APPENDIX THREE

PSNI Operational Use of Taser: Notes for Guidance on Police Use

Operational Guidance Index

APPENDIX THREE

PSNI Operational Use of Taser: Notes for Guidance on Police Use

1 Preface

1.1 Managing conflict and responding to violence are core police functions. Police action is underpinned by respect for human rights. The right to life is a fundamental human right, and the availability of Taser, with appropriate safeguards, can facilitate the PSNI in complying with its obligations in this respect.

1.2 This guidance is intended to inform the operational use of Taser. The use referred to in this document, during the pilot, will be by specialist police firearms officers and will be subject to continued monitoring and regular review.

1.3 The use of the Taser will be informed by reference to the ACPO Conflict Management Model, and is intended to provide Firearms Officers with an additional option when dealing with threats of serious violence. **The availability or deployment of the Taser should not be considered as a replacement for conventional firearms where the criteria for the issue of firearms is met**.

1.4 Authorised Firearms Officers are, in accordance with the ACPO Manual of Guidance on Police Use of Firearms, issued with firearms – *where the authorising officer has reason to suppose that they, in the course of their duty, may have to protect themselves or others from a person who is*

- in possession of a firearm, or
- has immediate access to a firearm, or
- is otherwise so dangerous that the officer's use of a firearm may be necessary

1.5 The issue and deployment of the Taser will conform to the well-established guidance already laid down in the ACPO Manual of Guidance on Police Use of Firearms (the Manual). The following issues are therefore relevant:

- Taser will be deployed at the direction of a Conflict Management trained supervisor and the Taser officer will be subject to their usual line management.

- The authorisation to deploy firearms will include the full range of conventional firearms and personal safety tactical options available to those officers.

- The post incident procedures set out in the Manual are specific to the use of conventional weapons.

- In situations where conventional firearms are not discharged, appropriate post incident procedures following the use of the Taser will be implemented depending on the nature of the injury or harm occasioned.

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- The test for the use of Taser is to be as follows: The use of Taser will be justified where the officer honestly and reasonably believes that it is necessary in order to prevent a risk of death or serious injury.

1.6 This guidance will be subject to regular review.

2 Introduction

2.1 The purpose of this guidance is to inform and support decision making in relation to training, deployment and use of the Taser. It is designed to give clear and precise instructions to police officers in order to ensure that its use by PSNI complies with all of our legal obligations.

2.2 The PSNI has decided to conduct a pilot of the use of Taser, in the circumstances set out in this guidance, due to an honestly held belief that it can reduce the likelihood of recourse to lethal force. This belief is based on the available evidence, including the experience of use of Taser by other police services throughout the United Kingdom, where it has facilitated the use of the minimum degree of force possible, and reduced recourse to lethal force by police officers.

2.3 The risk of life-threatening or serious injury resulting from the use of Taser has been assessed as "very low".[1] In view of the research carried out into its use and the effects on persons, it cannot sensibly be considered to be the equivalent of conventional firearms, which are known to involve a very high risk of death. However, there are concerns that Taser can have a heightened likelihood of such injuries if used in relation to certain categories of persons. This is dealt with in more detail below. In the absence of definitive medical evidence that it does not cause death, Taser is assessed as being potentially lethal equipment. This stands in stark contrast to firearms, which are classed as lethal.

2.4 The results of the pilot will inform the decision as to whether, and if so, under what circumstances, the PSNI will adopt Taser on a permanent basis.

2.5 The intention is to provide Chief Officers, operational commanders and firearms officers with written guidance on the use of the equipment.

2.6 Detailed instructions on the characteristics, operation and use of the Taser will be covered in the training and documentation provided to officers to be accredited in its use.

3 Description of equipment

3.1 The Taser is a single shot weapon designed to temporarily incapacitate a subject through the use of an electrical current, which temporarily interferes with the body's neuromuscular system. It is a potentially lethal weapon and may, in certain circumstances, provide the police with an alternative to lethal force. Accordingly, it can assist the police in complying with legal and human rights obligations, which require that any force used be kept to a minimum.

[1] DOMILL statement of December 2002 concerning M26 Taser.

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3.2 The Taser is laser-sighted and uses cartridges attached to the end of the cartridge bay. The cartridges project a pair of barbs or darts attached to insulated wires. The maximum range of the device is currently 21 feet (6.4 metres); this being the length of the wires that carry the current and attach the barbs to the weapon. It may also be used in a direct contact stun mode.

3.3 The device delivers a sequence of very high voltage pulses of very short duration through the wires.

3.4 The normal reaction of a person exposed to the discharge of the Taser is the loss of some voluntary muscle control resulting in the subject falling to the ground or 'freezing' on the spot. The device relies on physiological effects other than pain alone to achieve its objective, although pain is the main factor when it is used in 'drive stun' mode.

4 Modes of operation

4.1 The Taser may be operated with or without the cartridge that fires the wires and contact barbs. The electric charge can therefore be delivered to a subject either by:

- means of two barbs, attached to the weapon by fine insulated wires, fired into the subject or their clothing, or

- direct contact with the device in 'drive stun' mode. This method of delivery can be achieved with either no cartridge fitted or when a discharged cartridge is still attached.

4.2 To be effective, the Taser power source must be sufficiently charged, the wires connecting the barbs to the Taser must be unbroken and both darts (or in 'drive stun' mode both electrodes) much attach to the subject's body or clothing.

5 Effects of the Taser

5.1 In either mode the Taser delivers its electrical charge in a five-second cycle (which can be broken or repeated), but once the cycle ends or is broken, the direct incapacitation effect ceases.

5.2 In most cases this application will be sufficient to render a subject incapable of continuing an attack or other conduct which justified the use of Taser and is likely to result in the subject collapsing to the ground. The effect is not intended nor is it likely to render the subject into a state of unconsciousness.

5.3 Provided both barbs attach correctly, with sufficient spread, the effects are likely to be instantaneous. It should, however, be remembered that no incapacitating device, including firearms capable of discharging conventional ammunition, is universally effective and there may be individuals on whom the Taser may not be effective at all or only partially so.

5.4 The direct incapacitating effect is only likely to last for as long as the electrical charge is being delivered. The subject may recover immediately afterwards and could continue with their previous behaviour. It is therefore important that an incapacitated subject is approached and restrained quickly and effectively.

5.5 Whilst the 5-second cycle electrical charge can be repeated if the incapacitation effect does not occur, there may be technical or physiological reasons why the device is not working as expected on a particular individual. It should be noted that medical evidence (see Appendix 'B') indicates that repeated application of electrical charges to a person can increase the likelihood of serious medical consequences resulting. Consequently, repeated applications should be avoided if possible.

5.6 **Medical evidence indicates that certain categories of persons may be at heightened risk from negative health effects resulting from Taser. While there is no definitive list of such categories, pregnant women, juveniles and children, persons of low body weight, persons under the influence of certain illegal drugs (including amphetamines and cocaine), persons suffering from mental illness and persons with pre-existing heart conditions are generally considered to be more vulnerable to serious medical consequences as a result of Taser use. Current guidance relating to Taser states that:** "until more research is undertaken to clarify the vulnerability of children to Taser currents, children and persons of small stature should be considered at possible greater risk than adults and this should be stated in the Guidance and training modules."[2]

[2] DSTL/BSC/27/01/07 dated 30 May 2007 **DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL).**

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5.7 In addition to the guidance provided at paragraph 5.6 above, an Equality Impact Assessment (EQIA) carried out by the PSNI has highlighted the potential for adverse or differential impact on the following groups.

- Children and Young People
- Women and Pregnant Women
- Men
- People from Minority Ethnic Groups
- People with Disabilities

5.8 In order to minimise the potential for any adverse of differential impacts on the above-mentioned groups, the following guidance will be adhered to. (See also paragraph 9 – Training)

5.9 **Children and Young Persons –** The Bronze Firearms Commander will make a dynamic risk assessment at the scene on the use of Taser if the subject appears to be a child, and will ensure that the reason for the use of Taser involving a child is clearly documented.

5.10 **Women -** The Bronze Firearms Commander will make a dynamic risk assessment at the scene on the use of Taser if the subject appears to be a woman, and will ensure that the reason for the use of Taser involving a woman is clearly documented.

5.11 **Pregnant Women –** The Bronze Firearms Commander should dynamically risk assess the requirement to use Taser on a woman whom they know or have reasonable cause to believe is pregnant, taking into account the unique circumstances of each incident.

5.12 **Men –** Officers will receive training which will include information on the DOMILL statement DSTL/BSC/27/01/07 on the implications of the use of Taser on persons of smaller stature.

5.13 **People from Minority Ethnic Groups -** Officers should receive training specifically on the impact of Taser on persons who may have different needs and/or expectations due to their ethnicity. (This should include young persons from minority ethnic groups); AND if it is identified that a subject cannot or would not be able to understand instructions from police due to a language barrier, then where possible the services of an interpreter via radio or mobile telephone should be considered.

5.14 **People with Mental Health or Neurological Conditions -** Officers should be trained in dealing with persons who have mental health problems or neurological conditions, including where possible provision of training from an independent outside organisation.

5.15 **People who are wearing Pace-Makers or who have heart problems -** Firearms teams who are deployed with availability of Taser should have at least one officer who is trained to an appropriately high level in dealing with persons with such a medical condition and appropriate medical equipment should be available to that officer commensurate with the high level of

training. This level of training will be directed by the Chief Medical Adviser Occupational Health and Welfare.

5.16 **People with Epilepsy -** Firearms teams who are deployed with availability of Taser should have at least one officer who is trained to an appropriately high level in dealing with persons with such a medical condition and appropriate medical equipment should be available to that officer commensurate with the high level of training. This level of training will be directed by the Chief Medical Adviser Occupational Health and Welfare.

5.17 **People with a Hearing Loss -** Officers should be trained in dealing with persons who have hearing loss including where possible professional training from an independent outside organisation.

5.18 All Taser uses will be subject to thorough review and additional mitigating actions for all groups will be applied if identified. Anyone subjected to Taser discharge should be examined by a medical practitioner at the earliest practical opportunity and agreed protocols with the Police Ombudsman adhered to.

6 Issue/Possession

6.1 The Taser will only be issued to specialist firearms officers who have successfully completed approved ACPO sponsored training in the use of the device. The authority for the issue of Taser will therefore be in line with PSNI procedures for the issue of conventional firearms and other less lethal weapons.

6.2 Electrical Incapacitation Devices are classified as 'prohibited weapons' by virtue of Art. 45 Firearms (NI) Order 2004. Police officers whilst acting in their capacity as such, are exempt from the requirements of the legislation and do not need any additional legal authority to possess the Taser.

