Should the Berkeley Police Department Purchase and Deploy Tasers?

A Look at Qualitative and Quantitative Implications

James Baird

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Executive Summary

The use of Electronic Control Weapons (ECWs) in law enforcement has grown steadily over the last ten to fifteen years. Proponents view them as an effective less-lethal tool while detractors feel that they are dangerous and often overused. The Berkeley Police Department sought to investigate whether these less-lethal devices were a useful tool for their department. This report is a culmination of hundreds of hours of research including medical and legal literature reviews and interviews with agencies throughout the United States. The findings from this report are as follows:

1. If ECWs were adopted as a less-lethal tool for all officers, a cost benefit analysis suggests that Berkeley could save an estimated $2.35 million over ten years. Much of this savings comes from fewer officer injuries.

2. The risk of death from ECWs does exist and policies and procedures should be adopted to mitigate that risk, specifically involving training and post application medical care.

3. ECWs can decrease the overall amount of force used by a police department and can contribute to less officer and suspect injuries.
Introduction

Police officers in the City of Berkeley have expressed interest in the department purchasing and issuing Electronic Control Weapons (ECWs)\(^1\) commonly known by the brand name Taser, as an additional less lethal option. This report uses qualitative and quantitative metrics to evaluate Tasers as an additional tool for the Berkeley Police Department. Advantages include less officer and suspect injuries, an alternative to lethal force in certain circumstances, and a decrease in overall force used by a department. Disadvantages include the medical risks associated with the use of Tasers and the cost to purchase and maintain them.

The background section will begin by giving a concise description of what a Taser is and the physiological consequences of its use. Next, this report illustrates where Tasers lie on the continuum of force and discusses their effectiveness as compared to other force options. After that, the medical implications and risk of death are explored including a brief comparison of electric shock and the controlled pulses of a Taser. Finally, the last section of the background describes the effect Tasers have on the number of officer and suspect injuries as well as their effect on complaints and lawsuits.

Following the background section, a Berkeley specific section addresses how Tasers might impact the police department and the city, including a cost-benefit analysis of implementation. Taking all of the previous information and synthesizing it, recommendations are given followed by an extensive appendix that elaborates on specific points in greater detail. While this report uses a variety of sources, including numerous academic articles, studies funded by the National Institute of Justice, and case studies from individual jurisdictions, much of the specific information comes directly or indirectly from Taser International (the most prominent manufacturer of ECWs). This report thus acknowledges the potential for bias and, where possible, uses outside sources to corroborate information. Those sources that are known to be affiliated with Taser International are bold in the footnotes.

Background

What is a Taser: Description and Physiological Effects

The Taser\(^2\) is a pistol-shaped device with a laser sight that is powered by a lithium battery. It can operate in two different modes: the primary “probe” mode, and the secondary “drive-stun” mode. When used in the probe mode, it uses compressed nitrogen to fire two probes a distance of 15-35 feet (depending on the specific cartridge). The probes are tethered to the device by insulated copper wires. On contact, a five-second burst of electricity is sent between the two probes. When the probes make direct contact or come within close proximity to the skin,

\(^1\) Otherwise known as Controlled Electronic Devices (CEDs) or by the brand name Taser® Due to the ubiquitous nature of Tasers and the amount of research done specifically on one brand, the brand name Taser will be used in the body of the report to refer to all ECWs.

\(^2\) Description and details refer to the 4th generation Taser X26, the prevailing Taser used by law enforcement at this time. While other models and other brands exist, much of the latest research and discussion has revolved on this model.
numerous pulses simulate motor neuron connections and disrupt the nervous system in a process referred to by Taser International as neuromuscular incapacitation. This causes temporary paralysis for the duration of the application (five seconds for each pull of the trigger). The shock can be reapplied with subsequent pulls of the trigger or for a prolonged period if the trigger is not released. When using a Taser in “drive-stun” mode, the cartridge is removed and two bare points of contact create a smaller field for the electricity to pass through. In drive-stun mode the Taser is not as effective in causing neuromuscular incapacitation and is primarily used for pain compliance.

Where do Tasers Fall on the Continuum of Force?

The Taser is an intermediate weapon falling between control holds and lethal force. Until recently, many agencies had a fairly low threshold for Taser use. The 9th Circuit Court of Appeals decision in Bryan v. McPherson limited the scope in which a Taser can be used. The court ruled that Tasers constitute an “intermediate quantum of force” and therefore cannot be used against passive resistance. Instead, citing Graham v. Connor, the court reiterated the need for there to be an “immediate threat to the safety of officers or others.”

A recent report from the International Association of Chiefs of Police (IACP) released a report and model policy which states that a Taser can be used:

"where grounds to arrest or detain are present and the subject’s actions cause a reasonable officer to believe that physical force will be used by the subject to resist the arrest or detention. Such actions may include but are not limited to:

- Use of force against the officer or another person;
- Violent, threatening, or potentially violent behavior;
- Physically resisting the arrest or detention;
- Flight in order to avoid arrest or detention, in circumstances where officers would pursue on foot and physically effect the arrest or detention; and
- Self-destructive behavior”

Even in light of the court’s decision, as the IACP report illustrates, Tasers can have broad application. The most common application of Tasers would be in lieu of batons and personal body weapons. Instead of numerous strikes with a baton, a five-second Taser charge can immobilize a suspect in time for officers to gain control and restrain the individual. As an example, an NFL lineman was arrested in Florida after fighting with the police. At 6’4” and 305 pounds, two Taser shocks did what would have required many more officers, multiple baton and/or personal body weapon strikes, causing a greater potential for injury to all involved parties.

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1 See Appendix A-2 for a review of this case and other Taser-related cases
2 Bryan v. McPherson 590 F.3d 767 (9th Cir. 2009) which directly cites Graham v. Connor
4 This report would caution the use of a Taser on flight alone and would recommend use only when the flight is for a serious crime or of a felonious suspect.
Another place where Tasers can be useful is in combating subjects with bladed weapons. If presented with a bladed weapon, officers are generally authorized to use lethal force to stop the threat. With a Taser, another option is available in certain circumstances when there is a less immediate threat and/or lethal cover (i.e. another officer with a firearm) is available. As a recent example, Michigan City officers were able to take a machete wielding subject into custody without using lethal force.\(^8\) Finally, there are some limited circumstances where a Taser could be used in place of a firearm. In one recent case, a distraught woman with a handgun took her son hostage and had threatened to kill herself.\(^9\) Officers were able to use a Taser to take her into custody without using lethal force. In situations where a subject has a firearm but is not an immediate threat, Tasers can be utilized so as to end a threat before it escalates to deadly force.

To clarify, a Taser is not a replacement for a firearm. There are situations where lethal force is necessary and Tasers would not be a viable option. Often, situations happen too quickly and/or the range from the officer to the suspect is outside the capability of a Taser. The last two incidents above highlight a place for Tasers among all other force options and illustrates situations where Tasers may provide the best alternative to lethal force.

**Effectiveness**

In order to understand and evaluate a new force option, the accuracy and effectiveness of the force option needs to be addressed. A United States Air Force study using real world data estimated that Tasers are 80% effective from 1-11 feet and 72% effective from 11-15’ of the target.\(^10\) While some of the cartridges have extended ranges of 25 and even 35’, the accuracy falls off dramatically after 15 feet. The reason for the decrease in accuracy stems from the design of the Taser: when the darts deploy, they spread out so as to create a field for the current to transmit through with the second probe being purposefully angled down at approximately 8 degrees. With a rate of spread of 2” per foot traveled,\(^11\) anything past 15’ (30” of spread) becomes much more prone to misses. Anecdotal evidence from individual departments suggests that the overall effectiveness of Tasers is approximately 76-94%.\(^12\)

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\(^10\) Maier, A. N., P; Price, P; Sherry, C; Reilly, J; Klaucenberg, B; Drummond, J Lt Col, USAF (2005). "Human Effectiveness and Risk Characterization of the Electromuscular Incapacitation Device – A Limited Analysis of the TASER: Part I." Pg. 88.


