other residents and throwing things. During a struggle with police officers, a Taser was discharged six times while in probe mode; he was shocked again in drive stun mode and "approximately 30 seconds later he was noted to be pale, unresponsive and not breathing". He was placed on life support but did not recover and was declared brain dead two days later. Cause of death was listed as "acute hypoxic/ischemic encephalopathy due to: cardiopulmonary arrest during law enforcement restraint following application of a Taser; due to excited delirium; due to acute cocaine and methamphetamine intoxication", with heart disease a contributing factor. Manner of death was listed as homicide. Elsewhere the autopsy summary states "II. History of cardiopulmonary arrest during restraint by law enforcement and directly following application of Taser".

Jaime Teran Coronel, 27, died 30 January 2006, Monterey County, California

According to the autopsy report, Monterey County sheriffs had tried to talk him down from a roof six days before he died; he struggled with them and they applied a Taser in drive stun twice to gain control. After he was lowered off the roof in handcuffs medical personnel at the scene found him to be unconscious and asystole.[281] He was taken off life suport on 30 January. Cause of death was given as acute methamphetamine and cocaine intoxication, with contributing conditions Taser application and struggle with police. (Professor Rogde, reviewing the autopsy report for Amnesty International noted that the drug levels were fairly high but not at a usually fatal level.)

Clever Craig, 46, died 28 June 2002, Mobile, Alabama

Clever Craig, who had a clinical history of mental illness, was reportedly shocked at least twice by officers responding to a disturbance at his home, when he refused to drop a barbell weight. Cause of death was given as cardiac dysrhythmia during an episode of excited delirium and following electrical shock from a Taser; manner of death, homicide. The autopsy report noted a history of schizophrenia. The report also noted that blunt force injuries to Craig's body were not significant, and that there were no illicit drugs in his system.

Nickolos Cyrus, 29, died 9 July 2006 Waukesha County, Wisconsin

A mentally ill man with a history of schizophrenia, Nickolos Cyrus was shocked at least six times after failing to comply with deputies' commands after being found partially clad in a home under construction. After he was handcuffed, officers noticed he had stopped breathing. Cause of death: sudden death

during stuggle and restraint, with manner of death homicide. In an amendment to the autopsy report, dated April 2007, it is stated that the injury occurred "as a result of struggle with and prone restraint by 1-2 police officers, including multiple electronic control weapon discharges". Toxicology reports were negative for illicit drugs.

Alfredo Diaz, 29, died 18 April 2004, Orange County, Florida

Deputies were called to his home by his brother who said he was running through the streets, taking off his clothes and "going crazy". Deputies reportedly used pepper spray, then Taser darts. Deputies noticed he had trouble breathing after he was handcuffed, shortly after being shocked. A sheriff's office spokesperson is quoted as saying it was "never a criminal arrest situation, but deputies were acting correctly to restrain him"; they were told he had ingested harmful drugs and felt he was a danger to himself. According to the background given in the autopsy report, he was subdued with three Taser shots, with multiple pulses over four minutes. Cause of death: "LSD induced psychosis with hyperthermia. A contributing significant condition is that he was subdued by police and tazed (sic)."

Gresmond Gray, 26, died 2 November 2004, La Grange Police Department, Georgia

The autopsy states that "according to reports, he immediately collapsed and become unresponsive after having been struck by a Taser". The police had been called by his girlfriend who wanted him removed from her apartment. The autopsy report noted two Taser marks in the left upper chest and left lower chest. There were no other significant injuries. Cause of death was given as "having been caused by the combined effects of the physiologic stress of a physical altercation (including use of a Taser) and underlying heart disease". The report noted that he had a history of cocaine use which may have caused or partially caused the underlying heart disease, and only mild traumatic injuries.

Ronald Hasse, 54, died 10 February 2005, Chicago Police Department, Illinois

Ronald Hasse died after being shocked twice in the chest by Chicago police, with one of the shocks lasting 57 seconds. Police reportedly used the Taser because Hasse was attempting to bite and kick them. He went into cardiac arrest at the scene and was pronounced dead in hospital about 90 minutes later. Cause of death was given as electrocution due to Taser application, with significant contributing factor methamphetamine intoxication. The autopsy report also noted that he had some heart disease (coronary atheroscelerosis.)

Taser International has challenged the medical examiner's findings in this case, stating, inter alia that Hassse had a lethal level of methamphetamine in his system.[282] In December 2006, the Cook County circuit court granted Taser International's motion to dismiss a product liability lawsuit in the case. *Professor Rogde, in reviewing the case for Amnesty International gave her opinion that the drug levels were commonplace for abusers and normally not lethal.*

Robert Clark Heston Jr, 40, died 20 February 2005, Salinas Police Department, California

Police were called to a domestic disturbance where they found Heston outside his residence; officers deployed Tasers after he threw a piece of furniture at them and noticed he had stopped breathing as they tried to handcuff him behind his back. Paramedics retrieved a pulse but he sustained irreversible anoxic brain injury and multiple organ damage as a result of prolonged cardiac arrest and never regained consciousness. Downloaded data from the officers' weapons showed that five officers had deployed Tasers on Heston, with multiple trigger pulls (11 shock cycles). One autopsy was performed and two case reviews. The first report of the autopsy findings listed the Taser as a cause of death; following the first case review a second report was prepared which listed an enlarged heart as cause of death and the Taser as contributory causes.

The third and final report, prepared at the request of the Monterey Sheriff's department, determined that cause of death was multiple organ failure due to cardiopulmonary arrest; due to methamphetamine intoxication; excited delirium; left ventricular enlargement and fibrosis, with contributory causes: Rhabdomyolysis, secondary to multiple Taser application.

Richard Thomas Holcomb, 18, died 28 May 2005, Spring Township Police Department, Pennsylvania

Holcomb had been at a graduation party earlier that evening but police were called when he was observed later in a disturbed state. He was shocked four times when he allegedly refused to cooperate and "charged towards" an officer; he was placed in handcuffs which were removed when officers noticed he was becoming unresponsive. According to officers he was still breathing and had a pulse which stopped while they were waiting for the emergency medical services. He was found to be in Ventricular Fibrillation (VF); defibrillation was unsuccessful and he was taken to hospital in full cardiac arrest. Cause of death: cardiac arrhythmia due to drug induced psychosis (methamphetamine and MDA:ecstasy), with contributory conditions: electrical pulse incapacitation. The Spring Township agreed to settle a wrongful death claim brought by Richard Holcomb's family (undisclosed damages) in November 2006. A claim against Taser International was dismissed. In May 2008, a judge ordered that the autopsy report findings be changed to delete reference to the Taser as a contributory factor, following a lawsuit brought by Taser International and the City of Akron; the medical examiner's office is appealing against the ruling (see 3 (vi) above).

Professor Rogde noted that the methamphetamine level was low.

Dennis Hyde, 30, died 5 January 2005, Akron Police Department, Ohio

Hyde was found hiding in a basement after breaking into a house. He was shocked multiple times in dart mode by three officers when he allegedly became combative during arrest; there were a total of 30 recorded Taser discharges lasting for a total of three minutes (accepting that each charge was

successful). According to the autopsy report, he became unresponsive while on a stretcher being carried from the house. Life support measures were unsuccessful and he was pronounced dead in hospital less than an hour later. The autopsy report noted multiple Taser discharges, with Taser probe implantation on the back and probable Taser puncture sites in the abdomen, neck and right arm. The autopsy found no evidence of asphyxia or significant blunt force injury. Cause of death was listed as: "Probable cardiac arrhythmia due to acute methamphetamine intoxication and electrical pulse incapacitation". Contributory conditions were listed as "Psychiatric disorder with agitated behaviour; blood loss by arterial injury". Manner of death was given as "Homicide: Sudden death incurred during restraint".

In May 2008, following a lawsuit brought by Taser International and the City of Akron against the medical examiner's findings, a judge ordered reference to the Taser to be removed from the cause of death finding. The judge based his decision on testimony by experts for the plaintiffs that Hyde probably died from a cardiac arrhythmia induced by drug intoxication and "Excited Delirium Syndrome" with blood loss a contributory cause. The Chief Medical Examiner of Summit County, Ohio, has appealed against the decision, standing by the findings of her pathologists. Among the autopsy findings were the large number of Taser shocks and the fact that Hyde's death was documented within minutes of the last shock; Dr Kohler also informed Amnesty International that, while there was blood at the scene and on Hyde's clothing (probably incurred when he broke through a window to enter the house), this did not amount to an "exsanguination" as there was sufficient blood in his system and lividity at autopsy (see Section 3 (iv) and note 120, above). *Professor Rogde noted for Amnesty International that while the methamphetamine level was not low, it was in a common range among abusers and would not necessarily have been fatal.*

Charles Christopher Keiser, 47, died in November 2004 in Livingston County , Michigan

Keiser had an altercation with a state trooper after he had driven his bulldozer onto an expressway to retrieve his car which had broken down. He ran into a shallow muddy pool in a nearby swamp. Nine officers from three departments were reportedly involved in attempts to arrest him. According to police reports, he was ordered out of the water but plunged underneath, holding his head in the water for a few seconds. Officers went into the water and he was struck with batons, pepper spray and hit with a Taser five times. The autopsy report gives no time-line for when the Taser was used. However, according to media reports, he was shocked repeatedly while struggling with police in the water and was restrained while lying face-down in the water. He stopped breathing at the scene. At autopsy, a large amount of sludge and plant material was found in his lungs and airways. There was no evidence of disease. The first autopsy, performed by the county coroner, concluded that he had died from drowning, with the manner an accident. A second autopsy commissioned by Keiser's family also concluded that he died as a result of drowning in muddy water and that "The use of the Taser while immersed would have enhanced the drowning process".

The County Prosecutor reviewed the case and said that the officers had acted appropriately and shown "remarkable restraint" during the incident.

Jacob John Lair, 26, died 9 June 2004, Washoe County, Nevada

He was reportedly Involved in an altercation with police at his apartment when police entered his residence to question him about an alleged theft. He collapsed after being shocked, pepper sprayed, handcuffed and placed in hobble restraints in a prone position. The time-line to the arrival of police at his apartment and the call for emergency services was seven minutes. The emergency medical response team found him on his bed without pulse or respiration. Resuscitation procedures were initiated and he was transported to hospital where he remained without a spontaneous pulse or respiration and he was pronounced dead less than an hour later. Immediate cause of death was listed as acute methamphetamine intoxication with associated probable cardiac arrhythmia while engaged in physical struggle with law enforcement involving Taser gun, pepper spray and restraints. The Washoe County Coroner, Vernon McCarty, is quoted as saying the Taser was "part of the scenario" which had contributed to his death, observing that, while Lair had methamphetamine in his system, the levels "were not as high as you would normally expect" and that the death could not be called a drug overdose.[283]

William Lomax, 26, died 21 February 2004, Las Vegas Police Department, Nevada

(Information from transcript of inquest)

Lomax was found "dazed and confused" at a housing complex, sweating and lifting his shirt. During a struggle with police, an officer jolted him seven times with an X26 Taser in stun gun mode, some of the jolts applied as he lay pinned face-down to the ground by four security guards, and again when he was face-down on a gurney (stretcher). According to inquest testimony at least three of the shocks were applied to the side of his neck. Data downloaded from the Taser's microchip revealed that the seven shocks were applied over a period of nine minutes, 55 seconds, in cycles lasting between two and eight seconds. (A paramedic called to the scene testified that "the Taser didn't seem to have any effect. It made him angry".) After Lomax was placed face-down on the stretcher, officers noticed he had stopped breathing. Paramedics got his heart beating in the ambulance and he was placed on a ventilator and died the next day without regaining consciousness.

At the inquest the medical examiner testified that "cause of death was a cardiac arrest during restraining procedures", with phencyclidine (PCP) intoxication and early bronchial pneumonia contributing factors. He found that Lomax's obesity and the fact that he was placed face-down with pressure on his diaphragm had restricted his breathing, which would already have been affected by the drugs and the physical struggle. He observed that, while the levels of PCP in his system raised his metabolic rate, the amount of drugs was "not an extremely toxic level". He testified that use of the Taser was incorporated into his finding of a restraint-related death, and that the muscle contractions caused by the Taser shocks would have further compromised his capacity for breathing as he lay face-down, contributing to asphyxia through a decreased flow of oxygen to the brain. The coroner's jury ruled that his death was "a combination of drugs, restraining force, and the use of the Taser".

Jose Maravilla Perez, 33, died 20 October 2005, San Leandro Police Department, California

According to police reports, he became highly combative as police attempted to arrest him for violating a restraining order and was shocked multiple times in drive stun mode, with no apparent effect, and again when he refused to get into a patrol car, with the Taser applied to the belly, left clavicle and neck. According to police, a carotid restraint hold was applied during the initial contact. He was stunned again in jail as officers tried to get him out of a body wrap, after which he suddenly collapsed and became unresponsive. Attempts at rescuscitation were unsuccessful and he was pronounced dead in hospital. Cause of death was listed as "methamphetamine intoxication associated with physical exertion immediate cause of death". Multiple electrical stimulations and fracture of the superior horn of the thyroid cartilage were listed as "other significant conditions".

Martin Mendoza, 43, died 21 February 2007, San Diego Sheriff's Department, California

Martin Mendoza called the police from a gas station saying someone was trying to kill him. When police arrived they arrested him for intoxication. He reportedly became agitated in the patrol car and fell out of the car when a deputy opened the door. According to the autopsy report, all three deputies used Tasers on him, three times in dart-firing mode and 10 drive stun deployments for a combined total of 67 seconds over less than three minutes. After he was put into four-point restraint, deputies noticed he had turned blue. CPR was performed and a pulse later regained but he remained in a coma and was declared brain dead in hospital three days later. Cause of death was given as "anoxic/ischemic encephalopathy due to resuscitated cardiopulmonary arrest during law enforcement restraint (including Taser use and maximum retraint application), due to excited delirium due to acute methamphetamine and ethanol intoxication", with manner of death homicide.

Juan Manuel Nunez, 27, died 16 April 2006, Lubbock Police Department, Texas

Officers responding to reports of a domestic dispute reportedly shocked Nunez multiple times in the chest, after he allegedly became violent. He sustained a head injury when he fell to the ground. He was asystole[284] en route to hospital and pronounced dead shortly after arrival. Cause of death was given as acute alcohol intoxication and concussive brain injury, with contributory cause "Taser event". The autopsy report noted that the head injury was received "secondary to the Taser event and collapse, therefore the Taser is contributory towards death". A wrongful death lawsuit against the city and police department was pending in February 2008; the family dropped a claim against Taser International. *Professor Rogde observed that, although the autopsy showed bleeding to the scalp, there was no fracture or evidence of serious head injury. She observed that a concussive brain injury is not lethal in itself unless breathing was restricted, which did not seem to be the case here. The alcohol concentration was also at a non-lethal level. Therefore she questioned the conculsion of the autopsy report on cause of death, and found that the Taser shocks in the chest could not be excluded.*

Jerry Preyer, 45, died 13 June 2006, Escambia County Jail, Florida

Jerry Preyer, who was mentally ill, became disturbed while in jail, reportedly because he had not received his medication. He was placed in a restraint chair and reportedly calmed down. After he was released from the chair he reportedly became combative again and was shocked at least twice by guards and went into medical distress shortly afterwards.[285] Cause of death was listed as excited delirium, with contributory cause physical struggle, including use of Taser; manner of death: homicide. The autopsy report notes a Taser injury to the chest.

Daniel Walter Quick, 43, died 30 December 2006, Butte County, California

His parents called police after he threatened them while under the influence of methamphetamine. He reportedly threw shards of glass at deputies and was "verbally aggressive". He slumped to the floor and started having convulsions after two deputies fired their Taser darts at him, striking him four times in the face, chest and neck. He was pronounced dead shortly after arriving at hospital. Cause of death was given as "Cardiac dysrhythmia due to violent encounter with police involving conducted electrical weapon use (minutes), due to methamphetamine intoxication (hours)." Other significant conditions included: hypertension and cardiopulmonary disease. *Professor Rogde for Amnesty International noted that the methamphetamine levels were within the normal range for a habitual user and not normally lethal.*

Ryan Rich, 33 died 4 January 2008, Las Vegas, Nevada

(Information from the inquest transcript). Dr Rich crashed his car onto the side of a motorway after suffering an epileptic seizure. A patrol officer pulled him from his vehicle and shocked him repeatedly with a Taser (including in the chest), when he started to struggle. He was noticed to be "turning blue" after he was handcuffed and it was only at this point that the officer called an ambulance. He could not be revived and was pronounced dead in hospital a short time later. The Clark County medical examiner testified at the inquest that Dr Rich's immediate cause of death was "cardiac arrest due to arrhythmia combined with restraining procedures". While he gave his opinion that the seizure had caused Dr Rich's heart to beat unevenly, he could not say that this alone caused the death, describing the cause of death as "multifactorial". He said that the restraining procedures "would not have helped" Dr Rich to recover from the seizure and "probably contributed" to his death. Dr Rich had no alcohol or recreational drugs in his blood, only medication for his epilepsy.

Jose Angel Rios, 38, died 18 November 2005, San Jose Police Department, California

According to the information noted in the autopsy report, Jose Angel Rios was combative and in an apparent state of acute psychosis in a parking lot. Police were called and Rios continued to be combative and resisted officers. During the struggle he was shocked with at least two Tasers, hit with batons, pepper sprayed and "ultimately restrained on the ground with handcuffs". Firemen and paramedics arrived on the scene and he became unresponsive as they attempted to examine him. Resuscitation was unsuccessful and he was pronounced dead shortly after arrival at hospital. Cause of death was given as "cardiopulmonary arrest following violent struggle with police in individual with acute cocaine intoxication with psychosis". "Status post Tasering and pepper spraying; obesity; cardiovascular disease due to chronic cocaine abuse" was listed under "Contributory Cause of Death". The report noted that "Although no existing scientific studies of Taser or Pepper Spray have shown an association with sudden or delayed death, the effect of these methods on persons in an "excited delirium" is not known"; the manner of death was therefore given as "undetermined".

Albert Romero, 47, died 16 July 2007, Denver Police Department Colorado

According to police, Romero was acting in a delirious state outside his house, breaking car headlights, yard lights and attempting to pull out a stop sign. He was shocked twice after he reportedly charged at a police car. He was brought to hospital in cardiopulmonary arrest and pronounced dead shortly afterwards. The main diagnosis in the autopsy report was cardiopulmonary arrest, status post electrical restraint. Cause of death was listed as complications of a cardiopulmonary arrest which occurred in a setting of coronary artery disease, probable state of excited delirium, electrical restraint and marijuana in the blood. Manner of death undetermined.

Jose Eduardo Romero, 23, died 24 April 2006, Dallas, Texas

He was shocked twice by officers as they arrested him for breaking into a house, where he was found at 3am, foaming at the mouth and cutting himself with a knife. He was reportedly shocked when he charged at police officers and ignored their commands to drop the knife. He went into medical distress at the scene after being handcuffed following the second shock, and was pronounced dead in hospital. The cause of death was given as a "lethal cardiac dysrhythmia due to the combined effects of cocaine-induced excited delirium and electrical shock from a Taser discharge during attempted police restraint".

Michael Robert Rosa, 38, died 30 August 2004, Del Rey Oaks Police, California

Police were called by a neighbour who reported Rosa yelling in a back yard; police found him walking along the road but when they approached he fled into the back yards of nearby houses. According to police reports, he then "threatened" officers with a piece of fencing. He was shocked several times in

dart mode but continued to resist; he was then "drive stunned" and became compliant. As they handcuffed him and rolled him onto his side, they noticed he had stopped breathing and he was found to be pulseless. Life saving efforts were unsuccessful. The medical examiner concluded that Rosa "died as a result of a ventricular arrhythmia while in an agitated, delirious or psychotic state caused by acute methamphetamine intoxication", noting that "The added stress and/or physiologic effects of Taser application and arrest by police very likely contributed to death".

Milton Salazar, 29, died 23 July 2004, Mesa Police Department, Arizona

Milton Salazar was shocked twice in probe mode and at least three times in drive stun mode during a struggle with police officers who were attempting to arrest him for throwing candy at a store clerk. He collapsed at the scene and died two days later in hospital. The medical examiner listed cause of death as "complications of excited delirium due to cocaine adverse effect", concluding that "The stress from the physical struggle and Taser and stun gun injuries is contributing factor to excited delirium".

Gregory Saulsbury, 30, died 3 January 2005, Pacifica Police Department, California

Police responded to a call from his family requesting medical help because of Saulsbury's disturbed behaviour. Police found him being held by his father. When he broke loose they shocked him multiple times in drive stun mode including in the chest, held him in a "bear hug" and handcuffed him; he began vomiting prior to becoming unresponsive at the scene and could not be resuscitated. The family expressed anger that police officers rather than paramedics responded and said they believed that officers had used excessive force. Cause of death was given as "recent agitation/paranoid state, associated with cocaine intoxication and with forcible restraints including Taser stun gun applications, 'bear hugs', 'lying over' and handcuffs". An investigation by the District Attorney's office cleared the officers of wrongdoing. The city agreed to settle a wrongful death claim filed by the family for $395,000 in January 2007, shortly before the case was due to go to trial.