6.3 The Taser should not be regarded as a replacement for other issued "work equipment'', or for firearms capable of discharging conventional ammunition, but rather one of a number of personal safety tactical options. An officer may also need to resort to another option if the device does not have the effect intended or if s/he does not consider that it is the most appropriate course of action in the circumstances.

6.4 In circumstances where specialist firearms officers have been deployed to a situation, the authorisation to utilise their firearm will also include the authority to use any other less lethal option or technology with which they have been issued including, where appropriate, the Taser.

6.5 It would be inappropriate for commanders or supervisory officers to attempt to restrict the deployment of a specialist firearms officer to a particular less lethal technology or personal safety tactical option.

6.6 The limited range and single shot capability of the Taser are constraining factors.

6.7 The Taser normally causes immediate incapacitation and its effect may also cause muscles to contract. This may result in immediate and involuntary clenching of the fingers and/or the arms rising uncontrollably. This potential reaction requires to be factored into any decision to utilise the Taser against a subject actually holding what is believed to be a firearm, as the application of the Taser may cause the subject to unintentionally and indiscriminately discharge the firearm. Additionally, it has been shown that it is possible, in certain circumstances, for some individuals to maintain enough control to aim and fire a weapon while under the effects of Taser.

6.8 However, if the weapon is merely close to hand the Taser may be useful in preventing the subject gaining access to the weapon.

7 Possession outside Force area

7.1 Firearms officers are on occasions deployed outside of their immediate Force area. Chief Officers will agree a protocol with relevant Forces (Appendix A) that enables officers equipped with the Taser to utilise the device should they be required to respond in another Force area. Individual Chief Officers will remain vicariously liable in civil law for their own officers' actions. Guidance for the use of the Taser, whether within or outside the Force area, is set out below.

8 Specific Risk Factors

8.1 The most recent DOMILL statement reference DSTL/BSC/27/01/07 dated 30 May 2007 identifies that children and adults of smaller stature as being at potentially greater risk from the cardiac effects of Taser currents than normal adults of average or large stature. DOMILL recommends that officers should be particularly vigilant for any Taser-induced adverse responses in this subset of the population.

8.2 Occasions will arise where it is necessary to use the Taser on a person who is exhibiting violent behaviour and who is also suffering from a mental disorder or illness. Where it is possible to discuss options with mental health professionals, this should be considered.

8.3 In pre-planned joint activities such discussions could form part of any briefing for the event. Consultation with friends, relatives etc. who are likely to know the person well may also assist in deciding on the most appropriate use of force response. Consultation with Health Authorities and Social Services in this respect will form part of the implementation plan. Such consultation should be sought, if this is feasible in the circumstances. (See independent medical statements at Appendix 'B'). The final decision to use the Taser in these circumstances will rest with the officer concerned.

8.4 Similarly where it becomes apparent that the subject has an existing medical condition or is under the influence of drugs, assessment of these additional risk factors should be made in determining the appropriate option.

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8.5 Research by HOSDB has demonstrated that there is a risk of flammability if someone has already been sprayed with an incapacitant containing a flammable solvent, this is the case with CS Spray and PAVA. Clearly, there is also a risk of flammability where the subjects' clothing is doused with other flammable liquids. These might include, but are not limited to, lighter fuel, petrol and strong alcoholic spirits.

8.6 This heightened risk must be factored in when assessing the 'appropriateness' and 'necessity' of using a Taser. It is however recognised that there are circumstances where the only alternative may be the use of a potentially lethal firearm capable of discharging conventional ammunition, or where the officer honestly and reasonably believes that the activation of the Taser irrespective of the additional risk is necessary in order to prevent a risk of death or serious injury.

8.7 Further risk has been identified from use of Taser in proximity to a number of explosive formulations, which are sensitive to electrical discharge. One such group is the 'organic peroxide explosives' such as HMTD and TATP. Items that produce an electrical discharge (such as Taser) will set off peroxide explosives and other sensitive explosives. Other explosive materials may also be sensitive to electrical discharge, depending on how the material is packaged, its age, storage conditions and other factors. The heightened risk, in relation to subjects who may be holding or in close proximity to an improvised explosive device, must also be factored in when assessing the 'appropriateness' and 'necessity' of using a Taser. The potential threat of the subject being able to initiate the improvised explosive device, should the use of the Taser be ineffective, must also be taken into account.

8.8 The Taser should not be utilised in an environment where, due to the presence of a flammable substance in the atmosphere or escaping gas, its use is likely to result in an even more hazardous situation.

8.9 The normal reaction of a person exposed to the discharge of a Taser is the loss of some voluntary muscle control resulting in the subject falling to the ground or 'freezing' on the spot. For this reason there is clearly a possibility of some secondary injury to the tasered subject, caused by falling and striking a hard surface. Particular attention should therefore be paid to the immediate environment and to assessing any additional risk factors. This issue will be particularly relevant where the subject is located at some height above the ground where there is increased risk from a fall.

8.10 Repeated, prolonged and/or continuous exposure to the Taser electrical discharge may cause strong muscle contractions that may impair breathing and respiration, particularly when the probes are placed across the chest or diaphragm. Users should avoid prolonged, extended, uninterrupted discharges or extensive multiple discharges whenever practicable in order to minimise the potential for over-exertion of the subject or potential impairment of full ability to breathe over a prolonged time period.

8.11 There is a specific risk of injury to the eye through penetration of a barb. Barb penetration in the neck or head may also increase the level of injury. For this reason the Taser should not be aimed

so as to strike the head or neck of a subject unless this is wholly unavoidable. The laser sight should not intentionally be aimed at the eyes of the subject.

8.12 The Taser X26 emits 19 very short pulses every second. The power of 19 pulses per second equates to approximately 7 watts. Dual or multiple discharges of Taser will result in a double or multiple level of pulses per second and corresponding increases in power (7 watts per Taser) applied to the subject of the Taser.

9 Training

9.1 The aims and objectives of training in the use of the Taser are contained in the Taser Training Modules.

9.2 Tactical training in the use of the Taser should emphasise precautions in relation to the specific risk factors contained in this guidance and will include information on the DOMILL statement DSTL/BSC/27/01/07 on the implications of the use of Taser on persons of smaller stature.

9.3 Training will also be provided as outlined in paragraphs 5.9 – 5.17 in order to minimise the potential for any adverse of differential impacts on the groups identified.

9.4 Specialist Firearms Officers are trained in conflict management and must be aware of the dangers associated with the conditions known as 'positional asphyxia' and 'acute behavioural disorder'. PSNI Service Procedure 59/07 Positional Asphyxia / Excited Delirium refers.

9.5 It is important that officers have an appreciation of the physical and psychological effects of conducted energy devices.

10 Legal Basis

10.1 A use of Taser against a person constitutes a use of force. As such, it is regulated by the law. Taser is generally considered to be a potentially lethal weapon. This means that it is less likely to cause death than conventional firearms. Police officers must receive clear and precise instructions as to when and in what circumstances they are entitled to use force. This is in order to allow members of the public assess with some degree of certainty the likely consequences of their actions. It also serves to facilitate accountability and to enable police officers to know their rights and responsibilities in the discharge of their onerous functions.

10.2 The police use of force is governed by:

- Section 3 Criminal Law Act (Northern Ireland) 1967
- Common Law
- Article 88 Police and Criminal Evidence (Northern Ireland) Order 1989
- The Human Rights Act 1998
- The PSNI Code of Ethics

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10.3 Policy Directive 12/08 Police Use of Firearms sets out in detail the legal position regarding the use of firearms in general and reference should be made to this policy directive as appropriate. This Guidance sets out the legal position regarding the use of Taser. The test for Taser is as follows:

"The use of Taser will be justified where the officer honestly and reasonably believes that it is necessary in order to prevent a risk of death or serious injury."

10.4 This test is set at a slightly lower threshold than that for the use of lethal force, which requires an honest belief that such use is absolutely necessary to prevent death or serious injury. It is intended to cover a situation where an officer honestly believes that a situation is in immediate danger of escalating to a point where the use of lethal force will be required.[3] Taser must never be used to punish or inflict pain upon a person. It must never be used to ensure compliance with a police instruction, except where justified under the test set out above. For example, Taser should not be used against an uncooperative person whose conduct is not such that it would render the use of Taser immediately necessary to prevent or reduce the need to use lethal force. The improper use of Taser could potentially result in death, in violation of Article 2 of the European Convention on Human Rights, incorporated into United Kingdom law by the Human Rights Act 1998, and may result in a finding that a person has been subjected to torture or inhuman and degrading treatment or punishment, prohibited by Article 3 of the European Convention on Human Rights. This could lead to criminal consequences for the officer concerned and/or the PSNI.

10.5 Article 2 of the UN Basic Principles on the use of Force and Firearms states 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 and firearms.' This principle is reinforced by the decision of the European Court of Human Rights in the case of *Simsek v. Turkey* (judgment of 26 July 2005), where it was held that it is was unacceptable that a police service was not equipped with a range of alternatives to conventional firearms, as this increased the likelihood of recourse to lethal force. Consequently, the use of Taser in accordance with this guidance and with training provided to officers can assist the PSNI in protecting life by reducing recourse to lethal force.

10.6 Cognisance should also be taken of the United Nations Convention on the Rights of the Child, Article 3 of which requires the best interests of children to be a primary consideration in all actions concerning children.

10.7 Whilst the use of Taser represents an option, which is a less lethal alternative to conventional firearms, every effort should be made to ensure that children or members of other vulnerable groups are not placed at risk by its use.

[3] It is recognised that this test is novel in that it predicates the use of Taser upon a potential or actual justification for the use of firearms. In effect, an officer must consider whether s/he is imminently likely to be forced to use lethal force and assess the lawfulness of any use of Taser by reference to this. The views of officers during the pilot as to whether this is workable in practice are sought.

10.8 The level of belief required by a police officer for the use of Taser is an honest belief. A belief can be honest, even if it is subsequently shown to have been incorrect for some reason.

10.9 Article 4 of the PSNI Code of Ethics incorporates applicable national and international standards. It states (amongst other things):

- police officers responsible for the planning and control of operations where the use of force is a possibility shall so far as possible plan and control them to minimise recourse to the use of force, in particular, potentially lethal force (which includes Taser)

- police officers who are required to resort to the use of force to exercise restraint, must act in proportion to the seriousness of the offence, minimise injury, respect and preserve human life and ensure that assistance and medical aid are secured to any injured person at the earliest opportunity.

10.10 Medical evidence indicates that certain categories of person may be at heightened risk of injury from the use of Taser. These groups are detailed at paragraph 5.6 above. Officers planning operations where Taser may be available to Specialist Firearms Officers as an option must take into consideration the issue of whether a person against whom they are considering the use of Taser is, or may be, a member of one or more of such groups.

