

**Report of the Panel of Mental Health and
Medical Experts Review of Excited
Delirium**

June 30, 2009

June 30, 2009

The Honourable Ross Landry
Minister of Justice and Attorney General

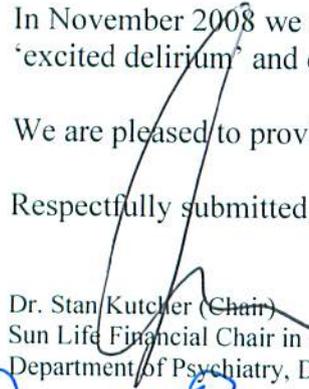
The Honourable Maureen MacDonald
Minister of Health

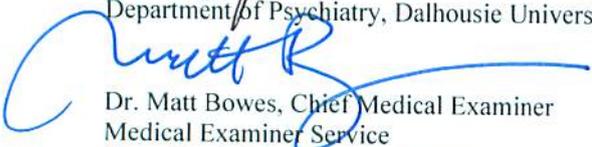
Ministers:

In November 2008 we were appointed as an advisory panel to review the phenomenon referred to as 'excited delirium' and develop a protocol for an appropriate response by law enforcement officers.

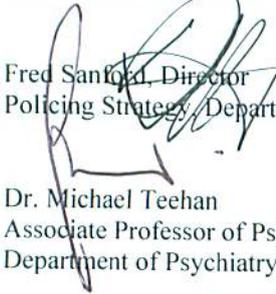
We are pleased to provide this report on our findings and recommendations.

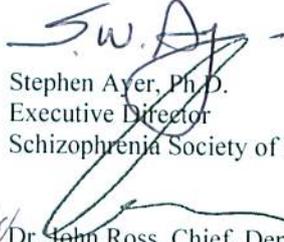
Respectfully submitted,


Dr. Stan Kutcher (Chair)
Sun Life Financial Chair in Adolescent Mental Health
Department of Psychiatry, Dalhousie University


Dr. Matt Bowes, Chief Medical Examiner
Medical Examiner Service
Nova Scotia Department of Justice


Fred Sanford, Director
Policing Strategy, Department of Justice


Dr. Michael Teehan
Associate Professor of Psychiatry
Department of Psychiatry, Dalhousie University


Stephen Ayer, Ph.D.
Executive Director
Schizophrenia Society of Nova Scotia


For/ Dr. John Ross, Chief, Department of Emergency Medicine
Capital Health; Head, Department of Emergency Medicine
Dalhousie University


Linda Smith, Executive Director, Mental Health
Children's Services and Addiction Treatment
Department of Health


Dr. Scott Theodor
Clinical Director
Adult Specialty Psychiatric Services, Capital Health

Panel of Mental Health and Medical Experts Review of Excited Delirium

Executive Summary

In March 2008, Minister of Justice Cecil P. Clarke appointed an advisory panel to review current policies and practices governing the use of conducted energy devices¹ (CEDs) by law enforcement agencies in Nova Scotia and provide advice to the Minister.

In its June 2008 report, the panel noted that it had given consideration to the phenomenon referred to as excited delirium (ED) because of the debate in the public domain regarding the use of CEDs on individuals displaying agitated, aggressive, irrational conduct. The panel expressed the view that there was an urgent need for more research in this area and recommended that the Province establish a panel of mental health and medical experts to address the issue of excited delirium and submit a separate and detailed report to the Ministers of Justice and Health.²

In November 2008 the Ministers of Justice and Health for Nova Scotia struck an advisory panel with a mandate as follows:

- Review the phenomenon referred to as excited delirium (ED) and its role in in-custody deaths;
- Determine the risks associated with various means of restraining individuals displaying ED symptoms;
- Develop a protocol for an appropriate response by law enforcement officers to individuals displaying ED symptoms; and
- Submit a report to the Ministers of Health and Justice by June 30, 2009.

The excited delirium phenomenon:

The debate concerning the controversial term ‘excited delirium’ has figured prominently in the popular press in recent months, leading to confusion regarding the nature, or indeed the existence, of the phenomenon.

The panel is of the view that the designation of ‘excited delirium’ as a medical diagnosis is much less critical than agreement about the occurrence and description of the phenomenon itself; how it can be recognized by first responders; and what should be done to mitigate the risk of negative outcome.

There is substantial consistency in the signs and symptoms which occur in individuals described as suffering from this condition, including:

- extreme agitation and restlessness,
- aggressive/combatative behavior,
- paranoia or delirium,

¹ Also referred to as conductive energy weapons (CEW), electronic control devices (ECD), stun gun or TASER®

² Nova Scotia (2008) Report of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Agencies in Nova Scotia. www.gov.ns.ca/just/global_docs/CED_2_20080630.pdf p.7

- incoherent and rambling speech,
- extraordinary strength, numbness to pain and
- profuse sweating.

The syndrome of excited delirium is not a new phenomenon. The medical literature contains a rich history of phenomena presenting with similar signs and symptoms but identified by different names. In reviewing these various diseases and syndromes, the panel concluded that, while there may be differences in their patho-etologies, they share a common final physiological pathway and all exhibit a phenomenon known as *autonomic hyperactivity*. This state has the potential to produce a number of substantial negative effects on the body, including hyperthermia and cardiac arrhythmia, that can lead to sudden death.

There is general agreement in the scientific literature that mortality rates are increased in the presence of the signs and symptoms of excited delirium – even with medical intervention or in the absence of use of restraints by law enforcement.

The panel believes it is reasonable to consider that, when further stressed by physical struggle or the application and continuation of physical restraints (including the CED), an individual exhibiting the syndrome of excited delirium may be at increased risk for sudden death. Similarly, the pre-existence of a medical or psychiatric condition (such as a psychotic illness, pre-existing cardiac condition, delirium with or without the use of psychostimulant drugs) may increase the risk for sudden death in an individual showing signs and symptoms consistent with excited delirium.

Recommendation 1:

Given our current understanding of:

- the *putative patho-etiology* of the syndrome commonly called excited delirium (ED), and
- the *substantial overlap* of the signs and symptoms of ED with other well described medical and psychiatric conditions, and
- the *difficulty in ascribing specific causes* of the syndrome in the situation of first response, and in
- the *increased risk for sudden death* (with or without a struggle or restraint [including the conducted energy device]) and as a result of
- the current *confusion* about the use of the term ED,

the panel recommends that the term ‘autonomic hyperarousal state’ (AHS) be used as a preferred descriptor for the signs and symptoms described above.

What site-based treatments are indicated?

The therapeutic response to the individual presenting with AHS should be guided by two principles:

- Use of the least intrusive and most effective means of intervention, and
- Ensuring the safety of the individual and other persons.

De-escalating strategies of verbal engagement and negotiation should be the first attempted. If these are unsuccessful, physical restraint must be used in order to bring the person under control and to administer necessary medication treatments. Rapid restraint is necessary in order to

reduce the period of struggle which may exacerbate the situation and increase the potential for a fatal outcome.

Recommendation 2:

It is recommended that

- *hospital emergency department staff receive training to assist in the identification and treatment of individuals displaying signs and symptoms of AHS;*
- *the principles of a therapeutic response to individuals presenting with AHS be followed;*
- *individuals displaying signs and symptoms of AHS be considered at risk of sudden death;*
- *these individuals be designated as triage level 1 or 2³;*
- *a detailed history and physical examination (injuries/trauma, cardio-respiratory, neurological) be undertaken;*
- *For individuals who require restraint due to violence and who present a danger to themselves or others, physical restraint may be applied briefly. Physical restraint increases risk to the patient and care givers and may exacerbate AHS by increasing metabolic rate, temperature, and compromising ventilation. Early chemical restraint in these cases should be considered; and*
- *Emergency staff should be prepared to undertake resuscitation procedures if the patient experiences sudden respiratory and/or cardiac arrest.*

The challenge for first responders:

It is the opinion of the panel that first responders should be able to recognize when a person may be in AHS and, within the reality of the situation, be able to best secure the safety of the person and others until such time as appropriately trained medical personnel are available. However, the panel is of the view that it is not practically possible to differentiate amongst the many possible causes of extreme agitated behavior in the field. Even in a highly controlled and well characterized therapeutic setting, such as a hospital, medical experts have noted that delirium may be difficult to diagnose. It is not reasonable to expect that first responders be able to determine if the person in AHS is suffering from the effects of cocaine or methamphetamine ingestion, or psychosis as a result of untreated schizophrenia, severe bipolar mania or some other disease entity.

Recommendation 3:

The panel recommends that the following procedures be adopted as the most appropriate response to individuals displaying signs and symptoms of AHS:

- *Call-takers, if possible, identify probable AHS cases and dispatch police and EHS simultaneously;*
- *Law enforcement officers identify individuals displaying signs and symptoms of AHS; Once symptoms are recognized, police should request backup and summon EHS (if they are not already at the scene);*

³ As per the *Canadian Triage and Acuity Scale* (www.caep.ca), levels 1 and 2 (the highest levels) are used to describe patients who are seen as posing a definite or probable risk of danger to themselves or others. These triage levels dictate continuous surveillance, close monitoring of vital signs and the administration of treatment as required.

- *Attempt to de-escalate the situation (if time permits and if there is no imminent danger to the individual or others);*

It is recommended that police scan the scene to remove potentially hazardous objects; remove bystanders who may be endangered or who might escalate the individual's level of agitation; reduce noise levels. Police should attempt to calm the individual: demands should be made in a non-challenging manner; statements should be phrased in a positive manner with offers to assist.

Police should recognize that persons in AHS frequently do not respond to verbal cues. Delays in subduing the individual may lead to life-threatening physiological changes.

- *Use overwhelming force if restraint must be used (see further explanatory detail below regarding use of force);*

Police must resort to restraint if verbal interventions are ineffective or if escalation of violent or threatening behavior occurs. Restraint must be applied rapidly in order to reduce the time of struggle. EHS staff should conduct a medical assessment of the patient and provide prehospital care as needed.

- *Monitor individuals at the scene and during transport to hospital, following restraint;*

Face-to-face monitoring of breathing status and other vital signs should be performed at all times by police or EHS staff until arrival at a medical facility. Diminished respiratory status or hyperthermia may signal the potential for cardiac arrest. If needed, cooling, sedation and hydration should be provided as soon as possible.

- *Immediately transport the individual to a hospital for observation or treatment.*

Use of force by law enforcement:

The use of force by law enforcement officials is addressed in international guidelines and Canadian criminal law, which generally prescribe that officers may use as much force as deemed necessary for the enforcement and administration of the law, the onus placed on the officer to show that the degree of force used is justified and not excessive. The range of acceptable responses varies from verbal communication through to the use of lethal force. The choice of force options is based on the officer's assessment of the threat and level of resistance shown by the subject, as well as the overall environmental context.

While the risk of harm to the person towards whom force is applied increases with escalating levels of response, even low level responses are not without risk. Any situation that requires forceful intervention carries with it some form of risk for harm.

Individuals who are in AHS are reported to be extremely difficult to restrain. The process of restraint may result in a prolonged struggle as police attempt to bring the individual under control. In some cases, sudden death may occur.

The panel conducted a review of various forms of restraint (chemical irritants, neck restraints and other holds, and CEDs) and examined the evidence of injuries/deaths associated with the use of these restraints. Given the current scientific understanding of the complex physiological processes at play in a situation where a person demonstrates symptoms of AHS (either with or without the application of restraint), the panel is of the view that it is frequently not possible to determine the role (if any) that restraint (including the CED) played, if sudden death occurs. In the absence of a critical synthesis of available research regarding the individual or combined impact of various forms of restraint, it is not possible to draw definitive conclusions regarding the safety of these restraint mechanisms (including the CED) for individuals experiencing AHS.

Recommendation 4:

With respect to the use of restraint for individuals experiencing AHS symptoms, the panel recommends that:

- *First responders initially attempt to de-escalate the situation through use of non-physical techniques;*
- *Restraints be used only when other attempts at de-escalation are ineffective or impractical;*
- *Use of restraints by law enforcement officers be governed by policies established and monitored by the Nova Scotia Department of Justice;*
- *Law enforcement officers receive regular training in the use of authorized restraint tools to maintain an appropriate skill level;*
- *Where restraints are required to bring an individual under control, the choice of restraint should be determined by the officer's view of the least restrictive means of bringing the subject under control in the shortest period of time (in order to minimize the likelihood of injury to the individual or others);*
- *Individuals subject to restraint be moved from a prone handcuffing position to a side-lying or seated position as soon as possible;*
- *Law enforcement officers be cognizant of the potential for injury due to the use of restraints;*
- *Individuals displaying AHS symptoms are at risk of sudden death and such persons who must be restrained by any method should be considered as a medical emergency; vital signs must be closely monitored while awaiting medical care; and*
- *EHS should be called to the scene immediately, if possible before restraints are applied*

Recommendation 5:

In recognition of the need for comparative scientific research on the individual and combined effects of restraint mechanisms on risk for sudden death, *the panel endorses the recommendation of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Agencies in Nova Scotia that a database be created, accessible to independent researchers, to permit a comprehensive review of use of force incidents*⁴.

⁴ Nova Scotia (2008) Report of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Officers in Nova Scotia. p.5

The panel is aware of current research being undertaken to determine the relationship between various means of restraint and in-custody deaths; for example mortality reviews of CED-related deaths in the United States sponsored by the National Institute of Justice; the RESTRAINT study (a prospective examination of in-custody deaths using data from Calgary, Victoria, San Francisco, San Diego) sponsored by the Canadian Association of Chiefs of Police and the Canadian Police Research Centre.

Recommendation 6:

The panel further recommends that the Nova Scotia Health Research Foundation and other appropriate funding agencies be asked to review current research priorities and consider funding further research regarding the relationship between the characteristics of subjects, nature of restraint applied and outcomes (i.e. injury or death).