Tyler Marshall Shaw, 19, died 25 November 2005, Asotin County Jail, Washington

Tyler Marshall Shaw, who had a history of mental illness, became disturbed while in jail; officers were called to remove him from his isolation cell because he was screaming and pounding on his cell door. Four officers fired their Tasers at him and struck him with batons, during the course of bringing him under control. He was subjected to repeated cycles of Taser shocks while the probes were attached, some delivered as he was lying naked on the jail floor as officers tried to handcuff him. He was then lifted up and strapped into a restraint chair, after which he was found to be pulseless. Jail officers later told investigators that Shaw had stopped resisting before being strapped into the chair but they thought he was faking sleep or unconsciousness. CPR was unsuccessful and he was pronounced dead at the scene.

Shaw had been shocked with Tasers and pepper sprayed for his disturbed behaviour in the jail the day before and his family have expressed concern that he did not receive appropriate medical care for his mental health problems.

The autopsy report noted that the Tasers were used over approximately four minutes, with continuous or back-to-back firing cycles: total firing times from the four devices were, respectively, 32 seconds, 22 seconds, 45 seconds and 10 seconds. Cause of death was given as an arrhythmia following multiple blunt force injuries and use of electromuscular incapacitation devices during a state of excited delirium, with manner of death an accident. No officers have been criminally charged in the case. A lawsuit against the county filed by the family was still pending at the time of writing.

Steven T. Spears, 46, died 4 August 2007, Shelby Township Police, Michigan

Spears was seen running in the street in his underwear; police called for an ambulance believing he was having psychiatric problems, but he ran into traffic when paramedics arrived. Officers used a Taser three times when they caught up with him and he lost consciousness at the scene and was pronounced dead in hospital. Cause of death was given as "cocaine-induced excited delirium and its complications". The autopsy report states that "Physical restraint that included multiple applications of the electromuscular disruptive devices and handcuffing was contributory".

William Teasley , 31, died 16 August 2004, Anderson County Detention Center, South Carolina

Teasley was arrested for disorderly conduct and reportedly became violent while being booked into jail. He collapsed immediately after he was struck with a Taser; he was taken to hospital in cardiac arrest and did not regain consciousness. He had a history of atherosclerosis, obesity and medical history of head trauma following a car accident. Cause of death was given as "cardiac arrhythmia due to a combination of pulmonary, cardiac and vascular disease following Taser electrical shock". The medical examiner said that his heart disease would have placed him at risk for arrhythmia and that the physical and emotional stress, with acidosis caused by partial obstruction of the airway, would have lowered the threshold for cardiac dysfunction.. "The added stress of Taser shock with its electrical current was proximal to the cardiac arrhythmia and must be considered contributory".

Jorge Terriquez, 35, died 9 September 2007, Anaheim, Orange County California

Police reportedly responded to a domestic violence call from Terriquez' wife and found them fighting. According to press reports, his wife later said that her husband was cooperating with the police by getting down onto the floor, but officers stunned him several times with Tasers when he did not put his hands behind his back.[286] (The autopsy report notes four sets of Taser darts but does not provide any

information on the duration of shocks.) He collapsed at the scene and was pronounced dead in hospital. The autopsy report gives cause of death as "Sudden cardiac arrest following electromuscular incapacitation device applications". Other conditions were listed as "acute ethanol intoxication; cardiomegaly; myocarditis; electrolyte imbalance", with manner of death an accident. He had no stimulant drugs in his system other than alcohol.

Jorge Luis Trujillo-Hernandez, 34, (H, M) died 26 January 2006, San Jose, California

Jorge Trujillo sustained serious head injuries after being assaulted by a group of men with a baseball bat on 25 January 2006 (police received reports of the attack but everyone had left the scene by the time officers arrived). Later that evening, police responded to reports of a man trying to break into a car. Trujillo was found at the scene reportedly bloodied and disturbed and striking cars with a garden hoe. When he resisted arrest, police used batons, pepper spray and 20 applications of two Taser devices to subdue him. He collapsed at the scene and was taken to hospital, where he was diagnosed with multiple skull fractures and swelling of the brain. He was declared brain dead the next day. The autopsy report showed that one of the two Tasers used on Trujillo was activated 12 times in five to six second bursts, totalling one minute, 1 second of activation time over a 1 minute 57 second time interval. The other Taser was activated 8 times in 5-6 second bursts, totalling 42 seconds of activation time over a 50 second interval. Cause of death was given as blunt impacts of the head and torso with skull, rib and sternal fractures and brain injury. "Status post multiple Taser device applications" was given as a contributory cause of death, with manner of death "Homicide (Physical altercation with assailant(s) and subsequent physical altercation with police)".

Darryl Turner, 17, died 20 March 2008, Charlotte-Mecklenberg Police Department, North Carolina

Darryl Turner collapsed after being shocked with a Taser after he got into an argument with the manager at a store where he worked. A video shows an officer fire his Taser at Darryl while the unarmed teenager was standing with his arms at his side. Downloaded data from the officer's Taser showed that Darryl was shocked in the chest at close range for 37 continous seconds and was shocked again (when he was on the ground). He collapsed at the scene and could not be revived. The cause of death was given as "acute ventricular dysrhythmia, specifically ventricular fibrillation, which further deteriorated to asystole from which the decedent could not be resuscitated. This lethal disturbance of the heart rhythm was precipitated by the agitated state and associated stress as well as the use of the conducted energy weapon (Taser)". The coroner also noted that there were no anatomic findings indicating a pre-existing cardiac abnormality or disease, and no illegal drugs in his system.

Jeffrey Turner, 41, died 31 January 2005, Lucas County Jail, Ohio

Lucas County jail officers used a Taser four times to subdue Turner after he banged repeatedly on his cell window. He had earlier been shocked five times while being arrested. After he was shocked at the jail he was placed in handcuffs and leg restraints. He became unresponsive at the scene and was pronounced dead when taken to hospital. The medical examiner ruled that he died from hypertensive heart disease, with significant conditions the altercation with jail personnel, including multiple shocks with Taser. Manner of death homicide. Toxicology reports for drugs and alcohol were negative apart from cannabinoid in the urine (which can be detected weeks after exposure).

Robert Earl Williams, 62, died 14 June 2005, Waco Police Department, Texas

Died after police officers shocked him four times with a Taser and then handcuffed him. Williams had been involved in an altercation with his sister and when police arrived he picked up a metal pipe. Police report the Tasers shocks had no effect and that it took five officers to restrain him. After he was handcuffed, Williams had trouble breathing. When the ambulance arrived, officers were performing CPR but were unable to revive him. The autopsy report stated that "It is our opinion that Robert Earl Williams ... died as the result of acute physiologic stress which was associated with multiple electrical shocks during attempted restraint by police for schizophrenia and excited delirium". Heart disease, diabetes and obesity contributed to the death. Manner of death was ruled a homicide.

Ryan Michael Wilson, 22, died 4 August 2006, Lafayette PD, Colorado

Ryan Wilson was shocked after he was chased on foot for more than half a mile by officers responding to reports that marijuana was being grown in a field. The officer fired an X26 Taser in dart mode in a single six-second burst to Wilson's chest. The autopsy report states that "Wilson immediately collapsed, with reports of shaking or seizure-like activity, and was found to have no pulse or respirations; he could not be resuscitated despite transport to a local emergency department". He had no illicit drugs, stimulants or otherwise, in his system.

The coroner noted that, while effect of electrical weapons in states of stimulation remains unclear, it is "certainly conceivable, that in these conditions, the increased cardiac muscle excitability makes the heart more susceptible to arrhythia induced by Taser discharge". He found that a heart abnormality (hyoplastic left anterior descending coronary artery) may also have played a direct role in the death (although noting a dispute among medical experts on whether this anomaly is an appropriate explanation for cardiac dysfunction). He stated that "In addition, this death may be viewed as similar to deaths where a physical blow to the chest, or in this case application of electrical current, causes fatal arrhythmia due to interruption of the cardiac conduction cycle". He found cause of the fatal cardiac arrhythmia to be "multifactorial, and includes the Taser application, hypoplastic coronary artery, and extreme exertion".

A police internal investigation cleared the officer involved in firing the Taser of wrongdoing.

Daniel Bradley Young, 33, died 5 May 2007 Pillenas County, Florida

Young was shocked three times by deputies who had been called by neighbours for his allegedly suspicious behaviour. During the struggle, officers sat on his chest and legs while he was handcuffed. He was found unresponsive when they rolled him onto his back. He did not regain consciousness and was pronounced dead about an hour later. The autopsy report indicated that one of the Tasers had hit him in the mid chest region. Cause of death was given as excited delirium due to cocaine tocixity, with contributing cause, blunt force trauma, restraint. Manner of death, homicide. The Medical Examiner was quoted as saying: "In this case, the use of force resulting in blunt trauma, including the use of a Taser or restraint, individually or collectively contributed to, but did not cause, the death of Daniel Bradley Young". [287]

2. OTHER CASES WHERE CORONERS AND MEDICAL EXAMINERS ARE REPORTED TO HAVE FOUND TASERS CAUSED OR CONTRIBUTED TO DEATHS

(Amnesty International was unable to obtain autopsy reports.)

Henry Orlando Bryant, 35, died 28 March 2008, Indianapolis Metropolitan PD, Indiana

Police used a Taser and pepper spray while they arrested him on a charge of public intoxication while in a restaurant. He stopped breathing at the scene and was pronounced dead later in hospital. The coroner's office ruled that he died of "sudden cardiac death" during the struggle with police and that cocaine in his system and the electric shocks delivered by the Taser were contributing factors.

(http://www.indystar.com/apps/pbcs.dll/article?AID=/20081028/LOCAL18/810280369/1195/LOCAL18)

Nathaniel Cobbs, 24, died 8 July 2007, Newburgh Police Department, New York

Reportedly arrested during violent struggle with police where Taser and a police dog were used. He went into medical distress in the police car and died some nine hours later in hospital. According to the first autopsy report "cause of death was excited delirium ... caused by PCP, cocaine and other drugs". A second autopsy found death due to "multi-organ shock with exsanguination", dog bites and Taser with blunt force blows". http://www.recordonline.com/apps//pbcs.dll/article?AID=/20070907/NEWS/709070317

Maurice Cunningham, 29, died 23 July 2005, Lancaster County, South Carolina

After Cunningham, who had reportedly been hallucinating, attempted to attack two Lancaster County Jail deputies in order to escape from his cell, he was shocked repeatedly and pepper sprayed. He died at the scene.

The medical examiner reportedly ruled that he died of cardiac arrhythmia provoked by the application of six Taser cycles, one of which lasted two minutes and 49 seconds. He reportedly had no drugs or alcohol in his system. http://www.certops.com/certops/news/Sept280508.html; http://www.upi.com/Top/_News/2005/09/27

David Glowscenski 35, died 4 February 2004, Suffolk County, New York

His parents called police because of his distraught and irrational behaviour. Four officers used pepper spray and nine Taser shocks to subdue him. He stopped breathing at the scene after being shackled face-down. The first autopsy report listed his cause of death as "excited delirium" due to "acute exhaustive mania due to schizophrenia". A second autopsy commissioned by the family reportedly found that the repeated Taser shocks, blunt force injuries and exposure to pepper spray contributed to his death, with the weight of an officer on his back also playing a role. (http://www.indymedia.org.uk/en/2006/01/332133.html)

Israel Guerrero, 29, died 10 June 2007, San Benito County, California

He was shocked, pepper sprayed and shot in the arm by police during a confrontation on a highway. The pathologist reportedly ruled that he died of excited delirium due to methamphetamine and cocaine intoxication, with a gunshot wound, Taser shocks, pepper spray and struggle with police contributing to his death. (http://www.freelancenews.com/printer/article.asp?c=218367)

Emily Mary Delafield, 56, died on 24 April 2006, Green Cove Springs, Florida

Delafield, who had severe disabilities, including a history of schizophrenia, was shocked ten times for 212 seconds by police while she was sitting in her wheel chair with a knife and hammer. She had a history of respiratory problems and used an oxygen tank. She went into cardiac arrest shortly after being shocked and died some 90 minutes later. The medical examiner reportedly found the main cause of death was hypertensive heart disease but said the Taser shocks were a contributing factor which could have impacted on her breathing. (The Florida Times-Union, 13 February 2007)

Vardan Kasilyan, 29, died 30 September 2006, Las Vegas Metropolitan PD, Nevada

Police used a Taser on him twice while trying to subdue him in his parent's apartment. His parents later told an inquest jury that he was handcuffed at the time. The Medical examiner testified at the inquest that Kasilyan died by choking on his own vomit, and that contributing factors were his use of methamphetamine and cocaine, mental illness and use of the Taser.
(http://www.armeniandiaspora.com/forum/archive/index.php/t-72140.html)

Mark McCullaugh, 28, died 10 August 2006, Summit County Jail, Ohio

McCullaugh died following a struggle in his cell at the jail's mental health unit during which he was shocked with a Taser, saturated with pepper spray and allegedly beaten while in restraints. The medical examiner ruled cause of death to be asphyxia from the combined effects of chemical, mechanical and electrical restraint, with manner of death homicide. In May 2008, following a lawsuit brought by Taser International and the City of Akron, a judge ordered the cause of death findings to be changed to delete "any reference to death by 'Asphyxia due to the combined effects of chemical, mechanical and electrical restraint" as well as any reference to 'Homicide' due to "multiple restraint mechanisms"; the judge stated that the death was "more likely...due to a fatal cardiac arrhythmia brought on by severe heart disease, his schizophrenia, the struggle" and possibly a therapeutic injection.[288] However, the Summit County Medical Examiner has said she stands by the original findings and has lodged an appeal against the judge's ruling, which was still pending at the time of writing

Willie Maye, 43, died 5 June 2008, Birmingham Police Department, Alabama

Maye was shocked with a stun gun and pepper sprayed after fleeing from officers during a traffic stop. He went into medical distress at the scene and died later in hospital. The coroner is quoted as saying that "He had a bad heart, but the adrenaline from fleeing from the police first, the scuffle, the bruises he sustained, the physical exertion, the Taser and the Mace – all the ingredients together caused his death". (The Birmingham News, 19 July 2008)
http://www.al.com/news/birminghamnews/index.ssf?/base/news/121645535833670.xml&coll=2)

Baron Pikes, 21, died 17 January 2008, Winnfield City Police Department, Louisiana

Pikes was shocked nine times by a police officer during his arrest on an outstanding warrant for possessing drugs. He was shocked six times when he failed to obey a police command to get up off the ground and walk to a police car, was then "drive stunned" in the chest while in a police car and was shocked two more times as he was pulled from the car. The cause of death was reportedly given as "cardiac arrest following nine 50,000 volt electroshock applications from a conductive electrical weapon". Manner of death was given as homicide. Pikes had no drugs in his system. (http://www.chicagotribune.com/news/chi-taser_witt-web-jul19,0,2201847.story)

Kevin Piskura, 24, died 14 April 2008, Oxford Police Department, Ohio

24-year-old Kevin Piskura became unresponsive after being struck once in the chest with a Taser when he intervened as police tried to arrest his friend outside a bar in Oxford, Ohio; a video shows him rolling on the

ground while being shocked for about ten continuous seconds. He did not regain consciousness and died after five days on a hospital life-support machine. The coroner reportedly ruled that the application of the CED device, combined with other factors (including acute alcohol intoxication and exertion) to cause his death. (http://news.cincinnati.com/article/20081024/NEWS0107/810240418/-1/)

Chance Shrum, 20, died 15 May 2007, Iola Police Department, Kansas

Shrum was shocked at least twice with Tasers reportedly after police found him naked and dancing in the street in the early hours of the morning. Cause of death was given as "cardiac dysthythmia due to myocarditis", with the pathologist cited as stating in his report that "scene information suggests that a form of excited delirium existed and would have been a contributor. Due to the timeline given ... the additional stress from the use of the Taser should also be considered as a contributor". (http://www.iolaregister.com/Local%20News/Stories/No%20charges%20in%20Taser%20death%2)

Keith Tucker, 47, died 1 August 2004, Las Vegas Metropolitan Police Department, Nevada

Police used batons and a Taser gun to subdue Tucker in an apartment complex after his room-mate called them to say that he was acting in a disturbed manner. He went into cardiac arrest at the scene and police reportedly noticed he had stopped breathing after he was handcuffed. The coroner determined that Tucker had died from cardiac arrest during restraint procedures and that the Taser was one of those "restraint procedures". (http://www.lvrj.com/news/7708317).

3. CASES WHERE MEDICAL EXAMINERS MENTIONED TASER AS A POSSIBLE FACTOR OR NOTED A TEMPORAL LINK BUT EXACT ROLE IN DEATH UNDETERMINED OR COULD NOT BE EXCLUDED

(Autopsy reports reviewed by Amnesty International)

Eddie Alvarado, 32, died June 2002, Los Angeles Police Department, California

The autopsy report states that Eddie Alvarado was "observed to have seizure activity" while lying prone on the floor. He was handcuffed behind his back and prepared for transfer to hospital; when he continued to exhibit irrational behaviour "growling and yelling, thrusting his upper torso and kicking", he was shocked five times in dart mode (officers said he was lying near a mirror and could have hurt himself). The autopsy report states that: "After the 5th Taser application, he moved away from the mirror and prone on the floor (sic). He was then hobble restrained. Subsequently, he was found to be in pulmonary (sic) arrest .. and was pronounced dead on arrival to the hospital." Cause of death was given as: Sequelae of Methamphetamine Intoxication and Cocaine Use, status post-restraint, including Taser use. The autopsy report stated: "The circumstances indicated a temporal relationship between restraint,

including Taser application, and his cardiopulmonary arrest. However, this autopsy does not provide sufficient medical evidence to conclude or exclude that Taser use contributed to the death. It should be noted that after Taser the decedent was noted to have a weak pulse and agonal EKG change. Hence, the manner of death is undetermined".

Ray Charles Austin, 25, died 24 September 2003 Gwinnett County Jail, Georgia

Austin, who had a history of mental illness, was involved in a violent struggle with jail deputies. According to the autopsy report he was taken to the floor and shocked at least twice, and possibly three times, with a Taser, placed in handcuffs and put into a restraint chair where it was "quickly determined the decedent had become unresponsive". He was transported to hospital where he was placed on a ventilator and died two days later when life support was switched off. The autopsy report stated that he "appears to have died from complications of hyperactive delirium associated with physical restaint by detention center personnel". While there were no clear pathological signs of asphyxia, the medical examiner noted that his agitated delirium, coupled with struggle and restraint would have increased oxygen demand and "the possiblity remains that physical restraint may have impaired breathing by inhibiting chest wall and diaphragmatic movement".

In an addendum to the autopsy in August 2005, the coroner stated that "The close temporal relationship between the Taser deployment and the onset of the decedent's cardiorespiratory compromise would seem to imply the Taser to be at least partly responsible for his ultimately fatal medical condition. However, a definite cause-and-effect relationship ... can be neither confirmed nor refuted by the existing medical, pathologic and circumstantial evidence". The coroner noted that "Similar to other mechansims of death involving impairment of diaphragmatic excursion and chest expansion, asphyxia resulting from possible Taser paralysis of the diaphragm and intercostal musculature would not be expected to produce any internal pathology that could be detected by autopsy".

David Cooper, 40, died 30 December 2004, Johnson County Jail, Indiana

Cooper was mentally ill with a history of schizophrenia; he was reportedly shocked around nine times over a two day period in jail. He went into cardiac arrest after the last two Taser applications and was placed on a respirator in hospital, where he died six days later. Cause of death was listed as cardiac arrest due to probable cardiac arrhythmia, with possible contributory factor schizophrenia, manner natural. Chief Deputy Coroner John Linehamd said there was not enough data on the effects of stun guns to draw firm conclusions, but the two instances in which officers used a stun gun on Cooper just before his death were "absolutely" a consideration. [289]

Johnny Lozoya, 34, died 20 July 2002, Gardena, California

According to the history given in the autopsy report, officers found Lozoya on the sidewalk, frothing at the mouth and apparently having a seizure. According to the police report, paramedics suspected that he had fallen from the roof of a building (there had been complaints earlier about a man on a roof). He reportedly became combative while being put into restraints and an officer deployed an Taser in stun gun mode. Witness statements indicate that the Taser was used while he was strapped to a backboard with one hand still unrestrained, and that he was stunned "several times". He went into cardiac arrest within minutes and was rescucitated; however, he remained comatose and unresponsive to stimuli. He was pronounced brain dead later that night.

The autopsy report concluded that Lozoya died "as a result of hypoxic encephalopathy following cardiopulmonary arrest due to complications of cocaine intoxication and the need for restraint. The complications include hyperthermia, tachycardia, increased protein and chemical changes in the blood indicating heart and renal failure". The report also stated that "An informal consultation with Dr Daniel Reider, Cardiologist with Dr. Lakshmanan Sathyavagiswaran, Chief Medical Examiner-Coroner indicate (sic) that one cannot exclude the Tazer (sic) causing the above damage to the tissues, specifically the heart. Thus, the manner of death could not be determined".