10.11 It should be borne in mind that PSNI is currently piloting Taser. This provides the organisation with an opportunity to assess whether this guidance is appropriate. In order to benefit fully from the experience gained during the pilot, it is important that the Taser Deployment Form, TAS.1 (at Appendix H) is completed in as much detail as possible.

11 Use

11.1 Use of the Taser is one of a number of tactical options available to an officer who is faced with violence or the threat of violence, which may escalate to the point where the use of lethal force would be justified. Its purpose is to temporarily incapacitate an individual in order to control and neutralise the threat that they pose. It must not be used to inflict severe pain or suffering on another in the performance or purported performance of official duties. To do so would constitute a violation of the criminal law for example, the offence of torture created by s. 134(1) of the Criminal Justice Act 1988 s.134) and may also expose the officer concerned and the PSNI to civil and disciplinary liability.

11.2 The duration of the initial discharge and any subsequent discharge must be in accordance with the test set out at paragraph 10.3 above. It must be done solely for a lawful purpose. The decision to use the Taser is an individual one for which the officer will be accountable. The Conflict Management Model should assist officers in making such judgements. The decision as to any use of force is one that must be taken in accordance with the circumstances of the incident concerned, the law, relevant procedures and guidance, training and the professional judgment of the officer concerned. No improper considerations may be taken into account.

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11.3 Officers will carry out appropriate functions checks in accordance with their training whenever the weapon is issued.

11.4 When the Taser is discharged at a subject, a separation of the two barbs greater than 8" (200mm) is desirable in order to provide maximum incapacitation. This separation is achieved at a range of 5 feet (1.5 metres). The separation of the barbs increases with range. It is also important that the barbs penetrate the subjects' skin or at least attach onto their clothing, otherwise the circuit cannot be completed.

11.5 The Taser is sighted so that the top barb will strike in the area of the projected laser sight. It is acknowledged that there will be diminished accuracy and a fall off in trajectory at ranges in excess of 15 feet (4.6 metres). Ordinarily the Taser should be aimed to strike the body mass below the neck. Because of the specific risks previously highlighted (para 8.11) the Taser should not be aimed so as to strike the head or neck of a subject unless this is wholly unavoidable. The laser sight should not intentionally be aimed at the eyes of the subject.

11.6 In stun mode the Taser should be pressed directly to the subjects body. Stun mode should not be used unless specific circumstances require it. Unless absolutely necessary in order to protect life the Taser should not, due to increased risk factors, be applied directly to the subjects' neck or head.

11.7 The risk of an officer receiving an electric shock whilst handling a subject who is being Tasered is low provided that the officer does not place any part of their body directly between the points of contact of the barbs on the subjects' body.

11.8 The term 'use of the Taser' will include any of the following actions carried out in an operational setting:

1 Drawing of a device in circumstances where any person perceives the action as a use of force or threat of a use of force, whether or not this is accompanied by a verbal warning, sparking of the device or placing of the laser sight red dot onto a subject

2 Firing of a device so that the barbs are discharged at a subject

3 Application and discharge of a device in 'drive stun' mode to a subject

11.9 An evaluation form TAS.1 (See Appendix 'H') is to be completed for every operation where Taser is used and forwarded to the ACPO Police Use of Firearms Secretariat.

11.10 The Taser Liaison Officer should receive all PSNI Taser Deployment forms (TAS.1) prior to them being submitted centrally for evaluation. This individual will then be the conduit between the PSNI and the representative from the relevant ACPO Police Secretariat in terms of clarifying any information on the form.

12 **Oral and Visual warnings**

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12.1 Where circumstances permit, officers should give a clear warning of their intent to use the Taser, giving sufficient time for the warnings to be observed, unless to do so would unduly place any person at risk, or would be clearly inappropriate or pointless in the circumstances of the incident.

12.2 It may in certain circumstances be appropriate to provide a visual display of the sparking effect of the unloaded Taser in order to induce compliance, thus avoiding the need to actually discharge the Taser at the subject.

12.3 The visual effect of the laser sight being directed at an individual may also have a deterrent effect. Officers should be aware that the pointing of a Taser at an individual represents a use of force and may in certain circumstances constitute an assault.

12.4 Police officers shall give the clear verbal warning 'Taser, Taser' indicating to all persons in the vicinity that Taser is being discharged.

13 **Aftercare**

13.1 Recovery from the direct effects of the Taser should be almost instantaneous, once the current has been turned off. After application of the Taser and once the subject has been properly restrained it is important that the officer provides verbal reassurance as to the temporary effects of the Taser and instructs the subject to breathe normally. This will aid recovery and mitigate against hyperventilation.

13.2 Article 4.3(c) of the PSNI Code of Ethics states that whenever it is necessary for a police officer to resort to the use of force or firearms they ensure that assistance and medical aid are secured to any inured person at the earliest possible opportunity.

13.3 The barbs are designed to penetrate either the clothing or the skin. Injuries caused by Taser barbs penetrating the skin are normally minor. Ordinarily, the copper wire attached to the barbs should be broken or cut close to the barbs so as to avoid trailing wires. When doing this particular care must be taken to avoid pulling on the wires with the barbs still attached to the skin.

13.4 Unless there is an operational necessity no attempt should be made by officers to remove the barbs which have penetrated the skin. This should only be done by a medical professional either at the scene, at a hospital or in the custody suite. This is principally because of the requirement for infection control, the potential for additional trauma to the skin and superficial tissues of the subject, and risk of self injury. Needles/barbs in particularly vulnerable areas, such as the eyes, should always be removed by medical staff only. In the event of there being an operational necessity, only officers trained in barb removal and the risks should carry out this procedure.

13.5 However, officers also have a duty of care in relation to the well-being of individuals under their control. Where it is evident that the barbs are attached to clothing (with no penetration of the skin) they may be removed by gently pulling on the barbs. Care should be taken not to unnecessarily further damage the clothing.

13.6 Once the barbs are removed, they must be secured as evidence and any injury or damage noted. Barbs removed from the body should be considered as biohazards. It is important that suitable evidential containers are readily available. Once removed the barbs must be examined to ensure that they are complete.

13.7 Where officers are informed or come to believe that a person to whom the taser had been applied has a cardiac pacemaker or other implanted device in place, immediate referral should be made to a hospital. Similarly, if the subject is found to have any other pre-existing medical condition that might lead to increased medical risk immediate referral to a hospital should be considered.

13.8 All arrested persons who have been subjected to the discharge of a Taser, must be examined by a Forensic Medical Officer (FMO) as soon as practicable.

13.9 Close monitoring of a subject throughout the period following application of the Taser is of utmost importance. If the person is detained in a cell they should be subject to the same cell supervision provided for persons who have consumed alcohol or drugs. If there are any signs of adverse or unusual reactions then medical attention should be provided immediately and if necessary this must be given precedence over conveying the subject to the police station.

13.10 Experience from the use of Tasers in other countries, which is supported by medical assessment in the UK, has shown that the persons most likely to be at greatest risk from any harmful effects of the Taser device are those also suffering from the effects of drugs or who have been struggling violently. There are cases where such persons exposed to the effects of Taser have died some time after being exposed although the cause is unlikely to have been Taser itself. For this reason, such persons should be very closely monitored following exposure to the effects of the Taser. In addition, and as highlighted in other guidance, if there is any suspicion at all that the violent behaviour of any subject is being caused by acute behavioural disorder; they should be treated as a medical emergency and conveyed directly to hospital.

13.11 At the earliest opportunity following arrival at the custody suite, any person who has been subjected to a Taser discharge should be given an information leaflet describing the Taser, its mode of operation and effects (See Appendix ‘C’). This should be fully explained and recorded on the custody record.

14 Post Incident Procedures

14.1 Chapter 6 of the ACPO Manual of Guidance on Police Use of Firearms sets out guidance to be followed where conventional police firearms are discharged. The principles of chapter 6 will be extended to take account of situations where Taser has been used in other conflict management situations. Further guidance in relation to post incident procedures can be found in PSNI Policy

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14.2 Directive 03/06 – Post Incident Procedures, Deployment of Post Incident Managers – Discharge of Firearms.

14.3 In situations where the Taser is discharged, appropriate post incident procedures will be implemented depending on the nature of the injury or harm occasioned. An investigation will be undertaken by an Initial Investigating Officer.

14.4 The police use of Taser will be referred to the Police Ombudsman (PONI) under the following circumstances.

14.5 All instances mentioned under paragraph 11.8 point 1 should be notified to the PONI on-call SIO. The notification should include the PSNI Command and Control reference number and the serial number of the Taser. PONI will record these details for collation purposes only. No further investigation will take place unless a complaint has been made or is subsequently received.

14.6 The PONI on-call SIO will attend to investigate all instances referred to at points 2 and 3 of paragraph 11.8.

14.7 The Police Ombudsman will retain a Taser for the following periods and reasons: -

1. Temporary, until the download of information, pertaining to the Tasers use as outlined below has been completed.
2. Temporary, until PONI has initially established the basic facts of what has taken place. (The facts provided should be restricted to a brief outline of the incident. These details can be gleaned in consultation with the PIM as outlined in PSNI Policy Directive 03/06 Post Incident Procedure Deployment of Post Incident Managers – Discharge of Firearms).
3. Retained where the Taser did not deliver the intended electrical charge.

Once 1 and 2 above have been complied with PONI should return the Taser.

14.7 In the event of the Taser being used operationally, only those members, who have been trained in the download procedure, will carry out any requests by PONI to download information pertaining to its use. No other persons are permitted to do this.

14.8 Prior to the authorised officer fulfilling the Police Ombudsman's request for a download of information, they will perform an integrity test on another Taser, not involved in any incident under investigation, in order to test systems and procedures before complying with the Police Ombudsman's request.

14.9 This does not preclude referring discharges in other circumstances if considered appropriate. This might include, for example, where Tasers are used outside policy guidelines.

14.10 In the event of an unintentional discharge where there has been no danger to the public, this will be subject to an internal investigation.

14.11 In addition to the data logging system when a Taser cartridge is discharged' a number of identification (AFID) tags are expelled. These contain information which identifies the specific cartridge fired and therefore facilitates any investigation. This provides an additional means of auditing the weapon.

14.12 Following an operational discharge the data should be downloaded as soon as possible. This procedure should be undertaken by a suitably qualified officer, as directed by the Initial Investigation Officer.

14.13 The data record, cartridge, AFID tags and barbs will be secured and retained as evidence. With the approval of the investigating officer the Taser may be returned to operational use.

14.14 The welfare of principal officers must be considered when undertaking any investigation following a critical incident even where little or no injury has been caused.

15 Battery Maintenance

15.1 Function checks of the X26 should include checking the battery percentage left on the device. Battery (Digital Power Magazine - DPM) should be removed from operational use at 10%.

