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Wednesday, January 16, 2002

Chief Neil Ferdelam
Hamilton Police Dept
331 S Front St
Hamilton, OH 45011

Dear Chief Ferdelam,

Rick Smith asked me to send you this medical response letter as relating to the recent in-custody death that occurred in Hamilton. He wanted me to address two specific items, namely:

- The results of the 1991 article in the Journal of Forensic Sciences (JFS) titled *Effects of the TASER in Fatalities Involving Police Confrontation*.
- The medical implications of electrical stimulation from the TASER as they relate to the recent in-custody death in Hamilton.

As regards the March 1991 JFS article, I am somewhat surprised that this article was considered alarming. The JFS article is widely regarded as a forensic benchmark throughout the industry. The conclusions clearly show that the TASER can be responsibly ruled out as a cause of death in each of the sixteen cited cases (with the possible exception of case #3, a case to be expanded upon in this letter and a circumstance of such complexity that no factor was ruled out, including the TASER). Quoting from the abstract of the article, "The cause of death was an overdose of drugs in eleven (cases), gunshot wounds in three, heart disease and Taser shock in one, and an undetermined cause in one". All suspects at one time or another during the course of these incidents were considered by the police to be under the influence of psychotomimetic drugs, most commonly phencyclidine (PCP). All were unarmed, which, of course, was the reason a Taser was used instead of a lethal weapon. **The unified conclusion of the authors reached after evaluation of these cases is that the Taser in and of itself does not cause or contribute to death, although its "effects" cannot be ruled out in but one of these sixteen cases.**

I have added the bold to the last sentence for emphasis. In my opinion had the authors wanted to be totally objective in titling their paper they should have said: *Lack of Effects of the of TASER.....etc.* Perhaps to temper a little bit of anti-Taser bias imbedded in the published title, it is important to note that the authors found sufficient evidence to rule out the TASER as having played a causal role in all the 16 fatalities. Again, In case #3, the authors did not find the TASER was a causal factor. Rather, the sheer complexity of that subject's medical condition made it impossible for the authors to rule out any factor, including the TASER. Such might be referred to as a political conclusion rather than a scientific conclusion. This case will now be outlined in detail starting at the third paragraph from the bottom of page 446.

"Two years prior to his death, the subject was in a car accident caused by an episode of syncope and cardiac arrhythmia. Cardiology consultation noted syncope secondary to cardiac arrhythmia and mitral regurgitation secondary to mitral valve prolapse. The patient was advised to have a pacemaker implanted but he refused. . . At autopsy, an enlarged heart was noted with mucinous degeneration of the mitral valve. On microscopic examination, there was noted mucinous



degeneration of the mitral valve area, eosinophilic fragmentation of the myocardium, and patchy foci of myocytolysis and interstitial fibrosis in the heart tissue.”

“PCP was also found in the blood, bile, and liver and, therefore, the cause of death could be attributed to the PCP. However, the subject’s heart condition was such that he could have suffered a fatal arrhythmia from the PCP, the excitement, the electrical stimulation, or a combination of any or all of these factors. The cause of death was, therefore, certified as cardiac arrhythmia due to sick sinus syndrome, prolapse of the mitral valve, and electrical (Taser) stimulation while under the influence of PCP.”

Again, the above conclusion does not state that the TASER was a contributing factor in the death. Rather, the authors note that the extreme and precarious condition of the subject’s heart coupled with PCP use, the struggle and the use of the TASER prevented ruling out any factor. From a clinical standpoint, this man had a serious medical condition, but not a life threatening one if he had followed the most basic medical advice. Such advice would not have included the periodic preferential poisoning of his heart with PCP, cocaine, alcohol, etc.

One note of significant interest: the time between the use of the TASER and the death of the subject was recorded as 45 minutes (see chart attached). I am unaware of any pathophysiological mechanism whereby the application of a TASER-like electrical stimulus anywhere on the body surface could be the cause of that person’s death some 45 minutes later. The only plausible cause of death from electrical injury not leaving tell-tale skin lesions -- clearly not present in any of the cited cases -- is ventricular fibrillation, a fatal disturbance of heart rhythm which ensues immediately upon shocking the heart with greater-than-threshold, non-Taser-like electric current pulses. Specifically, if the TASER output were to cause cardiac arrest, it would be immediate.

As a court recognized expert who has testified in over 50 cases regarding electrical safety, electrocution, and less-lethal weapons, I believe that in the Ohio case at issue, the recorded time lag of minutes (rather than a few seconds) between application of the TASER and pulseless collapse of the subject proves beyond reasonable doubt that the TASER was not the cause of death.

One other important note: the Kornblum, et. al. article was concerned with a different weapon system than the ADVANCED TASER M26 now utilized by the Hamilton Police Department. Specifically, the weapons used in all the cases analyzed were original analog devices manufactured by Tasertron, a separate company not affiliated with TASER International. There are significant differences between the older Tasertron weapon system built in the 1970’s and the ADVANCED TASER M26, a microprocessor controlled platform that was released years after the Kornblum, et. al. article was published. It would be unrealistic to draw any conclusions concerning the relative safety and efficacy of the ADVANCED TASER based upon the outdated, very different weapon system reported in the Journal of Forensic Sciences.