Uwyanda Peterson, 42, died 24 April 2007, Baltimore Police Department Maryland

Peterson was shot in the chest with a Taser when she reportedly jumped out at an officer who was chasing a drugs suspect in a unrelated case. She ran approximately 90 feet (30 meters), with the darts in her chest and collapsed face-down. She did not regain consciousness and was pronounced dead in hospital about half an hour later. The autopsy report noted that her initial cardiac rhythm recorded by emergency medical personnel at the scene was ventricular fibrillation. One of the Taser probes had passed through her chest wall and superficially into the upper lobe of the lung and anterior heart. Cause of death was given as "cocaine and heroin intoxication associated with police altercation and pursuit".

The medical examiner stated that "The relative contribution of the drug intoxication, mild heart disease, restraint method (Taser), and stress induced by a struggle with and pursuit by police cannot be determined with certainty. Therefore, the manner of death is best certified as undetermined".

Theodore Paul Rosenberry, 35, died 24 March 2006

The history given in the autopsy report states that witnesses observed Rosenberry trying to enter a local business, then he walked about half a mile down the road, where police found him sitting by the side of the road. He appeared short of breath and sweating. He tried to run away through a field, where three officers restrained him. While he was lying on his back, one of the officers applied pressure to his neck and a fourth officer applied his Taser in "drive stun" mode to Rosenberry's chest, thigh and neck. (The autopsy report notes paired Taser injuries to all three locations.) He stopped resisting and shortly

afterwards, while he was face-down with his hands cuffed behind his back, he was noted to be unresponsive. Resuscitation efforts failed and he was pronounced dead on arrival at hospital.

Cause of death was given as "Cardiac arrthythmia during police restraint associated with cocaine intoxication" The medical examiner stated that "The relative contribution of the cocaine intoxication, stress of the struggle, the police restraint, tazer (sic) discharges and heart disease to the induction of the fatal arrhythmia cannot be clearly elucidated; therefore the manner of death is undetermined".

Steve Salinas, 47, died 25 May 2007, San Jose Police Department, California

Police were called to Salinas's motel room after guests heard a "commotion" coming from the room. He was shocked in the back and buttocks in probe mode when he reportedly became "combative"; he was unarmed and naked at the time. He collapsed and died at the scene. The medical examiner gave his opinion that Salinas most likely died of a lethal cardiac arrhythmia due to violent physical struggle during PCP (Phencyclidine) intoxication, in the presence of significant heart disease. The autopsy report noted that "the current scientific literature does not describe an unequivocal link between Taser use and sudden cardiac death nor does it provide proof that it contributed to death. As a result, at this time Taser use is documented as an "other significant condition" largely for statistical and epidemiologic purpose".

Carl Nathaniel Trotter, 33, died 8 Janury 2005, Escambia County, Florida

Carl Trotter allegedly became violent and was subdued by two deputies, both using their Tasers. The autopsy report notes Taser darts to Trotter's chest and back (the number of electrical pulses is not recorded). The autopsy report lists excited delirium due to cocaine and ethanol abuse and Taser wounds of the torso among its diagnoses. Manner of death undetermined.

Frederick Williams, 31, died 27 May 2004, Gwinnett County, Georgia

Police responded to a call to the emergency services from Williams' wife and son in which they said that he had become violent because he was not taking his eplipsy medication and asked for an ambulance. Williams reportedly fought with officers who took him to jail instead of hospital. A jail video-tape released a year after the incident showed Williams being carried by 5-6 officers calling out "I can't breathe man, Don't kill me man, I've calmed down". He was then pinned to the ground and, while he was virtually immobilised, officers are seen striking him repeatedly in the chest which what appeared to be a stun gun, with the jolts jerking his chest upwards (he was reportedly shocked five times in drive stun mode). Seconds later Williams was shown being lifted onto a restraint chair; he appeared to be barely conscious, or even unconscious, at this point, with one officer holding up his head. After he was strapped into the chair an officer put his finger to Williams' neck and, apparently feeling no pulse, called for

someone to get an ambulance. Paramedics found him in full cardiac arrest; they reportedly established a pulse 19 minutes later but he did not regain consciousness and was pronounced dead when he was removed from a ventilator the following day. He had a history of epilepsy and seizure disorder.

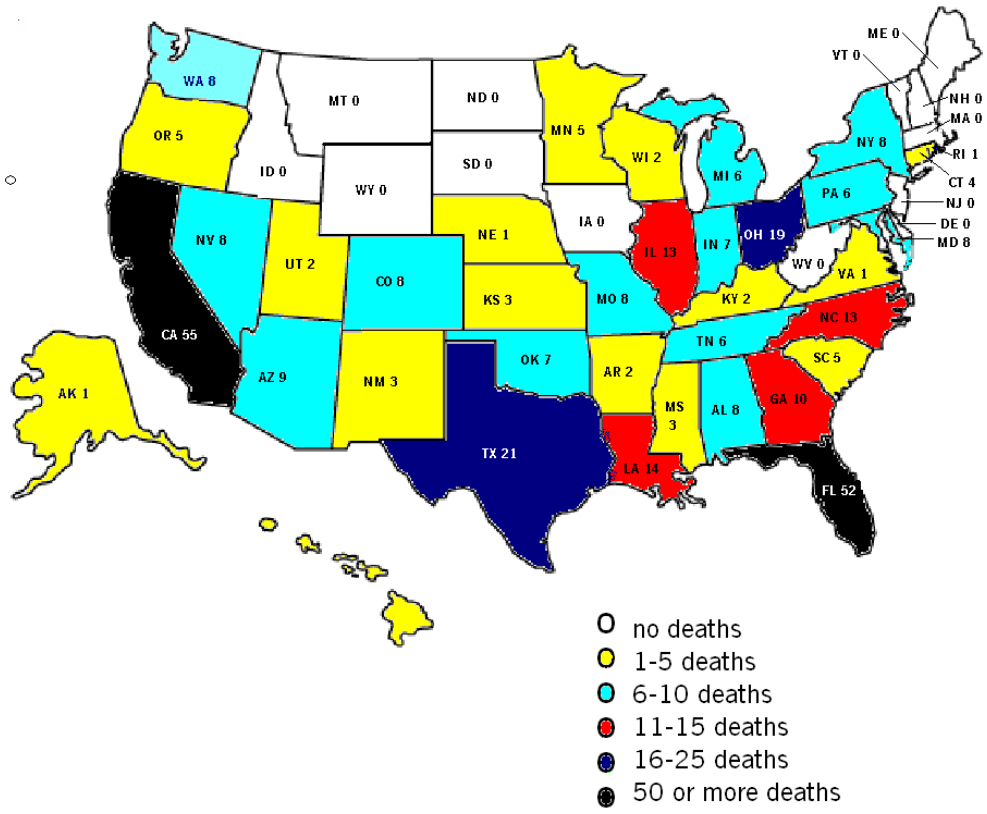
Initially the medical examiner could not determine an exact cause of death, listing it as "hypoxic encephalopathy due to cardiorespiratory arrest of uncertain etiology." Toxicology reports were negative for drugs. However, in August 2005 he issued an Addendum to the autopsy report which was identical to the Addendum in the case of Ray Austin, above, who died in similar circumstances, and who also had no illicit drugs in his sytem. The addendum noted that the close temporal relationship between the Taser deployment and the onset of the cardiac arrest would seem to imply a causal connection, but he was unable to make a definitive determination.

A Gwinnett County grand jury decided not to pursue criminal charges against any of the officers involved in Williams' death. They chose not to view the jail video tape released by the District Attorney's office in the case.

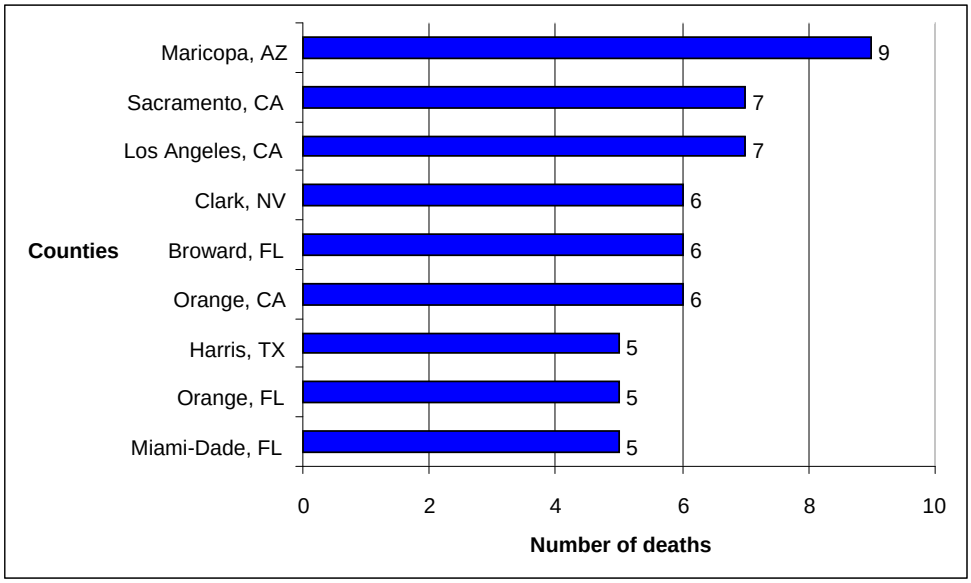
APPENDIX B: SELECTED DATA ON USE OF CEDS BY US LAW ENFORCEMENT OFFICIALS

From June 2001 to 31 August 2008

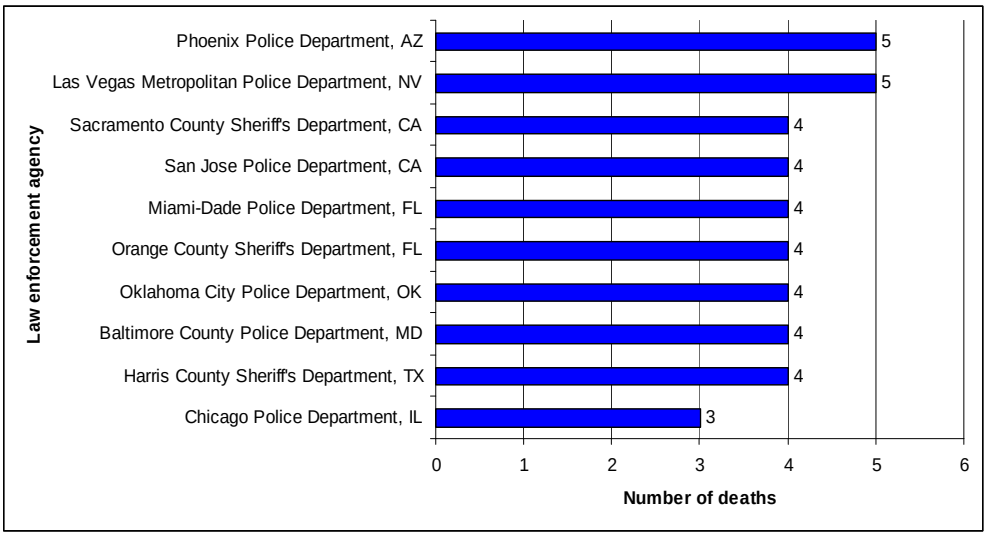
DEATHS BY STATE



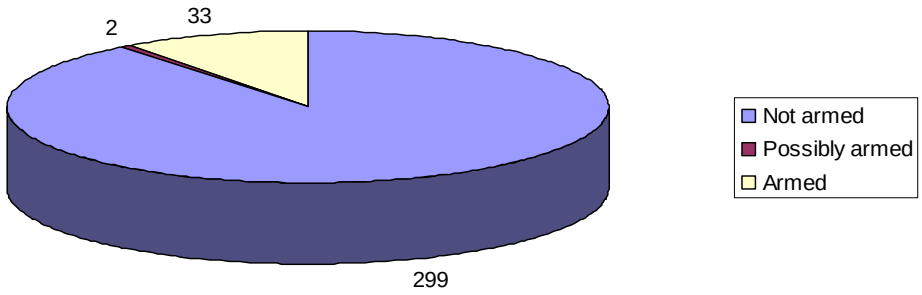
COUNTIES WITH MOST DEATHS FOLLOWING USE OF CEDS BY US LAW ENFORCEMENT



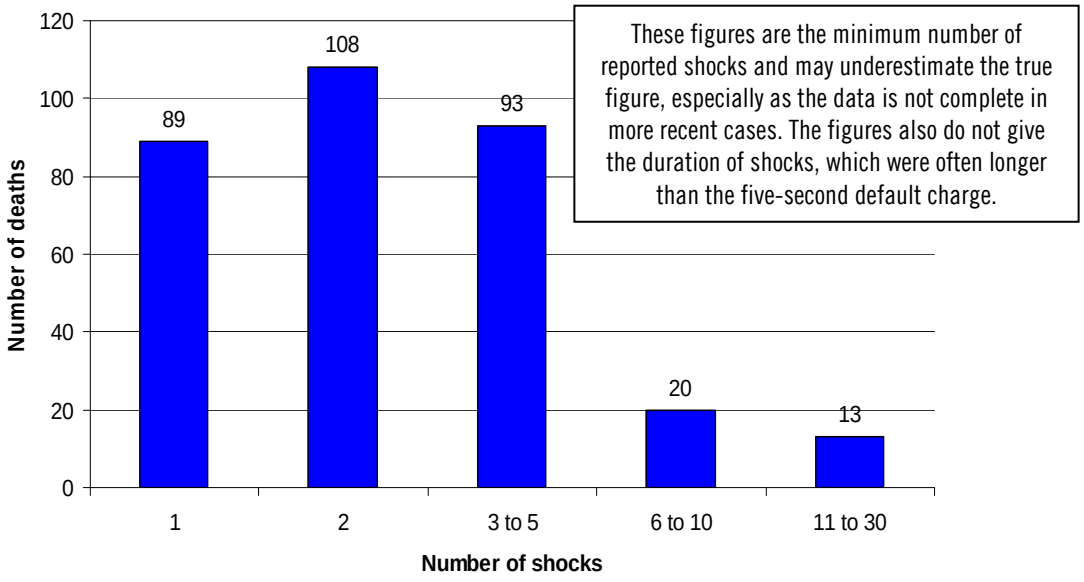
LAW ENFORCEMENT AGENCIES WITH MOST DEATHS FOLLOWING THE USE OF CEDS



DEATHS FOLLOWING USE OF CEDS ON ARMED INDIVIDUALS



NUMBER OF CEDS SHOCKS



APPENDIX C: MEDICAL AND SCIENTIFIC STUDIES ON CEDS

One of Amnesty International's concerns since the introduction of CEDs by US law enforcement agencies has been the lack of independent, comprehensive medical testing of the safety of Tasers and similar devices. The only medical safety studies prior to the marketing of the Advanced M26 Taser in late 1999 were animal tests conducted for Taser International to see whether the device could cause ventricular fibrillation (VF)[290] in a pig and three dogs.[291] These and further company-sponsored testing of the X26 Taser on swine concluded there was a high margin of safety for the induction of ventricular fibrillation.[292] However, in its report published in November 2004, Amnesty International noted that there had been no independent medical literature published on the effects of the M26 or the X26 model, despite growing deployment of the devices in law enforcement.

More medical and scientific research into the safety of CEDs has taken place since then, including a small number of human studies and a survey of injuries resulting from the use of these devices in the field. While most studies to date have found the risk of direct adverse effects from CED shocks to be generally low in healthy adults, they remain limited in scope. Studies have continued to highlight the need for further research, particularly on the likely effects of CED shocks on vulnerable populations, such as children, the elderly and people with underlying heart conditions or who are agitated and under the influence of stimulant drugs. As noted above, concerns have also been raised about the potential adverse effects of exposure to repeated or prolonged shocks.

For example, a study of the M26 and X26 Tasers carried out by The Joint Non-Lethal Weapons Human Effects Center of Excellence (HECOE) for the US Department of Defence, reporting in March 2005, concluded that the available, limited, data suggested that healthy adults or larger children would not be at significant risk if exposed to a five-second shock.[293] However, the report also noted that "if long periods of EMI[294] activation did occur, the risk of unintended adverse effects such as cardiac arrhythmia, impairment of respiration or widespread metabolic muscle damage (rhabdomyolysis) could be severe".[295] It concluded that "further research will be needed to address longer duration exposures" as well as the effects of "multiple simultaneous exposure" or "sequential exposure" to Taser shocks on the heart. While the HECOE study was based mainly on a review of existing research, it was supported by tests carried out by the US Air Force Research Laboratory which showed that test animals suspended breathing during Taser shocks, and that swine exposed to repeated cycles of five-second shocks from an X26 Taser developed acidosis from muscle contractions.[296]

The HECOE study further noted that due to the "absence of specific threshold information in young children, the elderly, individuals with underlying heart conditions, or individuals with concurrent drug use, it is not known whether there are highly sensitive individuals in these groups that could experience ventricular fibrillation (VF) under normal use of an EMI device".[297]

A later study into exposure to multiple CED shocks found that repeated shocks from the Stinger S-400 (another CED projectile model) resulted in respiratory acidosis and an increase in blood lactate level in anaesthetized pigs, with full recovery by four hours post-exposure. While the study concluded that the Stinger S-400 appeared to have no serious adverse physiologic effects on healthy, anaesthetized swine, it noted that this may not apply to persons with cardiac abnormalities or disease or to those in a stressful state, and that more research was needed in this area.[298]

In November 2007, UK scientists led by the Defence Scientific and Technology Laboratory (DstI), part of a group which advises the UK government on the effects of less lethal weapons, published the results of an experimental study using electro-magnetic modelling to see if Taser shocks could cause life-threatening cardiac arrhythmias through direct electrical action on the heart.[299] The study found there was a wide safety margin for induction of VF or VEB (ventricular ectopic beats: a condition which can also lead to fatal arrhythmias) in guinea pig hearts which, scaled-up to the human heart, would make it unlikely that discharge from the weapons would influence cardiac rhythmicity by a direct electrical action on the heart. However, the study included the same caveat contained in earlier statements by the UK scientific advisers on Tasers, noting that:

"The possibility that factors such as illicit drug intoxication, alcohol abuse, pre-existing heart disease and cardioactive therapeutic drugs may modify the threshold for generation of cardiac arrhythmias cannot be excluded. Similarly, other responses to Taser deployment (e.g. arrhythmias precipitated by stress-or-exercise-induced catecholamine release) may, in themselves, predispose to an adverse cardiac outcome independently of the primary (electrical) action of the Taser devices." [300]

Although the DstI experimental study suggested a wide margin of safety for the direct induction of fatal arrhythmias in healthy humans, this continues to be an area of concern. Three recent independent studies have shown that Taser shocks can dangerously affect the heart rhythm of pigs and have pointed to the need for more research into the effects on humans.

In one of the studies, carried out by a Chicago hospital trauma unit, six pigs were exposed to two 40-second X26 Taser discharges across the torso. Two of the animals died immediately from acute onset VF: in one animal, the Taser discharge "captured" the heart rhythm, causing ventricular tachycardia (VT: a rapid increase in the heart rate) which degenerated into fatal VF after 16 seconds; the same process was observed in the second animal, with VT turning into fatal VF within a few minutes. The discharges affected the heart rhythm of all surviving animals with rapid or immediate onset atrial standstill, raised heart rates, with VT or VF. There was also severe metabolic and respiratory acidosis in the surviving animals, with elevated lactate levels during 60 minutes of post-discharge monitoring, returning to baseline levels by 24 hours.[301] The experiment was later repeated on a similar swine model after giving the animals a paralytic agent that made it impossible for the muscles to contract so the lactate levels (and therefore the acid level in the blood) rose minimally. In the latter case, all the animals still suffered immediate heart rhythm problems, which in one case degenerated into fatal VF. [302]

The Chicago study used six-month old healthy pigs weighing between 22kg and 46 kg, the sizes correlating with those of children, teenagers and some adult humans with small frames.

