TASER RELATED INJURIES: FACT OR FICTION

Jeff Barfield

Abstract

The implementation by law enforcement agencies of the Electronic Control Device commonly known as a "Taser" has significantly reduced injuries sustained by officers and uncooperative arrestees during an incident. The reduction in injuries can be attributed to the Tasers use as an effective alternative to other traditional methods of gaining compliance such as hands on physical force, baton strikes, or chemical agents. Less injuries sustained equals money saved for the liable agency.

However, with innovation comes controversy. A review of the research material will present different sides of the argument possibly influencing the future use of Tasers in law enforcement. The research information will show that some medical experts support the opinion that being shocked by a Taser can result in death.

Introduction

The evolution of professional law enforcement agencies today is directly influenced by their ability to adopt and apply new technology. Advancements in information processing and weapon systems remain at the forefront of innovation.

Firearms, combined with less-lethal intermediate class weapons including chemical sprays, batons, and electronic control devices (ECDs) also know as "Tasers" are standard issue items for many law enforcement agencies. Weapons systems have reached a new level of effectiveness thereby setting a new standard in the industry complete with associated controversies.

The ECD is commercially available in both law enforcement and civilian models. Law enforcement and society in general, typically refer to an ECD weapons system as a "Taser". As a result, the word Taser is used interchangeably throughout this research paper when referring to an ECD. In reality, "Taser" is actually a manufacturer's brand name and a registered trademark for their own products.

The purpose of this research information is to determine if law enforcement agencies in general, have experienced a reduction in injuries and the resulting cost savings since their Taser implementation. The supporting theory is a reduction in injuries sustained by officers and arrestees results in less medical related expenditures for the liable agency. A recognized nationwide study examining the safety of Tasers confirmed this point stating "the devices are safe, causing a low occurrence of serious injuries." (ScienceDaily, 2007)

To accomplish this task, this research paper will focus primarily on establishing any patterns of injuries or lack of injuries sustained by officers and subjects while utilizing a Taser during an arrest situation. This information was obtained from independent Taser related studies conducted by subject matter experts posted on and selected by Internet research. In addition, an inter-agency survey was conducted targeting the Highlands County Sheriff's Office (HCSO) to

capture a variety of Taser deployment information topics including frequency, injuries sustained, and officer confidence levels.

For reader familiarization purposes, a common law enforcement Taser device is Taser International's Model X-26. It is a pistol type device designed to deliver a low amp, high voltage shock, temporarily incapacitating a noncompliant subject. This allows an officer a brief period of time to gain control of a subject with minimal hands on force. The dart firing Taser can be deployed by direct contact, or from a distance of up to 35 feet away from a subject.

A Taser would typically be issued to an officer who has a high likelihood of contact with suspects such as a patrol officer, or a detective working the streets. The spontaneous nature of the patrol environment requires an officer to be prepared at all times to respond to an endless variety of potentially dangerous situations.

This research indicates that officers, who have deployed a Taser during a hostile encounter with an uncooperative subject, have a high probability of sustaining minimal or no injury during the incident.

Literature Review

In the article entitled "Medical Consequences Of Police Use Of Force During Restraint Examined" the author reviews a study of medical records conducted Dr. Jared Strote of the University of Washington Medical Center. The purpose of the study was to determine injuries associated with law enforcement use of conducted electrical weapons, and use of force. (Wiley-Blackwell, 2009)

To collect the necessary data, the scope of the study targeted almost nine hundred (900) patients who were subdued by the Seattle Police Department with the use of a Taser type device, over a six (6) year period. The research revealed that slightly over one percent (1%) of the arrestees sustained injuries requiring admission to a hospital. There were two (2) deaths recorded during the research period that was attributed to firearms. The research did indicate that some arrestees did exhibit signs of excited delirium, however it did not say how many.

Dr. Strote presented his research results to the Trauma Forum at the 2009 SAEM Annual Meeting in New Orleans, on May 17, 2009. In summary, the results indicated that individuals experiencing use of force through being subdued by use of a Taser type device rarely sustained injury. According to Dr. Strote, related findings include a high use of drug and alcohol and a psychiatric history among the arrestees.