Models for police response to mentally ill persons:

The panel reviewed a number of specialized police-mental health models that have been developed to improve the response to crisis situations involving persons suffering from a mental illness. While there have been a number of qualitative studies that report positive responses to the *crisis intervention team* and other program models from police, mental health practitioners and mental health consumer advocates, the research base does not permit a definitive conclusion about the relative effectiveness of the programs in achieving their stated goals.

The panel acknowledges that law enforcement agencies have demonstrated an awareness of the need for improving the response to individuals displaying symptoms of mental illness. The panel further recognizes that some excellent training programs have been developed. However, we have concerns that a number of training initiatives have been developed and implemented independently, resulting in some fragmentation of effort, lack of consistency and sustainability.

Recommendation 7:

The panel recommends the development of a provincial training plan for first responders that addresses, at minimum:

- *For all first responders, recognition of signs and symptoms of mental illness and appropriate response;*
- *Specialized training for call-takers and dispatchers to recognize the characteristics of calls likely involving persons with mental illness;*
- *More intensive training for a designated group of law enforcement officers who are to be called to the scene of incidents involving persons with mental illness; and*
- *Training for all EHS providers in the recognition of the signs and symptoms of AHS and appropriate responses.*

A coordinated, collaborative approach:

An effective response to individuals suffering from AHS will require a coordinated collaborative approach between law enforcement and health agencies, and mental health advocates. The panel does not believe that sufficient evidence exists to support any one specific *first response* model. However, we are of the view that core elements of an effective response can be identified: collaborative planning involving police, health agencies (including emergency health services),

mental health services and the community; specialized training tailored to the roles of various responders; and formal protocols which define the roles and responsibilities of each member of the response team. Further, we acknowledge that the specific nature of the response will vary according to the characteristics, needs and capacity of individual communities.

The panel endorses the approach that has been adopted by the Law Enforcement and Mental Health Partnerships Project and urges that it be supported by government.

Recommendation 8:

The panel recommends that a formal protocol be developed in each area of the province that describes the role of law enforcement (and other emergency responders) and health professionals to acutely mentally ill persons, including those who may be suffering from AHS, based on the best practices described in this report.

Recommendation 9:

The panel further recommends that an evaluation process be undertaken to assess the effectiveness of the protocols.

The EHS Communications and Dispatch Centre is an important source of data and this, combined with information provided by law enforcement (see recommendation 5), could contribute to a database that would be useful in assessing the effectiveness of the protocols for joint response.

Conclusion:

The formulation of a just and effective response to acutely mentally ill persons, including those demonstrating AHS, presents significant challenges for law enforcement and health agencies. Many considerations must be balanced:

- the need to treat individuals with dignity
- the need to protect individuals from harming themselves or others
- the need to provide medical treatment as quickly as possible

In many circumstances this will most certainly require the application of physical restraints. No use of restraint is without risk. But there are risks involved in doing nothing, as the research on the treatment of persons suffering from AHS reveals.

Research on the impact of restraints (either individually or in combination) is inconclusive and many questions remain to be answered regarding the impact of restraints (including the CED) on at-risk individuals. The panel urges that a process be established to systematically evaluate subsequent scientific studies as they become available and that this assessment be used to inform policy regarding the use of restraints on acutely mentally ill individuals.

The building blocks for developing a more effective response to individuals suffering from AHS and other mental illness are clear and are presented in this report. We expect that government agencies will promote efforts to enhance knowledge and understanding on the part of all first responders regarding the needs of the acutely mentally ill and support the development of

partnerships between law enforcement, health services and mental health consumer groups in communities throughout Nova Scotia.

Table of Contents

	Page
Executive Summary	i
Introduction	1
The Excited Delirium Phenomenon	3
Description of the phenomenon	3
Historical review	4
Diseases and syndromes displaying similar symptoms	7
Underlying patho-physiology	9
Site-based treatments	12
The Challenge for First Responders	14
Differentiation amongst possible causes in the field	14
Response by law enforcement officers to AHS	14
Use of force by law enforcement – restraint mechanisms	16
Models for Police Response to Mentally Ill Persons	19
Training	21
Protocols	24
A coordinated, collaborative approach	26
Conclusion	26
Appendix 1: Various forms of restraint	28
Appendix 2: Protocols between mental health services and law enforcement	36
Appendix 3: EHS protocol for response to violent/agitated persons	38

Panel of Mental Health and Medical Experts Review of Excited Delirium

Introduction:

In March 2008, Minister of Justice Cecil P. Clarke appointed an advisory panel to review current policies and practices governing the use of conducted energy devices¹ (CEDs) by law enforcement agencies in Nova Scotia and provide advice to the Minister.

In its June 2008 report, the panel noted that it had given consideration to the phenomenon referred to as excited delirium (ED) because of the debate in the public domain regarding the use of CEDs on individuals displaying agitated, aggressive, irrational conduct. The panel expressed the view that there was an urgent need for more research in this area and recommended that the Province establish a panel of mental health and medical experts to address the issue of excited delirium and submit a separate and detailed report to the Ministers of Justice and Health.²

In November 2008 the Ministers of Justice and Health struck an advisory panel with a mandate as follows:

Review the phenomenon referred to as excited delirium (ED) and its role in in-custody deaths.

Determine the risks associated with various means of restraining individuals displaying ED symptoms.

Develop a protocol for an appropriate response by law enforcement officers to individuals displaying ED symptoms.

Submit a report to the Ministers of Health and Justice by June 30, 2009.

Members of the advisory panel appointed by the Ministers:

Dr. Stan Kutcher (chair)
Sun Life Financial Chair in Adolescent Mental Health
Department of Psychiatry, Dalhousie University

Stephen Ayer, Ph.D.
Executive Director, Schizophrenia Society of Nova Scotia

Dr. Matt Bowes
Chief Medical Examiner, Medical Examiner Service
Nova Scotia Department of Justice

¹ Also referred to as conductive energy weapons (CEW), electronic control devices (ECD), stun gun or TASER®

² Nova Scotia (2008) Report of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Agencies in Nova Scotia. www.gov.ns.ca/just/global_docs/CED_2_20080630.pdf p.7

Dr. John Ross
Chief, Department of Emergency Medicine, Capital Health
Head, Department of Emergency Medicine, Dalhousie University

Fred Sanford
Director, Policing Strategy, Department of Justice

Linda Smith
Executive Director, Mental Health
Children's Services and Addiction Treatment, Department of Health

Dr. Michael Teehan
Associate Professor of Psychiatry
Department of Psychiatry, Dalhousie University

Dr. Scott Theriault
Clinical Director, Adult Specialty Psychiatric Services
Capital Health

The Excited Delirium Phenomenon

The term ‘excited delirium’ is itself highly controversial:³ it is not formally recognized as a diagnostic term by the American Psychiatric Association⁴ nor by the World Health Organization⁵. It has, however, been recognized by the National Association of Medical Examiners as a distinct entity for more than a decade⁶ and has been listed as a cause of death in autopsy reports. Many law enforcement agencies recognize the term and specify, in policy and training documents, means of dealing with individuals displaying features consistent with ‘excited delirium’ (such as: agitation; aggression; extraordinary strength; imperviousness to pain).

Critics, disputing the legitimacy of the term, claim that it is being used as a ‘catch-all’ that masks contributions to in-custody deaths from factors such as dangerous restraint procedures or inappropriate use of force by law enforcement officers.⁷

The debate has figured prominently in the popular press in recent months, leading to confusion regarding the nature, or indeed the existence, of the phenomenon. However, both proponents and critics of the specific terminology ‘excited delirium’ agree that, no matter what it is called, law enforcement officers are not infrequently required to respond to individuals who appear to display symptoms of the phenomenon that has been characterized as ‘excited delirium’.

The panel is of the view that designation of ‘excited delirium’ as a medical diagnosis is much less critical than agreement on:

- the occurrence and description of the phenomenon itself, as well as a general understanding of its putative patho-physiology;
- how it can be recognized by first responders; and
- what should be done to mitigate the risk of negative outcome for those who are exhibiting the signs and symptoms of the phenomenon.

Description of the phenomenon known as ‘excited delirium’ (ED):

There is substantial consistency in the signs and symptoms which occur in individuals described as suffering from this condition. These include but are not limited to:

- extreme agitation and restlessness,
- aggressive/combatative behavior,
- paranoia or delirium,
- incoherent and rambling speech,

³ The specific term ‘excited delirium’ is thought to have been used first in 1985 by C.V. Wetli and D.A. Fishbain in an article describing fatal cocaine intoxication (Cocaine-induced psychosis and sudden death in recreational cocaine users. *Journal of Forensic Sciences*, 1985, 30(3))

⁴ American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (4th edition, revised 2000) DSM IV

⁵ World Health Organization. International Classification of Diseases, 10th ed. ICD-10. Geneva.

⁶ Wetli, C.V. (2006) *Excited Delirium* in Ross, D.L. and Chan, T.C. Sudden Deaths in Custody. Humana Press, 99-112.

⁷ See for example Amnesty International (2008) Less than Lethal? The use of stun weapons in US law enforcement.

www.amnesty.org/en/library/asset/AMR51/101/2008; Gelinias, B. Excited delirium killed tasered man. *The Edmonton Journal*, March 27, 2009; Truscott, A. (2008) A knee in the neck of excited delirium. *Canadian Medical Association Journal*, 178(6), 669-670.

- extraordinary strength,
- numbness to pain, and
- profuse sweating.

These features are considered to demonstrate a relatively rapid onset, and may occur without any observed precipitating factors. First responders are thus faced with an individual who may not be aware of what they are doing or what is occurring in their surrounds, while concurrently exhibiting a marked degree of physical and mental hyperarousal.

Available documentation describes a variety of strategies by first responders to gain control of the subject or secure the situation.⁸ These responses may include a variety of verbal directions or physical restraints. In some cases, the individual being restrained may suddenly lose consciousness and be found pulseless and to have stopped breathing. This condition is consistent with the occurrence of sudden death.⁹

Results of the autopsy conducted in these situations generally contain no significant anatomical or toxicological findings to explain the death.¹⁰ Occasionally autopsy will reveal evidence of heart disease.¹¹ It is often therefore presumed that the mechanism (not cause) of death was a cardiac event – a lethal arrhythmia, although others have hypothesized that hyperthermia is the primary mechanism of death.¹²

Historical review:

The syndrome of ED described above is not a new phenomenon. The medical literature contains a rich history of phenomena presenting with similar signs and symptoms but identified by numerous different names.

Reports of sudden death associated with these signs and symptoms were first noted in the psychiatric literature in the mid-1800s.¹³ This phenomenon was variously labeled as: acute exhaustive mania; Bell’s mania; fatal catatonia; acute exhaustive psychosis. In 1849 Dr. Luther Bell, superintendent of an ‘asylum for the insane’ in Massachusetts, described the symptoms of what would come to be called ‘Bell’s mania’:

- acute onset of symptoms;
- manic excitement;
- violent and unpredictable behavior;
- need for restraint;
- refusal of food;
- inability to sleep and fatigue, resulting in physical exhaustion and circulatory collapse.

⁸ With excited delirium, violent struggle is part of the syndrome. Wetli, C.V. (2009) Sudden Unexpected Death in Custody in Kroll, M.W. and Ho, J.D. (eds.) *Taser Conducted Electrical Weapons: Physiology, Pathology and Law*. New York: Springer Science + Business Media. Pp379-388

⁹ Stratton, S.J. et al (2001) Factors associated with sudden death of individuals requiring restraint for excited delirium. *American Journal of Emergency Medicine*, 19, 187-191

¹⁰ Wetli, C.V. (2009)

¹¹ Pollanen, M.S. et al (1998) Unexpected death related to restraint for excited delirium: a retrospective study of deaths in police custody and in the community. *Canadian Medical Association Journal*. 158, 1603-1607.

¹² Morgan, J. (2008) Medical panel issues interim findings on stun gun safety. *NIJ Journal*, 261, 20-23.

¹³ DiMaio, T.G. and DiMaio, V.J.M. (2006) *Excited Delirium Syndrome: Cause of death and prevention*. Boca Raton: Taylor and Francis.

In reviewing the syndrome in 40 cases out of 1700 admissions to the asylum during the period 1836-1849, Bell concluded that the patients suffered from endogenous mental disease; their health was noted to decline dramatically over a 2-3 week period, their restlessness resulting in little food intake and sleep and finally death.¹⁴ It has been suggested that fatalities associated with this syndrome were likely due to a combination of “electrolyte disturbances, dehydration, and chronic catecholamine insult on the cardiovascular system”¹⁵ with perhaps other undefined contributory factors. Bell observed that while the syndrome resulted in death in the majority of cases, some patients recovered almost immediately “as they would do in the delirium of any acute disease”.

In the late 1800s, Dr. Emil Kraepelin, one of the most influential figures in modern psychiatry who originally described the condition we now call Schizophrenia, described similar symptoms (severe states of excitement over a period of weeks/months), leading to progressive loss of strength and culminating in death.¹⁶

An analysis of deaths at Brooklyn State Hospital during the period 1927-1932 revealed a high percentage of patients displaying mania dying from exhaustion. On admission these patients displayed symptoms as previously described by Bell but with the additional symptoms of dehydration, rapid pulse, low blood pressure and (frequently) elevated temperature. Reports of deaths due to what was called ‘acute lethal excitement’ over a similar period (1929-1934) at the Manhattan State Hospital listed the following set of symptoms in the syndrome: sudden onset of symptoms; history of delusions with hallucinations, acute state lasting from 4-20 days; extreme psychomotor excitement and restlessness, rapid physical decline and death.¹⁷

Adland¹⁸ provided a comprehensive review of the medical literature from the mid-1800s to 1947, documenting cases of this syndrome, variously described as: acute exhaustive syndrome; acute delirium; fatal catatonia; manic-depressive exhaustive deaths. The studies report an incidence varying from 1 in 400 cases to 22 in 1000 cases; a much higher incidence among females and in individuals aged 18-35; and death occurring in approximately 75% of the cases. His review identified the following explanations for this phenomenon: “Some investigators considered this syndrome to be merely secondary to an infectious process...Others held that death in this primary syndrome is caused by increased intracranial pressure...Still others considered the syndrome an idiopathic intoxication, causing definite cellular changes, primarily lipid, in the brain...Some speculated that a toxic factor (histamine or histamine-like) disrupts the normal functioning of the hematopoietic and cardiovascular system.”¹⁹ Adland himself considered the syndrome to be primarily a psychiatric disorder with the primary psychiatric psychopathology concurrently expressed through peripheral dysfunctions of the cardiovascular, heat regulatory and hematopoietic systems.