In discussion of their findings, the researchers noted that the study suggested a lower threshold for induction of fatal VF from Taser shocks than in an earlier study which showed that the threshold for VF was directly proportional to body mass.[303] The pigs in that study ranged from 30 to 117 kg, and the researchers suggested that the current output of that the current output of a custom-built CED device had to increase by a factor of 15 to induce VF with a 5-second discharge in the smallest model. As the Chicago researchers noted, "Our animals varied in mass from 22 to 46 kg and two animals showed fatal VF after two 40-second discharges. If an unmodified TASER X26 has the same safety factor as that reported by Mc Daniel et al, then we should never have seen VF".[304]

The two other studies have found that Taser shocks can stimulate the heart, depending on the positioning of the barbs. An NIJ-funded study led by John Webster at the University of Wisconsin found that Tasers had the potential to trigger ventricular fibrillation in pigs if the barbs penetrated the small spaces between the ribs that surround the heart and that this could apply to humans, although they suggested that the probability of the barbs landing in such a small area (between 1.5cm and 2.4 cm from the right ventricle) was extremely low.[305] Nevertheless, one of the study's conclusions was that during Taser training it would be advisable to avoid having the dart land on the front of the thorax.[306] It should be noted that the dart-to-heart distance in which Taser charges induced VF in the Chicago study, cited above, was greater than in the Webster study.[307]

The remaining study, by a team at the University of Toronto, involved placing Taser barbs across the chest or abdomen of six pigs, ensuring that the barbs did not pierce deep into the tissue, and applying five-second discharges from X26 Taser guns. They found that, out of a total of 150 charges, the Taser charge captured the heart (causing rapid stimulation of the heart rate and no blood pressure for the duration of the charge) in almost half the cases. In all 74 discharges where capture occurred, the barbs were placed across the chest.[308] They also found a higher rate of Taser-associated "myocardial stimulation" after infusing pigs with epinephrine (adrenaline); one of the 16 Taser discharges in this experiment induced VF and another VT. This finding differed from the results of an earlier Taser-International sponsored study into the effects of Taser shocks on pigs effused with another cardiac stimulant, cocaine.[309]

The Toronto study is significant not only because of the high proportion of instances where the Taser shocks captured the heart when the current passed across the chest, but because (by placing catheters inside the pigs hearts) researchers were also able to monitor the heart rate during the application of the stun gun discharge. Most prior studies had only been able to record electrocardiogram (ECG) readings before and after, but not during, the stun gun discharge because of the electrical interference created by the CED discharge. The Chicago study also recorded cardiac rhythm during discharges in four of the six experimental pigs by use of echocardiography (cardiac ultrasound).[310]

While the results of the above studies cannot necessarily be extrapolated to humans they raise serious concern about the possibility of CED shocks causing direct fatal arrythmias, particularly if placed across the chest, and indicate the need for more research in this area. The Chicago study is also significant because it suggests there may be a greater risk of induction of VF through a relatively low number of (prolonged) Taser shocks in lower body weights than suggested by earlier studies.

Concerns in this area are heightened by the fact that in at least 42 (43 per cent) of the 98 autopsy reports reviewed by Amnesty International, the deceased were shocked in the chest (see section 4 (iv) of the main body of this report); in ten of these cases medical examiners found the Taser shocks had caused or contributed to the deaths, with at least one case of VF recorded. A case of VF was also recorded in a 14-year-old boy in Chicago who collapsed a short while after being shocked with a Taser in February 2005. He survived after a defibrillator was used to restart his heart. The case was described in a letter by two doctors at the Children's Memorial Hospital in Chicago, published in the New England Journal of Medicine.[311]

There is also a recent report of a case where Taser shocks were found to have captured the heart rate of a man with a pacemaker (see Cao, Shinbane et al case reported below). While this is a single case report, its significance is that it is the first human case where capture of the heart during a Taser shock has been demonstrated from the stored data from the pacemaker.

HUMAN STUDIES

Limited medical and scientific testing of the physiological effects of Tasers on humans has taken place since 2006. The first non-industry funded study was conducted by emergency medicine physicians at the University of San Diego, California, with a grant provided by the National Institute of Justice (NIJ). They reported their findings in May 2007 that no clinically significant changes of physiologic stress occurred in 32 healthy law enforcement officers who received a single five-second shock from a Taser discharge.[312] The researchers had originally wanted to use average people for the study but, because of the lack of any prior medical tests on humans and thus uncertainty about the risks, they had to use police volunteers who had already accepted risks from Tasers as part of their training.[313] A second phase of the study tested the effects of a single X26 Taser shock on eight law enforcement volunteers after exercise and again found no clinically significant or lasting significant changes in selected blood or cardiovascular levels.[314]

The value of the findings as regards the safety of CEDs in real-world conditions has been questioned by a number of experts, including the authors of a 2006 study of deaths following Taser use, who have noted that the San Diego tests were carried out on healthy volunteers without variables such as multiple discharges or "any of the physiologic conditions usually encountered in Taser-related deaths".[315]

The results of several other human studies funded by Taser International have been published and/or presented as abstracts and posters at various medical and scientific conferences since 2006. These include tests of the physiological effects of 15-second Taser shocks on adult police volunteers both while resting and after exercise.[316] While the researchers have reported no lasting clinically significant impairment of respiration or cardiac function in those tested, the studies are small and acknowledge the need for further research. An earlier company-sponsored peer-reviewed study on resting adults exposed to five-second Taser discharges also found no cardiac effects.[317] Recent industry-funded studies reportedly found no adverse effects on human respiration during cross-chest exposure and in tests on the XREP (a new Taser International projectile wireless stun weapon not yet piloted).[318] The web-site of Taser International has featured the above-mentioned studies as affirming the general safety of Tasers. As yet, little independent research is available to clarify this.[319]

As well as the limitations cited above, the human volunteer studies to date do not address the question of how far repeated Taser shocks might have adverse effects on less healthy populations or those compromised by drugs, heart disease, prolonged struggle or other police restraint. Furthermore, most of the volunteers in the human studies were shocked in the back, not in the chest, which other studies have suggested may be a particular risk site for cardiac arrhythmias. As the Toronto study noted (see above), the human studies recorded ECG findings only before and after the discharge, a limitation which prevented the researchers from observing any transient changes in heart rhythm during the discharge. One study since then has used limited echocardiography to record heart rhythm before, during and after X26 Taser discharges on human volunteers and reported no adverse event but research in this area remains limited.[320]

LACK OF DEFINITIVE SAFETY TESTING OF EFFECTS OF CEDS ON PEOPLE WITH PACEMAKERS, CHILDREN, THE ELDERLY AND PREGNANT WOMEN

People with pacemakers

There have been only a limited number of studies which have reviewed the likelihood of Taser-type devices affecting pacemakers or other implanted electrical devices. The HECOE study suggested that, as pacemakers are designed to withstand a shock from a defibrillator, it would seem unlikely that Taser shocks would adversely affect individuals with implanted electrical devices. However, it noted that, as Taser output is not identical to defibrillator outputs, the issue needs to be empirically explored. In July 2004, the UK Defence Scientific Advisory Council (DOMILL) concluded, from the limited number of studies on devices similar to Tasers available at that time, that the probability of direct impact and damage to implanted electronic devices was low.[321] However, one of the cases in Amnesty International's review was of a man fitted with a pacemaker who reportedly suffered a heart attack immediately after being shocked with a Taser (see the Samuel Hair case under section 4 (iii) in the body of the report above).

DOMILL noted that the effect of Taser outputs on other implantable devices, such as nerve stimulators, had not been reported, but that it was unlikely that any deleterious effects would be long-term or life-threatening.[322] There has been one reported case of a death following CED use of a man wearing a vagus nerve stimulator (VNS) for severe epilepsy; he reportedly died of a seizure while in custody some 17 hours after he was shocked with a Taser.[323]

A recent study funded by Taser International found that a standard Taser discharge did not affect the short-term functional integrity of certain pacemakers and defibrillators. However, the tests were limited to a five-second shock from an X26 on two pacemaker models and used a single animal; the study warned that extrapolation of results to other models should be done with caution.[324] An earlier study of a high output stun gun found it altered the cardiac rhythm of pigs implanted with pacemakers, causing pump failure if shocks were activated for more than 30 seconds.[325]

As noted above, there is also a recent report in the literature of a case where shocks from an X26 Taser resulted in capture of the heart rate of a man with a pacemaker. The 53-year-old man had been shot in the chest with two Taser barbs and a week later presented for medical evaluation due to non-specific chest pain. Examination of the pacemaker data revealed "two ventricular high rate episodes that corresponded to the exact time of the Taser barb

application".[326] The report suggested that there could be a higher risk of this occurring in patients with pacemakers and that "Further investigation is required to understand the effects of CEDs on people with cardiac devices".[327]

Risks in children, the elderly, pregnant women

The HECOE and other studies have noted the limited amount of research into the effects of Taser shocks on the elderly, children and pregnant women.

On children, the HECOE report noted that dose-response data from animal tests found the threshold for induction of ventricular fibrillation varied with the animals' weight, with "larger animals clearly less sensitive to the externally applied Taser stimulus".[328] While it found a large margin of safety with the "normal X26 operating output" in the case of large children and adults, it found that "for very small children …where the margin is limited (e.g. approximately 1.5 times above the normal output), the data are insufficient to conclude that there would be no VF".[329] One of the studies reviewed by the HECOE study authors were tests investigating the effects of Tasers on the hearts of pigs weighing between 30 and 117 kilograms and finding that safety margins increased with the animals' weight.[330] These tests have been interpreted to conclude that smaller individuals (e.g. children) may be more susceptible to adverse effects from Taser shocks. In its latest statement in May 2007, the UK's Defence Scientific Advisory Council Sub-Committee on the Medical Implications of Less-Lethal Weapons (DOMILL) noted that:

"There is very limited information globally on the relative vulnerability of children to Tasers, from either operational data or experimental studies on animals. However, data from McDaniel et al.[331]on the reduction in the body weight of pigs suggests, if extrapolated to humans, that the safety factor for induction of ventricular fibrillation by Taser discharge in children at the younger (i.e. smaller) range of the paediatric population may be lower compared with that in the adult population. Until more research is undertaken to clarify the vulnerability of children to Taser currents, children and persons of small stature should be considered at possible greater risk than adults…"[332]

As noted above, a study in Chicago in 2007 on pigs weighing between 22kg and 46 found a lower threshold for induction of fatal VF from Taser shocks than the McDaniel study; if extrapolated to humans this study suggests that children, teenagers and adults of small stature could be at risk from VF from CED discharges.[333]

It is also possible that the penetrative effects of Taser barbs may be more severe for children than for adults.[334] While some many US police policies warn against using Tasers on "young children" (except in life or death situations), not all contain such a restriction and often the age is undefined or the age limit is set very low)[335]. AI has received several reports of Tasers being used on children under the age of 12 in situations where they did not present a serious threat to themselves or others.

Amnesty International is not aware of specific research regarding the risks of CED shocks for elderly populations. However, older people suffering from arthritis or reduced bone density could be more prone to injuries from falls, and elderly people are statistically more likely to have underlying health problems such as heart disease which may make them more

susceptible to adverse cardiac or respiratory effects from Taser shocks. The muscle spasms caused by Taser shocks may also cause bone injuries; a law enforcement officer suffered compression fractures of his spine after volunteering to receive a Taser shock during training.[336] Amnesty International is concerned by reports that very elderly individuals have been subjected to police Taser shocks, without their having posed a serious threat (see section 2 (v) in main report, above.

Pregnancy/miscarriage

As the HECOE study noted, only limited data is available to assess effects of Taser shocks or similar devices on pregnancy or the developing foetus. While the HECOE report stated that the overall risk of miscarriage or developmental defects was "probably low", it called for further study.[337] One medical study concluded that exposure to shocks from an earlier Taser model caused a miscarriage in a woman in a US jail.[338] The study's author suggested that the uterus and amniotic fluid surrounding the foetus are electrical conductors which could deliver electricity to the foetus and potentially cause cardiac arrest. This theory was disputed by the former medical director of Taser International, who claimed that the uterus provides a "Faraday protective shield" [339]from the effects of Taser shocks. However, this claim has been discounted by several experts, including the UK's Defence Science and Technology Laboratory (DstI), which "dismiss[ed] the suggestion that the foetus is protected in the womb", concluding that the "Effects of electrical current on foetuses in the womb is uncertain".[340]

Most US law enforcement policies warn against using Tasers on "visibly pregnant" women unless the officer is faced with the threat of deadly force, mainly because of the risk of trauma from the mother falling. However, not all departments include such a restriction, and it is not always evident when someone is pregnant. There have been two reported cases of miscarriage or foetal death following use of M26 or X26 Tasers. In both cases, the officers involved said that they were not aware the women were pregnant.

Cindy Grippi was diagnosed with foetal demise some 12 hours after being struck by a police Taser in December 2001. The initial autopsy did not determine a cause of death and the medical examiner suggested it may be linked with the mother's amphetamine use; however, experts consulted by Cindy Grippi's attorney reportedly suggested that the electro-shock was a factor and Grippi was awarded substantial damages in a lawsuit filed in the case.[341] In October 2006, Tianesha Robinson suffered a miscarriage in jail about four weeks after being shocked with a Taser for failing to comply with a police command during a traffic stop; she was reportedly shocked in "drive stun" mode once against the side of her abdomen and twice against her back. In this case, there was a long time delay between the use of the Taser and miscarriage and Amnesty International does not have further information on the outcome of any investigation; however the woman was reported at the time as saying that she started suffering cramps and pain shortly after being shocked.[342]

WAKE FOREST STUDY OF INJURIES FROM TASER USE IN REAL-WORLD SITUATIONS

In October 2007, researchers from Wake Forest University School of Medicine in Winston-Salem, North Carolina, released the results of an independent, nationwide study of injuries associated with Taser use. Funded by the National Institute of Justice, the two-year study was based on data from six law enforcement agencies across the USA. A physician at each

participating agency reviewed police and medical records after each Taser application and classified the injuries as mild, moderate or severe. Nearly 1,000 cases were reviewed, 99.7 per cent of which were found to have resulted in either no injuries or mild injuries associated with scrapes, puncture marks and bruises.[343] Only three subjects sustained injuries serious enough to warrant hospitalization. Two subjects died but autopsy reports found no link between the Taser and the deaths. William Bozeman, the lead researcher, acknowledged that the Taser could cause injuries and deaths in some cases but the question, he said, is "how likely it is to cause a significant injury" and whether the "risk of injury outweighs the benefits it brings." [344] Overall, he said, the results "support the safety of the devices".

Amnesty International recognizes that, overall, the death rate compared to the number of reported Taser field uses is relatively low. However, the organization remains concerned that Tasers are used in many situations where the degree of force deployed is unwarranted, and considers that any risk of death resulting from the use of excessive or unnecessary force is unacceptable. Amnesty International notes that the Wake Forest study was not able to make individualised assessments of the nature of the Taser interventions or of the medical risks in specific populations.

According to the Wake Forest study's findings, the mean number of Taser shocks delivered was 1.6 in probe mode and 1.8 in drive stun mode. This is less than the mean number of shocks (a minimum of 3.17 shocks per person on average)[345] in the cases with fatal outcome cases reviewed by Amnesty International and does not appear to address the issue of the potential danger from multiple or prolonged shock.

JUSTICE DEPARTMENT STUDY

A number of other studies are underway, including a study commissioned by the US Justice Department's National Institute of Justice (NIJ) into deaths from "Electro-muscular Disruption Devices" (EMDDs). The study is reportedly reviewing more than 100 deaths following police Taser use, including a study of autopsy reports, background data on cases and comparative data on other in-custody deaths.[346] The study is directed by a steering group with representation from the NIJ, the American College of Pathologists, the Center for Disease Control and Prevention, and the National Association of Medical Examiners. The steering group has also appointed a medical panel "composed of physicians, medical examiners, and other relevant specialists in cardiology, emergency medicine, epidemiology, pathology and toxicology".[347]

In its interim report, published in June 2008, the NIJ study found "no conclusive evidence within the state of current research that indicates a high risk of serious injury or death from the direct effects of CED exposure". However, it found that the purported safety margins of CED deployment "may not be applicable in small children, those with diseased hearts, the elderly, those who are pregnant and other at-risk individuals". [348] It also stated that: "Research suggests that factors such as thin stature and dart placement in the chest may lower the safety margin for cardiac dysthythmias". The report further noted that while "Studies examining the effects of extended exposure in humans to CED are very limited", many deaths following CED use appear to be associated with "continuous or repeated discharge of the CED". It advised that use of CEDs in "at risk" populations should be avoided where possible and urged caution in the application of multiple shocks.

The NIJ study was still ongoing at the time of this report, with its final report expected to be issued some time in 2009. In the meantime, Amnesty International believes that the interim findings are consistent with many of the concerns raised in this report. Amnesty International believes that many of the individual cases in its own review reinforce and further validate concerns about the safety of CEDs, as well as the need for stricter guidelines in the use of such devices.

Amnesty International welcomes the Justice Department study and hopes that its final report will cast more light on in-custody deaths and safety concerns associated with electro-shock devices.[349] Amnesty International further believes that an inquiry by the Justice Department should be widened to address human rights concerns regarding the use of CEDs, including their capacity to inflict torture or other ill-treatment. Such an inquiry should draw on advice from human rights experts, and examine policies and practice and suggest guidelines to minimise the risk of unnecessary force and ill-treatment.

APPENDIX D: DISTRIBUTION AND DEPLOYMENT OF TASER, STINGER AND OTHER PROJECTILE CEDS

This information was compiled by the Omega Research Foundation. Further information was collated from company and open source information.

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
Africa		
Algeria	Stinger Systems Distributor (based in Belgium) Taser Distributor (a)	
Senegal		Taser reportedly used by: 'Multipurpose Intervention Brigade'
South Africa	Stinger Systems Distributor Taser distributor	Taser demonstrated but not yet deployed by law enforcement
Asia Pacific		
Australia	Stinger Systems Distributor Taser distributor	Taser used by: Australian Federal Police, Western Australia Police Service and the Department of Corrective Services, New South Wales Police
People's Republic of China	Stinger Systems Distributor FBQ, LM-A1 and AL-TA01 projectile CEDs produced domestically	

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
India	Stinger Systems Distributor	
Malaysia		Taser reportedly used by: Malaysia Police (b)
New Zealand	Taser Distributor	Taser fielded in 2008 by: Auckland and Wellington police
Pakistan		Taser reportedly evaluated by Sindh Police
Singapore	Stinger Systems Distributor Taser Distributor (a)	Taser used by: Singapore Police
South Korea	Stinger Systems Distributor Taser Distributor	Taser used by: National Police and Korean Airlines
Taiwan	Raysun X-1, 'Titan Taser' and 'TW-ESG-Z1' projectile CEDs produced domestically	
Thailand	Taser Distributor (a)	Taser reportedly "used"
Vietnam	Stinger Systems Distributor	
Europe		
Andorra	Taser Distributor	Taser reportedly "in use" (c)
Austria	Taser Distributor	Taser used by: Taskforce Cobra (EKO Cobra), Vienna Taskforce Groups Alarm Department (WEGA), Taskforce for the Combat of Street Crime (EGS) and Police Detention Centres (PAZ)
Belgium	Stinger Systems Distributor Taser Distributor	Taser reportedly used by: Belgian Federal Police (b)
Bulgaria	Taser Distributor possibly for civilian sales?	

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
Canary Isles	Taser Distributor (a)	Taser reportedly used by: Canary Island Authority (b)
Croatia	Taser Distributor	Presentation on 21 May 2008
Cyprus	Taser Distributor	Taser reportedly used by: MMAD (Rapid Reaction Unit) and the Special Anti-Terrorism Unit
Czech Republic	Taser Distributor	Taser: reportedly 50 in use by "specially trained officers"
Denmark	Taser Distributor (a)	
Finland	Stinger Systems Distributor	Taser reportedly used by: Finland Army units (b) and police
France	Taser Distributor	Taser reportedly used by: All police – National, Gendarmerie and Municipal
Germany	Taser Distributor	Taser reportedly used by: German Army Special Forces German Army for Peacekeepers in Kosovo German Government Federal Air Marshalls SEK North Rhine Westphalia SWAT Teams in Muenster, Bieldfeld, Cologne, Dusseldorf, Essen, Dortmund SEK Berlin SEK Niedersachsen SEK Sachsen SEK Baden Wuerttemberg SEK Thueringen

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
		SEK Rheinland Pfalz SEK Hessen SEK Bavaria South (Munich SWAT team) GSG 9 (German Federal Anti Terrorist unit) (b)
Greece		Taser used by: Greek Special Forces
Ireland		Taser used by: Garda Emergency response Units (ERU)
Italy	Stinger Systems Distributor Taser Agent/Distributor	
Latvia	Taser Distributor (a)	
Lithuania	Taser Distributor (a)	Taser reportedly 'in use'(c)
Luxembourg		Taser reportedly used by: Luxembourg SWAT (Unités Spéciales de Police Grand-Ducale de Luxembourg) (b)
Malta		Taser used by: Police
Netherlands	Taser Agent/Distributor	
Norway	Taser Distributor	
Poland	Stinger Systems Distributor Taser Distributor	Taser reportedly 'in use'(c)
Portugal		Taser reportedly 'in use'
Romania	Stinger Systems Distributor Taser Agent/Distributor	
Russia	Domestic production of March Group 107-U	March Group 107-U projectile stun baton reportedly issued to Ministry of Interior

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
	projectile stun baton and Yana stun baton firing 'Taser-type' cartridges	police
Slovakia	Taser Agent/Distributor	
Slovenia	Taser Agent/Distributor	Taser reportedly tested by Special Police
Spain	Stinger Systems Distributor Taser Distributor	Taser reportedly used by: Garafia, Espartinas, UEI Guardia Civil, - Sp. – Castellon, Alcala de Xivert (b)
Sweden	Taser Distributor	Taser tested but reportedly not yet deployed
Switzerland	Taser Distributor	Taser used by police
Turkey		Taser reportedly used by: Turkish Special Forces (b)
UK	Stinger Systems Distributor Taser Distributor	Taser used by: Firearms officers and tactical support groups
Middle East		
Bahrain		Taser reportedly used by: GHQ Bahrain Defence Force (b)
Iran	Taser Agent/Distributor	
Iraq		Taser used by: US Military Forces
Israel	Stinger Systems Distributor Taser Distributor (a)	Taser reportedly used by: Israeli Air Force, Israeli Police (b)
Jordan	Taser Distributor (a)	
Kuwait		Taser reportedly used by: Special Forces of MOI (b)
Lebanon	Taser Distributor (a)	

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
Saudi Arabia	Stinger Systems Distributor Taser Agent/Distributor	Taser reportedly 'in use'
United Arab Emirates	Taser Distributor (a)	Taser reportedly supplied to Abu Dhabi Police and Dubai Police (b)
North America		
Canada	Stinger Systems Distributor Taser Distributor	Taser used by: RCMP
Mexico	Taser production 1996-2001 Taser Distributor	Taser reportedly used by: Mexican Army (b)
United States	Taser and Stinger projectile CEDs domestically produced	Widespread use of Taser and increasing use of Stinger
South America / Carribean		
Argentina	Taser Distributor	Taser reportedly used by: Argentine Federal Police Gendameria Argentine Coast Guard Pan Air Force Argentine Presidential Security Justice Ministry – Jails (b)
Brazil	Stinger Systems Distributor Taser Distributors	Taser reportedly used by: Guardia Civil
Chile	Taser Distributor (a)	

COUNTRY	PRODUCTION / AGENT / DISTRIBUTOR	DEPLOYMENT / TRIALS
Colombia	Stinger Systems Distributor	
Costa Rica	Stinger Systems Distributor Taser Distributor	Stinger S-200 reportedly supplied to Costa Rican government Taser training for local and national police
Ecuador	Stinger Systems Distributor	
Trinidad & Tobago		Taser reportedly used by: Trinidad Police (b)
US Virgin Isles	Taser Agent/Distributor (a)	

Sources

(a) "International Distributors to Post on Web Site" www.taser.com/pages/international/internationaldistributors.doc, accessed 7/2004.