This research project led to an article titled "Tasers Used By Law Enforcement Are Safe, Review Suggests". (ScienceDaily, 2007) The article describes a large independent study of Taser related injuries.

According to Doctor William Bozeman, who was the lead investigator for the study, the purpose of the study was to "reliably assess the overall risk and severity of injuries in real world conditions". Doctor William Bozeman is an Emergency Medicine Specialist at Wake Forest University School of Medicine.

The study captured data related to physical injury resulting from the deployment of a Taser by law enforcement officers, while taking nearly one thousand (1000) subjects into custody. This study was designed to determine the medical effects of Taser deployments. To facilitate the study, a tactical physician reviewed medical records at each one of six (6) participating law enforcement agencies from across the nation.

Taser related injuries were identified as mild, moderate, or severe. Injuries were then classified by relationship to the Taser as direct, indirect, or uncertain. The study results showed that ninety nine point seven percent (99.7%) of those subjects studied, sustained only mild injuries consisting of scrapes and bruises or no injuries at all.

Only two (2) subjects sustained a head injury both of which occurred during a fall. One subject was admitted to the hospital days later for a total of point three percent (.3%) injuries requiring hospitalization for their injuries among the target group. Two (2) subjects died however the deaths were not related to the Taser deployment.

Doctor Bozeman presented the results of the study to the Emergency Physicians' Research Forum in Seattle, Washington on October 8, 2007. The study results proved the safety of the Taser device crediting them with decreasing injuries to both law enforcement officers and suspects.

In the article entitled "In Taser Targeting", the author Dr. Jeffrey Ho, evaluates Taser International's own Training Bulletin including their recommendation that officers avoid targeting the chest area when deploying a Taser. Originally, this was a common practice as outlined in Taser International's own lesson plan utilized for law enforcement training. The preferred targeting zone for the Taser is currently and has always been the back of the subject for best practice recommendations. This is a risk management related recommendation. (Ho, 2010)

The preferred target zone is based on the large amount of muscle mass in comparison to the chest, thereby more likely to incapacitate a subject. Dr. Ho states, "The bulletin was based on evolving knowledge of the research available and from field experiences with the Taser devices." (Ho, 2010).

Safety concerns relating to the manufacturer's claims regarding the power generated by a Taser type device combined with the potential to cause death, have been questioned for years and are surrounded by controversy. A Journal Study authored by Electrical Engineer James Ruggeri claimed that the energy from a Taser stun gun was actually thirty nine (39) times more powerful than the manufacturer claimed. (Arizona Republic, 2006)

Ruggieri's Journal Study was published in the Journal of the National Academy of Forensic Engineers (specifics not cited in the article). Ruggieri stated the shocks generated by a Taser have enough power to cause "fatal heart rhythms", and should be placed in the lethal category. Taser International, the manufacturer of record, did not agree with Ruggieri's findings stating they were exaggerated, beyond the laws of physics, and based on junk science.

In reference to credibility, according to the article, Ruggieri's resume indicates he has a Masters Degree and is a Professional Licensed Engineer in five (5) states. The results of his Journal Study were reviewed by an independent Electrical Engineer named Robert Nabours, who has degrees in electrical engineering from Stanford and the University of Arizona. Nabours said "Ruggieri's conclusions are credible and based on scientific principles." (Arizona Republic, 2006)

The article cited other independent tests resulting in multiple conclusions supporting opinions on either side of the debate. According to the article, Taser International hired a lab named Exponent of Phoenix. They were not able to duplicate Ruggieri's results. Exponent Electrical Engineer Ashish Arora conducted tests showing the "stun gun measured at or below specifications." It could almost be considered as answer shopping depending on what your agenda might be. (Arizona Republic, 2006)

Taser International said its products are safer than Tylenol. This claim led to an article entitled "CBC Investigates Tasers: Are They Really Safer than Tylenol?" published by

NowPublic (Crowd Powered Media), that further explores the safety of the Taser. This was done in response to a moratorium request from the human rights group, Amnesty International. The moratorium request was based on the CBC (News and Radio Canada) findings that some of the stun guns tested delivered a "higher level of electricity than the manufacturer claimed". (Mitchell, 2008)