Regarding the recent in-custody death in Hamilton. I would very much like the opportunity to learn more of the details surrounding this case, if possible from the Coroner himself. Such an arrangement could facilitate the collection of the data necessary to assemble a publishable scientific report if the Coroner were interested in collaborating. From news accounts I understand the following to be some of the facts:

- Suspect ingested a large amount of cocaine (assumedly for concealment)
- Officers used the ADVANCED TASER in the stun gun mode to the upper scapula area of the back in the course of subduing the subject



- _ Suspect was restrained and was responsive to commands from police officers for at least 15 minutes after the last ADVANCED TASER application
- _ After a period of time greater than 15 minutes, the subject experienced convulsions and eventual cardiac arrest during transport to a hospital facility

Assuming this limited amount of information to be accurate, I can state affirmatively that the TASER effect could not have measurably contributed to the fatality. Furthermore, It is my understanding the corporate office has forwarded to you under separate cover the results of the cardiac safety studies performed recently by Dr. Wayne McDaniel and myself at the University of Missouri Cardiothoracic Surgery Center. In these published studies, we tested the ADVANCED TASER directly on the surface of the heart (pericardium) of anesthetized large animals via surgical needles inserted between the ribs. Even under high intravenous doses of several cardiotoxic stimulants (including the PCP analog Ketamine), at no time, before, during or after administration of each drug ,did the ADVANCED TASER cause any self-sustaining arrhythmias or fibrillation. Given the lack of arrhythmogenesis observed in these experiments, it is inconceivable to me that the external application of the ADVANCED TASER output to a subject such as is described above could be causally related to a cardiac arrest occurring some 15 minutes later.

As you may be aware, cardiac electrophysiology is a new and highly specialized field of study in medicine. It may be difficult for busy clinicians or even forensic pathologists to have the latest information at their finger tips in a case such as this. Accordingly, I would like to offer to assist in any way possible to insure a technically accurate assessment of this case.

I can be reached at 402-572-7125 or by email at strat@ne.uswest.net and would suggest that we try to arrange a time when I might come to Ohio and meet with the Coroner to learn more about this case and to share some experiences in this field. I hope this information is helpful.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert A. Stratbucker", written in a cursive style.

Robert A. Stratbucker, M.D., Ph.D.
Medical Director
TASER International



Appendix

Causes of Death: Table from *Effects of the TASER in Fatalities Involving Police Confrontation*
Journal of Forensic Sciences, Volume 26, Number 2, March 1991.

Case No.	Age	Sex	Race	Cause of Death	Manner of Death	Drugs Detected	Time Interval Between Taser and Death	Number of Taser Cassettes Fired
1	27	M	M	Cardiac Dysrhythmia/acute PCP intoxication	Accident	PCP	15 min	1
2	30	M	M	Cardiac Decompensation during restraint procedure with blunt force trauma Cardiomyopathy Idiopathic with acute myocarditis	Homicide	Lidocaine	30 min	1
3	35	M	B	Cardiac arrhythmia Sick sinus syndrome, prolapse of mitral valve, and electrical (Taser) stimulation while under the influence of PCP	Homicide	PCP and digoxin	45 min	1
4	34	M	B	Acute cocaine intoxication	Accident	Cocaine and benzoylecgonine	3 hr	3
5	35	M	B	Acute cocaine intoxication	Accident	Cocaine and benzoylecgonine	2 hr	1
6	37	M	W	Cardiac arrest due to multiple Taser	Homicide	Cocaine and	45 min	7



				wounds/acute cocaine intoxication		benzoylecgonine		
7	31	M	W	Acute cocaine and PCP intoxication	Accident	Alcohol, cocaine, PCP. And benzoylecgonine	2 days	1
8	28	M	B	Hepatic necrosis and renal failure due to acute cocaine and chronic drug and alcohol abuse	Accident	Cocaine, benzoylecgonine, and morphine	2 days	1
9	26	M	M	Multiple gunshot wounds	Homicide	PCP	15 min	3
10	20	M	M	Multiple gunshot wounds	Homicide	None detected	15 min	2
11	27	M	M	Acute PCP intoxication	Accident	Alcohol and PCP	15 min	1
12	37	M	B	Multiple drug intoxication	Accident	Alcohol, PCP, and cocaine	45 min	1
13	36	M	B	Cardiac arrest during restraining procedures and PCP intoxication	Homicide	PCP	3 days	2
14	27	M	W	Multiple injuries and methamphetamine intoxication	Homicide	Methamphetamine and amphetamine	30 min	Multiple
15	27	M	B	Multiple gunshot wounds	Homicide	None detected	15 min	1
16	39	M	B	PCP intoxication,	Homicide	PCP	30 min	2



				esophageal airway obstruction and blunt force injury to neck				
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