(b) 'Harpia.cz Reference ADVANCED TASER M26 se pouziva v ozbrojenych slozkach techto statu' www.harpia.cz/taser/taser12.html, accessed 22/9/2004.

(c) www.aasias.com, accessed 2/10/2008. Andrea Soler i Associats, Spain. [Taser distributor, Spain]: "Entre los países que lo utilizan están: Portugal, Francia, Reino Unido, Alemania, Suiza, Finlandia, Polonia, Dinamarca, Suecia, Holanda, Lituania, Andorra, Eslovenia, Austria, Irlanda, Grecia, y Latvia. El Reino Unido tiene más de 4.000 Tasers en servicio, Francia 4.500, Suecia 3.000, etc."

ENDNOTES

[1] There are various other terms which have been used to describe the same weapons, including electro-muscular disruption technology (EMDT); electro-muscular incapacitation device (EMI) and electronic control device (ECD).

[2] Tasers were originally developed by a California-based company in the 1970s and had lower electrical output (5-7 watts) than the models later developed by Taser International. Both the M26 Advanced Taser and the X26 Taser models operate on 26 watts of electrical output and discharge pulsed energy at a peak of 50,000 volts.

[3] AI has reported separately on Canada, Amnesty International reports, *Canada:Excessive and Lethal Force? Amnesty International's Concerns about Deaths and Ill-treatment involving Tasers*, November

2004 http://www.amnesty.org/en/library/info/AMR20/002/2004/en and *Canada:Inappropriate and excessive use of Tasers*, May 2007 http://www.amnesty.ca/amnestynews/upload/AMR2000207.pdf.

[4] United Nations (UN) *Code of Conduct for Law Enforcement Officials (UN Code of Conduct),* and the UN *Basic Principles on the Use of Force and Firearms by Law Enforcement Officials* (*Basic Principles*), principles 2 and 3.

[5] Amnesty International reports, *USA: Excessive and lethal force? Amnesty International's concerns about deaths and ill-treatment involving Tasers* (AI Index AMR 51/139/2004) (hereafter referred to as *Excessive and Lethal Force?*) and *USA: Amnesty International's continuing concerns about Taser use* (AI Index AMR 51/030/2006).

[6] http://www.cbc.ca/canada/story/2008/12/04/taser-tests.html. The series of tests on 41 X26 Tasers was commissioned by CBC News and Radio-Canada. Of the 41 Tasers tested four delivered significantly more current than described in Taser International's specifications; all the models were manufactured before 2005. Pierre Savard, a biomedical engineer who designed the texts said the cause could be either due to faulty quality control during manufacturing or deterioration of the components with age.

[7] *Study of Deaths Following Electro-Muscular Disruption: Interim Report, US Department of Justice*, Office of Justice Programs, June 2008. http://www/ojp.usdoj.gov/nij/pubs-sum/222981.htm (hereafter referred to as *NIJ Interim Report*).

[8] In the executive summary of the study's findings, downloaded from the Justice Department's website (see note 5 above) on 23 June 2008, people with "excited delirium" were mentioned as among at risk populations.

[9] In a separate document to accompany publication of this report, Amnesty International lists all cases known to the organization where individuals are reported to have died in the USA after being struck by police Tasers between 17 June 2001and 31 August 2008. The list records the cause of death in each case where known to the organization, including the findings of medical examiners who have ruled out the Taser. Amnesty International reaches no conclusions as to the cause of death in all these cases, and acknowleges that the list includes some cases where the deaths can likely be attributed to drug overdoses or other factors. Amnesty International has included all reported cases in this list because of the continued controversy surrounding the issue and medical concerns about the safety of such weapons and because it believes the Taser cannot necessarily be excluded in all cases where medical examiners cite other death causes.

[10] The USA has ratified the UN Convention against Torture and Other Cruel, Inhuman or Degrading Treatment and the International Covenant on Civil and Political Rights both of which contain clauses on the international ban on torture or other cruel, inhuman or degrading treatment.

[11] See, for example, Amnesty International report, *Excessive and lethal force?,* pages 11-12.

[12] The NIJ in June 2008 cited industry sources indicating that some 11,500 law enforcement agencies have acquired CEDs, with Taser International being the leading manufacturer. It noted that the TASER X26 (introduced in 2003) is the prevailing model being acquired by most law enforcement departments in the USA today. (*NIJ Interim Report*, page 1.)

[13] There have been reports of ill-treatment of detainees in Iraq by US soldiers involving the use of Tasers (see Amnesty International report: *Iraq: Beyond Abu Ghraib: detention and torture in Iraq*, March 2006, www.amnesty.org/en/library/info/MDE14/001/2006).

[14] Thomas P. Smith, chairman of the board and co-founder of Taser International, on The Diane Rehm Show, 5 December 2007.

[15] See note 2, above.

[16] Tasers are available with cartridges with ranges of 15, 21, 25 and 35 feet; most departments use those within the 15-25' range. The 25 and 35' cartridges are equipped with a longer dart (13.33 mm compared to the 9.53mm standard probe length) designed to penetrate thicker clothing in colder climates.

[17] The peak voltage of the M26 and X26 models is reported by the manufacturer to be around 50,000 volts.

[18] The battery life of the M26 is reported to be about 10 minutes at room temperature and the dataport records the previous 500+ activations. The X26 battery reportedly lasts for more than 15 minutes and records the time date and duration of the cycle in 1,500+ activations. (http://www.mhpd.org/Taser%20Q&A.htm)

[19] www.stingersystems.com press releases (site visited 7 November 2008).

[20] http://www.stingersystems.com/band-it.aspx (site visited 7 November 2008).

[21] http://www.stingersystems.com/band-it.aspx (site visited 7 November 2008). Stinger Systems also produces the REACT stun belt (worn around the waist), the Ultron 11 stun gun which is used in some correctional facilities, and electronic stun shields which are also used in prisons.

[22] Amnesty International report, *United States of America: Cruelty in Control? The stun belt and other electro-shock equipment in law enforcement* (AI Index: AMR 51/04/1999).

[23] http://www.taser.com/PRODUCTS/LAW/Pages/XREP.aspx (site visited 7 November 2008); *Taser International to Showcase New Innovative Products and Concepts at the International Association of Chiefs of Police Conference in San Diego*, http://www.marketwatch.com/news.story, 7 November 2008.

[24] http://www.taser.com/PRODUCTS/LAW/Pages/XREP.aspx

[25] http://www.taser.com/products/military/Pages/TASERShockwave.aspx (site visited 22 October 2008); http://.marketwarch.com/news.story at note 22 above.

[26] Private ownership of Tasers or similar devices is banned in: Hawaii, Massachusetts; Michigan; New Jersey; New York; Rhode Island and Wisconsin, and in certain cities and counties, including Baltimore, Chicago, New York City, Philadelphia.

[27] http://www.taser.com/RESEARCH/Pages/FAQGeneral.aspx

[28] Taser International has incorporated its own background check on purchasers as part of the product package. The company screens purchasers by requiring them to complete an identification and felony conviction background check on-line or by phone before the C2 is activated, a process which reportedly takes about a minute. Each device also has its own serial number, linked to the purchaser, designed to make it easier to trace. However, once activated, the background check never has to be done again. As there is no official regulatory system, there are no controls placed on how the weapons should be used or to prevent the devices passing into other hands.

[29] Recently reported cases include the case of two teenagers arrested in Miami, Florida, in July 2008 after allegedly breaking into a woman's apartment, jolting her with a stun gun and raping her (Associated

Press, Miami, 18 July 2008). A Hillsborough County, Florida, sheriff's deputy was arrested in July 2008 for aggravated assault and domestic battery, for allegedly using a Taser three or four times on his wife, causing burns to her stomach ("*Hillsborough deputy accused of Taser abuse*", St Petersburg Times, 8 July 2008).

[30] See Amnesty International report, *Excessive and lethal force?*, page 66.

[31] Komonews.com/news/archive/4133831.htlm, quoting Chief of Seattle Police Department in September 2004.

[32] *Bridgeport in Review*, by Mayor John M. Fabrizi, 27 June 2007, referring to comments made by the Bridgeport Chief of Police Bryant T. Norwood, who had volunteered to be shocked the week before.

[33] National Public Radio broadcast 1 April 2005, cited in Stunning Trends in Shocking Crimes, *Journal of Law and Health*, *Cleveland State University*. Vol 20:357, (2007).

[34] Officer.com News, 24 July 2006.

[35] Taser International Product Warnings, 1 March 2007 and 28 April 2008.

[36] "Arcing" or "arching" means activating a Taser without a cartridge, so that it sparks but no darts are fired.

[37] *A Bad Night at Powell Library: The Events of November 14, 2006*, Report by the Police Assessment Resource Center, August 2007; the inquiry recommended a number of policy changes, including prohibiting use of CEDs on passive or mildly resistive subjects.

[38] Sources include press accounts and video footage of the incident seen by Amnesty International.

[39] Associated Press, Gainesville, 11 February 2008, "*UF revises policy after Taser used on student*"; www.president.ufl.edu/committees/civil (*University President accepts recommendations of Committee on Civil, Safe and Open Environment*, 22 April 2008).

[40] www.attorneygeneral.utah.gov/783.html.

[41] Footage viewed by Amnesty International. Amnesty International wrote to the New Orleans Police Department and the City authorities on 15 February 2008 to express concern about the incident, asking whether any officers had been disciplined. No reply was received.

[42] www.ChicoEr.com, 29 January 2008.

[43] NBC News, 22 February 2008; Oakland Tribune 28 February 2008; http://www.insidebayarea.com, 20 March 2008, "*High school student interfered with arrest of demonstrator, police say*".

[44] http:/www.newsvine.com, 28 October 2008, "*Probe clears Ozark Police officers for stun gun use on teen*".

[45] For example, the Sheriff of Duval County Florida, talking to parents protesting about re-authorizing officers to use Tasers in the county schools, is quoted as saying "the only way a child who is a student would get tased is if they are also eligible to be shocked with a glock. The question for parents is do you want us to shoot with the Taser or a glock?" (http://www.fox30online.com/news/local/story.aspx, 8 August 2006). A "glock" referred to in the above quote is a common class of handgun used by the military and in law enforcement.

[46] http://www.fox30online.com/news/local/story.aspx, 8 August 2006.

[47] NBC news, Florida, 28 March 2008.

[48] www.iol.co.za, 31 January 2007.

[49] AP, East Jefferson Bureau, 12 October 2006.

[50] Journal-News.com (Dayton Ohio), 16 May 2007.

[51] Cases cited in *The Need for Safer Taser Policies in North Carolina*, a report by the North Carolina Taser Safety Project, published in April 2008.

[52] CAT/C/USA/C)2 25 July 2006.

[53] 15/09/2006, CCPR/C/USA/CO/3.

[54] CAT/C/PRT/CO/4, 22 November 2007.

[55] In March 2008, AI sent a questionnaire to 47 police departments asking where each department placed CEDs on the force continuum, what restrictions there were on deployment and how they monitored such usage. The 47 departments included major city and county law enforcement agencies who have had CEDs for several years and some smaller departments. All of the responding agencies used X26 or M26 Tasers as their CED models. Other information included a survey of CED policies by the Police Executive Research Foundation (PERF): "Conducted Energy Devices: PERF's National Studies and Guidelines for Consideration", *Strategies for Resolving Conflict and Minimizing Use of Force, Critical Issues in Policing Series*, chapter 5, April 2007 (hereafter referred to as *Critical Issues in Policing Series*, April 2007).

[56] Many US police departments use a "force continuum" which matches the level and methods of force permitted against the level of threat or resistance. The level and type of police force typically ranges from low (police presence and verbal commands,) intermediate (hands-on force and non-lethal weapons such as pepper spray) high (open-hand strikes, batons and other impact weapons) to deadly force. Non-lethal weapons such as stun guns tend to fall mid-way in this continuum.

[57] "Report on Investigation of Taser Deployment on July 24, 2007 by Officers from the Brattelboro Police Department", released by Town of Brattleboro on 8 February, 2008; "*Brattleboro Use of Force Policy Revised*", Rutland Herald, 21 February 2008.

[58] Lorie Fridell, Ph.D, University of South Florida, "*CED Policy and Training: Results from a National Survey*" (PowerPoint presentation), providing selected information from an NIJ funded joint study by PERF and the University of South Florida (information provided to Amnesty International in May 2008). A third of the 82 police agencies surveyed by PERF in another study in 2005 permitted CED use against a subject who was passively resisting (see *Critical Issues in Policing Series,* April 2007). Examples from Amnesty International's own survey include Forth Worth Police Department, Texas, which authorizes use of Tasers below the level of intermediate force and just above verbal commands, including against passive resistance; Hillsborough County Sheriff's Office, Florida, allows Tasers to be used where the officer believes an escalation from passive to active resistance is imminent, Miami-Dade police department has a similar policy.

[59] A number of police agencies, including in Phoenix, Seattle and Miami, reported a fall in police shootings after Tasers were introduced. However, there is not always a clear correlation between a reduction in police shootings and Taser use, and in some jurisdictions (e.g. Phoenix) shootings are reported to have risen in subsequent years (*Phoenix New Times*, 21 June 2007). Multiple factors may

be involved in a rise or fall in shootings, including crime rates, demographics and training. There have been few independent studies to date on the effects of Tasers on reducing police shootings and other types of force liable to cause injury. Some departments have achieved a fall in police shootings and other types of force as a result of the introduction of tighter policies on the use of force and firearms more generally (see Amnesty International, *Excessive and Lethal Force?*, page 11. See also the US Department of Justice, Civil Rights Division website, with information under "Conduct of Law Enforcement Agencies" on settlements obtained under the police misconduct provision of the Violent Crime Control and Law Enforcement Act of 1994, http://www.usdoj.gov/crt/split/faq.php).

[60] The policy of the Charlotte-Mecklenberg Police Department, North Carolina, for example, states that CEDs can be used against suspects armed with an "object … other than a firearm". The Las Vegas Metropolitan policy seen by Amnesty International barred CEDs from use when suspects are "holding a firearm". The Tulsa Police Department authorizes CEDs to control a dangerous or violent subject "when deadly force is not justified or necessary".

[61] More than 93 percent of the responding agencies in the PERF study permitted use of CEDs against a subject with a firearm, while 99 percent permitted their use against a subject with an edged weapon. (*Critical Issues in Policing* series, April 2007, page 103).

[62] *Critical Issues in Policing* series, April 2007, page 102.

[63] However, when deployed in "drive stun" mode, the neck and groin have been considered acceptable targets in some policies and in Taser International training manuals in order to maximise use of the weapon as a "pain compliance" tool (see Amnesty International, *Excessive and Lethal Force?*, pages 6 and 7).

[64] Taser International Product Warnings, 28 April 2008. One of the first reported cases of injury was that of former Arizona sheriff's deputy Samuel Powers, who allegedly suffered a severe compression fracture to his spine after receiving just a one-second Taser shock during training in 2002. While being treated for the injury it was discovered that he had severe osteoporosis. He lost a product liability lawsuit against Taser International on the ground that the company did not know at the time that the muscle contractions produced by the M26 were strong enough to cause a fracture and could not therefore have warned Powers about such a danger. Taser International has since included a warning of the possible risk of injury in its training bulletins.

[65] Winslow J, Bozeman WP et al, "Thoracic Compression Fractures as a Result of Shock From a Conducted Energy Weapon: A Case Report", *Annals of Emergency Medicine*, Vol 50, 5, November 2007.

[66] A survey of 82 US law enforcement agencies in early 2005 found all but one allowed use of CEDs on the elderly and only two had age limit restrictions: in one case the limit was age 70 and older and the other age 81; other policies left this to the officers' judgement; some placed a high threshold for use of CEDs on the elderly (PERF survey, reported in *Critical Issues in Policing Series*, April 2007, Chapter 5).

[67] http://educate-yourself.org/cn/policetaser82yearoldman23June05.shtml (Ohio).

[68] Cases include use of a Taser on a nine-year old girl who had run away from a home as she was sitting handcuffed in a police car (Amnesty International report, *Excessive and Lethal Force?*, page 23); more recent cases include that of a 12-year-old girl trying to skip school who was reportedly stunned and brought to the ground when an officer chased her (http://www.newswithviews.com 10 July 2008 and the case of an 11-year-old girl shocked in a Florida school (cited above under 2 (iii)).

[69] Mehle (1992), see Studies section in Appendix C for more discussion.

[70] Case of Cindy Grippi, cited in Amnesty International report, *Excessive and Lethal Force?,* page 31. Cindy Grippi received $675,000 in damages from the city which employed the officer concerned; the officer had deployed his Taser when Cindy Grippi walked away from him to go back inside her house after she had reported a domestic violence incident.

[71] Osteoporosis is a condition in which bone mass deteriorates, increasing risk of fracture. According to the National Osteoporosis Foundation in Washington, DC, an estimated 55 per cent of people aged 50 or older have osteoporosis, often without being aware of the fact.

[72] Trotwood Police Department, Internal Affairs Investigation Executive Summary, December 24, 2007

[73] *The Seattle Times*, 13 June 2008.

[74] Taser International product warning bulletins also warn of "seizure risks" from Taser strikes, noting that "repetitive stimuli such as flashing lights or electrical stimuli can induce seizures in some individuals" (product warning bulletins 1 March 2007 and 28 April 2008.)

[75] A neurologist who treated the boy in hospital reportedly diagnosed his condition as "epilepsy with postictal confusion", Denton Record-Chronicle, 18 May 2008.

[76] *Ibid*

[77] Associated Press article published in *Seattle-Post-Intelligencer*, 21 January 2008.

[78] http://www.Star-Telegram.com, 2 June 2006.

[79] http://www,theNewspaper.com, 9 November 2007. Amnesty International has reported on an earlier case in which a diabetic prisoner in Virginia was shocked with a Stinger Systems Ultron 11 stun gun when he allegedly became "combative" during a medical examination while suffering from hypoglycaemia. He lapsed into a coma in the prison infirmary and subsequently died. The autopsy report gave cause of death as "cardiac arrhythmia due to stress while being restrained" (Amnesty International Report, *Excessive or Lethal Force?*, page 67).

[80] Bulletin published by the Epilepsy Foundation, *Inappropriate Response to Seizures* http://www.epilepsyfoundation.org/about/professionals/emergency/inappropriateness.cfm

[81] http://www.epilepsyfoundation.org/epilepsyusa/beloungea.cfm

[82] A form of partial seizure during which the person loses awareness without becoming fully unconscious; during the seizure the individual may carry out actions such as walking or shopping without awareness and often with no memory of the event after the seizure has passed. The seizure arises from abnormal electrical brain activity and may affect any lobe of the brain.

[83] http://www.epilepsyfoundation.org/epilepsyusa/beloungea.cfm

[84] The IACP, which has its headquarters in Alexandria, Virginia, USA, is described on its website as "the world's oldest and largest non-profit membership organization of police executives, with over 20,000 members in over 89 different countries. The IACP's leadership consists of the operating chief executives of international, federal, state and local agencies of all sizes." (http://www.theiacp.org/about/)

[85] PERF is a national membership organization of police executives from US city, county and state law enforcement agencies, described on its webpage as "dedicated to improving policing and advancing

professionalism through research and involvement in public policy debate". (http://www.policeforum.org)

[86] IACP National Law Enforcement Policy Center, *Electronic Control Weapons, Model Policy*, August 2005 (hereafter referred to as *IACP Model Policy*).