The U.S.-based lab National Technical Systems conducted tests to determine the energy level of a sample group of Tasers. The tests targeted forty one (41) Model X-26 Tasers manufactured by Taser International. This is a very common model used by law enforcement agencies to include your writer's agency. To collect data for the test, the Model X-26 Tasers were collected from seven (7) Police Departments in Canada, and fired six (6) times each. Four (4) of the forty one (41) Tasers tested produced up to fifty percent (50%) stronger current that Taser International claimed was possible. (Mitchell, 2008)

A Biomedical Engineer named Pierre Savard from the University of Montreal, prepared the testing method based on Taser International's specifications. Savard stated that the variations in current strength could be caused by faulty quality control, or deteriorating electrical components. Savard was outspoken about his opinion stating "When you combine an increased current intensity with a dart that falls right over the heart for somebody who has cardiovascular disease or other conditions such as using drugs, for example, it can all add up to a fatal issue."

Taser International officials responded by acknowledging that the four (4) Tasers appeared to be outliers. They went on to claim that they "hope the CBC will focus on the proven injury reductions law enforcement experience with this technology rather than using engineering minutia to confuse the viewer and create a false sense of controversy". (Mitchell, 2008)

Methods

Information contained in this research paper intended to target Taser related injuries, was collected from multiple sources, with the majority of the literature review article material being selected from the Internet. Additional sources include Highlands County Sheriff's Office General Orders with accompanying lesson plans relating to Taser training, and Taser International's lesson plan.

Initial research revealed that the Internet offered thousands of articles and studies for review. In response, collection of the research information was restricted to a narrow scope intended to capture studies and opinions from leading experts. Research information from all sources contained in this research paper was obtained during the months of January through March, 2010.

This research paper focuses on three (3) main categories of special interest to include the following: Reduction in officer related injuries, reduction in arrestee related injuries, and expert opinions on the safety of Taser deployments. In order to remain objective in the presentation of fact, information was selected to represent opinions from a diverse selection of subject matter experts. Some of the articles reviewed include statistic results based on long term studies by independent medical professionals.

To obtain technical data and manufacturer standards, descriptive specifications were obtained from Taser International through published manuals and lesson plans. Taser International is the manufacturer of record for the majority of ECDs in use today and the sole source for the Highlands County Sheriff's Office.

In addition, an interagency survey was completed to collect information from deputy sheriffs presently working for the Highlands County Sheriff's Office, who carry a Taser in the field. (See Appendix A) The survey instrument was distributed on March 11, 2010 and collected at random ending on April 9, 2010. (See Appendix A) The purpose of the survey was to solicit the target population's response regarding their opinion on the performance and reliability of the ECD.

The survey consisted of a variety of questions to solicit and record the deputy's opinions on Taser dynamics, and their confidence levels. The survey was conducted by use of a written survey instrument produced in hard copy format. The survey was then blindly circulated by bulk placement of sixty (60) copies in common area locations for random pick-up. The survey targeted the response of fifty (50) sworn law enforcement and detention deputies with restriction on rank. The completed surveys were returned by placement in one of two (2) mail boxes, or placed in an envelope for final analysis. Thirty five (35) of sixty (60) surveys were returned and analyzed. The final percentage figure of all question categories was calculated by rounding the percentage up to the nearest one hundredth. The final results are represented on two (2) graphs titled Electronic Control Device (ECD) Survey.

Strengths of this research paper include definitive answers to the target questions. The availability of high quality research material is excellent as demonstrated by the number of informative articles projecting a variety of opinions. This makes it clear the importance of ethical research soliciting varying opinions from subject matter experts. Failure to be objective can taint the research results and compromises the validity of the final research results.

Weakness could be considered the relatively few number of medical studies cited in literature review of this research paper when there are so many more available. This reduced selection was necessary to complete the assignment in the compressed time frame, however, resource intake would be expanded for any future studies on this subject.

Results

During the data collection process, sources of Taser related test study data were identified including documented responses from Taser International, which is the manufacturer of record. All independent study sources selected and cited for this research paper, were conducted by subject matter experts who are independent of Taser International. The data was then analyzed by review, then paraphrased to present objective opinions from a variety of independent sources.

In general, the study results indicate that the use of Tasers has resulted in a reduction of injuries sustained by law enforcement officers and arrestees during a use of force situation. Some of the studies indicate that Tasers do have the potential to malfunction and when combined with other factors can add up to a fatal issue.