Adland noted that therapy had generally been ineffective “because of the rapidity with which the illness progresses to death and because of the inadequate understanding of the total problem”.

¹⁴ Bell, L.V. (1849) On a disease resembling some advanced stages of mania and fever. *American Journal of Insanity*, October, 97-127.

¹⁵ DiMaio and DiMaio, p.9

¹⁶ Hoenig (1983) The concept of schizophrenia: Kraepelin-Bleuler-Schneider. *British Journal of Psychiatry*, 142(6), 547-556

¹⁷ DiMaio and DiMaio, p.11 Interestingly, the majority of patients described in the above studies were female. The authors speculate this is due to reluctance to place violent females in jail during this period.

¹⁸ Adland, M.L. (1947) Review, case studies, therapy and interpretation of the acute exhaustive psychoses. *Psychiatric Quarterly*, 21(1), 38-69

¹⁹ Adland, p.45

He recommended that the first approach must address the dehydration and hypochloremia, which he considered to be the immediate causes of death. Other researchers noted that large doses of sodium chloride and injections of adrenal cortical hormone produced some successful results. Sedation was sometimes recommended, although it was noted that for some patients with this syndrome, certain types of chemical sedation were ineffective.²⁰

Deaths due to Bell's mania were reported until the early 1950s, when they disappeared. It has been speculated that the introduction of phenothiazines for treatment of mental illness may have been responsible for the disappearance of the extended form of excited delirium.²¹ In the 1980s, more cases of an *acute* or short-term form of the condition began to appear, associated with the use of illegal substances, especially cocaine.²²

Consistent with this hypothesis, Wetli and Fishbain described a syndrome they identified as ED in seven users of cocaine hydrochloride who died between April 1983 and May 1984.²³ "The victims...exhibited the acute onset of bizarre and violent behavior, which was characterized by one or more of the following: aggression, combativeness, hyperactivity, extreme paranoia demonstration of unexpected strength or incoherent shouting. The incident was followed by fatal cardiorespiratory arrest. Four of the seven developed hyperthermia before death... it was not clear whether ED was caused by an undetected contaminant in cocaine preparations, by another drug that was not detected by usual toxicologic methods, by techniques used by police to restrain victims, or whether it was a newly recognized outcome of cocaine use."

Others have also recognized the relationship between illicit drug use and the acute, short-term syndrome of ED. For example, the chief medical examiner for Orlando Florida made the following comments at a July 2004 forum of medical professionals regarding the significance of cocaine use to deaths associated with the syndrome of ED:

"The timeline of excited delirium deaths was first reported out of Miami in 1985. It was reported by a doctor there who had seven cases, all showing bizarre psychotic behavior. They all [*sic*] had hyperthermia ...up to 107-108 degrees. They were all hyperactive and had experienced extreme exertion while fleeing or being pursued by police. And then they had sudden deaths, usually after being restrained by police. 1985 is a very important date, because that's when crack cocaine started being actively marketed in Miami."²⁴

The chief medical examiner concluded that deaths resulting from ED syndrome are different from acute cocaine intoxication deaths (which can occur with the first use of cocaine). He observed that with the ED deaths he had studied, cocaine is usually present in low levels and the subject is known to be a chronic intravenous cocaine user.

Although the elapsed time between onset of the symptoms and death differs in the extended and short-term states of the syndrome of ED, the symptoms in both forms are similar to the ones Bell

²⁰ Adland, p.65

²¹ Cancro, R. (2000) The introduction of neuroleptics: a psychiatric revolution. *Psychiatric Services*, 51(3) 333-335

²² Ruttenger, A.J. et al (1997) Fatal excited delirium following cocaine use. *Journal of Forensic Sciences*, 42(1), 25-31

²³ Wetli, C.V and Fishbain, D.A. (1985) Cocaine-induced psychosis and sudden death in recreational cocaine users. *Journal of Forensic Sciences*, 30(3), 873-880.

²⁴ British Columbia Office of the Police Complaint Commissioner (2004) *Taser Technology Review and Interim Recommendations*. p. 41

first described: “sudden onset of symptoms, delirium, extreme agitation, violence with no disposition to yield to overwhelming force and the need to use physical restraint to subdue the individual.”²⁵ Patients living with psychotic illnesses who have relapsed upon discontinuation of their antipsychotic medications; and the increasing availability of other illicit drugs known to elicit this syndrome (in particular: cocaine, methamphetamines and PCP); and other as yet unidentified causes are thought to underlie today’s occurrences of the syndrome of acute ED. Furthermore, given that each of these different patho-etiologicals produce a similar clinical presentation, it is usually not possible to differentiate their causes at the time of first contact.

A number of diseases and syndromes display symptoms similar to those of the phenomenon known as excited delirium:

A number of syndromes have been described in which the signs and symptoms are substantially similar to those observed in the syndrome of acute ED appearing in the context of illicit drug use, as noted above. These are briefly reviewed below. The phenomenological similarities amongst all of these syndromes suggest that, while there may be differences in their patho-etiologicals, they share a common final physiological pathway and all exhibit a phenomenon known as *autonomic hyperactivity*.

Acute delirious mania

A recent review of delirious mania reports that a number of terms have been used synonymously with the term acute delirious mania, including lethal catatonia and malignant catatonia.²⁶ In each of these phenomena, presenting symptoms include but are not limited to: elevated or irritable mood; reduced need for sleep; pressured speech; racing thoughts; distractibility; impulsivity; delirium (fluctuating levels of consciousness, episodic confusion/disorientation, episodes of incoherent speech interspersed with periods of lucidity); agitated behaviour. Other symptoms associated with acute delirious mania may also include: incontinence, high fever, rapid heart rate, disrobing. The exact prevalence of this syndrome is not known but is thought to be low. The mortality rate without immediate treatment is high. Preferred treatment includes electroconvulsive therapy, antipsychotic and benzodiazepine medications.

Malignant (fatal) catatonia

The syndrome of lethal or malignant catatonia is well documented in the medical literature. Persons with this syndrome exhibit autonomic instability with fever, rapid heart rate, rapid breathing and hypertension. Their speech is disorganized (often difficult to comprehend) and thoughts are frequently delusional. Other symptoms such as intense excitement, rigidity, stereotypic actions, mutism and posturing frequently occur. They refuse food and liquids.²⁷ Sudden death can occur. This syndrome has also been called ‘exhaustive mania’.²⁸ Preferred treatment includes anti-convulsive therapy, antipsychotic and benzodiazepine medications.

²⁵ DiMaio and DiMaio, p.14

²⁶ Karmacharya, R et al (2008) Delirious mania: clinical features and treatment response. *Journal of Affective Disorders*, 109(3), 312-316.

²⁷ Fink, M. and Taylor, M.A. (2001) The many varieties of catatonia. *Eur.Arch.Psychiatry Clin Neurosci.*, 251(Supp.1) 8-13.

²⁸ Robison, D. and Hunt, S. (2005) Sudden In-custody Death Syndrome. *Topics in Emergency Medicine*, 27(1)

Neuroleptic malignant syndrome

This syndrome has also been very well characterized in the medical literature. Signs and symptoms of this syndrome are: muscle rigidity, hyperthermia, altered consciousness, autonomic dysfunction.²⁹ The syndrome was originally characterized as an adverse effect of antipsychotic drugs and was considered to result from alterations in dopamine system function. More recently it has been described as occurring with other medications or medications used in combination with antipsychotics. Preferred treatment includes withdrawal of the neuroleptic, administration of Dantrolene sodium and benzodiazepine medications.

Some researchers have suggested a patho-etiological link between delirious mania, catatonia and neuroleptic malignant syndrome as each of these syndromes are associated with acute perturbations of the brain dopamine system. Fink and Taylor³⁰, for example, state that “the syndromes of delirious mania and excited catatonia are indistinguishable...

The syndrome is marked by the acute onset of the excitement, grandiosity, emotional lability, delusions, and insomnia characteristic of mania, and the disorientation and the altered consciousness characteristic of delirium. The patients are excited, restless, fearful, suspicious and delusional. Negativism, stereotypy, grimacing, posturing...are prominent. Garrulousness, flight of ideas and rambling speech alternate with mutism... fever, rapid heart rate, tachycardia, hypertension and rapid breathing are common.”

Acute delirium³¹

Delirium is a syndrome that can result from a variety of different underlying conditions.³² Acute confusional state and acute organic brain syndrome are some of the terms that have also been used interchangeably with ‘delirium’. Delirium can be defined as a brain disturbance of the conscious mind with reduced ability to focus, to sustain attention and to engage appropriately in higher cognitive functioning. There are three subtypes of delirium: hyperactive, hypoactive and mixed. The hypoactive subtype is characterized by drowsiness, apathy and very little speech or movement. Individuals experiencing the mixed subtype alternate between hypoactive and hyperactive states.

The hyperactive acute condition is characterized by the sudden onset of disorientation, hallucinations, anxiety, rambling and incoherent speech, restlessness, impaired insight and sensory misperceptions/delusions. There may be a reduced level of consciousness, drowsiness and indifference to surroundings. Behaviour may be agitated and unpredictable. Furthermore, persons with hyperactive delirium usually also present with autonomic instability – rapid breathing, sweating, increased heart rate and unstable blood pressure.

The condition may result from shock or trauma, intoxication or alcohol withdrawal, poisoning, brain injury, sleep deprivation, metabolic changes due to blood loss, high fever, CNS infection, dehydration, low oxygen level or heart disease, and dementia. It is reported that medications

²⁹ Koch, M. et al (2000) Catatonic signs in neuroleptic malignant syndrome. *Comparative Psychiatry*, 41, 73-75.

³⁰ Fink, M. and Taylor, M.A. p.10

³¹ Content of this section based on testimony delivered in May 2008 by Dr. Lu Shaohua (psychiatrist, Vancouver General Hospital) to the Braidwood Commission of Inquiry. www.braidwoodinquiry.ca/transcripts/08-05-13.pdf

³² Kaplan, H.J. and Sadock, B.J. (1989) *Comprehensive Textbook of Psychiatry* (5th ed.), v.1, p.625 “The prevalence in the community is low, but it is clearly high in hospitals, ICUs and emergency rooms serving inner city areas ridden with substance abuse...10% of medical-surgical inpatients and 40% of geriatric patients meet criteria for dementia sometime during admission...the very young (under 6) and the very old (over 75) are especially susceptible...”

(such as antihistamines, benzodiazepines, antipsychotics, antidepressants and muscle relaxants) may be common triggers for delirium.³³

Acute catatonic excitement

This syndrome was first documented by Calmeil in 1832.³⁴ He described patients suffering from this condition as passing rapidly through a state of acute excitement, to “profound stupor, with terminal hyperthermia and then sudden death.” At autopsy, nothing would be found to explain the hyperthermia and physical collapse which resulted in death. The condition has also been referred to as fatal catatonia.

Delirium tremens

This is a disorder that generally occurs in individuals with a history of habitual alcohol abuse after the abrupt withdrawal of alcohol. Tremors usually begin within 5-10 hours after the last alcohol intake, along with rapid pulse, increased blood pressure, rapid breathing, sweating, nausea and anxiety. Alcohol hallucinosis usually begins within 12-24 hours after the last alcohol ingestion. Other symptoms may include agitation, disorientation, delirium, seizures, restlessness or stupor. Patients may be treated with anticonvulsants, benzodiazepines or antipsychotic medications. The condition may be fatal.

Malignant Hyperthermia

This is an inherited disorder that causes an adverse reaction to certain anesthetic drugs.³⁵ After drug exposure, the affected individual may display any combination of the following signs and symptoms: muscle rigidity, increased blood pressure, rapid heart rate, agitation. Without proper treatment, internal bleeding, brain damage, rhabdomyolysis (destruction of muscle cells), kidney or cardiac failure can result. Sudden death may occur.

Drug intoxication

Drugs such as cocaine, methamphetamine and phencyclidine (as well as some over-the-counter medications) are known to interact with the central nervous system (CNS) and can produce the acute onset of violent behavior, hyperactivity, extreme paranoia, incoherent speech, hallucinations, confused mental state (delirium) and extraordinary strength.

Although the specific manner of interacting with the CNS differs somewhat for each of these compounds, as a class these drugs are stimulants which may increase the level of catecholamines in the CNS, amplifying the effects of these neurotransmitters. Their similar negative outcomes are thought to be related to these common CNS effects. Sudden death can occur.

The underlying patho-physiology of excited delirium and the phenomenon of sudden death:

The term sudden in-custody death has been used to describe the phenomenon of the rapid, unexpected death of an individual in the custody of law enforcement personnel. Unlike other causes of death that can frequently be anticipated, individuals succumbing to this syndrome

³³ www.mayoclinic.com/health/delirium/DS01064

³⁴ Fisher, K.J. and Greiner, A. (1960) Acute lethal catatonia treated by hypothermia. *Canad.M.A.J.*, 82, 630-634.

³⁵ www.mhaus.org

initially appear to be physically fit and there are no conventional medical warning signs. Moreover, usually no anatomic cause of death can be clearly determined at autopsy.

Stratton³⁶ identifies a number of factors that have been found to be associated with sudden in-custody death (although he cautions that a causal relationship has not been determined).