[87] *PERF Conducted Energy Device Policy and Training Guidelines for Consideration*, PERF Center on Force and Accountability, Washington DC, issued 25 October 2005 (hereafter referred to as the *PERF Guidelines* for CED use).

[88] This finding was based on a study commissioned by PERF of 118 deaths following a CED activation, reported in *Critical Issues in Policing Series*, April 2007 (see 4 (ii) for more information on the findings).

[89] See deaths section under 4 (ii) below where there has been an apparent reduction in number of multiple applications in death cases over the past few years, although more than 50% of those who died in 2007 were subjected to multiple shocks.

[90] *NIJ Interim Report*, p. 3 www.ojp.usdoj.gov/nij

[91] *NIJ interim report* p. 4.

[92] *NIJ Interim report,* p. 5.

[93] In a previous report, Amnesty International noted that several deaths had been linked with other high-voltage stun weapons in the USA, including the death of Larry Frazier, a prisoner in Virginia who died in July 2000 after being shocked with an Ultron II stun gun (see Amnesty International report, *Excessive or Lethal Force?,* pages 66-67).

[94] US jurisdictions have coroner or medical examiner systems, or a combination of both, to investigate deaths. Coroners are usually elected lay individuals who employ pathologists to conduct autopsies. Medical examiners are almost always appointed and are usually licensed physicians, usually pathologists with forensic death investigation training. There is often a coroner or medical examiner assigned to each county. Most large cities now employ medical examiners but coroners are still widely used throughout the US.

[95] Bureau of Justice Statistics (BJS) Special Report, *Arrest-Related Deaths in the United States 2003-2005,* October 2007. This was the latest information published by the BJS at the time of writing.

[96] 47 states and the District of Columbia provided data for the BJS report; the data sources included information from local law enforcement agencies, media reports and coroner's reports. The report notes that due to reporting gaps, the cases recorded did not represent a complete count of all deaths. The number of reported deaths involving use of CEDs, for example, was given as 36, below the number recorded by Amnesty International for the three-year period. Only aggregate data was provided; there was no detailed break-down of data by jurisdiction. Nevertheless, the report represents a welcome advance in attempting to provide nationwide data on deaths in custody. No such statistics were collected before 2000.

[97] Such discriminatory treatment has been documented in numerous inquiries and studies; see also *Amnesty International's Briefing to the Committee on the Elimination of Racial Discrimination (CERD)*, November 2007 (AI Index: AMR 51/178/2007).

[98] The study, carried out by the University of Houston Center for Public Policy noted that Latino and white police officers were more likely to use a CED on an African American suspect than on white or Latino suspects and that African American police officers were less likely to use CEDs than Latino or

white officers. There was not enough data to determine the causes of the disparities in CED use or to measure such variables as the threat faced by officers and the context in which CEDs were used which, the report said, required further investigation. Nevertheless the study found that "Depending on how the race of the officer and the race of the suspect were paired, it was possible to see significant increases and deceases in the rate of CED utilization" (http:/www.houstontx.gov/controller/auditmain.html).

[99] This was usually in cases where a heart rhythm was established but the individual failed to regain consciousness and died as a consequence of hypoxic brain damage.

[100] CNN interview with coroner Randolf Williams, broadcast on 22 July 2008.

[101] Chicago Tribune, 19 July 2008, "*Taser death ignites racial tensions*" by Howard Witt. Amnesty International was unable to obtain a copy of the autopsy report because of pending criminal proceedings in the case.

[102] Democracy Now (Radio Program), 24 July 2008, "*Death by Taser: Police Accused of Cover-Up in Death of African American Man Shocked Nine Times while in Handcuffs*", interview with Howard Witt; other sources include CNN, and conversation between Dr Randolf Williams and Amnesty International, 4 August 2008.

[103] http://www.cnn.com/crime 28 July 2008.

[104] Of the 334 reported deaths from 17 June 2001 to 31 August 2008 only 33 were reportedly armed and in another two cases the information was unclear. Of those who were armed, twelve people were reportedly armed with a knife and four with a gun; other weapons included objects at hand, including a broom and a pencil. The weapons were not always being brandished or held at the time. For example, Christian Allen (who died in Florida in November 2007) was shocked with a Taser following a foot-chase – afterwards police found that he had a loaded handgun in his jacket pocket. Police had persuaded Kenneth Eagleton (who died in Texas in June 2006) to throw the knife he was holding out of the car; he was shocked when he struggled while being handcuffed after getting out of the car and lying on the ground; another man (Samuel Baker, who died in Georgia in October 2007) had a knife strapped to his waist during a police struggle.

[105] The FrederickNewsPost.com, 14 June 2008, "*Police Report reveals details of Taser death*".

[106] Amnesty International has not seen the autopsy report but obtained information from the attorney for Jarrel Gray's family.

[107] http://wamu.org/news/08/05/10.php

[108] Vardan Kasilyan, who died in December 2006 in Las Vegas, Nevada. He died from choking on his own vomit; the medical examiner found contributing factors were methamphetamine and cocaine use and use of the Taser (medical examiner testimony at the inquest).

[109] Associated Press, 31 October 2006, "*Bible-carrying teen dies after stun gun shot*".

[110] Amnesty International's sources included the video recording of the incident seen by the organization; Report of the Autopsy Examination, Mecklenburg County Medical Examiner's Office, 20 June 2008; information from the attorney representing Darrel Turner's family and media reports.

[111] Jails are local (usually county) facilities housing people before trial or who are awaiting sentencing or are serving short sentences, generally less than one year.

[112] From an audio-video tape of the incident taken in the jail, later released into the public record, viewed by Amnesty International.

[113] Michael Lass, a homeless man arrested for drinking in public, died in October 2007 in the Central Men's Jail after an X26 Taser was used to restrain him; Jason Jesus Gomez died on 1 April 2008 after spending a week in a coma after he was shocked and subjected to blunt force injuries in the Intake Release Center during a cell extraction.

[114] "*The State of Orange County Jails*", grand jury report issued in June 2008. Grand juries may be judicial bodies or bodies empanelled to evaluate local county funding or procedures. In this instance the grand jury was a volunteer body of citizens empanelled by Orange County, whose duties included inspecting the county jails; similar grand jury inspection systems exist in other US jurisdictions.

[115] See reference to this case under (3 (vii) below.

[116] See, for example, Amnesty International Report, *Excessive and lethal force?* , p 27-29.

[117] The levels of force in many cases appear to contravene international standards which require law enforcement officers to use force with restraint, in proportion to the threat posed and in a manner designed to minimize damage or injury (see reference to UN *Code of Conduct* and *Basic Principles*, above).

[118] There is a recognized need among police professionals for police departments to be equipped for dealing with such situations, through the development of systems such as Crisis Intervention Teams, where officers receive special mental health training and liaise with mental health services, or where mental health consultants are hired to advise officers in specific situations (see, for example, *Police Use of Force and People with Mental Illness*, by Melissa Reuland, *Critical Issues in Policing Series*, April 2007.

[119] *PERF CED Police and Training Guidelines*, 11 and 13.

[120] Of the 334 deaths recorded by Amnesty International from June 2001 to 31 August 2008, the cause of death was reported in 250 cases. Of these 250 cases, 111 (33 per cent) were listed as solely due to cocaine, methamphetamine or (2 cases) PHC intoxication or a combination of drug intoxication and "excited delirium". While other cases cited drug use as a factor in the death, other causal or contributory factors were listed as well and these are not included in the 111 cases referred to above.

[121] Diagnostic and Statistical Manual of Mental Disorders (fourth edition, last revised 2000) - DSM IV- published by the American Psychiatric Association.

[122] WHO, International Classification of Diseases, tenth edition – ICD-10 – Geneva.

[123] Di Maio TG, Di Maio VJM, *Excited Delirium Syndrome, Cause of Death and Prevention*. Routledge, 2005.

[124] See, for example, "*Ruling in cocaine related Taser deaths splits experts*", Pittsburgh Tribune-Review, 17 March 2008; "*Deaths by Excited Delirium: Diagnosis and Cover-up*", Laura Sullivan, National Public Radio (NPR), 26 and 27 February 2007.

[125] Canadian Police Research Center, *Review of Conducted Energy Devices*, 22 August 2005, p.17.

[126] Information on the studies is available from the Justice Department's website: http://www.ojp.usdoj.gov/nij/topics/technology/less-lethal/conducted-energy-devices.htm

[127] Letter from the Civil Rights Division Special Litigation Section to Sheriff Kevin Beary, Orange County Sheriff's Office, 20 August 2008. (http://www.usdoj.gov/crt/split/documents/orangecty_ta_ltr.pdf) The letter outlines detailed recommendations resulting from an investigation by the US Justice Department into CED use by the Orange County Sheriff's Office, Florida. The recommendations include limiting the number of CED shocks to one cycle where possible; restricting use in case of children and other vulnerable individuals; and detailed training protocols. The letter is significant as this is the first federal investigation by the US Justice Department into CED use by an individual law enforcement agency under legislation which authorizes the US Justice Department to investigate whether there is a "pattern or practice" of civil rights violations. The legislation allows the Justice Department to prosecute an agency and seek a court order to change practices if an agreement to amend any unconstitutional policies and practice is not reached. The investigation into the Orange County Sheriff's Office was still pending resolution at the time of writing.

[128] *Ibid*, page 17.

[129] http://www.indymedia.org.uk/en/2006/01/332133.html. Information was also obtained from the attorney for David Glowscenski's family.

[130] There would be no obvious physical features on a body at autopsy of in cases of deaths from arrhythmias caused by CED shocks (unlike tissue damage from a burns electrocution, for example). Any effect on the heart rhythm could in theory only be measured by an electrocardiogram at the time of the shock. Similarly, asphyxia deaths from pressure on the diaphragm, or from possible Taser-induced paralysis caused by contraction of the muscles of the diaphragm, would produce no internal pathology. Thus, as with many sudden deaths, all the circumstances need to be taken into account.

[131] Cause of death findings have been taken from the "Cause of Death" section of autopsy reports. Amnesty International has not tried to interpret the precise role of any of the elements listed there. (In some cases the multiple number of causes of death listed suggest that these may be a mix of causal and contributory factors, though it is difficult to make an assessment solely on the basis of reading the report.) In a similar way, contributory factors are those listed under the relevant section of the autopsy report. (In one case – that of William Teasley - Taser was listed both as causal and as a contributory factor in a death). Cases in Appendix A where the medical examiner or coroner listed the Taser in the cause of death findings are: James Borden, Roberto Fidalgo Camba, Clever Craig, Nicolas Cyrus, Greshmond Gray, Ronald Hasse, Dennis Hyde, Jacob Lair, William Lomax (inquest testimony), Martin Mendoza, Daniel Quick, Albert Romero, Jose Romero, Gregory Saulsbury, Jorge Terriquez, Darryl Turner, Robert Earl Williams and Ryan Wilson. Some of these findings have been challenged by Taser International and in May 2008 a judge ordered references to the Taser to be deleted from the autopsy findings in the Hyde case (see section 3 (vi) of this report), a decision which the medical examiner's officer is appealing.

[132] Boulder County Coroner's Office, autopsy report (BCCO 1650-06-A).

[133] Report of Autopsy Examination B200801419, Mecklenburg County Medical Examiner's Office.

[134] Spokane County Office of the Medical Examiner, Autopsy Report 05-3076.

[135] Oakland County, Michigan, Office of the Medical Examiner, Autopsy Protocol case no: 07-2897.

[136] Lack of oxygen to the brain.

[137] Office of the Medical Examiner, Gwinnett County, Georgia, Case No: 04G-042.

[138] Deputy Coroner of Anderson County, South Carolina, Charles Boseman, for example, was reported as saying his office received calls from Taser International asking that the stun gun be excluded from his findings in the death of William Teasley; he refused. (cited in re: Taser International Securities Litigation, Consolidated Amended Class Action Complaint for Violation of the Securities and Exchange Act of 1934, United States District Court for the District of Arizona, No. CO5-0115-PHX-SRB, p.37). A Las Vegas County medical examiner is alleged to have partially based his testimony at a coroner's inquest on information supplied by Taser International after the company met with him before the hearing, (Las Vegas Review journal article cited in The Arizona Republic, 2 May 2008).

[139] This is the first case Amnesty International is aware of where Taser International has gone to court to seek a court order to have autopsy findings changed, although it has challenged the findings of medical examiners in a number of wrongful death lawsuits brought against the company. Taser International is also reported to have filed a lawsuit for defamation against a medical examiner who listed the Taser as a cause of death in the death of James Borden in Indiana in 2003; Amnesty International has no information on the outcome of the lawsuit, although a lawsuit against the company in the case was dismissed in October 2005 (http://www.policeone.com/police-products/less-lethal/taser/press-releases/120342/-). The company also said it would seek a judicial review of the findings of the Cook County Medical Examiner who cited the Taser as a cause of death in the case of Ronald Hasse in 2005 (http://www.ipicd.com/docs.Hassecasestudy.pdf).

[140] Final Order by Judge Ted Schneiderman in *Taser International, Inc and City of Akron v Chief Medical Examiner of Summit County, Ohio*, in the Court of Common Pleas, Summit County, Ohio, Case No. CV 2006-11-7421, 2 May 2008, at p.11-12. The City of Akron joined Taser International in the lawsuit after it had been filed.

[141] *Ibid*

[142] *Ibid*

[143] Several weeks after Judge Schneiderman's ruling a jail deputy went on trial for the murder of Mark McCullaugh. The county pathologist who conducted the autopsy stood by his original finding that McCullaugh had died from asphyxiation from the combined effects of electrical, chemical and mechanical pressure on his airways. The officer had elected to be tried without a jury and the judge in the case acquitted him after ruling that the state had failed to prove beyond reasonable doubt that McCullaugh had died of asphyxia or that "any conduct of the defendant" had caused his death. (http://www.ohio.com, 10 August 2008). He found it more likely that death was due to an accelerated heartbeat from the struggle and a history of heart disease. Many of the same witnesses who had appeared for the company in the civil case against the Summit County medical examiner appeared for the defence. It was unclear at the time of writing whether trials would proceed in the cases of several other guards charged with assault in the case.

[144] In the case of Dennis Hyde, the medical examiner informed Amnesty International that there were 30 recorded Taser discharges with a total duration of three minutes (if accepting that each discharge was successful) and that, although the time-line was not well-documented, his death was recorded within minutes of the last shock. She also informed Amnesty International that the blood loss in Hyde's case, which experts for the company had argued was a contributory cause of death, was not enough to amount to an "exsanguination" as her pathologists were still able to get adequate blood from the peripheral vessels and his lividity was quite intense; in exsanguination cases, lividity is pale and there is paucity of blood in the vessels and heart. See also the reference to the testimony of the pathologist in the case of

Mark McCullaugh at note 138, above.

[145] Jeff Jentzen, president of the National Association of Medical Examiners, quoted in The Arizona Republic, "Judge rules for Taser in cause-of-death decisions", May 2, 2008.

[146] www.northcountrygazette.org 8 May 2008, Dr Matthew Stanbrook of the Canada Medical Association, commenting on the case.

[147] As noted under the Studies section in Appendix C, the limited human studies to date have been carried out on small cohorts of healthy police volunteers, in controlled conditions which do not mimic conditions in the field; many are funded by Taser International.

[148] *NIJ Interim Report* June 2008. The report noted *inter alia* that purported safety margins of CED deployment on normal healthy adults "may not be applicable in small children, those with diseased hearts, the elderly, those who are pregnant and other at-risk individuals", stating that the use of CEDs against these populations are not clearly understood and should be avoided where possible.(*Interim Report*, page 4). Its preliminary review also found a link between deaths and extended exposure to CED shocks, while noting research in this area was limited (see also Studies section, Appendix C).

[149] "The possibility that other factors such as illicit drug intoxication, alcohol abuse, pre-existing heart disease and cardioactive therapeutic drugs may modify the threshold for generation of cardiac arrhythmias cannot be excluded", *Statement on the Medical implications of the X26 and M26 Taser*, DSAC Sub-committee on the Medical Implications of Less Lethal Weapons, Dstl/BSC/DOC/803, 7 March 2005; and Holden, Sheridan et al, (2007), cited in Studies section (Appendix C).

[150] "Similarly, other indirect responses to Taser deployment (e.g. arrhythmias precipitated by stress-or exercise-induced catecholamine release) may, in themselves, predispose to an adverse cardiac outcome independently of the primary (electrical) action of the Taser devices" (*ibid*).

[151] See Nanthakumar K, et al and Dennis, Valentino et al, cited in Studies section, Appendix C.

[152] See, for example the testimonies to the Braidwood Commission of Inquiry, Canada, (http:www/Braidwoodinquiry.ca/) of Pat Reilly, electrical engineer; Dr Zian Tseng, cardiologist and electrophysiologist at the UCSF Medical Center; Dr Michael Janusz, heart surgeon at Vancouver General Hospital; Dr Charles Kerr, a specialist in electrophysiology and head of the arrhythmia management program at St Paul's hospital and University of British Columbia (BC). The Braidwood inquiry is an independent public inquiry in BC, presided over by retired appellate judge the Hon. Thomas R Braidwood, QC, which was set up following the death of Robert Dziekanski at Vancouver airport in October 2007. The first phase of the inquiry opened in May 2008 and examined the general safety and use of CEDs in BC. A second phase of the inquiry into the circumstances surrounding the death of Robert Dziekanski following CED use is due to start in January 2009.

[153] See for example the testimonies cited at note 150, above; studies have also shown prolonged Taser shocks caused severe acidosis in pigs (e.g. Jauchem et al, Air Force Research Laboratory, 2006 and Dennis et al, Chicago 2007, cited under Studies section in Appendix C to this report).

[154] See for example testimony of Dr Zian Tseng to Braidwood inquiry.

[155] Jauchem et al, 2006; also Dennis et al, Chicago 2007, 2008, showing CEDs caused heart arrhythmias in pigs, leading to ventricular fibrillation and death in three cases (cited in Appendix C)

[156] *NIJ Interim Report*, page 3.

[157] One of the animal studies, in contrast, found that pigs subjected to two 40-second shocks all developed heart rhythm problems, with two degenerating into fatal VF (see Dennis, Valentino et al). Many of the individuals who died after being struck with a CED were subjected to longer shocks.

[158] Taser International Training Bulletin, 28 June 2005.

[159] Taser International Product Warnings for Law Enforcement; Product Warnings for Citizen; and Instructor and User and Volunteer Warnings, Risk, Liability Release and Covenent Not to Sue, dated 28 April 2008, http://www,TASER.com, site visited 18 October 2008. The warnings state under the relevant sections that "The Taser device can cause strong muscle contractions that may result in physical exertion or athletic/sports-type injuries. In certain instances, this may be serious for some people, such as those with pre-existing conditions, special susceptibilities, or in unusual circumstances. This may also occur in instances where a person has an unusual and/or unanticipated response to the Taser device deployment and/or discharge". The warnings also list various sprain-type injuries that may occur and state that they are "more likely to occur in people with pre-existing injuries or conditions such as pregnancy, osteopenia, osteoporosis, spinal injuries, diverticulitis, or in persons having previous muscle, disc, ligament, joint, bone, or tendon damage".

[160] Tests on 41 X26 Taser models, commissioned by the Canadian Broadcasting Corporation, see page 6 and note 6, above.

[161] See for example, testimony of Drs Tseng and Kerr to the Braidwood inquiry (op cit).

[162] Mc Daniel et al, 2005 (cited in Studies section, Appendix C). The NIJ in its interim report, states that "Research suggests that factors such as thin stature and dart placement in the chest may lower the safety margin for cardiac dysrhythmia" (*NIJ Interim Report*, page 3).

[163] Ventricular Fibrillation (VF) is a potentially fatal disturbance of the heart rhythm involving an uncoordinated series of rapid contractions of the muscle of the heart ventricles, which will cause the blood to cease circulating. Animal studies have shown that pigs suffered VF after exposure to CED shocks (see Dennis et al, Chicago 2007, and Nanthakumnar, Toronto, 2006, cited under Studies section in Appendix).

[164] Testimony of Dr Tseng to the Braidwood inquiry. Pat Reilly, an electrical engineer, gave similar testimony to the inquiry, presenting slides showing the vulnerable period in the heart's cycle, and describing how repeated shocks can lower the safety margins for an arrhythmia in such circumstances.

[165] For example, testimony of Pierre Savard, a biomedical engineer at the Department of Electrical Engineering, Polytechnique Montréal, to the Braidwood inquiry and in a communication to Amnesty International dated 4 June 2008; testimony of Dr Tseng; independent studies including Dennis and Nanthakumar found Taser shocks caused VT in pigs leading in some cases to VF. In one pig, VT turned into VF several minutes later (see Dennis, Valentino et al, 2007). The studies' findings are summarised in Appendix C.

