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Commissioner Braidwood,

I am pleased to have the opportunity to serve this Commission of inquiry into the use and safety of tasers. I am a duly qualified medical practitioner licenced to practice in British Columbia as a specialist in cardiovascular surgery. My medical training is as follows:

MD – 1974 – University of Manitoba
Internship – 1974-75 – Toronto General Hospital
General Surgery Residency – 1976-80 University of British Columbia
Cardiovascular Surgery Residency – 1980-83 – University of British Columbia
Cardiovascular Surgery Fellowship Training – 1983-84 – Baylor College of Medicine, Houston, Texas

I hold specialty certifications in General Surgery from the Royal College of Physicians and Surgeons of Canada, and the American Board of Surgery, and specialty certifications in Cardiovascular Surgery from the Royal College of Physicians and Surgeons of Canada, and the American Board of Thoracic Surgery. I hold the academic rank of Clinical Professor of Surgery at the University of British Columbia.

This submission is based on my clinical knowledge and experience in the treatment of patients with cardiac disease as well as documents forwarded to me by Mr. Vertlieb, including:

1. Kroll M.W. Science and Medicine of TASER® Electronic Control Devices. Mark Kroll & Associates, LLC, Crystal Bay, MA. 2008
2. Victoria Police Department memorandum April 6: 2005; Subject: Taser Testing
3. Truscott A; A knee in the neck of excited delirium. CMAJ 176(6) Mar 11, 2008, 669-673
4. Denton JS; Report of post mortem examination, Office of the Medical Examiner, County of Cook, Illinois. Case No. 190 of February 2005
5. TSENG, Z. Excerpt of proceedings at the Commission of Inquiry May 9, 2008

I wish to address the following items in the most succinct manner possible, recognizing the previous submission of Dr. Tseng:

- 1) Can TASERs cause cardiac arrest?
- 2) How often do TASERs cause cardiac arrest?
- 3) What is the appropriate police first aid care of someone who has been "tasered"?
- 4) Excited delirium

1) Can tasers cause cardiac arrest?

Kroll claims that the pulse width and current and energy of the TASER are too low to disturb cardiac activity. In fact, the pulse width is not very different (0.1 versus 0.2 msec) from that used in implanted cardiac pacemakers, and the electrical current and energy are higher than implanted pacemakers. Moreover, in his calculations, Kroll does not address the issue of change in position of the heart with changes in body position and, most importantly, does not discuss the ease of inducing ventricular fibrillation in diseased versus normal hearts. It is quite difficult to cause a normal heart to fibrillate, but it can be very easy to cause a severely diseased heart to fibrillate.

Dr. Tseng has made a very clear and detailed presentation to this Commission and I am in complete agreement with his assertions. I will not repeat that detailed information here. Suffice it to say that disturbances of cardiac rhythm (rapid pacing) and induction of ventricular fibrillation have been reproducibly demonstrated in a healthy pig model. In humans, pacing devices used in medical care, such as pacing system analyzers or external or implanted pacemakers usually carry a warning about possible ventricular fibrillation in they are set to pace at rates of 200 or more, underscoring the hazards of rapid ventricular pacing.

By the usual standards of evidence in the field of cardiac care, almost all physicians would conclude that TASERS can induce ventricular fibrillation in humans.

The risk of ventricular fibrillation will be especially high in persons with underlying heart disease. Unfortunately, persons with underlying heart disease will also be the most difficult to resuscitate from ventricular fibrillation.

The post mortem report from Cook County in 2005 showed a patient with some heart disease-left ventricular hypertrophy and some coronary artery disease. The recorded TASER dart positions would have created a current path which could have exposed the heart to electrical current. While the document does not give an exact report of the chain of events, the post mortem findings are suspicious for a TASER-induced arrhythmia as the cause of death.

In summary, then, TASERS almost certainly can cause cardiac arrest in humans, particularly in people with underlying heart disease. I don't believe that it will ever be ethically possible to conduct a human study to disprove this.