Independent Study Results

The results of the research produced expert conclusions based on specific studies. Doctor Jared Strote of the University of Washington Medical Center studied nine hundred (900) patients subdued by the Seattle Police Department by use of a Taser over a six (6) year period. Doctor Strote concluded that only slightly over one percent (1%) of arrestees studied sustained any injuries requiring admission to a hospital for treatment. There were a total of two (2) deaths recorded during his study as a result of gunshot wounds. He states that some arrestees exhibited

signs of excited delirium but did not state a definitive number. His final conclusion was that individuals being subdued by use of a Taser type device rarely sustained injury.

Doctor William Bozeman, an Emergency Medicine Specialist at Wake Forest University School of Medicine, conducted a large independent survey of Taser related injuries in real world conditions. His study incorporated six (6) participating law enforcement agencies located throughout the United States.

Doctor Bozeman studied the medical records of nearly one thousand (1000) arrestees taken into custody involving use of force. To analyze the records he categorized the arrestees into three (3) groups of injuries consisting of mild, moderate or severe. He then classified the injuries by relationship to the Taser deployment as direct, indirect, or uncertain. His final analysis revealed that ninety nine point seven percent (99.7%) of injuries were classified as mild consisting of "scrapes and bruises or, no injuries at all". Less than three tenths of one percent (.3%) of arrestees sustained any injuries requiring hospitalization.

Two (2) subjects did die during the study period although the deaths were not related to a Taser injury. Based on his completed study, Doctor Bozeman concluded and credited the Taser device with decreasing injuries to both law enforcement officers and suspects.

James Ruggieri, a Licensed Engineer in five (5) states, authored a Journal Study relating to the power output of a Taser. His Journal Study was published in the Journal of the National Academy of Forensic Engineers. In his opinion, a Taser produces enough power to cause "fatal heart rhythms" and therefore should be classified as lethal. He claims that the energy from a Taser stun gun was actually thirty nine times (39) more powerful than the manufacturer claimed.

In response, officials from Taser International, which is the manufacturer of record, stated that Ruggieri's findings were exaggerated and beyond the laws of physics. They went on to state that his findings are based on junk science. Ruggieri's Journal Study results were reviewed by an unnamed independent Electrical Engineer who states that Ruggieri's conclusions are based on scientific principals and are credible. Other independent tests did support opposing opinions casting doubt on the results with no clarity of fact.

During December of 2008, a human rights group named Amnesty International submitted a moratorium request to Taser International in reference to claims of the high level of electricity produced by their Model X-26 Taser.

The request for information was prompted on a report by CBC (News and Radio Canada) which stated that some of the Tasers they tested delivered a higher level of electricity than the manufacturer claimed. Independent testing was conducted by a U.S.-based lab National Technical Systems. During the testing, forty one (41) Model X-26 Taser International Tasers were checked. Interestingly the forty one (41) Tasers for the testing were collected from seven (7) separate Canadian Police Agencies and were fired a total of six (6) times each.

The test revealed that four (4) of the Tasers tested did in fact produce up to fifty (50%) percent more current than Taser International claimed was possible. The testing was conducted to Taser International's specifications by a University of Montreal Engineer named Pierre Savard. He concluded that the differences in the strength of the current by the four (4) Tasers could be caused by deteriorating electrical components. Savard stated that the increased current when applied over the heart when combined with cardiovascular disease or drug use could add up to a fatal issue.