[166] As of June 2008, more than 70 such claims had been dismissed (Taser International website, 13 June 2008).

[167] Taser International news release, 17 January 2008.

[168] Betty Lou Heston et al v. City of Salinas, et al; in the US District Court for the Northern District of California, San Jose Division, No. C 05-03658, Verdict, filed 6 June 2008. The jury did not find that the company "knew or it was knowable by the use of available scientific knowledge" at that time that

prolonged exposure to Taser shocks caused a "substantial" danger of acidosis; it therefore found the company negligent rather than strictly liable for misleading product information. The jury cleared the police officers named in the lawsuit of any responsibility for Heston's death.

[169] http://www.bloomberg.com/apps/news?pid=20601109&sid=aN.vLaQTxHX4&refer=home. The article states that information was obtained from court records showing settlement conferences had been scheduled before cases were registered as dismissed and from interviews with plaintiffs' attorneys and Taser International's legal adviser. Out-of-court or court-approved settlement agreements between the parties are often confidential, which means the details cannot be disclosed. Settlements are often entered into to avoid the cost of taking a case to trial and involve no admission of liability on either side.

[170] Police officers in at least five states are reported to have filed lawsuits against Taser International since 2005, claiming that the company failed to include warnings in its earlier training bulletins of risks of injuries, for example, from muscle contractions.

[171] As noted above, both the M26 and X26 models record the number and timing of firings; the X26 also records the duration of each firing.

[172] Office of the Medical Examiner, Maricopa County, Report of Autopsy, Case: 05-01639.

[173] According to information later revealed during a police internal affairs investigation, Keith Graff had been sitting in a chair playing a computer game when police arrived at the apartment; he tried to leave shortly afterwards after failing to show correct identification and was stopped by an officer. Only a brief struggle took place, during which Keith Graff was shocked almost immediately by one officer and shocked again after he fell to the ground. The whole incident took place just outside the apartment. (Amnesty International's sources included the autopsy report, an article in the Phoenix New Times, 28 June 2007 and information from the attorney for Keith Graff's family.)

[174] Despite the autopsy finding, the City of Phoenix later paid Keith Graff's family $2million in a wrongful death claim; the case was settled out of court without going to trial. No officers were disciplined in the case.

[175] Medical Examiner's Report, Case no: 04G-0402, Office of the Medical Examiner, Gwinnett County, Georgia.

[176] Addendum to the autopsy report, August 2005.

[177] *NIJ Interim Report*, page 6

[178] This report gives selected case examples, including summaries of all known cases where medical examiners found a link between the CED shocks and death. A full list of the 334 cases is available on Amnesty International's website; the list gives brief information on the time-line or circumstances of death, where reported.

[179] Boulder County Coroner's Office Autopsy Report, Ryan Wilson, 21 September 2006, page 2.

[180] Mecklenburg Count ME Office, Report of Autopsy Examination in the case of Darryl Wayne Turner, 30 June 2008.

[181] Report of the Chief Medical Examiner Roger E. Mittleman, M.D., Medical Examiner Department District 19 (St Lucie, Martin, Indian River and Okeechobee Counties) Florida, Case No. 07-19-015, 12 February 2007. The cause of death was given as acute cocaine toxicity, with manner of death an accident.

[182] The FrederickNewsPost.com, 14 June 2008, reporting on the findings of the police investigation.

[183] Office of the Medical Examiner, County of San Diego, autopsy report case no 05-00304. The medical examiner wrote that "the cause of death is best listed as acute hypoxic/ischemic encephalopathy due to cardiopulmonary arrest during law enforcement restraint and following application of a Taser due to excited delirium due to acute cocaine and methamphetamine intoxication" with heart disease a significant contributory factor. The manner of death was classified as "homicide as defined as 'death at the hands of another' to reflect the role of the officers in the death without implying that they intended to cause him harm".

[184] CNN interview with coroner Randolf Williams, broadcast 22 July 2008; interview with Amnesty International on 4 August 2008.

[185] According to the reports of the investigation into the incident, one officer said Shaw appeared to be still breathing after the Taser shocks and another said he found a weak pulse after he was put into the restraint chair; however, this was based only on the officers' accounts, before paramedics arrived when he was definitely found to be pulseless. It appears that Shaw may well have been unconscious when he was placed in the restraint chair: one officer present at the scene testified that he thought he was "faking sleep" and another that he thought he was "pretending to be unconscious" (Washington State Patrol, Criminal Investigation Division, Investigative Report into the case, dated 30 March 2006).

[186] Office of the Medical Examiner, Spokane County, Washington, Autopsy Report No: 05-3076.

[187] James M. Cronin, Joshua Ederheimer, *Conducted Energy Devices: Development of Standards for Consistency and Guidance: The Creation of National CED Policy and Training Guidelines*, published by the US Department of Justice Office of Community Oriented Policing Services and PERF, November 2006.

[188] The study's findings were reported in *Critical Issues in Policing Series*, April 2007, Chapter 5, (p.112-121). The study noted that data was not always complete as the duration of activations of the M26 could not be recorded. It also noted that total duration does not necessarily represent a continuous exposure to CED, but includes cumulative activations.

[189] "*Human Effectiveness and Risk Characterization of the Electromuscular Incapacitation Device – A limited analysis of the TASER*", the Joint Non-Lethal Weapons Human Effects Center of Excellence, 1 March 2005 (HECOE report 2005); animal tests carried out by the US Air Force Research Laboratory showed test animals held their breath during Taser shocks (Jauchem et al, 2005).

[190] Canadian Police Research Center, *Review of Conducted Energy Devices*, 22 August 2005.

[191] Jauchem et al, Air Force Laboratory, 2005, 2006; Dennis, Valentino et al, 2007.

[192] This data does not include the length of each shock which could be longer than five seconds, the default charge which continues even after the officer has released his finger from the trigger. Thus, the figures on the number of shocks may underestimate of the amount of discharge. (Although officers can deploy less than a five-second charge, the five-second cycle appears to be the standard single charge, from surveys and reports of CED use.)

[193] See *Amnesty International's Continuing Concerns about Taser Use*, March 2006, page 4 (http://www.amnesty.org/en/library/asset/AMR51/030/2006/en/dom-AMR510302006en.pdf

[194] *Ibid*, page 9.

[195] The autopsy report in Hammock's case notes three sets of Taser probe marks on his chest and cites police reports that he was shocked five-six times in the chest in dart mode, then drived stunned three more times (Tarrant County Medical Examiner's report, Case no. 050-3238).

[196] Report of Investigation by the Santa Clara Medical Examiner-Coroner, Case No.06-00397.

[197] According to Amnesty International's data, two or more Taser strikes were used in all three of the deaths reported in 2001 (100 per cent); 11 (92 per cent) of the 12 deaths reported in 2002; 15 (94 per cent) of the 16 deaths in 2003; 40 (83 per cent) of the 48 deaths in 2004; 52 (81 per cent) of the 64 deaths in 2005; 56 (76 per cent) of the 74 deaths in 2006 and 39 (59 per cent) of the 66 deaths in 2007. 18 (45 per cent) of the 40 deaths reported betweenJanuary and 31 August 2008 are reported to involve multiple shocks, although data on these cases is not complete. None of these statistics provide the duration of each shock.

[198] T. Wildermuth, "Autopsy: Saenz died of cocaine intoxication", *The Raton Range*, 6 February 2008, reporting on findings of a state police investigation and the final autopsy report.

[199] Office of the Medical Examiner, County of San Diego, Investigative Report, case no. 07-00452.

[200] Jail audio-video tape recording, viewed by Amnesty International.

[201] IACP Model Policy, no. 4, op cit.

[202] *PERF Guidelines* for CED use, No. 3 (cited under 2 (vii) above).

[203] Observation of an Amnesty International researcher attending a UK police Taser training session in July 2008.

[204] Letter from the Special Litigation Section of the Civil Rights Division to Sheriff Kevin Beary, Orange County Sheriff's Office, 20 August 2008 (see also note 127, above).

[205] Strote, J and Hutson, H. R, (2006) "*Taser Use in Restraint-Related Deaths*", Prehospital Emergency Care, 10:4, 447-450. The deaths occurred between January 2001 and January 2005.

[206] *Ibid*, page 448.

[207] Anderson County Coroner's Office, Postmortem Report, Number: 0A-04-0000143. William Teasley died in August 2004 after reportedly becoming disruptive while being booked into a South Carolina jail; he collapsed immediately after being hit with a Taser and was taken to hospital in cardiac arrest and did not regain consciousness (see Appendix A).

[208] Alabama Department of Forensic Sciences, Report of Autopsy, Case No: 01 (A)-02MB-05430, in the case of Clever Craig, aged 46, who died in June 2002 in Mobile, Alabama; he had a history of mental illness and was reportedly shocked at least twice by officers responding to a disturbance at his home, when he refused to drop a barbell weight.

[209] Lucas County Coroner's Office, Ohio, Report of Autopsy, 69-05. Jeffrey Turner, aged 41, collapsed at Lucas County Jail, Ohio in January 2005, after being shocked 4 times after he banged repeatedly on his cell window; he was pronounced dead on arrival in hospital.

[210] Office of the Medical Examiner, District 19, Florida, Case No. 06-19-131.

[211] The medical examiner was quoted in March 2006 (a month after the autopsy report was prepared) as saying that the effects of the Taser shocks "are uncertain at this time and remain under study"

(http:www/tyler.treadway@scripps.com); however no information was given on the role of the Taser in the autopsy report received by Amnesty International in March 2007.

[212] www.TCPalm.com/news, 17 April 2008. The case was still under investigation at the time of writing.

[213] In the medical studies section, (see Appendix C) Amnesty International notes that more research is needed into the effects of CEDs on people with pacemakers or other implanted devices.

[214] *NIJ Interim Report*, page 4.

[215] See Wu et al, 2007 (suggesting risk of VF in humans if barbs strike 2.5cm from the heart's surface); Nanthakumar, 2006: 80% of Taser discharges to chests of pigs "captured" (ie caused a potentially fatal disturbance of) the heartbeat, even when the probes were sited just below skin surface some distance from the heart; no such effect was seen when the probes were placed away from chest; Dennis, Walter et al, Chicago, 2007, 2008 (Cases summarized under the Studies section, Appendix C).

[216] *NIJ Interim Report*, page 3.

[217] E.g. HECOE study, Department of Defense, March 2005, cited in Appendix C. As noted above these results on animals have not been replicated in the limited human studies to date.

[218] Boulder County Coroner's Office, Autopsy Report, Case no 06A-KL-15.

[219] http://news.cinncinnati.com, 24 October 2008, "*Coroner says Taser a factor in death*".

[220] Letter from the Butler County Prosecuting Attorney to Chief Stephan C. Schwein, Chief of the Oxford Police Department, dated 7 October 2008 reporting the findings an investigation by the Butler County Sheriff's Office and a review of the case by his office.

[221] Office of the Medical Examiner, Cook County, Illinois, Report of Postmortem Examination, Case No. 190 of February 2005. Professor Rogde, the forensic pathologist who reviewed autopsy reports for AI, advised that, in her opinion, the methamphetamine levels in Hasse's case were of a common concentration for abusers of this type of drug and might therefore not have been overly important.

[222] Report of Coroner's Physician to the Coroner of Madison County, Illinois, 16 April 2006, case no 06-0555.

[223] Office of the Chief Medical Examiner, State of Maryland, Post Mortem Examination Report, Case no: #07-03164. The medical examiner states that the fact that the downloaded data shows that the Taser was deployed for 23 seconds does not necessarily imply a complete circuit; however, Amnesty International notes that the fact that both probes were embedded in the chest suggests that the circuit was completed.

[224] However, Professor Rogde noted to Amnesty International that the autopsy did find a thermal effect to the skin, suggesting passage of current.

[225] Cao M, Shinblane et al , Taser-Induced Rapid Ventricular Myocardial Capture Demonstrated by Pacemaker Intracardiac Electrograms, *Journal of Cardiovascular Electrophysiology,* Vol 18, August 2007 (see Studies section in Appendix C).

[226] Dr Tseng testified to the Braidwood inquiry that while it cannot be proved at autopsy that someone died from electrical shock to the heart without an ECG at the time of death, a finding of a cardiac arrhythmia in the right temporal frame, particularly if the shock is across the chest, could be assumed to be caused by the shock. The Wu, Webster et al study suggested that necessary conditions for concluding

that the heart was directly electrocuted from a CED device would require the dart landing over or near the heart, and the deceased collapsing within 30 seconds (*Taser Dart-to-Dart Distance that Causes Ventricular Fibrillation in Pigs*, Wu, Webster et al, Biomedical Engineering, March 2007, Vol 54, Issue 3, pp 503-508. and John Webster testimony to Braidwood inquiry, 5 May 2008). As noted above, some experts have suggested a longer delay if shocks caused VT (tachycardia: rapid heart rhythm) which developed into VF (e.g. testimony of Pierre Savard). Amnesty International believes it cannot be excluded that these conditions may have existed in some of the death cases reviewed.

[227] Wu, Webster et al, 2007.

[228] See testimony to Braidwood inquiry in 3 (vii) above.

[229] *IACP, Concepts and Issues Paper on Electronic Control Weapons*, revised January 2005, issued to accompany the IACP Model Policy, August 2005.

[230] *IACP Concepts and Issues Paper*, *ibid*; The IACP Model Policy states that "Center mass of the subject's back should be the primary target where reasonably possible; center mass of the chest or the legs are the secondary targets".

[231] Taser International Volunteer Warnings and Instructor and User Warnings: Risks, Liability Release and Covenant Not to Sue, March 1, 2007.

[232] Taser International Product Warnings, 28 April 2008' http://www.taser.com/legal/Pages/Warnings.aspx (site visited 14 November 2008).

[233] Some chokeholds restrict the airway and can interfere with the flow of blood to the neck. The carotid restraint compresses one or both carotid arteries and/or jugular veins without compressing the airway but can cause unconsciousness within seconds by restricting the flow of blood to the brain. The lateral vascular neck restraint involves compression of the carotid arteries and jugular veins on the side of the neck by placing an arm around the subject's neck from behind. Stimulation of the carotid artery can also lead to low heart rate and possible death. Some departments do not authorize chokeholds (e.g. the New York, Chicago, Philadelphia, Detroit and Houston police departments); others permit use of chokeholds such as the lateral vascular neck restraint only if an officer is faced with the threat of deadly force (e.g. Cincinnati, Los Angeles, Miami-Dade and Seattle police departments).

[234] Several others were placed in what is described as a "hobble restraint": this sometimes refers to a less severe form of restraint in which the ankles and wrists are bound but not joined together behind the back; however, the term is sometimes used interchangeably with hogtying.

[235] These include the U.S. Department of Justice NIJ Advisory Guidelines for the Care of Subdued Subjects (June 1995); NIJ Bulletin on Positional Restraint, October 1995; and the Metropolitan Police Complaints Authority (UK), bulletin July 2001.

[236] AI is aware of at least 29 deaths of individuals immobilized in restraint chairs in which subjects are restrained at the wrists, ankles and with straps pulled across the chest.

[237] Transcript of inquest held in Las Vegas, Nevada on 24 June 2004.

[238] Office of Medical Examiner, Waukesha County, Autopsy Protocol, Case No. 06-1058.

[239] San Mateo County, Office of the Coroner – Investigative Report, Case No. 05-22.

[240] In more than 50 of the 334 cases, use of pepper spray was involved in the arrest.

[241] Since the early 1990s more than 100 people in the USA are reported to have died in custody after being subjected to pepper spray. Most deaths have been attributed by coroners to other causes; however, pepper spray has been found to be a factor in several in-custody deaths. Studies discounting a link between physical restraint and pepper spray have generally been conducted on healthy individuals and do not replicate the type of conditions in the field.

[242] Joseph Stockdale, who died in June 2006, Indianapolis, Indiana (he was reportedly treated at the scene for pepper spray effect, and died while waiting for transportation). Cause of death was given as agitated delirium with cocaine intoxication, manner of death accidental (AI has not seen the autopsy report).

[243] AI has not seen the autopsy report in this case and does not know whether any findings were made regarding the role or otherwise of the Taser strikes and pepper spray. The decedent reportedly had no drugs other than alcohol in his system, http://www.wreg.com/global/story.asp, 6 December 2006 "*No drugs except alcohol in Taser death of Memphis man*".

[244] Testimony of county pathologist at trial of a deputy charged with murder in the case, see 3 (vi) above.

[245] Office of the Medical Examiner, County of Santa Clara, Report of Autopsy, Case no. 05-04036.

[246] Report of Coroner's Physician to the Coroner of Madison County, Illinois, case 06-0555.

[247] *PERF Guidelines* for CED use, guideline 16.

[248] Taser International warns in its training bulletins that electrical stimuli can induce seizures in some individuals, particularly if the darts strike the head.[248] Amnesty International is concerned that shocks may also exacerbate the situation if someone has suffered a seizure, whatever the cause.

[249] The Florida Times-Union, 13 February 2007, "State rules Taser death homicide".

[250] *ibid*

[251] Information from Epilepsy Foundation, op cit at note 78.

[252] *Take Another Look: Police Response to Seizures and Epilepsy*, Epilepsy Foundation (site visited 9 July 2008).

[253] Information from Reporter's Transcript of Coroner's Inquest into the death of Ryan Rich, held in Las Vegas, Nevada on 18 April 2008.

[254] Testimony to the inquest, op cit.

[255] Another doctor, who witnessed the incident and stopped his car to help, testified at the inquest that Dr Rich appeared "dazed" and was "looking straight ahead" while still in the car; once he was pulled out of the car, he "just seemed to be very unresponsive, not knowing where he was, didn't respond to the verbal commands the officer gave him". He said the man started walking into traffic and was shocked when he failed to comply with verbal commands to lie on his stomach.

[256] Associated Press, 16 May 2007 "*Death of Spokane man hogtied, tasered by police raises questions*"; http://www.spokesmanreview.com/tools/story_breakingnews_pf.asp, 7 July 2007, "*Yohe death ruled homicide*"; http://www.emsresponder.com, 25 July 2007, "*Report: Spokane Medics, Deputies Disagreed on Restraints*" (describing police investigation report). Amnesty International did not see the autopsy report in this case.

[257] Similar to a hogtie restraint.

[258] Autopsy Report, Department of Coroner, Los Angeles, CaliforniaCase No. 2002-04388.

[259] Autopsy report, Office of the District Medical Examiner, District 21, Florida, Case No. 00884-2004.

[260] Information from police sources cited in Autopsy Report, Department of Coroner, Los Angeles, California, Case No. 2002-05488.

[261] Case described in Amnesty International report, *Excessive and Lethal Force?* page 48. Sources include Autopsy Report, Arapahoe County Coroner's Office, ACCO#03A278 and report from paramedics attached to the Glendale Fire Department who responded to the scene.

[262] The other two cases are Christopher Hernandez who died in December 2004, after being shocked and pepper sprayed, and Stefan McMinn, who died in November 2007. In Hernandez's case, the medical examiner listed cause of death as cardiac arrest due to drugs and his medical condition. The cause of death in Stefan Minn's case was given as undetermined but the medical examiner is reported as saying the likely cause was the cocaine and alcohol in his system and sickle cell disease.

[263] Medical Examiner Report, Office of the Medical Examiner of Travis County, Texas, Case No. ME-05-1805.

[264] Report of Autopsy conducted by Werner U. Spitz, M.D., dated 4, April 2005.

[265] naplesnews.com 20 November 2007, "Sheriff's Office exonerated deputy involved in Taser incident".

[266] *ibid.* Other sources include FOX4 Investigation-Nazaire Report, 20 November 2007.

[267] The police department's internal review board found that the actions of the arresting officers were "determined to be within state and federal laws and within departmental policy": public statement by the Bakersfield Police Department, 23 August 2007, "*Board Review of In-custody Death*", 23 August 2007.

[268] http://www.kait8.com/global/story.asp, 5 October 2006, "*Bay Man Dies While Being Arrested by Craighead County Deputies*".

[269] The New York Times, 18 July 2004, Alex Berenson, "*As Police Use of Tasers Rises, Questions over Safety Increase*".

[270] Press release from the Sonoma County District Attorney, 5 June 2008, www.sonoma-county.org/da/press_release/2008.

[271] http://www.wapt.com/news, 2 May 2007.

[272] The Valdosta Daily Times, 16 November 2007.

[273] Case cited in *The Need for Safer TASER Policies in North Carolina*, a report by the North Carolina Taser Safety Project, published in April 2008. According to this report, compiled by the North Carolina Civil Liberties Union and others, the county refused to release a videotape of the incident or the police use of force report. However, a public records request revealed that the officer involved was promoted several months after the incident.

[274] http://www.dallasnews.com, 20 June 2007, "Taser may have set man on fire".

[275] Examples of such use would include armed stand-offs where there is an opportunity for the subject to

be safely disabled by a projectile stun weapon, or where the target has immediate access to a gun of other dangerous weapon and can be disabled safely (including cases where the subject is armed with a bladed instrument, where a less lethal projectile weapon may be effective in preventing physical contact). Amnesty International recognizes that there may be certain exceptional circumstances in which a CED might be effective in preventing a life-threatening injury where recourse to police firearms would never be justified, as in the case of an individual at imminent risk of serious self harm; such a situation would apply where there are no reasonable alternative preventitive measures available.