The Vancouver Sun reported that Taser International recently made a submission to this Commission wherein they stated their position that TASERS could not cause cardiac arrest. If accurately quoted by the Sun, this position is clearly unrealistic. This creates a problem with respect to the credibility of the Company and could lead to difficulty in dealing with the Company in matters of safety standards and training requirements.

2) How often do TASERS cause cardiac arrest?

Dr. Tseng gives some useful insights into this in his submission which he quoted a 1.4% mortality for individuals subdued by police using a TASER. This is similar to the mortality risk, for example, of a coronary artery bypass operation. We do not know how many of these were due to the TASER itself, but one could conclude that the risk of death from the TASER is small but not insignificant.

Further information could be obtained by reviewing cases of death in which a TASER had been used, but the exact details and time sequences, including precise details of the victim's condition would have to have been carefully recorded in order to provide useable data.

3) What is the appropriate police first aid of someone who has been "tasered"?

A falling level of consciousness is a medical emergency. If someone becomes unresponsive (unresponsive to voice and to painful stimuli), something is very seriously amiss, and the

situation must be diagnosed and appropriate treatment commenced immediately. Immediate examination and documentation should include:

1. Response to stimuli
2. Pupil size and reactivity to light
3. Pulse rate and regularity
4. Respiratory rate and depth

From this it will be obvious if a person has had a cardiac arrest or is having breathing difficulties.

If someone is "tasered" in the front of the chest and immediately falls to the ground and is unresponsive, it is almost certainly ventricular fibrillation and CPR and defibrillation are required. In other situations, the presence of cardiac arrest may not be as obvious, due to the presence of a brief period of seizure activity or the presence of an agonal gasping reflex in the first few minutes after a cardiac arrest. In any case, it is imperative that the victim be examined carefully immediately upon becoming unresponsive. Police should have thorough first aid training which includes CPR and the use of defibrillator devices.

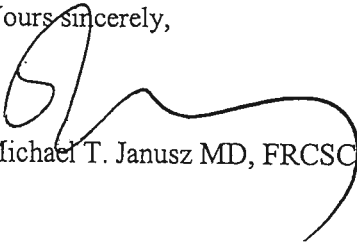
4) Excited delirium

The TASER literature frequently includes a discussion of the diagnosis of "excited delirium". This is beyond my usual scope of practice, and hence I have questions rather than answers. The recent article by Truscott in the CMAJ has raised concerns that most physicians can share. I believe that most medical practitioners are uncomfortable with a condition which is only recognized by some psychiatrists and pathologists. In every other condition in Medicine, where there are "hits", there are also "near misses" which can be recognized. What is the experience in the fields of Emergency Medicine or Critical Care with an agitated delirious state that causes cardiac arrest? What is the heart rhythm or sequence of rhythms in such a cardiac arrest (VF, heart block, asystole, PEA)? These patients are said to be hyperthermic - what range of temperatures are seen? What are the associated metabolic abnormalities (blood gases, acid-base balance, blood electrolytes, and enzymes or other biochemical markers)?

Hearts don't simply "stop". They may have an underlying disease or injury which causes cardiac arrest, and which would usually be diagnosed at autopsy. Alternatively, they may have been deprived of oxygen due to asphyxia or massive blood loss. Another cause of cardiac arrest would be exposure to severe metabolic abnormalities such as acidosis or very high or low potassium, or response to an administered drug or toxin. There must be a physical or chemical cause of cardiac arrest in "agitated delirium". This has to be delineated in order for this diagnosis to be accepted by most physicians.

SUMMARY: TASERs must be regarded as being capable of causing cardiac arrest. The device appears to be safer for all concerned (including bystanders) than guns or clubs, but its consequences are not trivial. Police should be cognizant of this hazard and be trained and prepared to deal immediately and effectively with the possible consequences of its use. This will require a "mindset" of providing immediate, thorough and meticulous care of critically injured persons.

Yours sincerely,



Michael T. Janusz MD, FRCSC