Taser International Training Bulletin

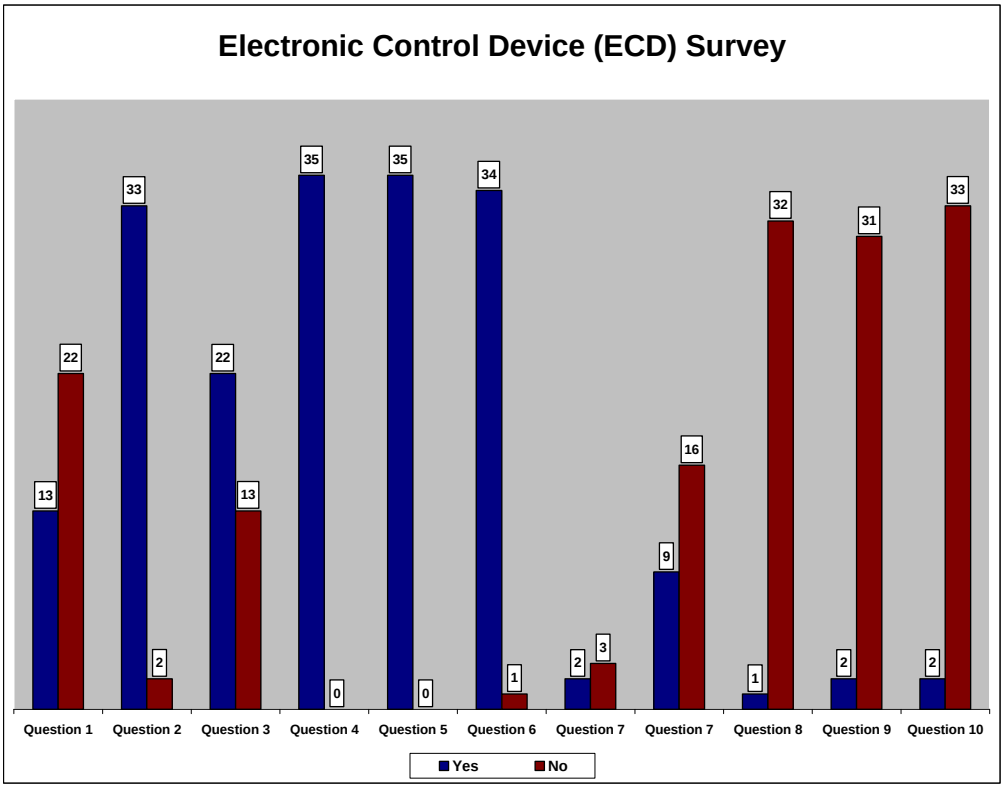
During 2009-2010, Taser International published a training bulletin updating their recommended targeting area for Taser deployment. Originally the chest area was outlined as

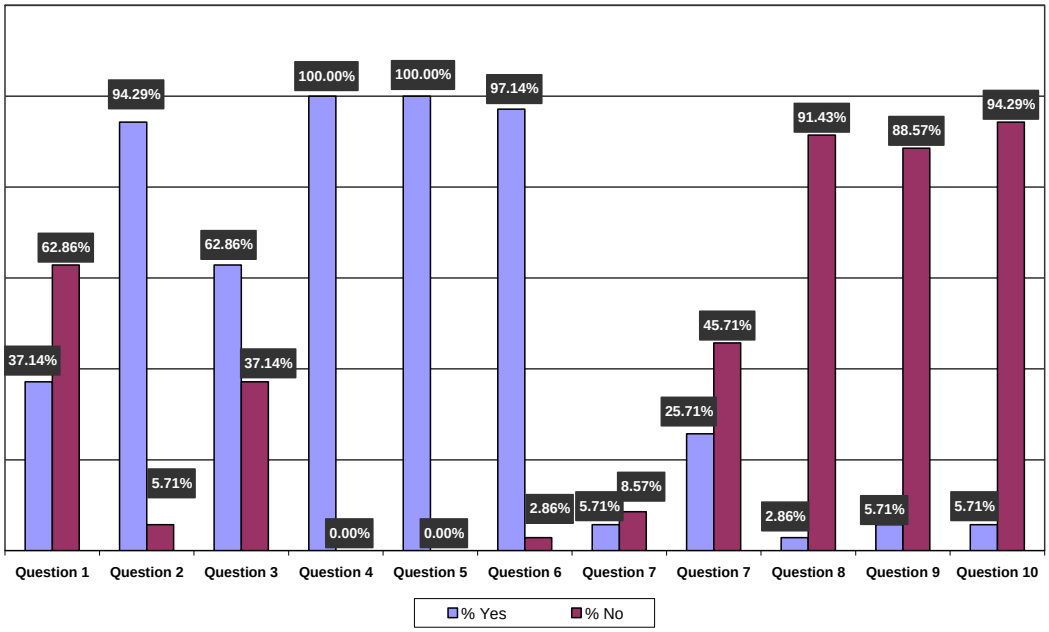
common practice in their own lesson plan. New revisions now recommend that officers avoid targeting the chest area when deploying their Taser. Since shot placement is critical, they maintain that their best practice recommendation has always been and currently is a subject's back area. This is due to the large amount of muscle mass located in the back area which is more likely to temporarily incapacitate a subject. This knowledge and the resulting recommendation are based on "evolving knowledge".