\(^12\) (March 2011) “TASER® Electronic Control Devices (ECDs): Field Data and Risk Management.” Taser International PowerPoint presentation. Slides 66 (notes), 115, 189, 71
<table>
<thead>
<tr>
<th>Agency or Area</th>
<th>Length of Time Studied</th>
<th>Deployments (fired)</th>
<th>Percent Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus, Ohio</td>
<td>6 months</td>
<td>144</td>
<td>76%</td>
</tr>
<tr>
<td>Long Beach, California</td>
<td>1 year</td>
<td>342</td>
<td>78%</td>
</tr>
<tr>
<td>Michigan Municipal Risk Management Authority</td>
<td>5 years</td>
<td>1092</td>
<td>92.6%</td>
</tr>
<tr>
<td>Toronto, Canada</td>
<td>1 year</td>
<td>174</td>
<td>94%</td>
</tr>
</tbody>
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While the higher numbers from Canada and Minnesota may be unrealistic as a benchmark, 76% appears to be a reasonable estimate based on all available information.

Based on a five-year analysis by Florida Gulf Coast University Weapons and Equipment Research Institute, Tasers were shown to be a more effective force option than chemical agents and impact weapons:  

One distinct characteristic of neuromuscular incapacitation as compared to a pain compliance technique is that people who are intoxicated or under the influence of drugs (and who might not be as affected by baton strikes or pepper spray) will typically be subdued by a successful application of a Taser. One additional benefit to Tasers as compared to chemical agents (pepper spray) is the lack of contamination and shorter duration of symptoms. While deployment options are a policy matter for the department, the ability to carry the Taser on an officer’s person and the potential for full deployment would allow for better accessibility during a critical incident and provide a more portable option.

**Medical Risk**

There have been numerous studies exploring any correlation between Taser use and death. People have speculated that changes in catecholamines, acidosis, and/or heart rhythms during or proximal to Taser use may be a contributing factor. Examining the link between acidosis/catecholamine levels, and Tasers, one study showed that the greatest stress on the subjects was from sprinting (simulating flight from arrest) and heavy bag use (simulating a

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struggle or fight with police). Taser use was on the same magnitude as being pepper sprayed. Animal studies have shown that it is possible to induce ventricular fibrillation in swine with a Taser, but only with long duration exposure, strategic placement of the probes, or epinephrine injections to simulate worst case scenarios. One study, using data from previous studies as well as computer modeling, estimated the probability of a Taser inducing ventricular fibrillation in humans at .00006 or 1 death in 166,667 applications. This data suggests a low risk of serious injury or death from Tasers. Additionally, it appears that limiting the duration and number of applications appears to greatly decrease the risk of serious injury or death. See Appendix A-3 for further analysis of the medical risks associated with Tasers as well as A-8: American Medical Association report.

When discussing the medical risks associated with Tasers, it is important to distinguish neuromuscular incapacitation with electrocution. The definition of electrocution includes injury or death by electric shock. The controlled shock from a Taser is not like that of power lines, the electric chair, or imagined torture devices from movies and television. The difference is in the amperage. The Taser “shock” is actually 19 controlled pulses per second with an average current of 1.9 mA and a maximum current of 18-19mA.

**Electricity and Current**

| TASERS | Peak of 19 mA | 60-100 mA
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of 1.9 mA</td>
<td>Irregular Heart Rhythms</td>
<td></td>
</tr>
<tr>
<td>0 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mA</td>
<td>5 mA</td>
<td>15 mA</td>
</tr>
<tr>
<td>Felt</td>
<td>Painful</td>
<td>Loss of Muscle Control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 mA+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatal</td>
<td></td>
<td></td>
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</tbody>
</table>

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To give perspective, the previous chart gives a visible representation of where a Taser falls on a continuum of electric current.\textsuperscript{23,24,25,26} The chart clearly shows that the amount of current is well below the level typically associated with irregular heart rhythms. It also illustrates that the current is nowhere near the level associated with a fatal shock or electrocution.

**Consequences of Taser Use**

**Officer and Suspect Injuries**

Numerous cities have shown significant reductions in officer and suspect injuries after deploying Tasers to their officers. The Ventura County Sheriff’s Department conducted a study of their first year of operations with Tasers (2007) and showed a 72% decrease in officer injuries while the city of Phoenix showed a 67% decrease in suspect injuries in their first year (2004).\textsuperscript{27} While these results are anecdotal, two major studies have been conducted more recently to investigate whether these individual results were indicative of a systemic reduction of officer and suspect injuries attributable to Tasers. The first study was published in 2009 by the Police Executive Research Forum (PERF) comparing similar agencies with and without CEDs over time. For those using CEDs:\textsuperscript{28}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{reduction_injuries.png}
\caption{Reduction in Injuries with Taser Deployment}
\end{figure}

\textsuperscript{23} See Appendix A-4: Physics of Electricity
\textsuperscript{26} Miller, Rex. (1993) Industrial Electricity Handbook. Peoria, IL: Chas. A. Bennett.
\textsuperscript{27} (March 2011) "TASER® Electronic Control Devices (ECDs): Field Data and Risk Management." Taser International PowerPoint presentation. Slides 14, 15.
\textsuperscript{28} Police Executive Research Forum (2009) "Comparing Safety Outcomes in Police Use-of-Force Cases for Law Enforcement Agencies that have Deployed Conducted Energy Devices and a Matched Comparison Group that have not: A Quasi-experimental Evaluation." Washington D.C.
A 2010 study by the Department of Justice (DOJ) on use of force outcomes found that:

"the use of [Tasers] significantly reduced the probability of injuries [with one sample showing] the odds of a suspect being injured decreased by almost 60 percent when a [Taser] was used."^29

The DOJ report noted that, "the implications...suggest the need for agencies to consider alternatives to officer use of hands-on tactics."^30

Both of these studies illustrate the increased risk to officers and suspects when an officer goes "hands-on" and they demonstrate how Tasers can be utilized to end confrontations quickly thus reducing the possibility of injuries.

**Use of Force and Complaints**

One of the benefits to Taser use is a decreased need to use other force options such as batons and personal body weapons (punches, kicks, etc.). In numerous cities, Taser deployment was followed by decreases in the overall use of force as well as a decrease in complaints for use of force.\(^{31}\) The City of Columbus, Ohio had a decrease in other uses of force (21-37% depending on the type of force) and of complaints for excessive force (24%) following their implementation of Tasers. A study in Michigan showed a 95% decrease in use of force complaints once Tasers were introduced. Another benefit of Tasers is their ability to diffuse a situation by merely displaying the Taser before it is fired. Quoting the Marin County Sheriff's 2009 Annual Electronic Control Device Report,

"It should be noted that 49 out of the 87 deployments in 2009 resulted in incidents wherein the suspect surrendered upon mere display of the ECD."^32

Likewise, the Winnipeg Police Services Assistant Chief Doug Webster stated in 2007,

"In 65 cases [40%), just showing a TASER or threatening to use it was enough to rein in an out-of-control situation."^33

This data suggest that the addition of Tasers could provide for a more efficient and judicious use of force.

**Lawsuits**

Based on a review of available data, it is unclear whether Taser implementation would increase or decrease the risk of lawsuits for use of force claims. With less force being used and fewer use-of-force complaints being filed, it seems reasonable that the risk of lawsuits would also decrease. The Michigan Municipal Risk Management Authority (MMRMA) conducted a

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^30 Ibid: Page 2-6
^32 Ibid. Slide 37.
^33 Ibid. Slide 37.
study of 46 agencies during the first year of deployment (2004) and found a 54% decrease in use-of-force litigation following Taser deployment. While this is promising, there were no details on methodology and no comparable control groups. A larger study from 2003 to 2008 looking at 123 agencies found that out of 1,768 deployments of Tasers there were 27 incidents of lawsuits or settlements (1.5%). Of those, 7 settled for $0, 11 were active at the time the report was made public, and the remaining 9 averaged a settlement of $28,389. In 2008, the same group reported no claims related to Tasers. While those numbers suggest a fairly low risk of large awards, there have been some high profile cases where the use of Tasers resulted in municipalities paying out substantial claims.