- Excited delirium requiring physical restraint
 - Chronic stimulant abuse
 - Schizophrenia, especially with paranoid features
- Forceful irrational struggle against restraints
- Acute stimulant drug use
 - Cocaine
 - Amphetamines
 - Ethanol
- Autopsy evidence of chronic heart disease
- Clinical medical abnormalities, including:
 - Dehydration
 - Hyperthermia
 - Metabolic acidosis

As noted above, numerous in-custody deaths occur in the population of individuals who have been long-term drug (specifically, cocaine and methamphetamine) abusers. Some researchers believe that long-term drug use negatively affects cardiac function, rendering the individual suffering from drug-induced delirium more susceptible to a variety of cardiac problems that can lead to sudden death.³⁷

Others highlight the complex interplay between the primary medical or psychiatric condition and the impact of struggle and restraint that may occur when a first responder confronts an individual who presents in a state of confusion, agitation, autonomic hyperarousal and unpredictable behavior. For example, DiMaio is of the view that **ED deaths are “due to a combination of the normal physiologic changes seen in a struggle, combined with – depending on the case – illicit drugs, prescribed medications and natural disease.”**³⁸ The putative patho-etiological underpinning is considered to involve the stress response which causes the release of the neurotransmitter catecholamines norepinephrine and dopamine (in the brain) and norepinephrine and epinephrine (outside the brain). The multiple mental and physical effects of these chemicals are thought to create or substantially contribute to the signs and symptoms of ED. Corroborating this theory are a number of studies published by Dr. Deborah Mash and her coworkers that demonstrate measurable changes in the brain chemistry of chronic cocaine users.^{39 40 41}

³⁶ Stratton et al (2001)

³⁷ Rutenber, A.J. et al (1999) Cocaine-associated rhabdomyolysis and excited delirium: Different stages of the same syndrome. *American Journal of Forensic Medical Pathology*, 2, 120-127.

³⁸ DiMaio, V.J.M and DiMaio, T.G. (2009) Excited Delirium Syndrome in Kroll and Ho, p.352.

³⁹ Mash, D.C. and Staley, J.K. (1999) D3dopamine and kappa opioid receptor alterations in human brain of cocaine-overdoes victims. *Annals of NY Academy of Science*, 877, 507-522

⁴⁰ Mash, D.C et al (2000) Serotonin transporters upregulate with chronic cocaine use. *Journal of Chemical Neuroanatomy*, 20, 271-280

⁴¹ Mash, D.C et al (2003) Cocaine abusers have an overexpression of alpha-synuclein in dopamine neurons. *Journal of Neuroscience*, 23, 2564-2571.

Because death due to ED may occur once a struggle ensues or once a person is restrained, it suggests a mechanism which has been labeled ‘postexercise peril’.⁴² It has been noted that norepinephrine and epinephrine levels, which increase during strenuous exercise, increase more dramatically *after* the cessation of exercise. The catecholamines may cause vasoconstriction, limiting the supply of oxygenated blood to the heart at precisely when it is needed most. Blood potassium levels may also fall to dangerously low levels following stress, which may lead to cardiac arrhythmia.

Drugs such as cocaine and methamphetamine are also responsible for elevating levels of catecholamines, which has the potential to exacerbate the above-described normal physiological events.

Supporting this perspective is a body of research that has examined ED-related deaths of cocaine users. This research suggests that chronic use of cocaine may disrupt normal brain function (specifically producing abnormal dopamine levels) and that binge cocaine usage can be the ‘tipping point’ that results in agitation, delirium, hyperthermia, rhabdomyolysis (muscle deterioration) and ultimately death.⁴³ The establishment of a common set of factors associated with ED, rhabdomyolysis and neuroleptic malignant syndrome (which can be explained by dopamine dysfunction) suggests a common pathway for these phenomena.

It is, however, important to note that not all victims of in-custody deaths who were considered to be experiencing symptoms consistent with ED have been found to have consumed illegal drugs. Thus, other mechanisms, not due to drug effects, are likely also at play. For example, hyperthermia is frequently noted in individuals who suffer sudden death associated with delirium even when the person in this state has not consumed illicit drugs such as cocaine. Hyperthermia itself may stress cardiac function and increase demand for oxygen. Persons experiencing severe agitation of the sort associated with ED may experience dehydration resulting from profuse sweating and hyperventilation. This may cause electrolyte imbalance and a build-up of metabolic acid byproducts in the body, leading to the further release of stress hormones and adding to behavioural agitation. Medical shock may result and vital organs such as the heart, kidneys, liver and brain can begin to fail.⁴⁴

In summary, it is reasonable to conclude that individuals, when suffering from ED, experience a final common pathological pathway consistent with a ‘*hyperadrenergic state*’ that can be the result of a number of different etiologies. This state has the potential to produce a number of substantial negative effects on the body, including but not limited to hyperthermia and cardiac arrhythmia that can lead to sudden death.

Thus, there is general agreement in the scientific literature that mortality rates are increased in the presence of the signs and symptoms of ED. The National Institute of Justice, in a comprehensive study conducted by a team of physicians, medical examiners and other scientific

⁴² Dimsdale, J.E. et al (1984) Post-exercise peril: plasma catecholamines and exercise. *Journal of American Medical Association*, 251, 630-632

⁴³ Rutenber, A.J. et al (1997) Fatal excited delirium following cocaine use: epidemiological findings provide new evidence for mechanisms of cocaine toxicity. *Journal of Forensic Sciences*, 42, 25-31.

⁴⁴ Stratton, S.J. et al (2001)

experts declared that ED carries “a high risk of mortality in the short term, even with medical intervention or in the absence of CED deployment or other types of subdual”.⁴⁵

Although further causal considerations are generally speculative, it is reasonable to consider that when further stressed by a physical struggle or the application and continuation of physical restraints (including the CED), an individual exhibiting the syndrome of ED may be at increased risk for sudden death. Similarly, the pre-existence of a medical or psychiatric condition in which perturbations of CNS functioning already exist (such as in a psychotic illness, in a pre-existing cardiac condition, in a delirium or with the use of psychostimulant drugs) may increase the risk for sudden death in an individual already showing signs and symptoms consistent with ED.

Recommendation 1:

Given our current understanding of :

- the *putative patho-etiology* of the syndrome commonly called excited delirium (ED), and
- the *substantial overlap* of the signs and symptoms of ED with other well described medical and psychiatric conditions, and
- the *difficulty in ascribing specific causes* of the syndrome in the situation of first response, and in
- the *increased risk for sudden death* (with or without a struggle or restraint[including the use of the CED]) and as a result of
- the current *confusion* about the use of the term ED,

the panel recommends that the term ‘autonomic hyperarousal state’ (AHS) be used as a preferred descriptor for the signs and symptoms described above. This nomenclature would have the advantage of not suggesting a defined medical diagnosis (such as would be found in ICD or DSM), nor of suggesting a unique etiology for any observable case. It would serve to identify the putative final pathway that is likely common to all the terms identified above and would signal the increased risk for sudden death already known to exist in the situation of such a physiological state.

What site-based treatments are indicated? Description of current standard of care (under optimal conditions)

The therapeutic response to the individual presenting with AHS is currently guided by two principles:

- Use of the least intrusive and most effective means of intervention, and
- Ensuring the safety of the individual and other persons

Ideally the response is a team effort led by an identified team leader, with members representing various disciplines but who share common training in intervention best practice. The initial step consists of isolating the crisis, by removing distractions and potentially aggravating factors (for example, other persons, dangerous objects, etc). De-escalating strategies of verbal engagement and negotiation are used, complemented by a number of well established physical conventions (such as: not crowding the person’s space, avoiding rapid movements toward the person, limited

⁴⁵ United States Department of Justice. National Institute of Justice (2008) Study of deaths following electro-muscular disruption: Interim report. www.ojp.usdoj.gov/nij/pubs-sum/222981.htm. p.3

direct eye contact, speaking in a low soothing but confident voice, displaying a collaborative attitude). The presence of adequate numbers of personnel can be used to establish the futility of resistance.

If these non-intrusive approaches are unsuccessful, physical restraint must be used in order to ensure the safety of the person and others, and to administer necessary medication treatments. In this situation, rapid restraint is necessary in order to reduce the period of struggle (which may exacerbate the situation and increase the potential for fatal outcome.) Five or six trained team members control limb and head movement and institute removal to a secure, custom-designed isolation room as soon as possible. Medication (e.g. intravenous benzodiazepine; intramuscular antipsychotic) is administered to reduce agitation and induce sedation. If necessary, face down physical restraint, continuously monitored by trained medical personnel, may be applied for short periods of time.

Recommendation 2:

It is recommended that

- *hospital emergency department staff receive training to assist in the identification and treatment of individuals displaying signs and symptoms of AHS;*
- *the principles of a therapeutic response to individuals presenting with AHS be followed;*
- *individuals displaying signs and symptoms of AHS be considered at risk of sudden death;*
- *these individuals be designated as triage level 1 or 2⁴⁶ ;*
- *a detailed history and physical examination (injuries/trauma, cardio-respiratory, neurological) be undertaken;*
- *For individuals who require restraint due to violence and who present a danger to themselves or others, physical restraint may be applied briefly. Physical restraint increases risk to the patient and care givers and may exacerbate AHS by increasing metabolic rate, temperature, and compromising ventilation. Early chemical restraint in these cases should be considered;*
- *Emergency staff should be prepared to undertake resuscitation procedures if the patient experiences sudden respiratory and/or cardiac arrest.*

⁴⁶ As per the Canadian Triage and Acuity Scale (www.caep.ca), levels 1 and 2 (the highest levels) are used to describe patients who are seen as posing a definite or probable risk of danger to themselves or others. These triage levels dictate continuous surveillance, close monitoring of vital signs and the administration of treatment as required.

The challenge for first responders

Law enforcement officers and other first responders work in a volatile and frequently non-secured environment. When they respond to a call involving an extremely agitated person, they are obliged to consider a broad range of environmental factors and public safety concerns in addition to the condition of the disturbed individual; for example, the presence of bystanders, weapons, hazards in the vicinity, availability of medical/mental health supports and the need for law enforcement back-up. Urban/rural differences are significant, as medical or other assistance is often not as readily available in rural settings.

Police encounters with persons displaying AHS symptoms may be dangerous for the responding officers or for others at the scene. Often police are only called to a scene when an individual's behavior has become very aggressive and there is a significant risk of injury to the subject or other persons. Furthermore, police may be unaware of any history of violence and may also be unaware of the individual's history of medical/mental disorders or drug use. Police officers may, for some substantial periods of time, be the only responders at the scene and are expected to intervene as rapidly as possible to assist and protect the subject and others.

Police⁴⁷ are trained to consider these encounters as medical emergencies, but medical staff (when they arrive on the scene) will not intervene until the subject is brought under control.

Is it possible to differentiate amongst potential causes in the field?

It is the opinion of the panel that first responders should be able to recognize when a person may be in AHS and, within the reality of the situation, be able to best secure the safety of the person and others until such time as appropriately trained medical personnel are available. However, the panel is of the view that it is not practically possible to differentiate amongst the many possible causes of extreme agitated behavior in the field. Even in a highly controlled and well characterized therapeutic setting, such as a hospital, medical experts have noted that delirium may be difficult to diagnose.⁴⁸ It is not reasonable to expect that first responders be able to determine if the person in AHS is suffering from the effects of cocaine or methamphetamine ingestion, or psychosis as a result of untreated schizophrenia, severe bipolar mania or some other disease entity.

Response by law enforcement officers to persons in AHS:

The recommended response for law enforcement officers is clear: attempt to bring the subject under control (first by verbal de-escalation techniques; and if these responses are ineffective,

⁴⁷ This refers to police who have received training in recognition of the signs and symptoms of mental illness. It should be noted that not all police officers in Nova Scotia have received this training, as indicated in this report.

⁴⁸ For example, Dr. Lu Shaohua, (psychiatrist, Vancouver General Hospital) testifying in May 2008 at the Braidwood Inquiry, noted that "it's not unusual even for somebody like myself, who sees delirium on a regular basis, and we are not 100% certain whether or not a patient is in a delirious state versus an extreme depression, or psychosis."

through appropriate physical restraint measures) in order to allow medical personnel to apply treatment.

Specific steps that should be taken by first responders to minimize the risk of death are as follows⁴⁹:

- Call-takers, if possible, identify probable AHS cases and dispatch police and EHS simultaneously
- Law enforcement officers identify individuals displaying signs and symptoms of AHS. Once symptoms are recognized, police should request backup and summon EHS (if they are not already at the scene).
- Attempt to de-escalate the situation (if time permits and if there is no imminent danger to the individual or others)

It is recommended that police scan the scene to remove potentially hazardous objects; remove bystanders who may be endangered or who might escalate the individual's level of agitation; reduce noise levels. Police should attempt to calm the individual: demands should be made in a non-challenging manner; statements should be phrased in a positive manner with offers to assist.

Police should recognize that persons in AHS frequently do not respond to verbal cues. Delays in subduing the individual may lead to life-threatening physiological changes.

- Use overwhelming force if restraint must be used (see further explanatory detail below regarding use of force)

Police must resort to restraint if verbal interventions are ineffective or if an escalation of violent or threatening behavior occurs. Restraint must be applied rapidly in order to reduce the time of struggle. EHS staff should conduct a medical assessment of the patient and provide prehospital care as needed.

- Monitor individuals at the scene and during transport to hospital, following restraint
Face-to-face monitoring of breathing status and other vital signs should be performed at all times by police or EHS staff until arrival at a medical facility. Diminished respiratory status or hyperthermia may signal the potential for cardiac arrest. If needed, cooling, sedation and hydration should be provided as soon as possible.⁵⁰
- Immediately transport the individual to a hospital for observation or treatment.

Recommendation 3:

The panel recommends that the procedures outlined above be adopted as the most appropriate response to individuals displaying signs and symptoms of AHS.