16 Dataport Auditing

16.1 An internal data logging system within the X26 Taser records the details the previous 1500 activations. This shows the exact time and date that the current was discharged. The length of the discharge, temperature and battery condition is also shown on the X26. Details of activations can be downloaded via the dataport on to a computer.

16.2 Taser data should be downloaded on a monthly basis. This information will be retained to provide an audit trail of the activation of each Taser.

17 Storage and Health and Safety

17.1 Health and Safety Legislation, in particular the Health and Safety at Work (Northern Ireland) Order 1978 and the Management of the Health and Safety at Work Regulations (Northern Ireland) 2000, and the legislation that extends this to the Police Service, the Police (Health and Safety) (Northern Ireland) Order 1997 and Police (Health and Safety) Regulations (Northern Ireland) 2000 puts an onus on the employer (The PSNI) to carry out risk assessments and develop safe systems of work as part of an overall process to manage Health and Safety, both for the staff and members of the public, where a duty of care is owed.

17.2 A generic risk assessment covering the use of the Taser is attached at Appendix 'D'. This should be considered a base document that can be expanded on to reflect the circumstances in which Taser is to be used. Subjects that need to be considered for a specific risk assessment are likely to include storage and carriage arrangements and if there are any implications, with, for

instance, existing equipment (e.g. Body Armour) and vehicles that the introduction of the Taser may affect.

17.3 One specific risk worth drawing attention to here is that electrical devices should not be stored alongside pyrotechnics, ammunition, specialist munitions or flammable products. However, this does not refer to when Taser is being carried in a police vehicle.

17.4 In addition, the manufacturer's guidelines for storage of the Taser should be considered.

17.5 A comprehensive list of Health and Safety legislation that should be considered in developing safe systems of work is provided at Appendix 'E'.

APPENDIX THREE

PSNI Operational Use of Taser: Notes for Guidance on Police Use

Appendix A

Association of Chief Police Officers – Operational Deployment of Taser

Cross Border Protocols

The current situation across the UK is that there are a number of Forces which have equipped officers with the Taser.

On borders of Forces, it is not uncommon for armed officers to cross boundaries when operationally necessary.

With the likelihood of mutual aid between Forces a cross border protocol is required in the deployment of the Taser.

It is clear that the Chief Constable of each Constabulary has a duty of care to their officers regardless of whether they are operating within their own Force boundaries or in adjacent Force areas.

In order to achieve a unified approach to this issue, the following draft protocol is proposed:

"It is agreed that the Chief Constable of a Constabulary has a duty of care to their officers, regardless of whether they are operating within their own or other force areas. It is agreed, therefore, that Forces will allow the carriage and operational use of the Taser, as per national guidance in line with the Conflict Management Model"

ACPO Conflict Management, September 2002

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Appendix B

DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL)

Second statement on the medical implications of the use of the

M26 Advanced Taser (March 2004)

Background

1. The role of the DSAC[4] Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL) is to provide the Secretary of State for the Home Department and the Secretary of State for Northern Ireland with:

   a. Advice on the medical implications of generic classes of less-lethal weapon systems (which includes biophysical, pathological and clinical aspects);

   b. Independent statements on the medical implications of use of specific less-lethal systems, when used according to the formal guidance provided to users;

   c. Advice on the risk of injury from identified less-lethal systems striking specific areas of the body, in a format that would assist users in making tactical decisions, and developing guidance to users to minimise the risk of injury.

2. On 30 Jan 03, the Home Secretary gave authority to proceed with an operational trial of the M26 Taser as a less-lethal option in incidents at which authority to use firearms had been granted. The M26 Taser would be used by police officers already trained in the use of firearms. The operational trial commenced on 21 Apr 03 for a duration of 12 months. Five police forces are taking part in the trial, employing a joint policy, operational guidance and training strategy developed by the Association of Chief Police Officers (ACPO). The police forces funded an independent evaluation of the trial, undertaken by PricewaterhouseCoopers.

3. Prior to the commencement of the trial, DOMILL provided an independent statement on the medical implications of the use of the M26 Taser within the ACPO Policy and the ACPO Operational Guidance[5]. The statement was based primarily on an assessment of the medical risks undertaken on behalf of DOMILL by the Defence Science and Technology Laboratory (Dstl). The statement is an Annex to this document. DOMILL also produced medical advice notes for the subjects on whom the M26 had been used, hospital staff, and General Practitioners. The DOMILL statement concluded that: "*From the available evidence on the use of the device, the risk of life-threatening or serious injuries from the M26 Advanced Taser appears to be very low*."

4. DOMILL recommended that research should be undertaken to clarify the cardiac hazards associated with use of the M26 Taser on individuals who could be considered to have a greater risk of adverse effects. The principal investigations should address the possible cardiac hypersusceptibility to M26 Taser currents arising from drugs commonly used illegally in the UK, acidosis and pre-existing disease, and a more thorough review of the vulnerability of pacemakers and other implanted devices. DOMILL did not consider it *essential* from a medical

[4] Defence Scientific Advisory Council.
[5] DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL). Statement on the medical implications of the use of the M26 Advanced Taser. DSTL/CBS/BTP/PAT-ACPO/MAN/REP/4/ dated 9 Dec 02.

perspective that the studies be completed before approval was considered for the initial trial of the M26 Taser under the terms of the ACPO Policy and Guidance. DOMILL also requested that the output of the sighting laser of the M26 Taser should be measured and classified according to British Standards.

Extension of the operational trial of the M26 Taser

5. An interim report on the first five months of the operational trial has been produced by PricewaterhouseCoopers. The interim report concluded that use[6] of the M26 Taser "*helped secure a positive outcome to an incident, minimising the potential need for officers to deploy other, possibly more lethal technologies*" [7]. ACPO has proposed that, subject to a review of the medical assessment and Ministerial support, the trial should be extended thus:

- With Chief Officer agreement, the trial should be extended to all forces for use by existing firearms officers, in situations where an authority for firearms would be granted in accordance with criteria presently laid down within the ACPO Manual of Guidance on the Police Use of Firearms;

- The five forces within the current trial should commence a further trial for 12 months where the deployment of the M26 Taser is extended for use by specialist units at incidents where there is presently no remit to authorise firearms, but where officers are facing violence or threats of violence of such severity that it is likely that they will need to use force to protect themselves or a member of the public.

6. ACPO and the Home Office have requested that DOMILL review the extant medical statement and offer a second statement on the medical implications of use, consequential to:

- Revised and reviewed ACPO policy, operational guidance and training;
- The outcome of the research to date addressing their recommendations in the extant statement;
- The data presented to them by ACPO on the outcome (to date) of the initial trial currently proceeding.

This statement is the outcome of that review.

Review of the research undertaken

Effect of M26 Taser cardiac currents

7. The research requested by DOMILL was undertaken by Biomedical Sciences department of Dstl. Dstl adopted a two-fold experimental approach to clarifying the risks of adverse cardiac effects arising from use of the M26 Taser:

a. **Effect of drugs of abuse on cardiac function.** This approach was predicated on empirical observations made in the United States that many of those involved in confrontations in which Taser was used were under the influence of drugs. The hypothesis tested was that the drugs *per se* could predispose an individual to an adverse cardiac event, irrespective of Taser use. Seven drugs of abuse were

[6] "Use" by ACPO's definition is the: (i) drawing of a device in circumstances where any person perceives the action as a use of force or a threat of use of force; (ii) discharging the barbs at a subject; (iii) application and discharge in "touch stun" mode.
[7] Association of Chief Police Officers: Independent evaluation of the operational trial of taser. Interim report dated September 2003.PricewaterhouseCoopers LLP.

tested for their ability to modify the electrical properties of cardiac ventricular conduction tissue *in vitro*[8].

b. **Direct application of electrical pulses to isolated beating hearts.** The pulses represent the current predicted to flow in the heart during discharge of the M26 Taser. The assessment is designed to investigate the effect of the pulses on heart rhythm, the threshold for any effects observed and the effects of selected drugs of abuse upon this threshold. These studies necessitated the development of novel, complex computer models of the interaction of M26 Taser pulses with the human body, in order to predict the shape and magnitude of current flowing in the heart.

8. **Effect of drugs of abuse on cardiac function.** Seven recreational drugs, or their active metabolites, were examined in the sheep isolated cardiac Purkinje fibre preparation. MDMA (Ecstasy) and phencyclidine (PCP) produced effects on the action potential suggestive of an increased risk of development of *torsades de pointes* arrhythmia. Although cocaine, cocaethylene (a psychoactive metabolite formed when cocaine and alcohol are concurrently abused) and (+)-methamphetamine did not induce action potential prolongation, a critical review of the scientific and clinical literature revealed that these drugs still have the potential to compromise cardiovascular function in a way that could precipitate a life-threatening cardiac event. The clinical literature suggested that morphine (the principal metabolite of heroin) and Δ9-tetrahydrocannabinol (the principal psychoactive component of cannabis) are likely to be relatively benign in terms of cardiovascular toxicity at doses likely to be employed by abusers.

9. The results from the study, together with evidence gleaned from the literature, suggest 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 generalised to other emotionally charged and possibly violent confrontations with law enforcement personnel.

10. The adverse cardiac effects produced by any individual drug are likely to be dependent on several risk factors, including dose consumed, co-use with other drugs (including pharmaceutical drugs and ethanol) and pre-existing heart disease. This complex interplay of multiple risk factors could conceivably contribute to any cardiac-related morbidity or mortality associated with Taser use against drug-intoxicated persons. Officers should be aware that the risk of any adverse response in the aftermath of Taser deployment may be higher in drug-impaired individuals and, accordingly, they should be vigilant of any unusual behaviour displayed by the apprehended person that may signal the need for early medical intervention.

11. DOMILL has reviewed the paragraph in its first statement that discussed pro-arrhythmic factors (paragraph 28) and concludes that it does not require modification on the basis of the current work. The current work provides experimental evidence to support the original statement.

12. **Direct application of electrical pulses to isolated beating hearts.** The complex mathematical modelling underpinning the second experimental approach has never been undertaken before and has challenged the limits of current knowledge. Early setbacks with the modelling have

[8] The assay looked at the effect of drugs on the cardiac action potential (the electrical basis for cardiac conduction, contraction and relaxation) in sheep isolated Purkinje fibres. Prolongation of the action potential duration is thought to be a possible marker for a potentially lethal type of ventricular arrhythmia known as *torsades de pointes*.

been overcome and the quantitative modelling of the M26 Taser current flow in the heart will be completed shortly. This will enable the studies on the isolated beating heart to commence.