While there is an obvious risk of lawsuit any time force is used, there does not appear to be evidence suggesting a systemic rise in lawsuits after Tasers are introduced. In the Texas case, it appears that user error contributed to the tragedy more than any other factor (the deputy was unaware that the Taser continued to shock if the trigger remained pressed). While these settlements are, and should be a concern, they can be mitigated by thorough training and sound policies.

**Berkeley Context**

**Cost to Purchase and Maintain the Tasers and to Train the Officers**

The Berkeley Police department has approximately 118 officers that would require Tasers for full deployment. Full deployment to officers in the field is common and will illustrate the most expensive scenario in regards to the costs of purchasing and training. For this analysis, it will be assumed that during the first year of implementation the department would purchase 120 Tasers with optional camera attachment (rounded off to include 2 spare units, 2 spare cameras, and 2 spare holsters), 250 field cartridges, and 354 training cartridges (3 for each officer) for a total of $178,739. Along with the up-front costs would be the training costs associated with issuing the Tasers. California Peace Officer Standards and Training does have three Electronic Weapons courses including “Electronic Weapons,” “Electronics Weapons Instructor,” and “Electronic Weapons Update” but currently, there are no classes being offered for the rest of 2011. The alternative is to use Taser International classes to train departmental force options instructors who will then train the rest of the department during annual perishable skills training. The cost to train four “Taser Training Officers” in the first year would be roughly $2500 total ($375 training fee per person plus possible room and board – 2 day class). Adding

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34 Ibid. Slide 188.
39 See Appendix A5 for relevant: cost information
that to the equipment costs, the total first year costs would be $181,239. After that, the yearly costs would include training equipment and replenishing used field cartridges ($8,996.97) and recertifying the trainers (1 day class for each of the four trainers totaling roughly $800 with food allowance). Adding up nine consecutive years after the first year of implementation, the total cost for ten years would be approximately $269,412.

Officer Injuries

Most cities pay out a substantial amount of money in workers compensation to police officers due to the inherently dangerous nature of their work; Berkeley is no exception. The Human Resources Department provided the police department with all of the workers compensation claims for 2006-2010. The Police Department then went through the cases where the injury resulted from officer and suspect interaction and determined in which scenarios a Taser could have prevented the injury. Totaling up all of the associated costs of the injuries including medical costs, time off (cost to backfill the position), and medical retirements (there were two for this five year period), the total costs (possibly prevented by Tasers) would be $1,326,745. That number was then multiplied by 2 (the time period being used for this analysis is ten years) and then multiplied by .76 (the effectiveness of Tasers), the actual expected savings over a ten year period would be $2,016,652. A second way to calculate an approximation would be to use the 60% reduction in officer injuries from the DOJ report which would make the savings smaller at $1,592,094.

Estimated Changes in Lawsuits

In order to approximate any changes in use of force, complaints, and lawsuits, the current force profile for Berkeley must be established. For the years 2006-2010, officers in Berkeley generated an average of 19.2 use-of-force reports per year. In the highest year (2008) there were 28 use-of-force reports. As for complaints, using the period of 2005-2009 (2010 was not yet available) there were an average of 23.8 use of force complaints per year with the highest years having 28 complaints (2005 and 2008). Sgt. Jennifer Wilson explained that the high rate of complaints compared to use-of-force reports was mainly due to complaints involving handcuffing and crowd control situations (not documented in a standard use-of-force report).

As for lawsuits, when looking at the five year period between fiscal years 2005-2010 there were no lawsuits or claims related to use of force complaints. Looking at the previous five fiscal years (2000-2005), there were eight claims totaling $80,350. This averages $16,070 a year for fiscal years 2000-2005 and $8035 a year if averaged over the entire ten year period.

In order to approximate the risk of lawsuits after Taser implementation, several similarly sized bay area cities were contacted to determine if they carry Tasers and how that has impacted their city. The cities of Santa Clara, Vallejo, Fairfield, Antioch, Daly City, and Richmond were

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40 This information does not include medical retirements that occurred before 2006 and may have incomplete data for 2006 based on other documentation. As such, it is a lower bound estimate.
contacted with only Fairfield and Daly City providing detailed information. For a comparison of similarly sized college towns, the city of Ann Arbor, Michigan was also contacted.

The Fairfield Police Department has approximately 100 sworn officers for a population of 105,321 (compared to Berkeley with 176 and 112,580 respectively). Fairfield has had Tasers for almost fifteen years (before the current generation X26 Tasers were invented). Their population is similar in size to Berkeley although their demographics are not a perfect match. There had been no lawsuits and no settlements directly related to Taser use. There have been two deaths proximal to the use of a Taser but both were a result of drugs and the Taser was not found to be the cause of either death. Detailed use of force information was not available.

The Daly City Police Department is a similar, yet smaller sized department with 108 sworn officers for a population of just over 100,000. The Police Records Department reported 33 use-of-force reports in 2010 with 10 of those involving Tasers (8 uses and 2 display of Taser without use). According to Assistant City Attorney for Daly City (Kelly Schott) there had been no litigation in the last seven years that was directly related to the use of Tasers.

Last, to compare Berkeley to a similar sized college town, Ann Arbor, Michigan was contacted. Their police department has 120 sworn members and services a population of approximately 114,000. They have had Tasers for over six years and have not had an in-custody death related to Tasers. Assistant City Attorney Robert West stated that there had been two settlements involving Tasers. In one instance, a federal lawsuit was settled for $18,000 to avoid more litigation. In the other instance, officers deployed a Taser without warning on a homicide suspect who later turned out to be the wrong person. That was settled out of court for $30,000 and illustrates the need for detailed policies and comprehensive training. No use of force data was available for comparison.

When comparing the Berkeley Police Department to these other agencies, it appears that the risk of lawsuits is low. Even in Ann Arbor where they have paid out two claims, each claim is only slightly higher than use of force claims Berkeley paid out in 2001. While there may be a decrease in use-of-force complaints and even in related lawsuits, the minimal amount currently paid out in claims shows little room for additional savings. As such, the possible cost savings from a decrease in complaints and lawsuits will be assumed to be zero.

**Cost Benefit Analysis**

**Costs**

While not the only consideration, a cost benefit analysis shows the monetary implications of purchasing and deploying Tasers. In order to do this, everything must be monetized so as to understand the full implications of getting Tasers. For this analysis, due to numerous variables,

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41 All information was gathered from informal interviews conducted in April, 2011.
42 Information obtained from informal telephone interviews with Corporal Snyder of Fairfield Police Department and Kim Greer from the City of Fairfield’s Risk Management Department.
best estimates were used. In the appendix, (A-6) the methodology and sensitivity analysis is elaborated upon).

The associated monetary costs include the cost to purchase and maintain the Tasers, the cost to train all of the officers, and the ongoing cost to resupply the training and field cartridges every year. These costs over a ten year period would be approximately $260,000.\textsuperscript{43} Next, a possible risk for lawsuits has to be quantified. While there is no data to suggest an overall rise in lawsuits post Taser implementation, the worst case scenario would be a large $2 million settlement (like the previously mentioned $2 million settlement in Texas and the recent $1.9 million settlement in Marin County\textsuperscript{44}). This creates an upper bound of $2,000,000 while having a lower bound of $0 (no change in lawsuits as compared to the counter-factual without Tasers).

Last, the possibility of a Taser related death can be monetized by using the “value of a statistical life” or VSL. Using estimates from the Environmental Protection Agency (EPA) and other sources, this report will assume a VSL of $7.9 million.\textsuperscript{45} Based on data from Taser International\textsuperscript{46}, approximately 2.3 million people had been Tasered as of November 30, 2010 with approximately 1,165,650 of those being field uses. Amnesty International maintains that Tasers had killed “more than 400” people as of June of 2010.\textsuperscript{47} That same statement asserted that in more than 50 of those cases, the coroner had ruled that a Taser had at least contributed to the death. Taking those numbers as the worst case scenario, it will be assumed that risk of death falls between 50 per 1,165,650 applications and 400 per 1,165,650 applications. That results in a range between 1:2914 and 1:23,313. At 14 applications a year that averages one death every 208 to 1665 years on average. Assuming the VSL from above ($7.9 million) then the amortized risk of death would be $47,447 to $379,808 over ten years.