⁴⁹ Adapted from DiMaio and DiMaio (2006) p.107-109

⁵⁰ Recommendation made by the National Institute of Justice (2008) Study of deaths following electro-muscular disruption, Interim Report.

Use of force by law enforcement – restraint mechanisms:

The use of force by law enforcement officials is addressed in international guidelines and Canadian criminal law. The Criminal Code of Canada states that a law enforcement officer may use as much force as deemed necessary for the enforcement and the administration of the law. The onus is on the officer to show that, under the circumstances, the degree of force used was justified and not excessive.⁵¹

The United Nations Basic Principles on the Use of Force and Firearms by Law Enforcement Officials⁵² state that governments and law enforcement agencies should develop a range of means as broad as possible and equip law enforcement officials with various types of weapons and ammunition that would allow for a differentiated use of force. These should include the development of non-lethal incapacitating weapons for use in appropriate situations, with a view to increasingly restraining the application of means capable of causing death or injury to persons. The Principles specify that law enforcement officials, in carrying out their duty, shall, as far as possible, apply non-violent means before resorting to the use of force.

Canadian law enforcement agencies have developed policy regarding use of force, most based on the National Use of Force model developed under the auspices of the Canadian Association of Chiefs of Police in the 1990s. The use of various modes of force is based on the officer's assessment of the threat and level of resistance shown by the subject, as well as the overall environmental context; e.g. physical condition of the subject(s), number of officers present, distance from the threat and condition of the physical environment.

The range of acceptable responses varies from verbal communication with the subject through to use of lethal force. Specific escalating levels of response are as follows⁵³:

Officer presence	Officer's presence alone may defuse the situation.
Communication	Crisis intervention techniques Verbal communication (volume, tone) Vocabulary (context, commands) Non-verbal communication (posture, gestures, facial expressions)
Physical control (soft)	Pressure points Escort positions Joint locks Handcuffing
Physical control (hard)	Blocks, strikes
Intermediate weapons	OC spray, CED, water projection system, baton
Lethal force	Firearms

While the risk for harm to the person towards whom force is applied increases with escalating levels of response, even low level responses are not without risk. Concerns have been expressed by law enforcement and medical professionals regarding the risks inherent in *any* form of

⁵¹ Criminal Code of Canada. s.25(1)

⁵² Adopted by the 8th UN Congress on the Prevention of Crime and the Treatment of Offenders, September 1990. www.unhchr.ch/html/menu3/b/h_comp43.htm

⁵³ Adapted from the National Use of Force Model, Canadian Association of Chiefs of Police. www.caep.ca

restraint, as per the following excerpt from a 1993 editorial in the Canadian Medical Association Journal:

“restraint is not itself harmless; some proportion of those who are restrained may die. We do not know what this proportion is, or how many others will come near death and be revived. As clinicians we need to accept that restraint procedures are potentially lethal and to be judicious in their use.”⁵⁴

Consistent with this concern is a body of research on the impact of various restraint mechanisms. This has consistently shown that empty-handed tactics which require the police officer to have direct, physical contact with a subject results in a higher relative proportion of injuries to suspects and officers than methods such as OC spray, canines, batons and conducted energy weapons.⁵⁵ Thus, any situation that requires forceful intervention carries with it some form of risk for harm.

Individuals who are in AHS are reported to be extremely difficult to restrain. The recommended minimum number of personnel recommended to restrain an individual exhibiting these signs and symptoms is six.⁵⁶ There are typically fewer than six police officers as first responders at the scene (particularly in rural areas) and they may often need to address site and safety issues that are more variable or of a greater order of magnitude than in a controlled setting such as a hospital. It is not uncommon for police officers to encounter great difficulty in subduing the autonomically hyperaroused individual. Thus, the process of restraint may result in a prolonged struggle as police attempt to apply handcuffs, with police sometimes using neck restraints or applying pressure to the back of a prone individual.

In some cases, sudden death may occur within the context of the process of restraint. Determining the cause of death in these cases is difficult. Because these deaths often occur after restraints have been applied (to bring the subject under control), the restraint process and methods are frequently considered to be a probable contributing factor in the deaths.

However, given the current scientific understanding of the complex physiological processes at play in a situation where a person demonstrating symptoms of AHS (either with or without the application of restraint), the panel is of the opinion that it is frequently not possible to determine the role (if any) that restraint (including CEDs) played, if sudden death occurs. In the absence of a critical synthesis of available research regarding the individual or combined impact of various forms of restraint⁵⁷, it is not possible to draw definitive conclusions regarding the safety of these restraint mechanisms (including the CED) for individuals experiencing AHS.

Recommendation 4:

With respect to the use of restraint for individuals experiencing AHS symptoms, the panel recommends that:

- ***First responders initially attempt to de-escalate the situation through use of non-physical techniques;***

⁵⁴ Milliken, D. (1993) Canadian Medical Association Journal. p.1611

⁵⁵ Jenkinson, E., Neeson, C. and Bleetman, A. (2006) The relative risk of police use-of-force options. *Journal of Clinical Forensic Medicine*, 13(5), 229-241.

⁵⁶ Farrell, S.P. et al (1998) Nursing management of acute psychotic episodes. *Nursing Clinics of North America*, 33(1), 187-200

⁵⁷ See Appendix 1 for an overview of the current research

- *Restraints be used only when other attempts at de-escalation are ineffective or impractical;*
- *Use of restraints by law enforcement officers be governed by policies established and monitored by the Nova Scotia Department of Justice;*
- *Law enforcement officers receive regular training in the use of authorized restraint tools to maintain an appropriate skill level;*
- *Where restraints are required to bring an individual under control, the choice of restraint should be determined by the officer's view of the least restrictive means of bringing the subject under control in the shortest period of time (in order to minimize the likelihood of injury to the individual or others);*
- *Individuals subject to restraint be moved from a prone handcuffing position to a side-lying or seated position as soon as possible;*
- *Law enforcement officers be cognizant of the potential for injury due to the use of restraints;*
- *Individuals displaying AHS symptoms are at risk of sudden death and such persons who must be restrained by any method should be considered as a medical emergency; vital signs must be closely monitored while awaiting medical care; and*
- *EHS should be called to the scene immediately, if possible before restraints are applied*

Recommendation 5:

In recognition of the need for comparative scientific research on the individual and combined effects of restraint mechanisms on risk for sudden death, *the panel endorses the recommendation of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Agencies in Nova Scotia that a database be created, accessible to independent researchers, to permit a comprehensive review of use of force incidents*⁵⁸.

The panel is aware of current research being undertaken to determine the relationship between various means of restraint and in-custody deaths; for example mortality reviews of CED-related deaths in the United States sponsored by the National Institute of Justice; the RESTRAINT study (a prospective examination of in-custody deaths using data from Calgary, Victoria, San Francisco, San Diego) sponsored by the Canadian Association of Chiefs of Police and the Canadian Police Research Centre.

Recommendation 6:

The panel further recommends that the Nova Scotia Health Research Foundation and other appropriate funding agencies be asked to review current research priorities and consider funding further research regarding the relationship between the characteristics of subjects, nature of restraint applied and outcomes (i.e. injury or death).

⁵⁸ Nova Scotia (2008) Report of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Officers in Nova Scotia. p.5

Models for police response to mentally ill persons

Law enforcement agencies have acknowledged the need to develop more effective responses in interactions with mentally ill persons. The number of such interactions are said to have increased significantly in recent years due to a broad range of factors.⁵⁹ Mental health consumer advocates have voiced criticisms of the way in which police respond to individuals displaying symptoms of mental illness;⁶⁰ police themselves have expressed frustration about the limited number of options and resources available to them in dealing with these individuals.⁶¹

A number of barriers have been identified that prevent police from dealing effectively with crisis situations involving persons with mental illness:⁶²

- First responders do not have adequate information when they arrive at the scene
- Police databases do not contain sufficient information about previous contacts with mentally disordered persons and interventions that have proven successful/unsuccessful
- Police officers do not possess adequate information about mental illnesses and appropriate responses
- Lack of access to advice from mental health experts at the scene
- Delayed access to hospital emergency care

Specialized police-mental health models have been developed to address these concerns:

Police/mental health team: Specialized mental health crisis intervention team – plainclothes police and mental health professionals respond in unmarked cars, defuse the situation and ensure provision of medical/psychiatric care, civil certification, hospitalization or arrest and detention with psychiatric evaluation. The team is supported by psychiatric nurses via a mental health crisis line (screen calls for team response; on-call response to regular officers) and psychiatrists (on-call advice and attendance for certifications).⁶³

Specialized police crisis intervention officers: Specially trained police officers perform mental health crisis intervention services in addition to regular policing duties. At least one of these officers is available on every shift policing each geographic area; they provide first-line response to a mental health crisis, attempt to defuse the situation and refer the subject to community mental health resources or transport to a hospital/psychiatric centre (ideally with a ‘no reject’ policy, which means that the transported individual will be admitted to the medical facility).

Mental health-based specialized mental health response: Partnerships/agreements are implemented between police and mobile crisis intervention teams that are part of the community

⁵⁹ Canadian Association of Chiefs of Police, Police/Mental Health Subcommittee (2006) *Contemporary Policing Guidelines for working with the Mental Health System*.

⁶⁰ Watson, A.C. et al (2008) Defying Negative Expectations: Dimensions of Fair and Respectful Treatment by Police Officers as Perceived by People with Mental Illness. *Adm Policy Mental Health*, 35, 449-457

⁶¹ Council of State Governments. Criminal Justice/Mental Health Consensus Project. (2002) *Improving responses to People with Mental Illnesses*. New York: Council of State Governments. p.vii

⁶² Canadian Mental Health Association. B.C. Division (2003) *Study in Blue and Grey: Police interventions with people with mental illness: a review of challenges and responses*. www.cmha-bc.org

⁶³ Canadian Mental Health Association. BC Division. (2005) *Police and Mental Illness: models that work*. www.cmha.bc.ca/files/4-models.pdf

mental health services and operate independently of (but in cooperation with) law enforcement agencies.

The crisis intervention team model, first implemented in Memphis Tennessee in 1988, has spread to many other locations and is considered by many to be “the most rapidly expanding and promising partnership between law enforcement and mental health professionals”, with the Bureau of Justice Assistance estimating that there are more than 400 CIT programs operating in the United States.⁶⁴

While there have been a number of qualitative studies that report positive responses to the CIT and other program models from police, mental health practitioners and mental health consumer advocates, the current research base does not permit a definitive conclusion about the relative effectiveness of the programs in achieving their stated goals.^{65 66}

However, the literature does provide some direction regarding the critical elements of best practice to serve as a guide to jurisdictions seeking to improve the response to persons with mental disorders:^{67 68 69 70}

Collaborative planning and implementation: The importance of involving organizations and individuals from a wide range of disciplines and perspectives (including mental health, law enforcement, emergency medicine and consumer groups).

Partnerships between police and mental health: Program must be responsive to specific problems/issues in each geographic area; consider the law enforcement agency’s capacity to respond, and build on the available community resources for the treatment of mentally ill persons.

Designation of specialized law enforcement officers as first responders to incidents involving persons displaying symptoms of mental illness.

Training: All first line responders should receive a basic level of training to recognize the symptoms of mental illnesses and the need to call for specialized assistance. Those in specialized assignments should receive more comprehensive training. Dispatchers, call takers and other individuals in a support role receive training tailored to their needs.

Call taker and dispatch protocols: These individuals identify critical information and relay to the appropriate responders.

⁶⁴ Compton, M.T. et al (2008) A comprehensive review of extant research on crisis intervention team programs. *Journal of American Academy of Psychiatry and the Law*. 36,p.47.

⁶⁵ Compton, p.53

⁶⁶ Geller, J.L. (2008) Commentary: Is CIT today’s lobotomy? *Journal of the American Academy of Psychiatry and the Law*, 36, 56-58.

⁶⁷ Council of State Governments Justice Centre (2002) *Improving Responses to People with Mental Illnesses: The essential elements of a specialized law enforcement-based program*. www.consensusproject.org/downloads/LE-essentialelements.pdf

⁶⁸ Canadian Mental Health Association (BC Division) (2005) *Police and mental illness: models that work*. www.cmha.bc.ca/files/4-models.pdf

⁶⁹ Compton, M.T. et al (2008)

⁷⁰ Hails, J. and Borum, R. (2003) Police training and specialized approaches to respond to people with mental illnesses. *Crime and Delinquency*, 49(1), 52-61.

Protocols between emergency medical services and law enforcement to clarify procedures at the scene and transportation to a medical facility.

Accessible medical services. Availability of centralized sites where police can bring mentally ill persons at any time; single point of entry; streamlined, rapid intake to allow police officers to return to duty quickly.

Evaluation to measure outcomes and disseminate results in order to improve processes.

Training:

Many government and non-governmental organization reports and reviews⁷¹ have called for the delivery of training programs for law enforcement officers and other justice system personnel to assist them to better understand mental illness and how they should respond.

Training requirements differ by category of responder:

Front line law enforcement officers – require information to guide them in recognizing signs and symptoms of general categories of mental illness and appropriate responses, including when to call upon officers with specialized training.

Specialized officers/members of crisis intervention team – require a comprehensive training program to provide an understanding of: mental illnesses and their impact on individuals, families and communities; signs and symptoms of mental illnesses; stabilization and de-escalation techniques; disposition options; community resources; and legal issues.⁷²

Call-takers/Dispatchers – require training in identifying whether calls for service likely involve person with mental illness (i.e. description of behavior; whether the person appears to represent a threat to themselves or others; presence of weapons, etc) and how such calls should be directed.

*Emergency Medical Services*⁷³ – require training in appropriate response to mentally ill persons and knowledge of local protocols with police agencies.