Survey Instrument Results

A survey instrument was utilized to gather answer responses to ten (10) Taser related questions submitted by thirty five (35) deputies from the Highlands County Sheriff's Office (HCSO). The responding deputies were sworn members from the Detention and Law Enforcement Bureaus of undetermined rank. When asked the question if they had ever deployed their Taser while on duty, only thirty seven point one four percent (37.14%) responded yes. One hundred percent (100%) responded yes that they feel the implementation of Tasers at the HCSO has resulted in a reduction of injuries sustained by deputies and arrestees while affecting an arrest.

Forty five point seven one percent (45.71%) responded that seventy six percent (76%) to one hundred percent (100%) of uncooperative arrestees complied with there lawful commands after being warned of an impending Taser deployment. Only two point eight six percent (2.86%) responded that they have ever sustained any level of injury caused by an arrestee after a successful Taser deployment.





Discussion

The results of this research material indicate that Tasers do indeed contribute to the reduction of injuries sustained by both law enforcement and subjects during an arrest situation. This is accomplished through minimizing the necessity of hands on use of physical force accomplished by the temporary incapacitation of an arrestee. The brief incapacitation period generally allows an officer to secure the subject. Under favorable conditions, the Taser is capable of delivering multiple short interval shocks as necessary to secure a subject.

A Taser implementation program contributes to the creation of a three tier benefit cycle which is realized by the law enforcement agency. The cycle consists of a reduction in physical altercations, equals a reduction in injuries, equals fewer dollars spent on medical bills. To offer a purchase price for comparison purposes, a new Taser International Model X-26 Taser sells for approximately twelve hundred dollars ($1, 200.00) complete with an extended warranty. Based on a real numbers comparison, a single emergency room visit for a minor injury could easily exceed the purchase price of a Taser. The use of a Taser can still result in or be a contributing factor to an in custody death. Other elements were discussed that influence the effect such as drug and alcohol use and excited delirium syndrome. Research material reveals that in some professional opinions, shot placement of actual Taser darts can add to the severity and or results of the deployment. Case in point Pierre Savard's opinion that a dart placement near the heart area in combination with cardiovascular disease or drug use can add up to a fatal combination.

Taser International should be commended for conducting research prompting them to change recommended targeting areas from original locations based on data obtained. This is an

example of the importance of data collection occurring over an extended time period which, did not exist at the time of early implementation and Taser marketing.

Based on the survey instrument incorporated into this research, the results support the conclusion that the mere suggestion of an impending Taser deployment has an influence on the direction of an arrest situation. Perhaps this intimidation factor can be attributed to the public's growing knowledge of a painful shock as portrayed in the media, combined with personal experience for those who have previously been shocked by a Taser device. All deputies participating in the survey felt that a reduction in deputy and arrestee injuries has occurred since they were issued Tasers. The majority also felt confident with their training and the capabilities of the Taser.

This research paper is a condensed, miniature version of what a comprehensive research paper on Taser related injuries could contain. The fact is there is so much material available for review an author would only be limited by their own time, volume and resource limitations to present facts necessary to satisfy their intended purpose of the research paper.

In addition, due to the absolute quantity of material available for review, an author could actually make selections based on preconceived notions or a desirable outcome of what they want the results to be. By hypothetical example: A police chief wanted a staff member to complete a research paper on injuries sustained by arrestees by a Taser deployment during an arrest. Special instructions were given to the member by the Chief to make the final results support the conclusion that very few injuries are sustained. This is easily manipulated through selection of articles and or studies that support the desired conclusion otherwise known as answer shopping.

This makes it clear the importance of ethical research soliciting varying opinions from subject matter experts. Failure to be objective can taint the research results and compromise the validity of the final research results.