**Benefits**

The monetary benefits from Taser implementation would predominantly come from the reduction in officer injuries based upon available empirical research. In order to approximate this value, workers compensation data for the last five years (2006-2010) was evaluated. Using narratives from the incidents where officers were injured interacting with suspects, those which may have been impacted by having a Taser were identified. The cost of medical expenses, time off (backfilling the position), and medical retirements was monetized at $2,653,490.

Understanding that the Taser would not be effective every time, this total was reduced using the 60% reduction in officer injuries from the DOJ report and the 76% effective rate of Tasers from other analysis as an approximate high and low value. The result means that over a ten year

\textsuperscript{43} See Appendix A6: $178,738.95 + 9(8,996.97) = $259,711.68

\textsuperscript{44} See Appendix A-5 for details on the Marin County incident.


period, implementation of Tasers could save the city of Berkeley $1,592,094 to $2,016,652 in reduced officer injuries.\textsuperscript{48}

Another benefit would come from the potential reduction in use-of-force complaints and/or lawsuits. Due to the lack of any substantial claims in the last ten years and the average per year being miniscule, the cost savings from a reduction in use-of-force complaints and lawsuits will be assumed to be marginally close to zero and not included in the cost benefit analysis.

The last benefit would be the benefit of saving a life by deploying a Taser in lieu of a firearm. In the last ten years there have been four officer-involved shootings and it is unclear if Tasers would have been a possible option. There was one additional case in 2008 where a 40mm (less-lethal) launcher was ineffective on a knife wielding subject who had charged toward officers. That situation could have easily ended in an officer involved shooting but instead, using a high amount of restraint, officers risked their own safety by grabbing the suspect, pinning her to the ground, and removing the knife. Without specific situations where a subject was shot and might have otherwise been Tasered (in Berkeley), another approximation must be used.

Anecdotal evidence suggests a large amount of variability in the reduction of lethal force correlating with the introduction of Tasers.\textsuperscript{49} This is most likely due to differences in the amount and propensity of lethal force used by different agencies. Police departments in El Paso, Phoenix, and Fort Worth saw a respective 66%, 54%, and 30% decrease in officer involved shootings after Taser implementation. While these are impressive, data from those cities may not reflect what might happen in Berkeley. Abroad, the French National Police used Tasers 280 times in 2007 and saw a correlating 15% reduction in the need for police to use a handgun. Using the French decrease of 15% as the most conservative estimation, it would be assumed that there would be at least one life saved every twenty years from Taser use in lieu of firearms\textsuperscript{50}. Using the VSL from above ($7.9 million), this would amortize to $3,950,000 for a ten year period.

The following chart estimates costs and benefits as well as four scenarios based on different assumptions:

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Low Benefit and Low Cost</th>
<th>High Benefit and High Cost</th>
<th>High Benefit and Low Cost</th>
<th>Low Benefit and High Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less officer injuries</td>
<td>$1,592,094</td>
<td>$2,016,652</td>
<td>$2,016,652</td>
<td>$1,592,094</td>
</tr>
<tr>
<td>Less complaints, lawsuits</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Lives saved from Taser use</td>
<td>$0</td>
<td>$3,950,000</td>
<td>$3,950,000</td>
<td>$0</td>
</tr>
</tbody>
</table>

\textsuperscript{48} See Appendix A-6 for more detailed analysis.
\textsuperscript{49} (March 2011) "TASER® Electronic Control Devices (ECDs): Field Data and Risk Management." Taser International PowerPoint presentation. Slides 137, 139, 147, 156
\textsuperscript{50} Berkeley had 4 officer involved shootings in a ten year period. A 15% reduction would mean one life saved approximately every seven times lethal force was used.
<table>
<thead>
<tr>
<th>Costs</th>
<th>1st Quarter</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>4th Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment &amp; Training (Tasers)</td>
<td>-$260,000</td>
<td>-$260,000</td>
<td>-$260,000</td>
<td>-$260,000</td>
</tr>
<tr>
<td>Additional lawsuits</td>
<td>$0</td>
<td>-$2,000,000</td>
<td>$0</td>
<td>-$2,000,000</td>
</tr>
<tr>
<td>Taser related deaths</td>
<td>-$47,447</td>
<td>-$379,808</td>
<td>-$47,447</td>
<td>-$379,808</td>
</tr>
<tr>
<td><strong>Total Net Benefit:</strong></td>
<td><strong>$1,284,647</strong></td>
<td><strong>$2,305,746</strong></td>
<td><strong>$5,659,205</strong></td>
<td><strong>-$1,047,714</strong></td>
</tr>
</tbody>
</table>

In order to account for variations in the estimates, sensitivity analysis (specifically Monte Carlo simulations) were used to create a robust estimate of the total net benefit of Tasers. The simulations confirmed the average estimate of $2.3 million in savings over ten years.

**Public Perception**

While the size and scope of this project did not allow for an in-depth survey of Berkeley residents, other cities have solicited public opinion on Tasers. San Francisco Police Department (SFPD) is currently in the process of drafting policies to present to the Police Commission regarding Tasers and hope to deploy them if the Commission approves the policies. In order to prepare for meetings of the police review commission, SFPD reached out to community groups and solicited public opinion regarding Tasers. According to SFPD’s Community Relations Division, the informal surveys showed a majority of residents supported SFPD equipping their officers with Tasers. Unfortunately, no other public opinion related data was found for specific cities or for the United States as a whole.

**Recommendations**

Taking into consideration the sum of the evidence presented in this report, it is recommended that the Berkeley Police Department consider Electronic Control Weapons (Tasers) as a less-lethal option. Tasers are an effective less-lethal tool that fills a space not currently occupied by other less-lethal weapons. A thorough cost-benefit analysis suggests that Tasers could save the City of Berkeley approximately $2,300,000 over ten years. While the risk of death from Tasers does exist, available evidence suggests that it is low and is mitigated by sound policies and proper training. While exact deployment should be determined by the department, full deployment to officers in the field would allow Tasers to be immediately available in dynamic situations. As for policies, the Police Executive Research Forum (PERF) published guidelines in 2011. Many of the recommendations are similar to those made in previous guidelines. The following are some of the most salient and are recommended:

51 See appendix A-6 for more details.
52 This information comes from a conversation with the SFPD Community Relations Division
53 See Appendix A-8
1. Personnel should use an ECW for one standard cycle (five seconds) and then evaluate the situation to determine if subsequent cycles are necessary. Personnel should consider that exposure to the ECW for longer than 15 seconds (whether due to multiple applications or continuous cycling) may increase the risk of death or serious injury. Any subsequent applications should be independently justifiable, and the risks should be weighed against other force options.

2. Personnel should not intentionally activate more than one ECW at a time against a subject.

3. ECWs should not be used against passive resistance.

4. A medical evaluation should be done as soon as practical after application. If a subject receives multiple applications or long duration applications, they should be transported to an emergency department.

5. Officers should be trained to recognize Excited Delirium and understand the increased risk of death associated.

6. ECWs should be used as a weapon of need, not a tool of convenience.

While public sentiment in San Francisco appears to show support for Tasers, the exact extent of public sentiment in Berkeley is unknown at this time. Before pursuing the acquisition of Tasers, an effective education and outreach program should be implemented in order to continue the long standing trust the city has had with its citizens. Also, while the exact configuration is at the discretion of the department, a “weak-sided” carry is strongly recommended so as to not have any chance of weapon confusion. Finally, with newer models coming into production, it may be beneficial for the Taser trainers to field test one or more models before purchasing and issuing Tasers to the entire department.