[276] Principle 7 of the Basic Principles states that "Governments shall ensure that arbitrary or abusive use of force and firearms by law enforcement officials is punished as a criminal offence under their law".

[277] This is based on current CED models which provide a five-second default charge which can be interrupted before five seconds by engaging the safety switch.

[278] Amnesty International notes, in this regard, the recommendation of Civil Rights Division of the US Justice Department to the Orange County Sheriff's Department in August 2008, that "policy should clearly state that one standard cycle (a full five seconds) is often unnecessary to achieve compliance. Compliance can often be achieved two to three seconds into the deployment cycle, especially with an arrest team prepared to secure the subject under force".

[280] In a deposition on 3 March 2005, Dr Ronald Kohr, the medical examiner, acknowledged not having all of Borden's medical history at the time of the autopsy and that someone with Borden's history (including diabetes, obesity, hypertension, bi-polar disorder and a history of transient ischemic attacks) could be at risk of sudden cardiac failure without use of a Taser. He also conceded that claims that a deputy had applied pressure to Borden's neck could have impaired his cardiopulmonary function, but stated that the evidence for this was inconclusive. He acknowledged that the high concentrations of ephedrine and promethazine were potentially fatal (drug intoxicaton was included in the cause of death) but noted that blood concentrations could be redistributed after death and are not necessarily conclusive. This was also a point noted by the forensic pathologist who reviewed the autopsy for Amnesty International in 2004; she found the death might be related to the stress of Taser shocks, in combination with Borden's heart disease (see *Excessive and Lethal Force*?, op cit, page 48).

[281] Asystole means an absence of heartbeat or cardiac electrical output.

[282] http://www.ipicd.com/docs/Hasse_Case_Study.pdf

[283] Sources: "*Nevada Man Dies in Struggle with Authorities, Taser Involved*", Associated Press, 16 September 2004; Arizona Republic, 17 September 2004.

[284] See note 276 above for definition of asystole.

[285] According to press reports, testimony at the inquest hearing indicated that the Taser was fired at least 11 times (PRNewswire, April 16, 2007) although the exact number is not given in the autopsy report.

[286] Orange County Register, 3 March 2008.

[287] http://www.tbnweekly.com, 10 July 2007

[288] Final Order by Judge Ted Schneiderman in Taser International et al, v Chief Medical Examiner of Summit County, Ohio, 2 May 2008.

[289] "*Coroner Probes Role of Stun Gun in Suspect's Death*", AP, 6 January 2005.

[290] Ventricular fibrillation is a severe disturbance of the heart rhythm during which the heart pumps little or no blood; if the arrhythmia continues for more than a few seconds, blood circulation will cease. This can lead to cardiac arrest and death.

[291] McDaniel WC, Stratbucker RA, Smith RW: Surface application of Taser stun guns does not cause ventricular fibrillation in canines, study presented at Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2000; In 1996 Dr Stratbucker (a former Medical Director of Taser International) tested the Air Taser (a lower-powered predecessor to the M26), using several times its output, on the heart of an anaesthetized pig.

[292] Nerheim, Roeder and Stratbucker 2003: Cardiac safety of high voltage Taser X26 waveform, proceedings of 25th Annual International Conference of the IEEE; Sherry et al, unpublished studies cited in HECOE report March 2005 (see note 5, below).

[293] "Human Effectiveness and Risk Characterization of the Electromuscular Incapacitation Device – A Limited Analysis of the TASER", the Joint Non-Lethal Weapons Human Effects Center of Excellence, 1 March 2005. (HECOE report, March 2005) The report acknowledges the limitations of the data, the bulk of which was based on material provided by Taser International (including field uses and experimental data), as well as reviews of the literature pertaining to earlier weapons with different electrical wave forms which had limited value in assessing later models.

[294] The HECOE study refers to the Taser as an Electromuscular Incapacitation Device (EMI)

[295] The study noted, in this regard, that, based on animal tests, contraction of the muscles of respiration (diaphragm and inter-costal muscles) from Taser shocks could impair breathing which, if prolonged, could plausibly cause acute respiratory failure; and that acidosis from sustained muscle contraction could also be fatal if lactate production were prolonged and massive "such as might occur with stimulus durations much greater than the 5 seconds". The HECOE report lists the concerns as among a number of potential adverse unintended effects from Tasers "albeit with low probabilities of occurrence", but it may have underestimated the actual risk from prolonged exposure as it notes that the field data provided indicated that "in most cases only one or a small number of five-second applications are needed" and that because the "normal operating conditions for Taser do not include a stimulus duration longer than 5 seconds without operator action ... this is not in the quantitative effectiveness and risk characterization"; Amnesty International's data, in contrast, shows that there have been many cases where individuals have been exposed to multiple or prolonged shocks.

[296] The latter findings have since been released in the peer-reviewed literature: Jauchem JR, Sherry CJ, Fines DA, Cook MC, Air Force Research Laboratory, Human Effectiveness Directorate. Acidosis, lactate, electrolytes, muscle enzymes, and other factors in the blood of Sus scrofa following repeated Taser exposures. *Forensic Sci Int*, 2006 Aug 10; 161 (1): 20-30. Epub 2005 Nov 14.

[297] HECOE report March 2005, Executive Summary p. xvi

[298] Esquivel AO, Dawe EJ et al, "Physiologic Effects of a Conducted Electrical Weapon in Swine, *Annals of Emergency Medicine*, Volume 50, No.5, November 2007. The study exposed 10 healthy, anaesthetized pigs to the standard pulse generated by the Stinger S-400 20 times over a 31minute period. Amnesty International notes that some individuals shocked by police Tasers have been shocked multiple times over a much shorter period, with additional stresses such as physical impairment through drugs or heart disease, struggle or restraint.

[299] Holden SJ, Sheridan RD, Coffey TJ, Scaramuzza RA and Diamantopoulos P: Electromagnetic modelling of current flow in the heart from Taser devices and the risk of cardiac dysrhythmias, *Phys. Med. Bio*, 52 (2007) 7193-7209.

[300] *Ibid*. See also, "Statement on the comparative medical implications of use of the X26 Taser and the M26 Advanced Taser" Defence Scientific Advisory Council Sub-committee on the Medical Implications of Less-Lethal Weapons (DOMILL), Dstl/BSC/803, 7 March 2005, p.4.

[301] Dennis AJ, Valentino DJ, Walter, RJ, Nagy K, et al, Acute Effects of TASER X26 Discharges in a Swine Model, *J. Trauma* 2007, 63: 581-590.

[302] Walter RJ, Dennis AJ, Valentino DJ, Nagy K et al TASER X26 discharges in swine produce potentially fatal ventricular arrhythmias, *Acad Emerg Med*. 2008 Jan; 15 (1): 66-73) http://www.ncbi.nlm.nih.gov/pubmed/18211316

[303] McDaniel, Stratbucker et al, 2005.

[304] Dennis, Valentino et al, 2007, op cit at page 588.

[305] Wu, Webster, et al, "Taser Dart-to-Heart Distance That Causes Ventricular Fibrillation in Pigs", Biomedical Engineering, IEEE Transactions on Biomedical Engineering 2007;54 (3):503-508. The study used a standard length Taser probe of 9.53 mm. Amnesty International notes that Taser International also produces a longer probe of 13.33mm designed to penetrate thicker clothing in cold climates; the organization is not aware of whether tests have been conducted on the dart-to-heart distance of the longer probe.

[306] Webster JG, Will JA, et al "Can Tasers directly cause ventricular fibrillation?" http://www.engr.wisc.edu/bme/faculty/webster_john/4929Taser.pdf, http://www.engr.wisc.edu/bme/faculty/webster_john/EB2006Final.pdf

[307] Valentino et al, 2007, op cit, p588, "...the approximate dart-to-heart distances (5-10cm from the superior dart to the right ventricle and twice this from the inferior dart to the right ventricle) greatly exceeded the average distance of 1.5 cm and the maximum distance of 2.4 cm to the right ventricle where VF was reported by Webster et al. To some extent this may be related to the thinner body wall and smaller thoracic dimensions in our animals (22-46kg) when compared with those (54-75 kg) used by Webster et al".

[308] Nanthakumar K et al, Cardiac electrophysiological consequences of neuromuscular incapacitating device discharges. J. Am Coll Cardio. 2006 Aug 15; 48(4):798-804; abstract at http://www.ncbi.nlm.nih.gov/pubmed/16904552. The study was repeated in 2007 and in 2008, with an article on the findings (which included a critique of other studies) published in the Canadian Medical Association Journal: Nanthakumar K, MD, Massé Peng, S, Umapathy K, et al, Cardiac Stimulation with high voltage discharge from stun guns, *CMAJ*, 20 May 2008, pp 1451-1457.

[309] Lakkireddy D, Wallick D, Ryschon K, et al, Effects of cocaine intoxication on the threshold for stun gun induction of ventricular fibrillation, *J Am Coll Cardiol*. 2006 Aug 15; 48: 805-11. The study, which was supported by a grant from Taser International, found no adverse effects in pigs effused with cocaine (whose stimulant effects are similar to those of epinephrine), and subjected to a five-second stun gun application and suggested that cocaine may protect against arrhythmias in the absence of pre-existing heart problems or other abnormalities. However, a noted by Nanthakumar (2008), the Lakkireddy study did show the CED shocks stimulated the hearts of pigs.

[310] Jeffry Ho, who has conducted Taser International-funded research into CEDs, has reportedly conducted studies using echocardiology to measure heart rhythm on healthy human volunteers during the application of CED shocks to the chest. One such study was presented in an abstract at the Australasian College for Emergency Medicine Winter Symposium in July 2008. The study – which was able to obtain heart rates in all but three of the subjects – reportedly found no evidence of myocardial capture or arrhythmia during trans-thoracic **X-REP** exposure. However, the full study had not been published in the peer-reviewed literature at the time of writing.

[311] New England Journal of Medicine, Volume 353:958-959, 1 September 2005.

[312] Vilke GM, Sloane CM, Bouton KD, Kolkhorst FW, Levine SD, Neuman TS, Castillo EM, Chan TC. Physiological effects of a conducted electrical weapon on human subjects. *Ann Emerg Med*. 2007, Nov; 50 (5): 569-575.Epub 2007.

[313] "Taser study explores effects on people, why some die", *NCTimes.com*, 1 April 2007, Jo Moreland, quoting research team member Gary Vilke.

[314] Vilke, GM, Sloane C, et al, "Physiologic Effects of the Taser on Human Subjects After Exercise", *Ann Emerg Med.* 2007;50:S55.

[315] Letters to the Editor by Jared Strote, MD, MS, and H Range Hutson, MD, *Ann Emerg Med*.52, No.1, July 2008; also in same volume, letter from Eric M. Koscove, MD, Emergency Department, Kaiser Permanente Medical Center, Santa Clara, CA.

[316] See, for example, Ho JD, Dawes DM, Bultman LL, Thacker JK, Skinner LD, Bahr JM, Johnson MA, Miner JR, "Respiratory effect of prolonged electrical weapon application on human volunteers", *Acad Emerg Med*. 2007 Mar; 14(3):197-201.Epub 2007 Feb 5; Ho J, Reardon R, Dawes DM, Johnson M, Miner J (Abstract) (Poster) (Sept 17) Ultrasound Measurement of Cardiac Activity During Conducted Electrical Weapon Application in Exercising Adults; Ho J, Dawes D, Calkins H, Johnson M, (Abstract) (Poster) (Sept 18) Absence of Electrocardiographic Change Following Prolonged Application of a Conducted Electrical Weapon in Physically Exhausted Adults; Dawes DM, Ho J, Johnson M, Miner J (Abstract) (Poster) (Sept 19) 15-Second Conducted Electrical Weapon Exposure Does Not Cause Core Temperature Elevation in Non-Environmentally Stressed Resting Adults; Dawes DM, Ho J, Johnson MA, Miner J, *Forensic Sci Int.* 2008 Apr 7;176(2-3):253-7.Epub 2007 Nov 5; 15-Second Conducted Electrical Weapon Application Does Not Impair Basic Respiratory Parameters, Venous Blood Gases, or Blood Chemistries.

[317] Ho JD, Miner JR, Lakireddy DR, et al, Cardiovascular and Physiologic Effects of Conducted Electrical Weapon Discharge in Resting Adults, *Acad Emerg Med* 2006; 13, 589-95. However, the results of this study have been questioned, for example by Dr Tseng in testimony to the Braidwood Inquiry, Canada on the grounds inter alia that the study only recorded ECG before and after but not during, and did not measure acidosis from arterial blood samples.

[318] "Abstracts of Four Human Studies on the Effects of Taser Electronic Control Devices Presented at the Australasian College for Emergency Medicine Symposium: Studies find Taser Electronic Control Devices, Including XREP, Do Not Significantly Impair Breathing Nor Affect the Human Heart" press release by Taser International, 4 July 2008, studies by Ho, Dawes et al.

[319] Several of the co-authors of the studies cited under footnote 303, as well as being funded or part funded by Taser International, have close links with the company. MA Johnson, co-author of a number of the studies, has presented papers listing him as from the Division of Medical and Technical Research,

Taser International; Drs Ho and Dawes were reported in a medical journal in 2006 as serving as "independent, expert medical consultants to Taser International" and to "own stock shares of the company" . (www.aemj.org/cgi/content/full/j.aem.2006,11,016v1). Dr Ho, Associate Professor a the Department of Emergency Medicine, University of Minnesota, is listed on the faculty's website as serving on Taser International's Scientific/Medical Advisor Board. http://www.hcmc.org/education/residency/emresidency/faculty.htm

[320] In a recent non-blinded study by Ho et al, to test the occurrence of tachyarrhythmia in humans, 34 healthy human volunteers underwent limited echocardiography before, during and after a 10 section TASER X26 application across the thorax; the study reported no adverse events (Acad Emerg Med, 2008).

[321] DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL), Second statement on the medical implications of the use of the M26 Advanced Taser (July 2004), para 14.

[322] *Ibid*. para 14.

[323] Ronnie Pino, who died in December 2004 in Sacramento, California (Sacramento News and Review, 17 November 2005, article by Sasha Abramsky). Amnesty International did not obtain a copy of the autopsy report in this case but the Taser was reportedly not cited as a cause of death.

[324] Lakkireddy D, Khasnis A, Antenacci J, Ryshcon K, Chung MK, Wallick D, Kowalewski W, Patel D, Mlcochova H, Kondur A, Vacek J, Martin D, Natale A, Tchou P. Do electrical stun guns (TASER-X26) affect the functional integrity of implantable pacemakers and defibrillators? *The European Society of Cardiology*, Europace Advance Access published online on 9 May 2007. http://www.ncbi.nlm.nih.gov/pubmed/17491105The long-term effects on pacing, sending thresholds [?] and generator function and the effect of the shock on atrial leads were not evaluated in this study.

[325] Roy OZ, Podgorski AS. Tests on a shocking device – the stun gun. *Med Biol Eng Comput*. 1989; 27:445-8.

[326] Cao M, Shinbane JS, Gillberg MS, Saxon MD. Taser-Induced Rapid Ventricular Myocardial Capture Demonstrated by Pacemaker Intracardiac Electrograms , *Journal of Cardiovascular Electrophysiology*, Vol 18, Issue 8 p. 876-879, August 2007 http://www.ncbi.nlm.nih.gov/pubmed/17573837

[327] *Ibid*, p 879.

[328] HECOE report, p. 24.

[329] HECOE report, p. 40.

[330] A Taser International sponsored study, later published: McDaniel WC, Stratbuker RA, Nerheim M, Brewer JE. (2005). Cardiac Safety of Neuromuscular Incapacitating Defensive Devices. *PACE*, **28** (Suppl):S284-S287.

[331] *Ibid*

[332] DSTL/BSC/27/01/07 dated 30 May 2007:DOMILL "Statement on the medical implications of the M26 and X26 Taser use at incidents where firearms authority has not been granted", paragraph 13.

[333] Dennis, Valentino et al, 2007, op cit

[334] There is one case report of a Taser dart penetrating the skull of a 16-year-old boy; a CT scan of the boy's head "revealed intracranial penetration of the dart and possible dural perforation". The boy was

reportedly unconscious for five minutes; he fully recovered after an operation: Rehman T-U, Yonas, H, Intracranial penetration of a Taser dart, *The American Journal of Emergency Medicine* (2007) **25**, 733.e3-733.e4. The boy's size was not reported but such an incident could be serious in any case, and particularly so in the case of small children.

[335] As noted under Section 2 (v) of the main report and footnote 63 above.

[336] Winslow JE, Boseman WP, Fortner MC, Alson RL, "Thoracic Compression Fractures Secondary to Shock from a Taser Conducted Energy Weapon: A Case Report", *Annals of Emergency Medicine* (online) 4 September 2007.

[337] HECOE report p. 19. It referred to literature showing no difference in the outcome of pregnancies for women accidentally exposed to household electrical shock but noted that only limited animal data are available to assess the effects of Tasers on pregnancy or the developing foetus, referring to an "unpublished study with only summary data available for review" by Taser International reporting that the X26 did not induce miscarriage in either of two pregnant pigs.

[338] Mehle L.E. Electrical Injury from Tasering and Miscarriage, *Aca.Obstet Gynaecol Scan*, 1992; 71:118-23.

[339] A Faraday shield (also known as a Faraday cage) is a container made of a conductor, such as wire mesh or metal plates, which shields what it encloses from external electric fields; the devices are used to protect electronic equipment from such electrical interference as electromagnetic interference.

[340] *Medical Implications for the Use of Incapacitating Devices*, Dstl April 2002. See also the testimony of electrical engineer Pat Reilly to the Canadian Braidwood inquiry into CEDs (following the death of Robert Dziekanski) that the Faraday shield theory "would not apply at all to Tasers" and that "the foetus inside the woman's womb and the fluid surrounding is going to form a continuum, so that the current will be able to access the foetus as it could the other tissues of her body" (Transcript of testimony to Braidwood inquiry, 5 May 2008 at p. 51).

[341] See Amnesty International Report, *Excessive and Lethal Force?*, page 31. Cindy Grippi received $675,000 in damages from the city which employed the police officer who fired the Taser.

[342] "Deputy unaware of pregnancy", Tim Potter, The Wichita Eagle, October 28, 2006.

[343] A summary of the results includes a caveat that the reported incidences of mild injuries likely underestimates the true incidence of minor abrasions, contusions, etc http://www.calgarypolice.ca/news/pdf/2007-LLW%20Study%20 ACEP%20Poster%20(Hi%20Res).pdf.

[344] http://www1.wfubmc.edu/news/NewsArticle.htm?ArticleID=2165

[345] This figure is based on the available data in the 334 post CED death cases nationwide between June 2001 and 31 August 2008 recorded by Amnesty International. The figure from the autopsy reports reviewed by Amnesty International is a minimum of 2 shocks per person on average. However, because many autopsy reports did not give accurate figures for the number of CED hits against decedents, this figure is an underestimate. In some cases an autopsy report either gave no figure or under-estimated the number documented elsewhere. For example, in one case (Gordon Randall Jones) there was no mention of CED hits in the autopsy report; other data suggested 13 hits. In another (Patrick Lee) the autopsy report cited "multiple hits"; other evidence reported this as up to 19 times. These and similar cases would increase the mean number of Taser strikes per individual well above those cited in the Wake Forest study.

[346] http://www.ojp.usdoj.gov/nij/topics/technology/less-lethal/incustody-death-background.htm

[347] NIJ Special Report, Study of Deaths Following Electro Muscular Disruption: Interim Report, June 2008.

[348] *NIJ Interim report*, op cit, at page 4.

[349] AI provided testimony to the study's medical panel at a hearing in September 2007: USA, Amnesty International's concerns about Taser use: Statement to the U.S. Justice Department inquiry into deaths in custody http://www.amnesty.org/en/library/info/AMR51/151/2007

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‘LESS THAN LETHAL’?
THE USE OF STUN WEAPONS IN US LAW ENFORCEMENT

A 17-year-old unarmed boy collapsed and died shortly after being shocked for 37 continuous seconds with a police Taser. A young doctor, who crashed his car after he suffered an epileptic seizure, died when, dazed and confused, he was repeatedly shocked at the roadside for failing to comply with an officer’s commands.

These are not isolated cases. More than 300 people have died in the USA since June 2001 after being struck with police Tasers or similar devices. These dart-firing weapons commonly described as “conducted energy devices” (CEDs) – deliver a high-voltage electric shock; they can also be used close-up as stun guns.

This report shows how CEDs are potentially lethal and open to abuse. While in most cases coroners have ruled that deaths were due to other factors, medical examiners have found CEDs to be a cause or contributory factor in more than 40 deaths nationwide; in other cases the role of the weapon was unclear.

Amnesty International believes CEDs should be suspended unless strictly regulated. It is calling for these weapons to be restricted to use by trained officers and only in situations where they are necessary to protect life and avoid the use of firearms.

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