Vulnerability of pacemakers and other implantable electronic devices

13. The implanted devices examined in the review included cardiac pacemakers, cardioverter defibrillators, cochlear implants and other implantable neurostimulatory devices, such as phrenic and vagal nerve stimulators. Published material on the construction of the devices was consulted to assess the likely consequences of Taser barb impact on the device. An assessment of available published information on the observed interaction of external electromagnetic fields with active implantable devices was also undertaken. The review also addressed the probability of a person wearing an active implantable device being present in a situation where a Taser may be deployed and used; this drew upon a comparison of the age profiles of the frequency of use of pacemaker and implantable cardioverter defibrillator wearers in the UK, and data on the age profile of persons arrested by the police.

14. It was concluded that the probability of direct impact and physical damage to implanted electronic devices was very low. The effects of M26 Taser electrical fields on the function of cardiac pacemakers are unlikely to be permanent. The limited number of studies that have been reported on devices similar to Tasers indicate that effects are likely to be limited to reversion to asynchronous pacing mode, and that these effects are temporary. The effects of Taser output on implantable cardioverter defibrillators are likely to be similar to those on cardiac pacemakers. The nature of the cardiac rhythm sampling process indicates that application of a Taser for a period of 5 seconds is unlikely to result in inappropriate therapy delivery. The effect of Taser outputs on other active implantable devices, such as cochlear implants and nerve stimulators, has not been reported. The interaction with nerve stimulators could produce deleterious effects but the risk of such interaction occurring is low, and it is unlikely that the effects will be long-term or life-threatening.

15. The age profile of cardiac pacemaker recipients is significantly different from the overall population and that of persons arrested in situations where a Taser may be deployed. The probability of an individual wearing a pacemaker being present in such a situation is therefore likely to be considerably lower than the overall incidence of pacemakers in the population.

16. It is concluded that there is no requirement to undertake experimental studies on the vulnerability of active implantable medical devices to the output of the M26 Taser.

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Ocular hazard of the laser sight

17. The output of the sighting laser has been tested and is a Class 3R according to the British Standard BS EN 60825-1. Class 3R exceeds the internationally agreed maximum permissible exposure values, but due to the safety factors in these values, devices of this Class are unlikely to cause ocular injuries for accidental exposures. Intentional viewing or deliberate exposure of the eyes of a subject must be avoided.

Overall conclusion

18. The risk of life-threatening or serious injuries from the M26 Taser is very low.

Recommendations

19. DOMILL reaffirms its view that it does not consider it essential from a medical perspective that the experimental studies are completed before approval is considered for the extension of the M26 Taser trial under the terms of the ACPO Guidance. This DOMILL statement will be reviewed when the results of the study on the isolated beating heart are available.

20. The studies by Dstl on the effects of drugs on isolated Purkinje fibres should be published in the medical press.

21. Six months after the commencement of the extended operational trial, the Home Office should provide DOMILL with a report outlining the circumstances of every use of the M26 Taser, the post-incident medical assessments undertaken by the FME, and the clinical consequences noted by the FME or clinical staff. DOMILL should be advised as soon as practical of any primary or secondary injury that could be classed as life-threatening, unexpected, or potentially leading to disability.

22. DOMILL should be advised of any changes in:

    a. the specification or performance of the M26 Taser;
    b. the guidance to users, and training practices;
    c. the policy and practice of deployment, use and audit.

Chairman, DSAC Sub-committee on the Medical Implications of Less-lethal Weapons.

Annex: First DOMILL statement on the medical implications of the use of the M26 Advanced Taser (December 2002)

Background

A1. The role of the DSAC[9] Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL) is to provide the Secretary of State for the Home Department and the Secretary of State for Northern Ireland with:

a. Advice on the medical implications of generic classes of less-lethal (LL) weapon systems (which includes biophysical, pathological and clinical aspects);

b. Independent statements on the medical implications of use of specific LL systems, when used according to the formal guidance provided to users;

c. Advice on the risk of injury from identified LL systems striking specific areas of the body, in a format that would assist users in making tactical decisions, and developing guidance to users to minimise the risk of injury.

A2. This advice is in support of the UK Government's requirements arising from:

a. Recommendations 69 and 70 of the Patten report into policing in Northern Ireland[10]: (i) a research programme to find an acceptable, effective and less potentially lethal alternative to the Baton Round, (ii) provision of a broader range of public-order equipment to the police;

b. The desire of the Association of Chief Police Officers (ACPO) to have a wider range of options in conflict management scenarios, including those most commonly associated with self-defence and restraint, and the police use of firearms.

In summer 2000, the Secretary of State for Northern Ireland set up a UK-wide inter-departmental Steering Group to co-ordinate a programme to address both requirements.

A3. The report of the Steering Group on Phase 2 of the programme described the various classes of LL weapon systems being evaluated to address the requirements[11]. The report categorises the technologies according to the requirement for research and evaluation. Within Category A (devices which may be subject to research and evaluation immediately) are electrical incapacitation devices, specifically Tasers.

Evaluation of Tasers

A4. Tasers are hand-held devices that propel two barbs at an individual. The barbs are intended to attach to the skin or clothing on the torso and/or lower limbs. A sequence of very short duration high voltage current pulses passes through wires connecting the device to the barbs. The current flows into the body and results in a loss of muscular control and in pain. Some models also enable direct contact of the Taser hand-set to the surface of an individual; two closely spaced fixed electrodes pass the current

[9] Defence Scientific Advisory Council.
[10] Report of the Independent Commission on Policing in Northern Ireland; September 1999.
[11] Patten Report Recommendation 69 and 70 Relating to Public-Order Equipment – A research programme into alternative policing approaches towards the management of conflict. Second Report of the Steering Group; November 2001. www.nio.gov.uk/policing.htm.

pulses into the subject. This manner of application is usually classed as use in "stun" or "probe" mode; pain is the principal local physiological effect.

A5. The Police Scientific Development Branch of the Home Office has undertaken an evaluation of a number of commercially available Taser devices[12]. The evaluation addressed barb accuracy and dispersion, the measurement of electrical output and reliability, a review of manufacturers' claims and handling characteristics in a number of test scenarios. DOMILL also undertook a general review of the medical implications of the use of Tasers[13,14].

A6. On the basis of the objective technical and medical evaluations, and the policy underpinning the development of a broader range of options for conflict management in the UK, ACPO has proposed that an operational trial of the M26 Advanced Taser should take place. DOMILL was invited to provide this current statement for Ministers on the medical implications of the use of the M26 Advanced Taser in an operational trial.

Guidance on use by police of the M26 Advanced Taser

A7. The policy and practice defining the training for use, deployment and operational use of a weapon system is central to an assessment of the medical implications of that use. The ACPO Guidance[15] states that an operational trial would be limited to firearms officers in selected police forces. The M26 Advanced Taser would provide firearms officers with additional means of dealing with threats of violence in which conventional firearms and other less-lethal tactical options may be deployed. Such options include batons, sprays of sensory incapacitant, and "empty hand" physical restraint.

A8. Deployment and use of the Taser would conform to the principles of guidance already laid down in the ACPO Manual of Guidance on Police Use of Firearms. The trial would be subjected to critical and independent review.

Technical approach for the assessment of medical implications of use

A9. The milestones placed upon DOMILL by the Steering Group dictated the nature of the technical approach: a wide-ranging review of literature and preliminary analytical studies on the biophysical interaction of Taser current pulses with the body. On behalf of DOMILL, the Defence Science and Technology Laboratory (Dstl) undertook a comprehensive review of information publicly available, and provided by manufacturers and police forces in North America. Over 800 references were acquired and reviewed. The review encompassed:

a. basic neurophysiological science to consider the mechanism of the interaction with excitable tissues;

[12] PSDB Evaluation of Taser Devices. Publication Number 9/02, September 2002.
[13] The Medical Implications of the Use of Electrical Incapacitation Devices (Tasers). Prepared for DOMILL by the Defence Science and Technology Laboratory. DSTL/CBS/BTP/DOC/594/1.0. April 2002.
[14] An Update on the Review of the Medical Implications of the Use of Electrical Incapacitation Devices. Prepared for DOMILL by the Defence Science and Technology Laboratory. DSTL/CBS/BTP/PAT-ACPO/MAN/COM/3. 30 September 2002.
[15] The M26 Taser. Operational Trials involving Firearms Officers in Selected Forces. Notes for Guidance on Police Use. ACPO. 4 September 2002.

b. peer-reviewed scientific and medical papers specifically addressing laboratory and operational use of Tasers and stun weapons: electrical output, risks to personnel, analyses of medical issues observed in hospital facilities in individuals subjected to Tasers, and the circumstances surrounding the deaths of personnel subjected to Tasers in the course of their arrest;
c. evidence on the risks provided by manufacturers: scientific, medical, use on volunteers and records of operational use;
d. the basis of the application of electrical safety standards and criteria to Taser outputs;
e. newspaper reports of Taser use and complications arising from use;
f. surveys of effectiveness and injuries observed and recorded by law enforcement agencies in the United States and Canada;
g. peer-reviewed papers on the hazardous effects of electric fields on physiology.

The review by Dstl was conducted by cardiac and nerve electrophysiologists, physicists and engineers specialising in the interaction of electrical energy with the body, and trauma specialists.

A10. Dstl also undertook computer-based modelling of the interaction of Taser pulses with the body. The primary purpose was to assess qualitatively the distribution of currents from Tasers in the body, and to determine semi-quantitatively the changes in current magnitude and distribution for different barb separations and Taser outputs.

A11. DOMILL endorsed Dstl's approach and reviewed the substantial body of information compiled by Dstl. This statement is based on these data.

Classification of Taser outputs

A12. Tasers have been classed by users as "low-power" (5-7 Watt) or "high-power" (14-26 Watt). Tasers have been in use for over 20 years, principally in the US. Over most of this period, only low-power Tasers were available, deployed and used. High-power Tasers have been available and in use on volunteers and operationally for about two years; the M26 Advanced Taser is classed as high-power. Assessments undertaken by the PSDB showed that the principal differences in measured output between low- and high-power Tasers were the pulse repetition rate and pulse duration; differences in peak current and voltage between devices were also noted. Dstl modelling studies showed that the magnetic field strength in the body (an index of current) was greater with the high-power Tasers.

The evidence of hazard and risk from the M26 Advanced Taser

A13. The body of manufacturers' experimental evidence from biological models of the hazardous and intended effects of Taser on excitable tissues is not substantial, particularly with regard to the M26; the peer-reviewed evidence is even more limited. The epidemiological evidence to assess the hazards associated with use of the M26 Advanced Taser is not as robust as that for the low-power models. However, the manufacturer's database of over 1600 operational uses of the M26 and reports from law enforcement agencies in North America did offer some insight into the risks and nature of injuries.