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See Appendix A-5: Oscar Grant and Weapon Confusion as well as Appendix A-8: PERF Report
Appendix

A-1 List of Alameda County Agencies with/without Tasers

<table>
<thead>
<tr>
<th>Agencies with Tasers</th>
<th>Agencies without Tasers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda County Sheriff’s Department</td>
<td>Alameda PD</td>
</tr>
<tr>
<td>Albany PD</td>
<td>Berkeley PD</td>
</tr>
<tr>
<td>BART PD</td>
<td>Newark PD</td>
</tr>
<tr>
<td>Dublin PD</td>
<td>UCPD - Berkeley</td>
</tr>
<tr>
<td>East Bay Regional Parks PD</td>
<td></td>
</tr>
<tr>
<td>Emeryville PD</td>
<td></td>
</tr>
<tr>
<td>Fremont PD</td>
<td></td>
</tr>
<tr>
<td>Hayward PD</td>
<td></td>
</tr>
<tr>
<td>Livermore PD</td>
<td></td>
</tr>
<tr>
<td>Oakland PD</td>
<td></td>
</tr>
<tr>
<td>Piedmont PD</td>
<td></td>
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<tr>
<td>Pleasanton PD</td>
<td></td>
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<tr>
<td>San Leandro P</td>
<td></td>
</tr>
<tr>
<td>Union City PD</td>
<td></td>
</tr>
<tr>
<td>Cal State East Bay PD</td>
<td></td>
</tr>
<tr>
<td>California Highway Patrol</td>
<td></td>
</tr>
<tr>
<td>*Camp Parks</td>
<td></td>
</tr>
<tr>
<td>(In progress – currently training the trainers)</td>
<td></td>
</tr>
</tbody>
</table>

A-2 Legal Rulings Regarding Tasers

Case law has always been important to police officers and the case law surrounding Tasers is no different. It changes fairly rapidly and can even be contradictory at times. The following are some of the most important and most recent rulings regarding Tasers:55

Draper v. Reynolds (May, 2004)

The facts of the case are as follows: An officer (Reynolds) conducted a traffic stop and the subject (Draper) was verbally hostile from the start. During the encounter, the officer asked the suspect at least five times to produce paperwork as required by law. In between these requests, the suspect cursed and yelled at the officer and paced back and forth. At one point, the suspect stated, “How ‘bout you just go ahead and take me to fucking jail, then, man, you know, because I’m not going to kiss your damn ass because you’re a police officer.” By the fifth time the officer requested documents from the vehicle, the officer thought that the incident was going to end with an altercation so he deployed his Taser and took the subject into custody. The court ruled that the combination of the continuous disregard for the officers requests (to furnish vehicle registration and other documents) along with the suspect’s continuously “hostile, belligerent, and uncooperative” behavior warranted the use of a Taser.

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55 Descriptions (paraphrased) and quotations come directly from the cases themselves.
Oliver v. Fiorino (October, 2009)

The facts of the case are as follows: An officer (Fiorino) was flagged down by a mentally unstable subject (Oliver) standing on a median who thought there were people shooting at him. Throughout the contact, Oliver showed signs of mental illness but never showed any direct aggression toward the officer. At one point, another officer (Burk) arrived and tried to coerce Oliver out of the street away from traffic. When Oliver backed away and started to “babble” in the middle of the road, Fiorino shocked him with a Taser. During the next two minutes, Oliver was shocked eight more times and later died. The court ruled that this use violated Oliver’s fourth amendment rights and that it constituted excessive force.

Bryan v. McPherson (December, 2009)

The facts of this case are as follows: The officer (McPherson) stopped the subject (Bryan) for a seatbelt violation. Bryan exited the vehicle wearing nothing but boxer shorts and shoes. Ofc. McPherson had directed Bryan to stay inside his vehicle (but Bryan claims to have not heard that command). Bryan was yelling gibberish (not directly at Ofc. McPherson) and began slapping his thighs. Ofc. McPherson claimed that Bryan took a step toward him and so he fired his Taser into Bryan without warning. The Taser caused temporary paralysis to Bryan and he fell forward onto his face, resulting in four teeth being knocked out and other facial contusions. The court ruled that this was unconstitutional under the fourth amendment and constituted excessive force.

This case was vaguely similar to the Draper case, but the differences are illuminating. First, at no time did Bryan act in an aggressive manner (physically or verbally) toward Officer McPherson. While Bryan’s behavior was definitely strange, the immediacy of the threat had not been established and there was not a constant barrage of verbal hostilities as seen in the Draper case. As for the non-compliance, it was unclear whether Bryan heard the first request to stay in the vehicle and nowhere does Officer McPherson suggest repeated attempts to verbally control Bryan. Last, based on the location of the Taser darts and other evidence brought up at trial, it appears as though Bryan was facing away from McPherson when the Taser darts impacted Bryan’s back and arm.

In this case, the court specifically defined a Taser as an “intermediate or medium, though not insignificant, quantum of force.” To extrapolate from this, due to the Taser being an intermediate quantum of force, the suspect must pose an immediate threat to the officer and, where possible, a warning should be given. Though not completely ruling out the use of a Taser in less aggressive situations, it largely reduces the use of the Taser in drive-stun mode as well as limiting the overall use of Tasers. For many officers and agencies, this ruling is overly restrictive; however, this report finds that while the circumstances of the specific case could be argued, the overall ruling is sound.
**Mattos v. Agarano (January, 2010)**

The facts of the case are as follows: A child called 911 to report domestic violence. Officers arrived and contacted Mattos, Jayzel (wife) and Mattos, Troy (husband) inside their residence. As they attempted to detain and/or arrest Troy, Jayzel stepped in between officers and Troy and (probably accidentally) put her hands on one of the officers. An officer Tasered Jayzel and took Troy into custody. The 9th Circuit ruled that due to the need to quickly control the situation based on the knowledge that domestic violence situations are inherently dangerous, the officers’ actions were reasonable, given the circumstances, and did not constitute excessive force.

**Brooks v. City of Seattle (March, 2010)**

A woman (Brooks) was stopped in a vehicle for speeding in a school zone. Brooks refused to sign the citation and remained in her vehicle which was running with the keys in the ignition. After numerous attempts to resolve the situation, including unsuccessfully attempting to use control holds to remove her from the vehicle (she clutched onto the steering wheel), police used a Taser in “drive-stun” mode to remove her from the vehicle. The court ruled that there was no fourth amendment violation and believed the force was reasonable. In the ruling the 9th Circuit Court of Appeals clarified “the use of the Taser in drive-stun mode—as opposed to dart mode—seems unlike the force used in Bryan or uses of force which this court has previously considered severe.” It is worthy to note that in September of 2010, the 9th Circuit agreed to look at this case with the full court and therefore may reverse the 3 judge panel that originally heard this case.56

**Marquez v. City of Phoenix (August, 2010)**

The facts in this case are fairly convoluted but the judgment is clear. Officers responded to a 911 call from a family member stating that the suspect (Marquez) was performing an exorcism on his daughter Daisy. Officers responded and heard a little girl scream “ouch” when they entered the residence. They forced their way into a bedroom and confronted Marquez. Officers saw Marquez either choking or squeezing Daisy and ordered him to let go of her. When he did not comply, officers used a Taser on Marquez (in probe mode). The child was retrieved but a fight in close quarters ensued and Marquez was shocked numerous more times (anywhere from 6 to 14 times) in drive stun mode as officers tried to take him into custody. Marquez later died. The ruling from the 9th Circuit was that the officers were justified because they believed that Marquez had committed a crime and that he was actively resisting arrest. It is interesting to note that the coroner in this case stated that, Marquez had died from “excited delirium,” which was the product of “adrenaline toxicity.” And that “Marquez’s cardiac arrest could not be directly attributed to the taser deployments.”

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Cyrus v. Town of Mukwonago (November, 2010)
In this case, police responded to a partially built home on a report of a trespasser. When they arrived, they found the subject (Cyrus) who police knew as having mental health problems. When the responding officer advised Cyrus he was on the wrong property, Cyrus walked or ran back toward the house. The officer deployed his Taser and Cyrus fell to the ground. Cyrus was Tasered once more in probe mode and then numerous more times in drive stun mode for a total of 6-12 applications (officer claims 6 total, device shows 12 shocks). Cyrus later died and the medical examiner ruled that the Taser played some role in the death but could not parse out the eight different contributing factors. The 7th Circuit Court of Appeals overturned the district court and ruled that the force was not reasonable. This is in line with the Bryan v. McPherson decision and reaffirms that Tasers are meant for active resistance and not flight alone.