Training currently provided:

The June 2008 report of the Advisory Panel to the Minister of Justice on the Use of the Conducted Energy Device by Law Enforcement Agencies in Nova Scotia recommended the establishment of a provincial use of force training standard. It was further recommended that the training “address the special approaches to be taken with people apparently suffering from mental disorders.”⁷⁴ There is currently no provincial governance standard regarding response of

⁷¹ For example, Standing Committee on Justice and Human Rights (2002) *Review of the Mental Disorder Provisions of the Criminal Code*. House of Commons, Recommendation 17; House of Commons Standing Committee on Public Safety and National Security (2008) *Study of the Conductive Energy Weapon – TASER*, p.2

⁷² Council of State Governments, p.3

⁷³ Provided by Emergency Health Services in Nova Scotia

⁷⁴ Nova Scotia (2008) Report of the Advisory Panel to the Minister of Justice on the use of the Conducted Energy Device by Law Enforcement Agencies in Nova Scotia. p.25

municipal law enforcement officers to mentally ill persons.⁷⁵ The Department of Justice has indicated that the Panel's recommendations related to standardization of protocols and training are being addressed by the Use of Force Coordinator.

In 2002, through a partnership between the Department of Psychiatry and the provincial Department of Justice, a training program was developed to assist first responders to recognize the symptoms of mental illness and gain knowledge about appropriate response strategies.⁷⁶ The curriculum presented four broad categories of presenting behaviours:

- reality impaired;
- antisocial, argumentative, abuser;
- excited delirium;
- suicidal, depressed

rather than an inventory of signs and symptoms of a large number of mental illnesses. The program provides a list of 'do's and don'ts' for managing individuals in each category. The on-line version of this program Recognition of Emotionally Disturbed Persons was made available in the fall of 2008 to all police forces across Canada through the Canadian Police Knowledge Network (CPKN).⁷⁷

Halifax Regional Police

All cadets receive sixteen hours of training from a team of mental health experts (signs and symptoms of mental illness and appropriate responses). Since January 2009, all lateral hires have also received training from this team.

All Halifax police officers have completed the on-line CPKN training as of May 2009.

Training programs addressing the use of force and response to mental illness are now separate programs. In 'use of force' training, officers are taught how to respond to various 'threat' cues. Training personnel believe that this training should also incorporate appropriate response to individuals displaying symptoms of mental illness. Plans are now underway to include mental illness 'scenarios' in this training. The new focus of the training will be on recognizing the signs and symptoms of various mental illnesses (including AHS); applying strategies for defusing crisis situations; and using various forms of restraint that reduce struggle under varying circumstances. The strategies will include all force options (from verbal de-escalation methods up to lethal force encounters).

Crisis intervention team training (a 40 hour specialized training program) is delivered by mental health experts and representatives of mental health consumer groups. Three training sessions have been delivered since September 2008, with two more scheduled for the fall of 2009. Law enforcement officers from municipal police forces and the RCMP have participated.

Other municipal police departments

⁷⁵ *The Involuntary Psychiatric Treatment Act*, SNS, 2005, c.42, s.14 prescribes the right of a police officer, under certain circumstances, to transport to a place for medical examination a person whom they have reasonable and probable grounds to believe has a mental disorder.

⁷⁶ Department of Psychiatry Dalhousie University (2003) *Improving First Line Enforcement Responders Recognition of Emotionally Disturbed Persons: A Community Base Education Program*. Halifax, Nova Scotia

⁷⁷ www.cpkn.ca/course_detail/emotionally_disturbed_e.html The program is of 2 hours duration.

Smaller municipal police departments have no defined training program for their officers regarding response to mentally ill persons. However, many police agencies are taking advantage of the on-line training offered by the CPKN and availability of seats in training programs offered by Halifax Regional Police.

Royal Canadian Mounted Police

The RCMP have recently revised training requirements for CEW operators, requiring recertification each year. The training includes a component on the response to acutely agitated persons: including recognition of signs and symptoms of mental illness; requirement to contact EHS. RCMP officers also receive Operational Skills Maintenance mandatory recertification training (eight hours) every three years, which includes the full range of use of force options in the RCMP Incident Management Intervention Model. This training may include scenarios on tactical responses to acutely agitated persons.

All RCMP Communications Centre dispatch staff have received the on-line training on recognition of the signs and symptoms of mental illness provided through the CPKN. At this time, no specific formal training is provided to RCMP members regarding recognition of and response to signs and symptoms of mental illness. Plans are now underway to investigate the delivery of the CPKN program to all 'H' Division members in 2010-11.

Emergency Health Services

Emergency health services (EHS) play a vital role in the response to individuals displaying AHS symptoms, as they are the first point of contact with the health system. EHS in Nova Scotia operate within a centralized administration with standards set and monitored by the provincial Department of Health. EHS provides a single ambulance service throughout the province. The EHS Medical Communications Centre dispatches all emergency medical requests from the provincial 911 system.

EHS Communications Centre staff receive specialized training in the recognition of the signs and symptoms of mental illness. EHS responders receive regular training in a broad variety of topics. However, program administrators acknowledge that both Communications Centre staff and EHS responders could benefit from more training in the appropriate responses to 'low volume/high risk' situations such as those posed by individuals suffering from AHS symptoms.

Recommendation 7:

The panel acknowledges that law enforcement agencies have demonstrated an awareness of the need for improving the response to individuals displaying symptoms of mental illness. The panel further recognizes that some excellent training programs have been developed. However, we have concerns that a number of training initiatives have been developed and implemented independently, resulting in some fragmentation of effort, lack of consistency and sustainability.

The panel recommends the development of a provincial training plan for first responders that addresses, at minimum:

- ***For all first responders, recognition of signs and symptoms of mental illness and appropriate response;***
- ***Specialized training for call-takers and dispatchers to recognize the characteristics of calls likely involving persons with mental illness;***

- *More intensive training for a designated group of law enforcement officers who are to be called to the scene of incidents involving persons with mental illness; and*
- *Training for all EHS providers in the recognition of the signs and symptoms of AHS and appropriate responses.*

Protocols currently in place:

District health authorities:

An overview of arrangements/protocols currently in place in the nine district health authorities (DHAs) to guide the response of mental health providers and law enforcement agencies to individuals displaying symptoms of mental illness is provided in Appendix 2.

For the most part, the DHAs have developed informal relationships with law enforcement agencies in their areas. Some formal protocols have been developed. For example, the South Shore DHA has developed a formal protocol with municipal police agencies and the RCMP, governing respective roles and responsibilities and response times.

Mental Health Mobile Crisis Intervention Team:

Capital Health and the IWK, in partnership with Emergency Health Services (EHS) and police, operate a Mental Health Mobile Crisis Team (MHMCT) which is staffed by specially trained police officers and mental health workers. The team maintains a 24-hour crisis line. The team can respond to requests to assist first responders, but this is not a frequent occurrence because the service currently operates only 12 hours per day. The MHMCT can assist by making an assessment of the situation, advising police or others on specific strategies to manage a situation, directly intervening with the person in crisis (at times) and facilitating access to medical and mental health care.

Emergency Health Services:

The approach to psychiatric emergencies in the out-of-hospital setting can be broken down into three clinical phases: pre-exposure, exposure and post-exposure.

During the pre-exposure phase, formal protocols/policies exist, integrating law enforcement and EHS response to psychiatric emergencies.⁷⁸

During the exposure phase, formal medical protocols exist for the clinical care of psychiatric emergencies. However, gaps exist in optimizing the integrated roles between EHS and law enforcement in mitigating risk to patients and staff while on scene.

For the post-exposure phase (for example, when the patient is being transported by law enforcement or EHS) formal protocols regarding clinical management need to be developed for concurrent support between law enforcement and EHS.

⁷⁸ For example, see Appendix 3 for EHS protocol re response to violent/agitated persons

RCMP:

In January 2009, the RCMP (in amending its policy regarding the use of conducted energy weapons) provided direction to RCMP members when they are called to respond to incidents involving persons displaying signs of mental illness. The policy now states:

3.1.4. Acutely agitated or delirious persons may be at high risk of death. If an individual is in an acutely agitated or delirious state, and whenever possible when responding to reports of violent individuals, request the assistance of emergency medical services. If possible, bring medical assistance to the scene.

5.1 Ensure the individual receives medical assistance if the individual has any apparent injuries requiring medical treatment, the individual is in distress, or the individual requests medical assistance.⁷⁹

The term ‘excited delirium’ used in previous policy has been replaced by the term ‘acutely agitated or delirious persons’.

In his March 2009 report, the Commissioner for Public Complaints Against the RCMP commented favourably on the changes made by the RCMP in addressing interactions with mentally ill persons. The report notes that “the RCMP has added interaction with at-risk populations in their scenario-based training exercises.”⁸⁰ The report also indicated that the RCMP had consulted with the Canadian Association of Emergency Physicians and the Canadian Mental Health Association to discuss issues related to the recommendation that RCMP seek medical care for all individuals who have been the subject of a CEW discharge. Although the RCMP acknowledge that such medical attention is necessary, they pointed to operational difficulties. Challenges include: limited availability of medical resources, particularly in isolated areas; a possible disconnect between police perception and requirements of mental health legislation (the individual may not meet the criteria for involuntary admission to hospital and may refuse to be admitted voluntarily).

Law Enforcement and Mental Health Partnerships project:

A project has recently been initiated to support the creation of Law Enforcement and Mental Health Partnerships throughout the province. The project is sponsored by the Capital Health with a one year *Innovative Initiatives* grant. It is supported by a partnership between the provincial Department of Justice, Halifax Regional Police, Capital Health and the Dalhousie Department of Psychiatry and the Healthy Minds Co-operative. The objectives of the project are: to improve access to mental health training for law enforcement and other emergency responders; and to develop response models (tailored to the needs and capacities of communities) for individuals with mental illness who come into contact with law enforcement agencies or other emergency responders.

The project consists of the following elements:

- the development of a ‘tool kit’: to include topics such as writing a proposal for a collaborative service between law enforcement, mental health and community partners;

⁷⁹ Royal Canadian Mounted Police. Operational Manual. C. 17.7 *Conducted Energy Weapon*. January 27, 2009

⁸⁰ Commission for Public Complaints Against the RCMP (2009) *RCMP Use of the Conducted Energy Weapon : January 1, 2008 to December 31, 2008. Special Report*. p.7

writing a service agreement and/or an MOU; confidentiality considerations; information on advocacy and addressing stigma; tips on assessing needs and communicating identified gaps to key partners; gathering data to support needs assessment and designing outcome measures;

- a provincial workshop scheduled for the fall of 2009;
- ongoing consultation with communities (including on-site visits as appropriate); and
- a sustainable web-share information site to support knowledge-sharing.

A coordinated, collaborative approach

An effective response to individuals suffering from AHS will require a coordinated collaborative approach between law enforcement and health agencies and mental health advocates. The panel does not believe that sufficient evidence exists to support any one specific *first response* model. However, we are of the view that core elements of an effective response can be identified: collaborative planning involving police, health agencies (including emergency health services), mental health services and the community; specialized training tailored to the roles of various responders; and formal protocols which define the roles and responsibilities of each member of the response team. Further, we acknowledge that the specific nature of the response will vary according to the characteristics, needs and capacity of individual communities.

The panel endorses the approach that has been adopted by the Law Enforcement and Mental Health Partnerships Project and urges that it be supported by government.

Recommendation 8:

The panel recommends that a formal protocol be developed in each area of the province that describes the role of law enforcement (and other emergency responders) and health professionals to acutely mentally ill persons, including those who may be suffering from AHS, based on the best practices described above.

Recommendation 9:

The panel further recommends that an evaluation process be undertaken to assess the effectiveness of the protocols.

The EHS Communications and Dispatch Centre is an important source of data and this, combined with information provided by law enforcement (see recommendation 5), could contribute to a database that would be useful in assessing the effectiveness of the protocols for joint response.

Conclusion:

The formulation of a just and effective response to acutely mentally ill persons, including those demonstrating AHS, presents significant challenges for law enforcement and health agencies. Many considerations must be balanced:

- the need to treat individuals with dignity
- the need to protect individuals from harming themselves or others

- the need to provide medical treatment as quickly as possible

In many circumstances this will most certainly require the application of physical restraints. No use of restraint is without risk. But there are risks involved in doing nothing, as the research on the treatment of persons suffering from AHS reveals.

Research on the impact of restraints (either individually or in combination) is inconclusive and many questions remain to be answered regarding the impact of restraints (including the CED) on at-risk individuals. The panel urges that a process be established to systematically evaluate subsequent scientific studies as they become available and that this assessment be used to inform policy regarding the use of restraints on acutely mentally ill individuals.

The building blocks for developing a more effective response to individuals suffering from AHS and other mental illness are clear and are presented in this report. We expect that government agencies will promote efforts to enhance knowledge and understanding on the part of all first responders regarding the needs of the acutely mentally ill and support the development of partnerships between law enforcement, health services and mental health consumer groups in communities throughout Nova Scotia.

Appendix 1: Various Forms of Restraint

Chemical Irritants

Chemical irritants are meant to temporarily disable a subject by causing burning and tearing of the eyes, burning sensation of the skin, gagging and shortness of breath. Although various forms of chemical agents have been used throughout history, most law enforcement agencies now use oleoresin capsicum (OC) spray, made from hot peppers.

An overview of the literature regarding the effects of OC spray⁸¹ suggests that, for the most part, effects of the chemical on the eyes (visual acuity, corneal epithelial defects) are short-lived, but that prompt ocular irrigation is important to avoid the potential for permanent injury. Depending on the strength of the spray, most of the noxious effects disappear in 20-30 minutes. Deaths associated with the use of OC spray have been reported. An examination of 63 deaths after OC spray deployments found that the overwhelming majority were due to the subjects' drug use, disease, positional asphyxiation or a combination of these factors.⁸² This study also revealed that pepper spray was reported to be effective in only 20% of the incidents. Since many of the subjects were reported to be under the influence of drugs, the authors suggest that police officers should consider other forms of restraint for this group.