Classification of injuries

A14. Unintended adverse effects from the use of Tasers may be classed thus:

- Primary: immediate or delayed consequences of electrophysiological phenomena resulting directly from the current flow in the body; it is surmised from the known effects of electric fields and currents on the body (for example, lightning, electric fence controllers) that the organ of principal concern is the heart;

- Secondary: physical trauma directly associated with Taser use, principally injuries from the barbs and falls; the head is the principal area at risk;

- Coincidental: injuries received in the incident not directly related to Taser use e.g. baton use, self-inflicted wounds, gun-shot wounds.

It is notable that in two surveys from law-enforcement agencies in North America, more than half of the number of people confronted with the M26 Advanced Taser were impaired by alcohol, drugs or mental illness. Some drugs and metabolic consequences of muscular activity are believed to increase the susceptibility of the heart to potentially life-threatening disturbances of rhythm (arrhythmias).

Conclusions

A15. On the basis of the evidence, the following conclusions are offered on the medical implications of the use of the M26 Advanced Taser in an operational trial that may be undertaken within the terms of the ACPO Guidance provided to DOMILL.

A16. **Deaths:** Over the period of use of low-power Tasers, there have been a small number of deaths associated with a large number of operational uses. One paper discusses 16 deaths over a 4 year period in Los Angeles[16]. Other factors such as pre-existing heart disease and drug use were implicated in these reported deaths. On the available evidence, DOMILL considers it extremely unlikely that a death from primary injuries has been caused by a low-power Taser.

A17. With regard to the high-power M26 Advanced Taser, the risk of death from primary injury is low and in common with low-power Tasers, is certainly very much lower than that from conventional firearms. Deaths have been reported to be associated with (but not necessarily caused directly by) use of the M26. DOMILL is not aware of any deaths from primary injuries with this weapon, in both operational and volunteer use in North America.

A18. The confidence of the opinion of a very low risk of death from future use of the M26 is not as high as that for the low-power devices. This uncertainty arises from the smaller numbers of historical operational uses, and the dearth of information on the potentially adverse electrophysiological effects of the higher current flow in the body, particularly in subjects who may have a predisposition to cardiac arrhythmias arising from drug use, pre-existing heart disease or genetic factors.

[16] Kornblum RH, Reedy SK (1991). Effects of the Taser in fatalities involving police confrontation. J Forensic Sci. Vol 36, 434-448. For a rebuttal of some of the conclusions of this paper, see Allen TB (1992). Discussion of "Effects of the Taser in fatalities involving police confrontation". Letter to Editor. J Forensic Sci. Vol 37, 956-958.

A19. DOMILL is not aware of any deaths arising from the secondary consequences of Taser use.

A20. **Life-threatening and serious injuries:** The risk of life-threatening injuries and of other serious injuries such as the loss of an eye, is considered to be very low. The intuitive high risk of serious head injury from an uncontrolled collapse is not manifested in practice; most subjects apparently collapse in a semi-controlled manner.

A21. The probability of impact of a barb on the surface of the eye is considered to be low. The impact of barbs on the head has occurred operationally; non-operational evaluation trials on targets have also resulted in head impacts. On the basis of trial data, it is probable that by employing the ACPO Guidance, fewer than 1% of upper barb impacts will hit the head. In the worst case of frontal application, the eyes are a small proportion of the presented area of the head.

A22. The PSDB has shown in trials that the Taser may cause combustion of flammable solvents on the subject's clothing. This may result in serious burns to the torso and head; the Guidance to Users must highlight and control the risk from flammable liquids such as petrol on the subject.

A23. **Other effects:** Falls may result in abrasions, scratches, minor lacerations, swellings and areas of redness on the skin. Minor secondary trauma from the penetration of the skin by the barbs will occur; there is sufficient experience from North America to effect simple removal by UK medical professionals.

A24. Some of the barb penetrations will exhibit small circular burns; areas of skin where current has entered the body from barbs retained in clothing may also exhibit burns. These burns are likely to resolve within a few days, without complications and the need for medical intervention.

A25. DOMILL is not aware of any evidence that the Taser would induce an epileptic seizure.

A26. The M26 Taser has a US laser classification that indicates that it is potentially hazardous for *intrabeam* viewing of its sighting laser. The classification according to British Standards and the potential to cause injury must be determined.

A27. **Use on drug and cardiac-impaired individuals:** It is believed that drugs such as cocaine and pre-existing heart disease may lower the threshold for cardiac arrhythmias. Many of the 16 fatalities associated with use of the low-power Tasers in the Los Angeles survey had also taken PCP (phencyclidine) prior to the incident. PCP is also thought to be pro-arrhythmogenic but is infrequently encountered as a substance of abuse in the UK.

A28. There is no experimental evidence that the aforementioned pro-arrhythmic factors increase the susceptibility of the heart to low- or high-power Tasers specifically, sufficient to cause an arrhythmic event. Nevertheless, there is sufficient indication from the forensic data and the known electrophysiological characteristics of the heart (and the effects of certain drugs on this) to express a view that excited, intoxicated

individuals or those with pre-existing heart disease could be more prone to adverse effects from the M26 Taser, compared to unimpaired individuals. The ACPO Guidance to Users reflects this view.

A29. **Overall:** From the available evidence on the use of the device, the risk of life-threatening or serious injuries from the M26 Advanced Taser appears to be very low.

Recommendations

A30. Research should be undertaken to clarify the cardiac hazards associated with use of the Taser on individuals who could be considered to have a greater risk of adverse effects. The principal investigations should address:

a. Accurate, quantitative estimates of the magnitude of the magnetic and electric field strengths from the M26 in potentially vulnerable parts of the body; this would require enhancement of the preliminary model developed by Dstl. These data will focus the investigations in (b) and (c) below;
b. Possible hypersusceptibility to Taser currents arising from drugs commonly abused in the UK, acidosis and pre-existing disease; *in vitro* tissue models are available that could be used to address these issues;
c. The vulnerability of pacemakers and other implanted devices; this issue requires a more thorough review. Experimental studies to assess electromagnetic incompatibility issues are currently not warranted and should await the outcome of the review;

DOMILL does not consider it *essential* from a medical perspective that these studies are completed before approval is considered for the M26 Advanced Taser trial under the terms of the ACPO Guidance.

A31. The output of the sighting laser of the M26 Taser should be measured, classified according to British Standards and operated to reduce the risk from the ocular hazard.

A32. Forensic Medical Examiners (FME) and appropriate clinical staff in the principal hospitals within the areas of the police forces participating in the trial should be briefed on the nature of the M26 Advanced Taser, clinical and operational experience from North America, and the presumed and known risk factors. Additionally, it is recommended that a paper be prepared addressing these issues and the wider policy underpinning use, for submission to an appropriate clinical journal.

A33. At the end of any operational trial (or 6 months after commencement, whichever is earlier), the Home Office should provide DOMILL with a report outlining the circumstances of every use of the M26 Advanced Taser, the post-incident medical assessments undertaken by the FME, and the clinical consequences noted by the FME or clinical staff. DOMILL should be advised as soon as practical of any primary or secondary injury that could be classed as life-threatening, unexpected, or potentially leading to disability.

A34. DOMILL should inspect the M26 Training Programme Manual to advise on the specific medical risk factors declared in the document.

A35. DOMILL should be advised of any changes in:

a. the specification or performance of the M26 Advanced Taser;
b. the guidance to users, and training practices;
c. the policy and practice of deployment, use and audit.

Chairman, DSAC Sub-committee on the Medical Implications of Less-lethal Weapons

Dstl/BSC/BTP/DOC/803 dated 7 Mar 05

DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL).

Statement on the comparative medical implications of use of the X26 Taser and the M26 Advanced Taser.

Background

1. This statement has been produced by the Defence Scientific Advisory Council (DSAC) sub-committee on the Medical Implications of Less-Lethal Weapons (DOMILL). It provides an independent view for the UK Government on the medical implications of the use of the X26 Taser in the UK, within the policy and guidance of the Association of Chief Police Officers (ACPO). Specifically, this statement compares the predicted principal medical risks associated with the X26 Taser, and the M26 Advanced Taser (referred to subsequently as the M26).

2. On 30th January 2003, the Home Secretary gave authority to proceed with an operational trial of the M26 as a less-lethal option in incidents at which authority to use firearms had been granted. The M26 would be used by police officers already trained in the use of firearms. The operational trial commenced on 21st. April 2003 for an initial duration of 12 months. Five police forces took part in the trial, employing a joint policy, operational guidance and training strategy developed by ACPO.

3. Prior to the start of the trial, DOMILL provided an independent statement on the medical implications of the use of the M26 within the ACPO Policy and ACPO Operational Guidance[17]. The statement was based primarily on an assessment of the medical risks undertaken on behalf of DOMILL by the Defence Science and Technology Laboratory (Dstl). The DOMILL statement concluded that: "*From the available evidence on the use of the device, the risk of life-threatening or serious injuries from the M26 Advanced Taser appears to be very low*."

4. DOMILL recommended that research be undertaken to clarify the cardiac hazards associated with use of the M26 on individuals who could be considered to be at greater risk of adverse effects. The main thrust of the investigations addressed the possible cardiac hypersusceptibility to M26 currents arising from drugs commonly used illegally in the UK and a review of the vulnerability of pacemakers and other implanted devices.

5. A report on the operational trial of the M26 was produced by PricewaterhouseCoopers. The report concluded that use[18] of the M26 "*helped secure a positive outcome to an incident, minimising the potential need for officers to deploy other, possibly more lethal technologies*". ACPO proposed that, subject to a review of the medical assessment and Ministerial approval, the trial should be extended: With Chief Officer agreement, the trial should be extended to all forces for use by existing firearms officers, in situations

[17] DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL). Statement on the medical implications of the use of the M26 Advanced Taser. DSTL/CBS/BTP/PAT-ACPO/MAN/REP/4/ dated 9 Dec 02.

[18] "Use" by ACPO's definition is the: (i) drawing of a device in circumstances where any person perceives the action as a use of force or a threat of use of force; (ii) discharging the darts at a subject; (iii) application and discharge in "touch stun" mode.

where an authority for firearms would be granted in accordance with criteria presently laid down within the ACPO Manual of Guidance on the Police Use of Firearms.

6. Consequently, DOMILL issued a second statement[19] subsequent to a review of:

- revised and reviewed ACPO policy, operational guidance and training;
- the outcome of the research addressing the recommendations in their first statement;
- the data presented to them by ACPO on the outcome (to date) of the initial trial then proceeding.

The second statement also concluded that: "*The risk of life-threatening or serious injuries from the M26 Taser is very low*".