Cavanaugh v. Woods Cross City (November, 2010)
Police responded to the Cavanaugh residence after a domestic dispute. Shannon Cavanaugh had left prior to their arrival with a kitchen knife. When Cavanaugh returned to her house (no knife was visible in her hand), a deputy approached her from behind and Tasered her without warning causing her to fall and hit her head on the concrete stairs resulting in a traumatic brain injury. Similar to other cases, the 10th Circuit affirmed the lower court's decision that the force was not reasonable due to the level of the crime and of the resistance given at the time of the Taser application. While a warning is not necessary, this is an illustration of where a warning may have been appropriate and could have prevented the unintended consequences of application.

A-3 Medical Risks in Detail
The following sections touch upon each of the main concerns raised in numerous articles related to the possibility of Taser related deaths:

Excited Delirium
Before describing the medical risks of Tasers, one often-used term requires some discussion. The term “excited delirium” has been offered as an explanation for deaths proximal to Taser use. Though it is seen as a questionable diagnosis by some, the American College of Emergency Physicians recognized it as a syndrome in 2009 and gave it the acronym ExDS.57 While not completely understood, it is a predominantly descriptive term used to describe what some believe to be a brain disorder. Usually (but not always), ExDS is caused by the use of stimulants. It causes sweating, agitation, unusual pain tolerance, tachypnea (high respiratory rate), aggressive behavior (often with unexpected physical strength) and hyperthermia. It is

thought that the primary cause of death from “excited delirium” comes from abnormal changes in brain dopamine receptors which can cause hyperthermia or high core body temperature.58

One of the biggest challenges is untangling the effects caused by excited delirium and any effects that could be caused or exacerbated by a Taser deployment. Due to the erratic behavior and violence exhibited in many cases of excited delirium, a Taser will often be deployed to take immediate control of a potentially dangerous situation. This can cloud any inquest into what was the proximal cause of death causing one to wonder whether excited delirium or Taser application was responsible.

**Cardiac Related Issues**

One of the primary focal points of concern regarding the use of Tasers is the proposed link of Taser use and cardiac related death. Some have speculated that Tasers can cause ventricular fibrillation, acute stress cardiomyopathy, pace-maker malfunction, or exacerbate other cardiac conditions. In order to fully analyze the risk, each potential concern will be addressed separately:

**Ventricular Fibrillation**

The risk of ventricular fibrillation from Taser or other CED has been studied in humans and in swine. While it is almost impossible to get close to “real world situations,” pig studies have shown that it is indeed possible to induce ventricular fibrillation in swine, but only after long periods of time and/or under unrealistic settings.59 While no human studies have reported ventricular fibrillation, there have been anecdotal episodes where ventricular fibrillation occurred proximal to Taser use. Whether or not the Taser was directly responsible is unknown. One study attempting to quantify the probability of ventricular fibrillation from a Taser estimated the probability or risk at .000006 or 1 in 166,667.60

**Acute Stress Cardiomyopathy**

According to the Johns Hopkins website, Acute Stress Cardiomyopathy is defined as “[I]ntense emotional or physical stress [that] can cause rapid and severe heart muscle weakness.”61 This can, in rare cases, result in death. One hypothesis is that many of the events happening proximal to the use of a Taser (sprinting, fighting, being pepper sprayed, restrained etc.) increases catecholamine levels and that a Taser may be one additional stressor that contributes to acute stress cardiomyopathy.62 Other studies have confirmed that the use of a

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Taser can elevate catecholamines, but only to the same level as pepper spray and K-9 involvement, not to the level of sprinting and heavy-bag use (fight or flight responses).  

**Pace Makers/Implantable Cardioverter Defibrillators**

This report only found two studies that looked at the possible interference a Taser might have on a pace-maker. Both studies found no evidence that a Taser would either reprogram or damage the pace-maker device. There was one pace-maker that “inappropriately detected” ventricular fibrillation during testing but aborted the shock because the 5 second Taser application did not give it enough time to fully charge the capacitor before normal rhythm was realized. Since most implantable cardioverter defibrillators take longer than 5 seconds to prepare to deliver a shock, the 5-second long duration of a Taser should not cause an inappropriate shock from the pacemaker. This is another reason that extended shocks with a Taser would not be recommended.

**Respiratory Acidosis**

Another possibility that has been raised is that a Taser application could cause respiratory acidosis. The U.S. National Library of Medicine defines respiratory acidosis as, “a condition that occurs when the lungs cannot remove all of the carbon dioxide the body produces. This disrupts the body's acid-base balance causing body fluids, especially the blood, to become too acidic.” One such study showed that “Repeated exposures to a conducted electrical weapon result in respiratory acidosis” but noted that the results were transient. During the previously mentioned catecholamine study, acidosis measurements were worse after sprinting or punching a heavy bag than after Taser application. The most recent studies conclude that acidosis would only be an issue with repeated or long duration applications.

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67 Ibid.
Other Injuries

There is always an increased likelihood of injury and/or death when force is applied. There has been a reported case of pneumothorax\textsuperscript{71} and even ocular puncture\textsuperscript{72} from Taser probes. While not minimizing the seriousness of these injuries, other force options such as baton and personal body weapons share an incrementally small risk of serious injury and even death on rare occasions. Looking at a study performed in 2003, the similarities between concerns with OC pepper spray and Tasers is illuminating:

\textquote*{"Bowling, Gaines and Petty (2003) examined sixty-three deaths after oleoresin capsicum deployments and found that the overwhelming majority was due to the arrestee's drug use, disease, positional asphyxiation or a combination of these factors, similar to recent claims about TASERS (see also: Granfield, Onnen & Petty, 1994)."}\textsuperscript{73}

The best comparable force option available to the Berkeley Police Department (as compared to a Taser) is the 40mm "baton round." According to a study conducted using data from US and British sources, the estimated risk of serious injury from a baton round was estimated at 1:514 while the risk of death was estimated at 1:7801.\textsuperscript{74} One of the only legitimate attempts to quantify the number of Taser deaths comes from Amnesty International.\textsuperscript{75} In that report, 400 deaths are attributed to Tasers with only 50 of these being supported by medical examiners. While the 400 deaths figure almost certainly includes numerous cases where Tasers were only proximal and not a contributing factor, 50 may be too low of a number. Based on all of the available literature, a reasonable estimate of 150 triples what the medical experts have ruled was the cause and only takes field uses into account. This equates to a risk of death of 1:8267 which is approximately 6% lower than the risk from baton rounds.

Other Studies

One study looked indirectly at the number of in-custody deaths pre and post Taser implementation. While not looking specifically at cases where the Taser was used (and therefore having some issues with causation), the study looked at 84 moderate to large police departments in California and determined a sizable increase in in-custody deaths overall for the first year after Taser deployment. For subsequent years, the number of in-custody deaths returned to previous levels. Speculation by the authors and supported by this report is that liberal use of the Tasers could have played a role.\textsuperscript{76} This illustrates the need for proper training and specific guidelines to prevent officers from over-using the new device.

\textsuperscript{74} Hunter, Siman and Ian Greaves (2002) "Baton Rounds." \textit{Trauma} 4:29.
Overall Risk

The National Institute of Justice issued a report in 2005 which stated that,77

"[a]lthough exposure to CED is not risk free, there is no conclusive medical evidence... that indicates a high risk of serious injury or death from the direct effects of CED exposure."

The report does note that:

"CED may be a contributor to 'stress' when stress is an issue related to the cause of death determination" but not "of a magnitude that separates it from the other components of subdual."

Similarly, the Potomac Institute’s stated,

"Based on the available evidence, and on accepted criteria for defining product risk vs. efficacy, we believe that when stun technology is appropriately applied, it is relatively safe and clearly effective. The only known field data that are available suggest that the odds are, at worst, one in one thousand that a stun device would contribute to (and this does not imply "cause") death. This figure is likely not different than the odds of death when stun devices are not used, but when other multiple force measures are. A more defensible figure is one in one hundred thousand."78

After a thorough review of the medical literature and of other cumulative reviews of the same literature, this report supports both statements.