Limitations of this weapon have been noted: e.g. danger of cross-contamination to officers and bystanders; limited range of less than eight feet; and growing number of reports that some subjects are able to 'fight through' the burning pain of the chemical. Researchers have reported that individuals suffering from excited delirium appear to be resistant to the effects of repeated applications of OIC spray.⁸³

Positional/Restraint Asphyxia:

Case studies reported from the early 1990s of sudden deaths following restraint of subjects by police officers or medical personnel revealed a number of common themes: many subjects displayed symptoms of extreme agitation; significant quantities of stimulant drugs such as cocaine had been consumed; and death followed a period of restraint in the prone position.⁸⁴

There has been some research suggesting that death may result from positional asphyxia; i.e. interference with respiration due to position of the body. Cases have been reported where deaths have resulted when a person is wedged between the front and back seats of a vehicle. A study of 63 cases of asphyxia death (in medical settings) in New York State following restraint use in individuals of widely varying ages found that restraints (primarily vest restraints) had been properly applied in 90 per cent of the cases, leading researchers to conclude that restraints pose an inherent danger to patients even when proper techniques are used.⁸⁵

⁸¹ Mesloh, C. et al (2008) Less Lethal Weapons for Law Enforcement: A performance-based analysis. *Law Enforcement Executive Forum*, 8(1): 133-149

⁸² Bowling, M., Gaines, M. and Petty, C. (2003) Effectiveness and safety of pepper spray. US Department of Justice, National Institute of Justice.

⁸³ DiMaio and DiMaio, *supra* at p. 41.

⁸⁴ Ball, H.N. (2005) Death in restraint: lessons. *Psychiatric Bulletin*. 29:321-323.

⁸⁵ Rubin, B.S., Dube, A.H. and Mitchell, E.K. (1993) Asphyxial deaths due to physical restraint: a case series. *Archives of Family Medicine*, 2(4):405-408.

In a study of 21 cases of unexpected death in Ontario between 1988 and 1995 in individuals exhibiting the symptoms of excited delirium, the authors noted that all subjects had been restrained, most in the prone position. They hypothesized that the “greater oxygen requirement of people in that state predisposes them to anoxic death if they are restrained”.⁸⁶

Researchers have investigated the effects of positional restraints on individuals after vigorous exercise, attempting to replicate the condition of a subject after a violent struggle with police. In some studies on healthy subjects, it appears that prolonged recovery periods were experienced under conditions of prone restraint.⁸⁷ The authors speculate that the effects may be even stronger in a psychiatric population. But others have countered these findings in studies that report that placing an individual in a ‘hog-tied’ position⁸⁸ following strenuous exercise produces restriction in ventilation and impairment in oxygenation of the blood but that the decrease in pulmonary functioning was not clinically relevant.⁸⁹

Some research has pointed to considerable metabolic acidosis in cases of cardiac arrest following use of restraints on individuals demonstrating enormous exertions (as per those in a state of excited delirium). The researchers speculated that psychosis and delirium (including drug-induced delirium) “alter pain sensation and may thus render patients capable of exertion far beyond their normal capacity, leading to maximal sympathetic discharge and catecholamine depletion.”⁹⁰ They are of the view that the use of restraints often provokes further struggle, enhancing the acidosis; with the prone restraint position preventing the subject’s ability to reflexively compensate.

Studies have been conducted to determine whether death can result from an individual kneeling on the back of a subject while attempting to restrain them. No evidence of hypoxia or hypoventilation was found in a study of male subjects aged 18-45 when various weights (25-50 lb) were applied to the backs of subjects in a hog-tied position.⁹¹ The authors do caution that, in these studies, conditions of struggle, trauma and drug intoxication were not simulated – conditions which are commonly present in attempts to subdue agitated subjects. Acknowledging that police officers, during a struggle with a subject, may apply more than 50 lb of weight, further research was conducted with male and female subjects, using greater weights (up to 102 kg). They found that while decreases in pulmonary function were observed, they concluded that factors other than this associated with the restraint process must be responsible for the sudden deaths.⁹²

⁸⁶ Pollanen, M.S et al (1998) Unexpected death related to restraint for excited delirium: a *retrospective study of deaths in police custody and in the community*. *Canadian Medical Association Journal*. 158(12):1607.

⁸⁷ Reay, D.T. et al (1988) Effects of positional restraint on oxygen saturation and heart rate following exercise. *American Journal of Forensic Medical Pathology*. 9:16-18.

⁸⁸ Also referred to as prone maximal restraint position, this technique places a subject prone with wrists handcuffed behind the back, ankles bound together, and wrists and ankles secured with a strap or other device.

⁸⁹ Chan, T.C. et al (1997) Restraint position and positional asphyxia. *Ann Emergency Medicine*. 30:578-586.

⁹⁰ Hick, J.L., Smith S.W. and Lynch, M.T. (1999) Metabolic acidosis in restraint-associated cardiac arrest: a case series. *Academy of Emergency Medicine*. 6(3):239-243.

⁹¹ Chan, T.C et al (2004) Weight force during prone restraint and respiratory function. *American Journal of Forensic Medical Pathology*. 25(3): 185-189.

⁹² Michalewicz, B.A. et al (2007) Ventilatory and metabolic demands during aggressive physical restraint in healthy adults. *Journal of Forensic Sciences*. 52(1): 171-175.

An alternative mechanism of death was suggested by the Independent Panel of Inquiry into the Death of David Bennett, a patient who died in Norwich following a prolonged period of prone restraint. Pathologists at that inquiry proposed that muscle damage, resulting from pressure being applied to the limbs during the restraint process might have led to leakage of significant amount of potassium ions from the muscle fibres. The concentration of potassium ions, built up during the restraint, would surge into the central nervous system once the pressure was lifted, leading to the fatal ventricular dysrhythmia.⁹³

In concluding their overview of research concerning deaths proximal to the use of physical restraints in psychiatric settings, the authors conclude that “the causes of mortality are complex and multifactorial.”⁹⁴ They note that the rates of sudden death are higher for mentally ill persons for reasons such as general neglect of health, substance abuse, smoking and poor diet. Compromised general health status together with ingestion of prescription medication and/or street drugs and conditions such as excited delirium are seen as likely contributors to death in cases where physical restraints have been applied.

Some other real-world retrospective studies have shown an association between the use of restraints and death in persons suffering from ED^{95 96}. While the authors did not believe the evidence was strong enough to conclude that death was caused by restraint, they recommended that caution be exercised in the use of restraints with these individuals. Reflecting on the body of research that has been conducted on the impact of restraint, Brice et al conclude:

“The cause of in-custody deaths in physical restraints is not completely clear. These deaths could be due to positional asphyxia, severe acidosis, a state of excited delirium or any combination of these factors. It is clear, however, that patients who struggle and require a restraint should therefore be managed as a medical emergency and continuously monitored. Patients in hobble restraints should be positioned on their side, and a chemical restraint should be considered as necessary for further control and to terminate their struggling.”⁹⁷

Police trainers in Nova Scotia do not recommend that officers use the hog-tie unless there is an urgent need or extenuating circumstances; i.e. a subject is struggling violently and cannot be contained by any other means. Officers are instructed to place the subject in a ‘recovery’ position (lying on their side) as soon as possible to avoid prolonged periods in a prone position.⁹⁸

Neck restraints:

In applying the *lateral vascular neck restraint* (LVNR), the officer typically stands behind the subject and encircles the subject’s neck with his/her arm. The throat of the subject rests in the officer’s elbow and pressure is applied equally to either side of the neck, the intention being to gain control over the subject by causing loss of consciousness. Generally compression of the carotid arteries for 10-15 seconds is sufficient to produce loss of consciousness. If the arteries

⁹³ Ball, H.N. *supra*

⁹⁴ Mohr, W.K., Petti, T.A. and Mohr, B.D. (2003) Adverse effects associated with physical restraint. *Canadian Journal of Psychiatry*, 48(5):334.

⁹⁵ Stratton, S.J. et al (2001) Factors associated with sudden death of individuals requiring restraint for excited delirium. *American Journal of Emergency Medicine*, 19, 187-191

⁹⁶ O’Halloran R.L. and Lewman, L.V. (1993) Restraint asphyxiation in excited delirium, *American Journal of Forensic Medical Pathology*, 14, 289-295

⁹⁷ Brice, J.H. et al (2003) Management of the Violent Patient, *Prehospital Emergency Care*, 7(1) 48-55

⁹⁸ Verbal communication with Training Section, Halifax Regional Police

are blocked for two or more minutes, breathing will not usually recommence spontaneously and CPR is required.

The LVNR technique is sometimes confused with the *choke hold* which works by applying pressure (forearm, baton, metal flashlight) across the front of the neck, thus impeding the flow of oxygen to the lungs.

There are two categories of risk associated with neck restraint: 1) the dynamics of a struggle may result in a carotid neck hold becoming a respiratory or choke hold, and 2) certain individuals, because of their physiology, may be predisposed to serious injury/death from the restraint procedure. Sudden or severe pressure on the carotid arteries may, in some individuals, cause the heart to stop beating ('reflex cardiac arrest') People suffering from coronary artery disease and cardiac rhythm disorders may also be vulnerable.

Some researchers have indicated that the restraint poses greater risk to the following groups: men over 40; persons with seizure disorders; mentally disturbed persons; street drug users; and persons taking prescription drugs.⁹⁹ It has been speculated that the 'safe period' for oxygen deprivation is likely shorter for individuals suffering from excited delirium. A medical review of the neck hold literature¹⁰⁰ notes the following factors could shorten the period for which a person could safely be subject to a vascular neck restraint: oxygen debt as a result of running or fighting; increased metabolic rate as a result of physical activity; raised body temperature; shock due to dehydration.

In June 2007 the Canadian Police Research Centre published an overview of the research on vascular neck restraints.¹⁰¹ The study concluded that "while no restraint methodology is completely risk free, there is not medical reason to routinely expect grievous bodily harm or death following the correct application of the vascular neck restraint in the general population by professional police officers with standardized training and technique."

The report did issue some cautions regarding the use of the LVNR: the need for officers to receive training on a regular basis to maintain an appropriate skill level; the advisability of moving a subject from the prone handcuffing position to a side-lying recovery position as soon as possible; and, as well, the need for further research regarding the issue of restraint modality with subjects experiencing ED.¹⁰²

In Canada, most police forces authorize the use of LVNR holds; the differences in policies relate to where its use is placed on the force continuum. Police forces do not authorize the use of choke holds.

⁹⁹ Reay, D.T. and Eisele J.W. (1982) Death from law enforcement neck holds. *American Journal of Forensic Medicine and Pathology*. 3(3):253-258.

¹⁰⁰ Crime and Misconduct Commission (2005) *The Arrest of Samuel Hogan: A CMC Investigation*. Queensland, Australia.

¹⁰¹ Hall, C. and Butler, C. (2007) *National Study on Neck Restraints in Policing* TR-03-2007. Ottawa: Canadian Police Research Centre. p.1

¹⁰² The authors noted that this issue is the subject of the international RESTRAINT study, sponsored by the Canadian Association of Chiefs of Police

Conducted energy devices:

Conducted energy devices (CEDs) are part of a class of weapons that deliver high voltage, low current power into a subject in order to temporarily incapacitate the individual. The devices were first used by Canadian law enforcement agencies in 1999.

The body of research regarding the impact of CEDs has grown steadily in recent years. This research includes studies conducted on animal and human subjects. The majority of the human studies have been conducted on healthy individuals and may not be reflective of the impact of these devices on vulnerable populations; for example, the frail, those suffering from serious mental and physical conditions and those under the influence of alcohol or other substances.

The 2008 report of the National Institute of Justice (NIJ) on deaths following electro muscular disruption concluded, following mortality reviews of CED-related deaths from 2003-2005 in 47 states and the District of Columbia, that:

“Although exposure to CED is not risk free, there is no conclusive medical evidence within the state of current research that indicates a high risk of serious injury or death from the direct effects of CED exposure.”¹⁰³

Some studies have examined the impact of the CED on individuals reported to be suffering from excited delirium (ED). The NIJ study noted that ED that requires subdual carries with it a high risk of death, regardless of the method of subdual. Current human research suggests that the use of the CED is not a life-threatening stressor in cases of ED beyond the generalized stress of the underlying condition. In many cases, high body temperature is the primary mechanism of death and there is no medical evidence that exposure to CED has an effect on body temperature.¹⁰⁴

The NIJ study does note that the current research on the medical risks of extended or repeated CED exposure is insufficient to permit definitive conclusions. Because these risks are unknown, especially in cases of individuals who are in a state of drug intoxication or AHS, the NIJ panel of medical and legal experts urged caution in the use of multiple or extended activations of the CED for this population. The need for such caution (in multiple/extended CED applications) has also been expressed in other reports, such as those by the Canadian Police Research Centre¹⁰⁵, US Department of Defense¹⁰⁶ and Amnesty International.¹⁰⁷

The Commission for Public Complaints Against the RCMP in its review of CEW use by the RCMP concluded that “the CEW has a role in specific situations that require less than lethal alternatives to reduce the risk of injury or death to both the officer and the individual when use of force is required.”¹⁰⁸ The Commission was of the view that the weapon is typically safe when used on healthy populations, but expressed concern that there has not been sufficient research to examine the negative effects CEWs may have on vulnerable populations. The Commission stated that “CEWs are not the preferred option for dealing with individuals experiencing the

¹⁰³ US Dept of Justice. National Institute of Justice. (2008) Study of Deaths following Electro Muscular Disruption: Interim Report. www.ojp.usdoj.gov/nij/pubs-sum/222981.htm. p.3

¹⁰⁴ US Department of Justice . National Institute of Justice. p.3.