During this research project no data depicting the actual savings in dollars realized by an agency through lack of paying for physical injury was located. This would indicate that tracking mechanisms are not in place to capture data for that purpose. Perhaps this concept has created a whole new category of statistics that would require a custom made software program with a pre-established baseline for tracking if deemed necessary for a future study. Studies cited did capture the number of injuries that did occur to a target group, but no dollar amounts associated with injuries were identified.

Based on the data collected, the results of this research paper represent a clear conclusion providing answers to the target questions. The facts indicate that through the implementation of Taser type devices by law enforcement agencies, a substantial reduction has occurred in relationship to physical injuries to both officers and arrestees. Injuries are fewer in numbers and lesser in severity.

Regarding the large scale studies cited, the numbers of arrestee deaths occurring were a result of other factors with zero deaths being conclusively caused by or a result of a Taser deployment. The cost savings to law enforcement agencies due to reductions in injuries is substantial however; no definitive method of capturing those statistics was identified during this research paper.

Whether you support the concept of Taser type devices or not, the fact is they work the majority of the time. The days of arresting an uncooperative individual by use of hands on physical force or other less lethal options have almost been eliminated. The downside is law enforcement officers may tend to become dependent on a Taser more than they should. A Taser

is an electronic device and therefore is subject to failure at any time. A Taser should be considered an additional less lethal tool, but not a replacement for others such as chemical agents or batons. A selection of less lethal options should be made based on the unique factors of each qualifying encounter.

Although electronic control devices such as stun guns have been around for decades, they did seem to experience such a high level of media attention as incidents involving Tasers attract today. This public shock factor has been enhanced by the featuring of high profile Taser related incidents skyrocketing to unwanted public fame wherein a Taser was allegedly used improperly. The high profile media blitz of an occasional misused Taser by law enforcement typically publicized in a violent or unnecessary context, attaches a negative stigma to Tasers for some members of the public.

Jeff Barfield has worked with the Highlands County Sheriff's Office since 1994. He has been a supervisor within the Uniform Patrol, Investigations, and Judicial Process Divisions. His Current position is Law Enforcement Bureau Captain over the Judicial Process Division to include Warrants, Civil, and Courthouse operations, and he is the Director of Training, and Range operations. In addition he is the Supervisor of agency wide Accreditation including the Law Enforcement, Administrative and Detention Bureaus. Jeff has a bachelor's degree in Criminology from Saint Leo University.

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Appendix A
Electronic Control Device (ECD) Survey

Survey instructions:

1. **To be completed by Highlands County Law Enforcement and Detention Deputies only.** Please complete the survey by placing a check mark in the appropriate space indicating your response to each question. Use additional space on the back of the survey if needed.

2. Please deliver and deposit the completed survey instrument to Captain Jeff Barfield's mailbox, located at the Highlands County Sheriff's Office (HCSO) Main Building mailroom by April 2, 2010.

    1. Have you ever deployed a HCSO issued/owned ECD on a person? Yes____ No___

    2. Are you confident the ECD is an effective intermediate weapon to temporarily incapacitate an aggressor? Yes____ No____

    3. Did you experience the ECD effect either by probes or clips during training? Yes____ No____

    4. Do you feel the implementation of the ECD by the HCSO has resulted in a reduction of injuries sustained by deputies while affecting a lawful arrest? Yes____ No____

    5. Do you feel the implementation of the ECD by the HCSO has reduced injuries sustained by arrestees during a lawful arrest? Yes____ No____
    Briefly explain: _____
    _____

    6. Do you feel you are adequately trained in the application/deployment of an ECD? Yes____ No____
    Briefly explain: _____
    _____

    7. Based on your own experience, what **percentage** of uncooperative arrestees complied with your lawful commands, **after being warned** of an impending ECD deployment? 0-25%___ 26-50%___ 51-75%___ 76-100%___

    8. Have you personally ever sustained any level of injury caused by an arrestee after a successful deployment of an ECD on their person? Yes____ No____
    Briefly explain: _____
    _____

    9. Has a person arrested by you involving an ECD deployment, sustained any injury other than by probe punctures, requiring hospitalization? Yes____ No____

Briefly explain: _____

_____

10. Have you ever experienced an ECD malfunction during a deployment situation?
    Yes____ No____