7. On the basis of the second DOMILL statement and other evidence, the Home Secretary agreed to ACPO's proposal and the Parliamentary Under Secretary of State at the Home Office (Caroline Flint MP) announced the decision to Parliament in a Written Answer on 15th. September 2004. The Home Secretary's decision applies only to the M26 Advanced Taser.

8. In May 2003, the manufacturers of the M26 introduced another Taser weapon - the X26. ACPO expressed the view that the X26 may have operational benefits over the M26 and requested that the Police Scientific Development Branch (PSDB) conduct a handling trial with users on the X26, similar to the trial undertaken on the M26 before its introduction. Subsequent to the X26 handling trial, in which the X26 showed some potential operational benefits, the Home Office requested that DOMILL prepares this statement on the medical implications of the use of the X26.

Comparison of M26 and X26 Taser outputs

9. The manufacturers claim that the direct incapacitating effect of the X26 is 5% greater than that of the M26[20]. They claim that the X26 is 60% smaller, 60% lighter and consumes one fifth of the power. The electrical pulses from the two weapons have a different shape, magnitude and pulse repetition frequency. The X26 pulse has a lower peak voltage and a longer duration than the M26; it also has a lower pulse repetition frequency.

10. The evidence from the electro-physiological literature is that the threshold for stimulation of excitable tissues reduces as pulse duration is extended, and as the number of pulses is increased[21]. Although the implied reduction in peak current for the X26 would suggest a lower risk of adverse cardiac events from currents that may flow in the heart, the extended duration may offset some of that benefit. Because of the complex shape of the Taser waveforms, the overall effect of this trade-off cannot be assessed

[19] DSAC Sub-committee on the Medical Implications of Less-lethal Weapons (DOMILL). Second statement on the medical implications of the use of the M26 Advanced Taser (July 2004). DSTL/CBS/BTP/PAT-ACPO/MAN/REP/4/ dated 27 Jul 04.
[20] Taser International Inc. use a rating scale entitled "Muscular Disruption Units". The M26 is used as the baseline of 100 units. The X26 has 105 units. The rationale and method for determining these values is not stated, but is believed to have been based upon the Taser-induced contractile force in the muscles of a pig limb.
[21] Reilly JP. Applied Bioelectricity: From Electrical Stimulation to Electropathology. Springer - Verlag, 1998, ISBN 0-387-98407-0. Chapter 6 – Cardiac sensitivity to electrical stimulation. Pages 220-225.

from the literature, which has been developed using simple waveforms such as rectangular or sinusoidal pulses.

Technical approach to compare risks from X26 and M26

11. DOMILL requested that Dstl undertake the following modelling and experimental work:

    a. Characterisation and comparison of the electrical output of the X26 and M26 Tasers (in conjunction with PSDB).

    b. A comparison of the currents predicted to flow in the human heart from the M26 and X26 Tasers. This would require the use of a computer model of electromagnetic interactions of applied Taser pulses with the superficial tissues of the body, and the flow of currents to the heart.

    c. Application of the predicted currents to isolated, spontaneously beating hearts to establish the threshold for any potentially adverse effects on cardiac rhythm.

    Additionally, DOMILL requested a review of : (i) experimental work undertaken by, or on behalf of the manufacturers to support the introduction of the X26; (ii) operational and training data compiled by the manufacturers and global police forces; (iii) medical assessments undertaken by organisations and individuals unconnected with the manufacturers.

Review of the modelling and experimental work undertaken by Dstl

Prediction of Taser currents in the human heart.

12. Computational electromagnetic modelling of M26 and X26 Taser currents flowing in the human heart was achieved using a digital mannequin of the human body, in which the electrical properties of human tissues were represented.

13. Studies on the effect of dart separation on the predicted current density (mA/mm^2) flowing in the heart from the M26 showed that a vertical separation of 225 mm, with the upper dart overlying the heart, gave the maximum cardiac current of the scenarios modelled[22]. In this most severe scenario, about 20% of the applied current from the M26 was predicted to pass through the heart during the M26's 2½ cycle, 50 μs pulse. The peak predicted current density was about 0.66 mA/mm^2. With regard to the X26, initially about 10% of the applied current from the X26 was predicted to pass through the heart, rising to about 20%. During the X26's 4 cycle, 160 μs pulse, the peak current predicted was about[23] –0.11 mA/mm^2.

14. Thus, the model predicted that the peak current density flowing in the human heart from the X26 pulse was about one sixth that of the M26. The current duration of the X26 in the heart was about 3-4 times that of the M26.

[22] The dart separations modelled were those determined in M26 user trials undertaken by PSDB.
[23] The minus term indicates that this was flowing out of the heart (measured at the peak of the second half cycle).

Effects of the predicted Taser currents on cardiac rhythm.

15. **Method:** Excised, spontaneously beating guinea-pig hearts (the Langendorff preparation) were used to determine if the predicted M26 and X26 waveforms in human heart could induce either or both of two phenomena:

    - Ventricular ectopic beats (VEBs) – cardiac contractions outwith the normal inherent rhythmicity of the heart;

    - Ventricular fibrillation (VF) – chaotic, asynchronous contractions of the heart muscle fibres that result in no effective heart output. If uncorrected, this would lead rapidly to death in the human.

16. The modelled cardiac M26 and X26 Taser waveforms were applied to the ventricular outer surface of the isolated hearts. Both the absolute values of the peak currents predicted from the modelling, and higher magnitudes, were applied to determine the thresholds for the two phenomena. Rectangular pulses were also applied to hearts to determine the relationship between current density and pulse duration for a well-characterised, simple waveform, and to ensure that the heart preparations were capable of eliciting VEBs or VF.

17. **VEB induction:** When applied during the most vulnerable phase of the heart's electrical cycle (the T-wave of the electrocardiogram) at peak current densities predicted in the human heart during Taser discharge, neither the simulated M26 nor X26 waveforms evoked VEBs. However, VEBs could be elicited by both Taser waveforms by increasing the peak current density of the applied waveforms above those predicted to arise in the human heart. The threshold current density for generation of VEBs for both the M26 and X26 Taser waveforms was greater than 60-fold the modelled current density predicted to occur at the heart, implying a wide safety margin for this particular type of potentially pro-arrhythmic response.

18. **Ventricular fibrillation:** In an attempt to evoke ventricular fibrillation, trains of simulated M26 or X26 Taser waveforms (designed to mimic the discharge patterns of the respective Tasr devices) were applied to the ventricular muscle. When the simulated waveforms were applied in this way, neither the M26 nor X26 waveforms elicited ventricular fibrillation at peak current densities up to the maximum output available from the laboratory electrical stimulation system. The threshold peak current density for generation of ventricular fibrillation for the simulated M26 waveform was greater than 70-fold the modelled current density predicted to occur at the heart during Taser discharge. In the case of the simulated X26 waveform, the threshold peak current density was greater than 240-fold the modelled current density. That this failure of the simulated M26 and X26 Taser waveforms to induce ventricular fibrillation was not a function of the biological test system was demonstrated in each experiment by the generation of VF using the rectangular stimulation pulses.

19. **Conclusions:** The results show that the simulated M26 and X26 waveforms, *when amplified*, are capable of eliciting VEBs, but not VF, when applied to the ventricular muscle of spontaneously beating guinea-pig isolated hearts. The guinea-pig heart is more susceptible than hearts of larger animals (e.g. dog, calf and pig, and presumably

human) to VF induced by extrinsic electrical stimulation[24]. The present findings provide indirect evidence for a wide margin of safety in relation to induction of this type of lethal arrhythmia in man. A broadly similar conclusion was reached in a study in the US, in which trains of simulated X26 waveforms of varying intensity, applied across the thorax of anaesthetised pigs, induced ventricular fibrillation only at intensities 15- to 42-fold that of the standard X26 waveform[25].

20. On the basis of the present study, it is considered unlikely that the electrical discharge from the M26 and X26 Taser devices will influence cardiac rhythmicity by a direct action on the heart of healthy individuals.

21. **Contributing factors to cardiac susceptibility:** The possibility that other factors, such as illicit drug intoxication, alcohol abuse, pre-existing heart disease and cardioactive therapeutic drugs may modify the threshold for generation of cardiac arrhythmias cannot be excluded. Similarly, other indirect responses to Taser deployment (e.g. arrhythmias precipitated by stress- or exercise-induced catecholamine release) may, in themselves, predispose to an adverse cardiac outcome independently of the primary (electrical) action of the Taser devices.

22. DOMILL's first statement on the M26 Advanced Taser**Error! Bookmark not defined.** concluded that (paragraph 28):

> "There is no experimental evidence that the aforementioned pro-arrhythmic factors increase the susceptibility of the heart to low- or high-power Tasers specifically, sufficient to cause an arrhythmic event. Nevertheless, there is sufficient indication from the forensic data and the known electro-physiological characteristics of the heart (and the effects of certain drugs on this) to express a view that excited, intoxicated individuals or those with pre-existing heart disease could be more prone to adverse effects from the M26 Taser, compared to unimpaired individuals. The ACPO Guidance to Users reflects this view."

Experimental work reported in DOMILL's second statement**Error! Bookmark not defined.** on the effects of drugs on cardiac function supported this view. The view expressed above is also applicable to the X26 Taser.

Falls to the ground

23. The claim that the X26 is more effective than the M26 in stimulating skeletal muscle implies that falls following X26 application may be less controlled. This will increase the risk of head injury. It is anticipated therefore that there may be a greater likelihood of head contact with surfaces following use of the X26. Overall, the risk of serious head injury is considered to be low.

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[24] Ferris et al. (1936). Effect of electric shock on the heart. *Electrical Engineering* **55:** 498-515.
[25] McDaniel et. al. (2005). Cardiac safety of neuromuscular incapacitating defensive devices. *Pacing Clin Electrophysiol* **28(S1):** S284-S287.

Overall conclusion

24. The risk of a life-threatening event arising from the direct interaction of the currents of the X26 Taser with the heart, is less than the already low risk of such an event from the M26 Advanced Taser.

Recommendations

25. The Home Office should continue to provide DOMILL with reports outlining the circumstances of every use of the M26, the post-incident medical assessments undertaken by the Forensic Medical Examiner (FME), and the clinical consequences noted by the FME or clinical staff. This audit should include the X26 Taser if this system is made available for use. DOMILL should be advised as soon as practical of any primary or secondary injury that could be classed as life-threatening, unexpected, or potentially leading to disability.

26. DOMILL should be advised of any changes in:

    a. the specification or performance of the M26 and X26 Taser devices;
    b. the guidance to users and training practices;
    c. the policy and practice of deployment, use and audit.

[signed]

Chairman, DSAC Sub-committee on the Medical Implications of Less-lethal Weapons.

Appendix C

Association of Chief Police Officers – Operational deployment of Taser

Information leaflet for persons upon whom a Taser has been used.