A-4 The Physics of Electricity

In order to fully understand Tasers and put the shock into perspective, a review of the physics of electricity is warranted. There is one simple equation necessary to understand the power and current of electricity: P=IV where P is the Power of the Electricity (in watts), I is the current (in amperes) and V is the potential difference (in volts). The Taser has a maximum of 50,000 volts and 26 watts. After the initial burst of 50,000 volts, the actual shock is usually around 1200 volts which would mean a peak current of 19 mA. While most people equate the danger of electricity with the amount of volts, it is the current that is most dangerous. The human body can feel the current at 1mA, feels pain at 5mA, and loses muscle control at 15mA. With the Taser pulsating up to a peak of 19 mA, each peak should cause loss of muscle control but no other serious side effects. The amount of current that typically is seen as dangerous would be 60mA and above. Certainty, the duration and other factors could make the shock from a Taser more or less dangerous, however the magnitude of current is not enough in and of itself to be dangerous.

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A-5 High Profile Incidents

Marin County Sheriff’s Office

On April 26, 2011, the Marin Board of Supervisors agreed to settle a Taser related lawsuit for $1.9 million. The case involved Marin County deputies using a Taser on a 66 year old man who they believed had threatened to harm himself. Deputies shocked the man numerous times when he was a questionable threat to the deputies. County Counsel Patrick Faulkner stated that the incident “was not consistent with department policy.” As noted in the cost benefit section, there is a risk of lawsuit any time officers use force and while there is no evidence of an increase in lawsuits correlating with Taser implementation, good training and good policies (coupled with common sense by officers) can mitigate that risk.

Robert Dziekański and the Braidwood Inquiry

The case of Robert Dziekański was the foundation for the Braidwood Inquiry which looked at the use of conductive energy weapons (Tasers) in Canada. This report has caused half of all Canadians to support a moratorium on Tasers. The facts leading up to the incident as well as the aftermath are very complicated and are not relevant to this report. The proximal facts are as follows:

Robert Dziekański was a polish man visiting his mother in Canada. He spoke no English and had been through hours of customs problems in the airport at the time of the incident. Royal Canadian Mounted Police (RCMP) officers were called when Dziekański started throwing chairs in an airport lounge and acting irrationally. One of the witnesses had reported that they thought he was drunk and four RCMP contacted him at the doorway from the International Reception Lounge and a secure area. There was an obvious language barrier and multiple officers tried to communicate with Dziekański giving him numerous directions he could not possibly understand. Dziekański looked as though he could be drunk or possibly have mental health issues, however, he was not aggressive on first contact. Shortly afterward, Dziekański walked to a table and picked up a stapler. At that point, officers took up tactical positions in a semi-circle and deployed a Taser fearing Dziekański was going to use the stapler as a weapon. Only one probe from the Taser made direct contact with the skin while the other was caught in Dziekański’s clothing, causing a shock but little to no neuromuscular incapacitation. Dziekański fell to the ground but did not obey officer’s commands (because he could not understand them) and was Tasered a second time. Officers tackled Dziekański and tased him a couple of more times before getting him handcuffed. Minutes later, Dziekański stopped breathing and later died.

The Braidwood Inquiry was commissioned to look into the death and eventually ruled that the RCMP was not justified in using a Taser on Dziekański. The question of whether or not the officers should have used the Taser is beyond the scope of this report. It is the opinion of this

report that the first two applications of the Taser in probe mode may have been justified but subsequent applications may have been unnecessary and/or excessive. Whether or not the Taser was the cause of death is the most important question. Based on a review of medical literature on Tasers and on Excited Delirium, it appears just as likely that the stresses of flying for the first time exacerbated by hours of issues in immigration could have started Mr. Dziekański down numerous paths to stress induced arrhythmia. While it is likely that the Taser contributed some role, based on the medical review above, the changes in catecholamines and acidosis are greater with a struggle (after being Tased there was a struggle before Dziekański was restrained) therefore it is likely the struggle contributed as much or more than the tasering itself. Last, while Mr. Braidwood rejects the notion that Mr. Dziekański’s stress could have had a hyperadrenergic effect and/or caused excited delirium, some medical examiners from this report as well as others in the academic literature contradict this skepticism.81

**UCLA and Florida State**

Two of the most notable Taser stories involve campus police using Tasers in the “drive stun” mode when passively or minimally aggressive subjects did not comply with officers’ attempts to escort them out of an area. In the UCLA case, a patron refused to show his ID to security staff and was contacted by campus police. During the contact, he ignored directions from the police officers and sat down, refusing to move. After numerous attempts to persuade him to walk on his own accord, police used a Taser in the “drive stun” mode to compel him to move. While this was in policy (at the time of the incident) UCLA paid out $220,000 to settle the subsequent lawsuit.82 In the Florida State case, officers attempted to escort a student out of an event for causing a disturbance. During the interaction, the student failed to comply with officers and as he struggled with the officers, they used a Taser in the “drive stun” mode to gain compliance. While this case involved more than passive resistance, it was seen by many as unnecessary or excessive. The subsequent investigation ruled in favor of the officers and no lawsuit was filed. Based on the *Bryan v. McPherson* decision (which came after both of these incidents), the UCLA case would definitely not be constitutional and while the Florida State case would appear to be legal based on the active struggle with the officers, many agencies would be less likely to authorize the use of a Taser in similar situations.

**Oscar Grant and Weapon Confusion**

While the merits of the defenses argument are still debated, there is a risk of officers in stressful situations falling victim to muscle memory and using lethal force when they meant to fire a Taser. This has been seen in six cases in the last nine years.83 Like other risks associated with Taser use, this is easily mitigated by sound policies and proper training. As stated in the

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recommendations, the Taser should be carried in a support side ("weak side") draw, possibly even a drop holster to assist those with no more belt space. By mandating this configuration, there is little chance of weapon confusion and accidental discharge of the firearm.

**A-6 Monetary Costs Associated with Tasers**

*Equipment Costs*

First, below is a chart showing the cost of equipment for the first year and the cost for subsequent years.

<table>
<thead>
<tr>
<th>Model</th>
<th>Product Description</th>
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<th>Quantity</th>
<th>Amount</th>
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<td>26750</td>
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84 Quote from ProForce Law Enforcement (Jerry M. Yslas) 655 N. Berry Street, Suite H Brea, CA 92821 (714)-257-9095
85 In order to approximate the number of times that a Taser would be discharged in a year, use-of-force reports for the last five years were obtained (2006-2010). Using the most liberal estimates, a maximum of 68 incidents may have warranted Taser deployment over that five year period. For this cost portion of the analysis, it will be assumed that all of the possible incidents would have included deployment and discharge of a Taser cartridge. That equates to approximately 14 discharges a year. As for the life of a Taser, the representative at ProForce assured me that due to the durability and infrequency of use, they should last for ten years or more.
Injuries

As for officer injuries, the City of Berkeley Human Resources Department provided the medical costs while the police department provided the days off and medical retirement information. In order to attribute costs for days off in the short term, each day off was assumed to be backfilled at $87.47 (1.5 the top-step rate of $58.31) an hour for 10 hours (standard shift length). The longer durations appeared to be total time off (including scheduled days off). To account for this, the days off were divided by 365 and then multiplied by 2000 hours (at the same $87.47/hour rate). The medical retirements were calculated using 50% of the “fringe” rate of $98.60/hour (including benefits) due to the fact that the police department pays 50% of the salary and all of the benefits for an officer who is not working. The full spreadsheet is below:

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Total Cost (5 years) $1,817,379
Average for 10 years $3,634,759
Total Cost (10 years) using 76% effectiveness $2,762,417
Total Cost (10 years) using the 60% decrease in officer injuries from the DOJ report $2,180,855
Sensitivity Analysis

The original estimate for the net benefit to Taser used four different situations to try and show the range of possibilities. In order to be more thorough, sensitivity analysis was conducted using a Monte Carlo simulation. Using normally distributed values between the high and low estimate, the net benefit averaged out to $2,350,000.