¹⁰⁵ Canadian Police Research Centre (2005) *Review of Conducted Energy Devices. Technical Report TR01-2006*

¹⁰⁶ US Department of Defense (?) *Human Effectiveness and risk characterization of the Electromuscular Incapacitation Device.*

¹⁰⁷ Amnesty International (2007) *Canada – inappropriate and excessive use of tasers. AMR 20/002/2007*

¹⁰⁸ Commission for Public Complaints Against the RCMP (2007) *RCMP Use of the Conducted Energy Weapon: Interim Report.* p.2

condition(s) of excited delirium unless the behavior is combative or poses a risk of death or grievous bodily harm to the officer, the individual or the general public...the CEW is not a medical tool for dealing with individuals who appear to be experiencing the condition(s) of excited delirium.”¹⁰⁹

Similar concerns have been expressed by Amnesty International which has been critical of what they consider to be the continued widespread use of CEDs by law enforcement officers despite the lack of independent and comprehensive studies of their use and effects. They note that “while existing studies have found the risk of adverse effects from Tasers generally low in healthy subjects, they have pointed to the need for more understanding of the effects of such devices on vulnerable subjects and those compromised by substance abuse or poor health.”¹¹⁰

Several reports have raised some questions regarding the safety of CEDs with mitigating health conditions. For example, the Defense Scientific Advisory Council on the Medical Implications of Less-Lethal Weapons (DOMILL), in its 2004 statement concluded that

“some frequently abused drugs have the potential to contribute to any cardiac-related morbidity or mortality that may arise in the context of TASER use. Furthermore, it seems reasonable to assume that this conclusion could be generalized to emotionally charged and possibly violent confrontations with law enforcement personnel.”¹¹¹

Conducted energy devices may cause injuries.^{112 113 114} However, much of the research has concluded that the risk of death or serious injury associated with the use of the device is low; typical injuries are minor burns and abrasions that heal within two to three days and do not require hospitalization.¹¹⁵ A recent review of 1201 field applications of the CED in the United States during the period 2005-2008 revealed no or minimal injury (injuries requiring outpatient care or no care) occurred in 99.7 percent of subjects.¹¹⁶

A Canadian study¹¹⁷, analyzing the use of force in a major Canadian city during 2006 and 2007 found that the use of CEDs resulted in fewer injuries to subjects than either physical control (empty hand controls) or the baton, but more than OC spray and VLNR. Overall, 87% of all CED uses resulted in either no or minor injuries. Similar results in a recent U.S. study prompted the researchers to state that “officers and citizens are at greatest risk from injury when they engage in physical struggles, particularly when the suspect is actively or violently resisting arrest, and that CEDs...may reduce the probability of injury”.¹¹⁸

¹⁰⁹ Commission for Public Complaints Against the RCMP (2007) p.4

¹¹⁰ Amnesty International (2007) *Statement to the U.S. Justice Department inquiry into deaths in custody*. AMR 51/151/2007

¹¹¹ Defense Scientific Advisory Council, DOMILL, (2004) Second statement on the medical implications of the use of the M26 Advanced Taser. p.3

¹¹² Seth, R K. et al (2007) Cataract secondary to electrical shock from a Taser gun. *J. Cataract Refract Surg*, 33, 1664-1665

¹¹³ Sloane, C.M., Chan, T.C. and Vilke G.M. (2008) Thoracic spine compression after taser activation. *Journal of Emergency Medicine*, 34(3), 283-285.

¹¹⁴ Winslow, J.E. et al (2007) Thoracic compression fractures as a result of shock from a conducted energy weapon. *Annals of Emergency Medicine*, 50, 584-586.

¹¹⁵ Stuart, B. and Lawrence, C. (2007) *Report on Conducted Energy Weapons and Excited Delirium Syndrome*. RCMP. p.3

¹¹⁶ Bozeman, W. et al (2009) Safety and Injury Profile of Conducted Energy Weapons used by Law Enforcement Officers against Criminal Suspects, *Annals of Emergency Medicine*, 53(4), 480-489

¹¹⁷ Butler, C. and Hall, C. (2008) *Public-police interaction and its relation to arrest and use of force by police and resulting injuries to subjects and officers. TR-03-2009*. Canadian Police Research Centre (DRAFT)

¹¹⁸ Smith, M.R. et al (2007) *The impact of conducted energy devices and other types of force and resistance on officer and suspect injuries*. *Policing*, 30(3):423-446.

It has been noted, however, that “no research that has analyzed the relationship between CEDs and injuries while controlling for the effects of other types of force use by the police. Because many use-of-force encounters involve multiple types of force, it is critical to assess the independent contribution of CEDs to injury outcomes so as to avoid erroneous conclusions about cause and effect.”¹¹⁹

Research modeling the impact of the electrical impulses of the CED on human muscles has shown that they are strong enough to temporarily incapacitate a subject, but not strong enough to cause temporary tissue damage or cellular electroporation.¹²⁰ These electrical impulses have been found to be insufficient to trigger ventricular fibrillation.¹²¹

Studies of the impact of CEDs on animals (primarily pigs) have produced mixed results. Some have shown only transient effects and have concluded that the devices have no serious adverse physiological effects on the animals.^{122 123} Others have concluded that there is some potential for cardiac arrest following prolonged discharges from a CED.¹²⁴ Some scientists have questioned the relevance of the pig studies to the impact of the device on humans.¹²⁵

Laboratory research on human subjects has demonstrated no clinically significant or lasting changes in cardiovascular or metabolic function.¹²⁶ However, these findings have been criticized on the basis that the sample sizes are too small to draw definitive conclusions and that the research has been conducted in laboratories (and thus does not properly reflect real world situations). Furthermore, the majority of studies have been conducted on healthy individuals and may not be reflective of the impact of the devices on vulnerable populations; for example, the frail, those suffering from serious mental and physical health conditions, and those under the influence of alcohol or other substances. Concerns have also been raised that much of this research has been funded by TASER International.

Following a review of the relevant medical literature, the authors of the 2007 report of the RCMP and the Ontario Police College concluded that “despite an ongoing body of independent analysis, no researcher has proven either a causal relationship between a conducted energy weapon (CEW) and in-custody death, or a viable physiologic method for a CEW application facilitating in-custody death.”¹²⁷

¹¹⁹ Smith, M.R. et al (2008) Impact of CEW and other types of force and resistance on officer and suspect injuries. In Kroll and Ho. p.258

¹²⁰ Panescu, D. et al (2006) Finite element modeling of electric field effects of TASER devices on nerve and muscle. Proc. IEEE-EMBS Annual Int'l Conference, 1277-1279.

¹²¹ Statbucker, R. A. et al (2006) Cardiac current density distribution by electrical impulses from TASER devices. Proc. IEEE-EMBS Annual Int'l Conf. 6305-6307.

¹²² For example, Esquivel, A.O. (2007) The physiologic effects of a conducted energy weapon in swine. *Annals of Emergency Medicine*, 50(5), 576-583

¹²³ Jauchem, J.R. et al. (2008) Acidosis, lactate, electrolytes, muscle enzymes and other factors in the blood of *Sus scrofa* following repeated TASER exposures. *Forensic Science International*. 175, 166-170.

¹²⁴ For example, Dennis, A. et al (2007) *Acute effects of TASER X26 discharges in a swine model*. *Journal of Trauma Injury Infection and Critical Care*. 63(3):581-590 and Nanthakumar, K. et al (2006) *Cardiac electrophysiological consequences of neuromuscular incapacitating device discharges*. *Journal of American College of Cardiology*, 48(4):798-804.

¹²⁵ Many of the pig studies have been conducted with electrical discharge directly to the chest cavity or heart; in some studies the current is applied for an extended period (e.g. 40 seconds). These conditions would not apply when CEDs are used by law enforcement officers in real world situations.

¹²⁶ A number of recent human studies are reported in *AcadEmergMed* (2007) 14(5).

¹²⁷ Stuart, B. and Lawrence, C. (2007) *Report on Conducted Energy Weapons and Excited Delirium Syndrome*. RCMP. P.3

Conclusion:

The panel has concerns about the quality of some of the research that has been conducted regarding the impact of restraint mechanisms. To our knowledge, no systematic analysis has been undertaken that applies a critical evaluative methodology to these studies. In the absence of a critical synthesis of available research regarding the individual or combined impact of the various forms of restraint, it is not possible to draw definitive conclusions regarding the safety of these restraint mechanisms (including the conducted energy device) for individuals experiencing AHS.

Appendix 2: Arrangements/protocols between mental health services and law enforcement regarding response to mentally ill persons

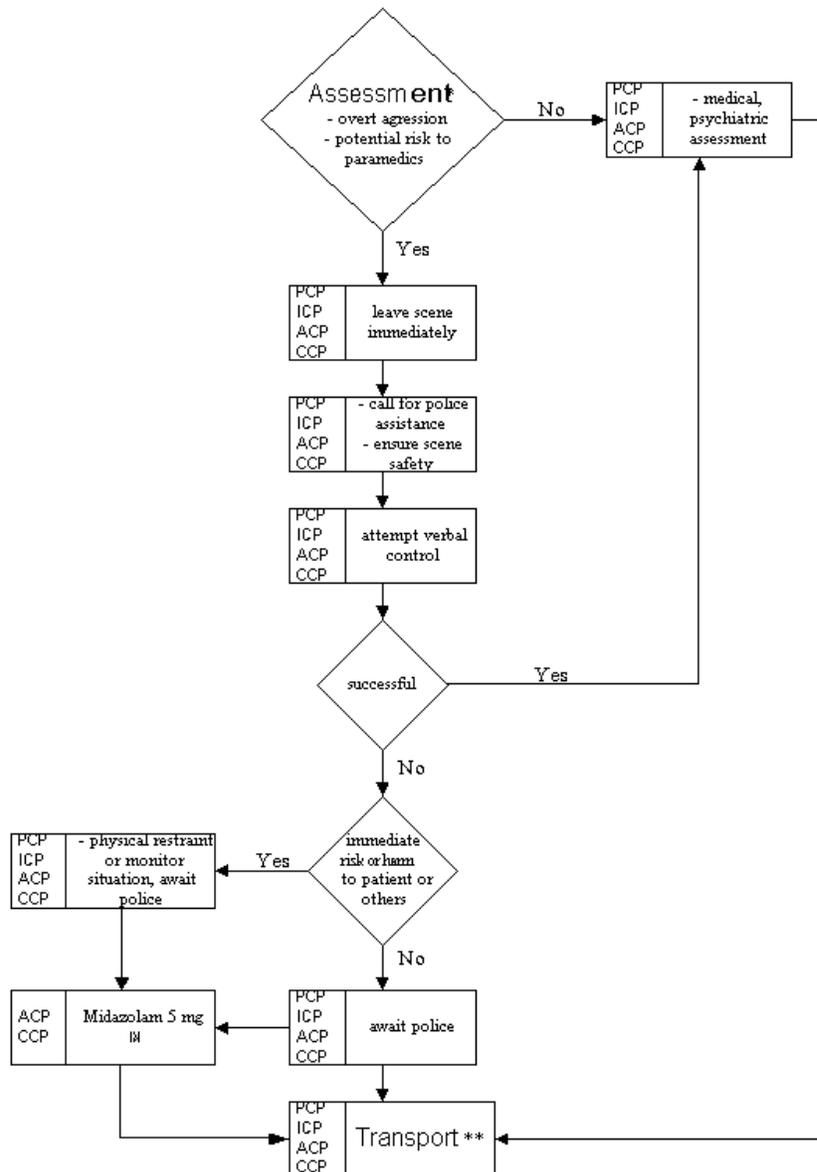
District Health Authority	Protocols/arrangements
1: South Shore	<ul style="list-style-type: none"> • Regular meetings with DHA, municipal police and RCMP • Protocol in place (provide for rapid mental health assessment when police bring individual to ER; allows police to return to duty quickly; police to contact Early Response Service asap to discuss triage in case of mental health crisis)
2: Southwest Nova	<ul style="list-style-type: none"> • Policy and Procedure “Interacting with law enforcement agencies” in place since March 2007 • Mental Health and Addictions program meets on an ad hoc/case-by-case basis with police (RCMP)
3: Annapolis Valley	<ul style="list-style-type: none"> • Police liaison committee composed of DHA, local police, emergency department, EHS, Community Services, Addictions Services
4: Colchester/East Hants	<ul style="list-style-type: none"> • No formal arrangements. • DHA in discussions with local police • Police have met with DHA crisis team • Police have expressed interest in participating in Mental Health First Aid Training, delivered by Dept. of Health
5: Cumberland	<ul style="list-style-type: none"> • No protocols in place • No inpatient unit – receive inpatient services from Colchester (DHA4)
6: Pictou	<ul style="list-style-type: none"> • Police-mental health liaison committee (representatives from municipal forces and RCMP) meets occasionally • Police provide security in ER if needed (e.g. remain with transported individual until person is admitted to hospital)
7: Guysborough Antigonish Strait	<ul style="list-style-type: none"> • Standing committee composed of DHA, ER, EHS and RCMP • Shared protocols; cross-training • Remain with transported individual in ER until person admitted to hospital
8: Cape Breton	<ul style="list-style-type: none"> • Memorandum of Understanding with police • Regular meetings between police and District, particularly Mental Health
9: Capital Health	<ul style="list-style-type: none"> • Capital Health and IWK operate Mobile Mental Health Crisis Service in partnership with Halifax Regional Police, RCMP and EHS • Police attend management meetings of mental health services to discuss and resolve ongoing issues

IWK Hospital	<ul style="list-style-type: none">• Protocol same as Capital Health• 24/7 mental health emergency service
--------------	--

Appendix 3: EHS Protocol for response to violent/agitated persons



Protocol#Violent&agitated	PDN:6278.03	Last Updated: February 9, 2005	Subject#Psychiatric	Page 1
---------------------------	-------------	--------------------------------	---------------------	--------



* be aware of the possibility of hypoglycemia

** whether police accompany you in ambulance or transport patient in their vehicle, this will be made on a case by case basis, either way

Patients receiving Medication must be Transported by Ambulance