A-7 Taser Training Bulletin #15

In late 2009, Taser International released a training bulletin recommending a lower point of aim. In the bulletin, they cite three reasons for the change.86

There are three reasons:

a. Simplify targeting for all TASER systems to one easy to remember map, avoiding chest shots when possible and the risk of a head/eye shot in a dynamic situation, as is standard for impact munitions

b. When possible, avoiding chest shots with ECDs avoids the controversy about whether ECDs do or do not affect the human heart.

c. Close-spread ECD discharges to the front of the body are more effective when at least one probe is in the major muscles of the pelvic triangle or thigh region.

Some claimed that this was an admission that the Taser can cause cardiac related death while Taser International claimed that it was issued in order to more effectively target the pelvic triangle, avoid accidental shots to the neck or head, and to minimize perceived liability regarding cardiac related deaths.

A-8 Academic and Governmental Reports

There have been many recommendations from agencies ranging from local departments to state and federal inquiries in the United States and abroad. The following reports were a sampling of the most recent and most relevant reports issued.

PERF Report (2011)

In 2011, the Police Executive Research Forum, a highly respected research organization in Washington D.C. updated its recommendations for what it is now calling “Electronic Control Weapons (ECWs).” In the report, they address some of the larger issues surrounding ECW related deaths.87

"Although causation factors are not clear, the most common factors that appear to be associated with fatal and other serious outcomes include 1) repeated and multiple applications, 2) cycling time that exceeds 15 seconds in duration, whether the time is consecutive or cumulative, and 3) simultaneous applications by more than one ECW."

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86 Taser International (October 2009) "Training Bulletin 15: Medical Research Update and Revised Warnings."
They also addressed excited delirium:

"Personnel should be trained about the medical complications that may occur after ECW use and should be made aware that certain individuals, such as those in a state of excited delirium, may be at a heightened risk for serious injury or death when subjected to ECW application or other uses of force to subdue them."

Responding to the criticism of many, they also clarified that:

"ECWs should be used as a weapon of need, not a tool of convenience" and that officers should avoid using the "drive stun" mode for pain compliance.

Finally, PERF concluded by reiterating that “[w]hen used appropriately with a full understanding of their risks, ECWs are useful weapons that can effectively help officers to resolve serious situations.”


In 2005, the International Association of Chiefs of Police issued a report citing a “nine-step strategy for effective deployment [of Tasers].” The following were their recommendations:

1. Build a team to address acquisition, costs, policies, training, liability and evaluation.
2. Place EMDT on the use-of-force continuum
3. Assess the Costs and Benefits of Using EMDT
4. Identify Roles and Responsibilities for EMDT Deployment
5. Engage in Community Outreach with key stakeholders and the community.
6. Develop Policies and Procedures for EMDT
7. Create a Comprehensive Training Program for EMDT Deployment
8. Use a Phased Deployment Approach for EMDT
9. Assess EMDT Use and Determine Next Steps

In 2010, the IACP updated their 2005 report on electronic control weapons. The following are two highlights from the report:

"The ECW should be cycled the least number of times and for the shortest duration reasonably necessary to gain compliance, overcome resistance, and place the subject in handcuffs, even during the ECW cycle."

and

"[O]fficers and agencies must guard against becoming overly dependent on the device to the exclusion of other reasonable alternative force options."

Along with their recommendations, the IACP released a sample policy to provide guidance to agencies writing their own Taser policies. Their model policy follows is listed in the next section.
AMA Report (2009)

The American Medical Association released a report in 2009 in which it concluded:88

“If deployed according to an appropriate use-of-force policy, and used in conjunction with a medically driven quality assurance process, Taser use by law enforcement officers appears to be a safe and effective tool to place uncooperative or combative subjects into custody.”

The report quotes a study out of Dallas showed that “in 5.4% of the deployments the Taser® was deemed to have clearly prevented the use of lethal force.” They also quote RAND who stated in a report that “[t]reating CEDs as “only a substitute for deadly force would endanger officers and negate the benefit that has been demonstrated.”

Last, the AMA recommends more independent research be conducted on Tasers so as to quantify the risk of death more accurately.

ACLU

In 2005, the ACLU of Northern California printed a report critical of Tasers.89 The ACLU’s main concern was the fact that many law enforcement agencies had inadequate Taser policies. Before Bryan v. Reynolds some agencies could use a Taser for passive resistance. Some agencies had no limit on how many times you could shock someone and/or no regulations on vulnerable populations. Instead of calling for a moratorium on Tasers, the ACLU of Northern California simply requested adequate restraints and accountability. Mark Schlosberg, the Police Practices Policy Director said in 2004, “We do not believe that Tasers should be banned.”90 In fact, the ACLU of Ohio has long advocated Tasers as long as they are well-regulated.91 The most recent opinion of the ACLU of Northern California was expressed by the Associate Director, Kelli M. Evans who said in response to the SFPD’s request to pursue Tasers:

“CEDs, while less lethal than firearms, constitute a significant level of force” and that “before deciding whether to implement CEDs, departments should have a real conversation with a broad range of community stakeholders, including communities of color, civil rights and mental health advocacy groups, school officials and parents, medical professionals, public officials, and other interested groups and individuals.”92

UN Committee on Torture

There was significant press given to a statement made by the United Nations Committee on Torture in 2007 regarding Tasers:

"The Committee is concerned that the use of these weapons [Tasers] causes severe pain constituting a form of torture, and that in some cases it may even cause death, as recent developments have shown."\(^{93}\)

Later reports have added that:

"by reason of their effects on the physical and mental state of persons they are used on, they [Tasers] may [emphasis added] infringe articles 2 and 16 of the Convention."\(^{94}\)

Despite these statements, many U.N. partners continue to use Tasers. These statements made by the Committee on Torture are not binding and have largely been ignored by those nations which seek to arm their officers with such weapons. These statements and similar sentiment from Amnesty International do reiterate the need to educate members of the public and involve them in the process by seeking their input and listening to their concerns.

**British Home Office and Canadian Law Enforcement Reports**

In 2005, the British Home Office conducted its own evaluation of Tasers. After its own review of all of the medical literature, it concluded that "The risk of a life-threatening event arising from the direct interaction of the currents of the X26 Taser with the heart is less than the already low risk of such an event from the M26 Advanced Taser."\(^{95}\) Certain police officers continue to carry Tasers in the UK.

In Canada, there have been numerous government reviews of Tasers. The most recent was conducted by the Alberta Solicitor General in 2009.\(^{96}\) The report provides guidelines for Taser use. Chapter 6: Use of Conducted Energy Weapons contains the following:

"(b) ...Before deploying a [Taser], a police officer must consider the availability of other reasonable use of force options and make a determination that a [Taser] is the proper level of force required.

c) The totality of circumstances warranting the use of a [Taser] as a use of force option includes but is not limited to the following:

i) While in the lawful execution of their duties, police officers may use a [Taser] if the officer subjectively believes that the subject will likely cause injury to the police officer, subject, or bystander. Further, the use of the [Taser] must also be objectively reasonable in light of Environmental Factors, Subject Factors, and Officer Factors. At all times, the force used must be reasonable;"

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ii) [Taser] use will be subjectively and objectively reasonable as an alternative to direct physical contact with a subject when, due to the Environmental Factors, Subject Factors, and Officer Factors involved, there is a real likelihood of injury to the officer, subject, or bystanders;

iii) The flight of a subject by itself would not satisfy the objective reasonable test. Environmental, Subject (i.e. nature of the offense) and Officer Factors, must always be considered; and

i) Actions to be taken when a subject's behavior, or police information, indicates that a subject or bystander may have an increased risk of serious injury if exposed to a use of force. This includes emotional or psychological illnesses, physical health risks, and environmental risks, such as the presence of flammable substances, or likelihood of falls.

These regulations are similar to those in the United States and reaffirm the common sense principles being adopted from agencies and governments around the world.
A-9 Current Sample Policies

*Alameda County Chiefs of Police and Sheriff’s Association - Policy Statement (2010)*

To be added in adobe
Sample Policy from Dr. Lorie Fridell, University of South Florida (2010)
IACP Sample Policy (2010)
To Be Added in Adobe
Additional References