You have been subjected to the effects of a Taser. The Taser passed short pulses of electricity into your body. The electricity made your muscles contract. You may have lost balance and fallen to the ground.

The device was used by a specially trained police officer.

During, or shortly after the use of the Taser, you may have experienced the following:

- Being dazed for several minutes;
- Muscle twitches;
- Loss of memory of the event;
- Unsteadiness, and a spinning sensation;
- Temporary tingling;
- Weakness in the limbs;
- Local aches and pains, and tissue swelling.

These sensations are normal effects of the Taser.

If any of these effects are still present a day later, see a doctor.
You may have two small marks (like bee stings) in your skin. These are small puncture wounds from the short needles used to inject the electricity directly into your skin. There may be small burns similar to sunburn around these marks. These should return to normal in a few days. If they do not and there is pain and swelling, you may have a local infection – see a doctor. If the probes only stuck in your clothing, you may still have two small areas of skin underneath that look sunburned.

Association of Chief Police Officers – Operational deployment of Taser

Information for General Practitioners

Introduction

The Police have commenced the operational deployment of Taser and are undertaking an extended operational trial in this area. This equipment has been made available to specially trained officers only.

Tasers are hand-held devices that fire two barbs at an individual. The barbs are intended to attach to the skin or clothing on the torso and/or lower limbs. The barbs are attached to the Taser handset by thin wires. A sequence of very short duration high voltage current pulses passes through wires connecting the handset to the barbs. The current flows into the body and results in a loss of muscular control and in pain. The device also enables direct contact of the Taser handset to the surface of an individual; two closely spaced fixed electrodes pass the current pulses into the subject. This manner of application is usually classed as use in "stun" or "probe" mode; pain is the principal local physiological effect.

The police use X26 and M26 (26 watt) Tasers, which have been available operationally within the UK since 2003 and in use on volunteers and operationally for several years before that in the US and Canada. Prior to this, lower power Tasers were used in North America for about 20 years.

The medical implications of use of the Taser, in the operational trial by the Police, have been reviewed by an independent panel of clinicians, and their statement was part of the evidence considered by Government prior to the decision to authorise the adoption of Taser by the police and for this extended trial.

Classification of injuries

Unintended adverse effects from the use of Tasers may be classed thus:

- Primary: immediate or delayed consequences of electrophysiological phenomena resulting directly from the current flow in the body; it is surmised from the known effects of electric fields and currents on the body (for example, lightning, electric fence controllers) that the organ of principal concern is the heart;

- Secondary: physical trauma directly associated with Taser use, principally injuries from falls; the head is the principal area at risk;

- Coincidental: injuries received in the incident not directly related to Taser use e.g. baton use, self-inflicted wounds, gunshot wounds.

Life-threatening and serious injuries

The risk of life-threatening injuries and of other serious injuries, such as the loss of an eye, is considered to be very low. The intuitive high risk of serious head injury from an uncontrolled collapse is not manifested in practice; most subjects apparently collapse in a semi-controlled manner. A number of deaths have occurred in the North America during (or after) the use of Tasers; the deaths were principally attributed to illegal drugs consumed by the subjects, or to physiological manifestations of severe exercise and restraint, frequently compounded by drug use or cardiac disease. There has not been a death unequivocally attributable to the primary effects of a Taser.

Other effects

Falls may result in abrasions, scratches, minor lacerations, swellings and areas of redness on the skin. Minor secondary trauma from the penetration of the skin by the barbs will occur. Some of the barb penetrations will exhibit small circular burns; areas of skin where current has entered the body from barbs retained in clothing may also exhibit burns. These burns are likely to resolve within a few days, without complications. The barbs will have been removed by medical staff; they were 8 mm in length with a 1 mm high barb about 3 mm from the tip. They were not “fish-hooked” in shape.

There is no evidence of any long-term clinical effect of Taser use.

Pacemakers

The evidence for the damage or disturbance to implanted electrical equipment such as pacemakers is limited and equivocal - be aware of the potential risk of damage to the device.

Use in Great Britain

Up to the end of December 2006, over 200 persons had been subjected to the Taser in GB. There were no serious or unexpected medical consequences. All uses of Taser are reviewed by the independent medical panel.

For additional information
Please Contact

PSNI Operational Support Department
Chief Inspector, Conflict Management Development Unit
Telephone: 028 9065 0222 Extension 21021

Association of Chief Police Officers – Operational deployment of Taser

Information for hospitals regarding the medical implications of the use of the Taser on subjects

Introduction

The Police have commenced the operational deployment of Taser and are undertaking an extended trial in this area. This equipment has been made available to specially trained officers only.

Tasers are hand-held devices that propel two barbs at an individual. The barbs are intended to attach to the skin or clothing on the torso and/or lower limbs. The barbs are attached to the Taser handset by thin wires. A sequence of very short duration high voltage current pulses passes through wires connecting the handset to the barbs. The current flows into the body and results in a loss of muscular control and in pain. The device also enables direct contact of the Taser handset to the surface of an individual; two closely spaced fixed electrodes pass the current pulses into the subject. This manner of application is usually classed as use in "stun" or "probe" mode; pain is the principal local physiological effect.

Tasers have been classed as "low-power" (5-7 Watt) or "high-power" (14-26 Watt). Tasers have been in use for over 20 years, principally in the US. High-power Tasers have been available and in use on volunteers and operationally for several years in the US and Canada; the Tasers in use in the UK are classed as high-power and are principally the type X26[26].

The medical implications of use of the Taser, in the initial operational trial by the Police have been reviewed by an independent panel of clinicians, and their statement was part of the evidence considered by Government prior to the decision to authorise the adoption of Taser by police and for this extended trial.

The independent panel of clinicians has also reviewed all cases of use of the Taser since the commencement of operational use by Specialist Firearms Officers in April 2004.

Classification of injuries

Unintended adverse effects from the use of Tasers may be classed thus:

[26] www.taser.com

- Primary: immediate or delayed consequences of electrophysiological phenomena resulting directly from the current flow in the body; it is surmised from the known effects of electric fields and currents on the body (for example, lightning, electric fence controllers) that the organ of principal concern is the heart;

- Secondary: physical trauma directly associated with Taser use, principally injuries from falls; the head is the principal area at risk;

- Coincidental: injuries received in the incident not directly related to Taser use e.g. baton use, self-inflicted wounds, gunshot wounds.

It is notable that in two surveys from law-enforcement agencies in North America, more than half of the number of people confronted with the Taser were impaired by alcohol, drugs or mental illness. Some drugs and the metabolic consequences of muscular activity are believed to increase the susceptibility of the heart to potentially life-threatening arrhythmias. Experience in Great Britain also confirms that a significant proportion of subjects are intoxicated by illegal drugs or alcohol.

Deaths

Over the period of use of low-power Tasers, there were a small number of deaths associated with a large number of operational uses. Kornblum and Reedy discuss 16 deaths over a 4-year period in Los Angeles[27]. Other factors such as pre-existing heart disease and drug use were implicated in these deaths. The time interval between Taser application and death ranged from 15 min. to 3 days; 5 deaths occurred at 15 min., 3 at 30 min. and 3 at 45 min. On the available evidence, it is considered extremely unlikely that a death from primary injuries has been caused by a low-power Taser.

With regard to the high-power X26 and M26 Tasers, the risk of death from primary injury is low and in common with low-power Tasers, is certainly very much lower than that from conventional firearms. A small number of deaths has been reported to be associated with (but not necessarily caused directly by) use of the X26 and M26 Tasers. A report in 2004 by Amnesty International discusses deaths associated with Taser use[28].

There is considerable debate on the cause of death in fatalities arising during or subsequent to restraint and arrest in incidents involving Taser application. Although this is disputed in some quarters, the deaths are principally attributed by medical examiners to illegal drugs consumed by the subjects, or to physiological manifestations of severe exercise and restraint, frequently compounded by drug use or cardiac disease. The view of the independent medical panel in the UK is that there has not been a death unequivocally attributable to the primary effects of a Taser.

Deaths arising from the secondary consequences of Taser use have not been reported.

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[27] Kornblum RH, Reedy SK (1991). Effects of the Taser in fatalities involving police confrontation. J Forensic Sci. Vol 36, 434-448. For a rebuttal of some of the conclusions of this paper, see Allen TB (1992). Discussion of "Effects of the Taser in fatalities involving police confrontation". Letter to Editor. J Forensic Sci. Vol 37, 956-958.

[28] http://web.amnesty.org/library/pdf/AMR511392004ENGLISH/$File/AMR5113904.pdf

Life-threatening and serious injuries

The risk of life-threatening injuries and of other serious injuries, such as the loss of an eye, is very low. The probability of impact of a barb on the surface of the eye is considered to be low. The impact of barbs on the head has occurred operationally; non-operational evaluation trials on targets have also resulted in head impacts.

The intuitive high risk of serious head injury from an uncontrolled collapse is not manifested in practice; most subjects apparently collapse in a semi-controlled manner.

Other effects

Falls may result in abrasions, scratches, minor lacerations, swellings and areas of redness on the skin. Minor secondary trauma from the penetration of the skin by the barbs will occur. Some of the barb penetrations will exhibit small circular burns; areas of skin where current has entered the body from barbs retained in clothing may also exhibit burns. These burns are likely to resolve within a few days, without complications.

Barb removal

The current injection needles are 8 mm in length and have a 1 mm high barb about 3 mm from the tip. They are not “fish-hooked” in shape. It is believed that the normal practice in the US for removal of a barb from torso and limbs is to support the skin around the barb with fingers and withdraw the barb by gentle traction. Removal of barbs from areas such as the face and eye may require advice from appropriate clinical specialists.

Use on drug and cardiac impaired individuals

It is believed that drugs such as cocaine and pre-existing heart disease may lower the threshold for cardiac arrhythmias. Many of the 16 fatalities associated with use of the low-power Tasers in the Los Angeles survey had also taken PCP (phencyclidine) prior to the incident. PCP is also thought to be pro-arrhythmogenic but is infrequently encountered as a substance of abuse in the UK.

There is no experimental evidence that the aforementioned pro-arrhythmic factors increase the susceptibility of the heart to low or high power Tasers specifically, sufficient to cause an arrhythmic event. Nevertheless, there is sufficient indication from the forensic data and the known electrophysiological characteristics of the heart (and the effects of certain drugs on this) to express a view that excited, intoxicated individuals or those with pre-existing heart disease could be more prone to adverse effects from the high power Taser, compared with unimpaired individuals.

Admission for observation may be advisable.

Acidosis

Fish and Geddes[29] discuss the metabolic consequences of Taser use and the metabolic status of agitated or intoxicated individuals on whom the Taser may be used. Specifically, metabolic acidosis arising from physical activity (or clinical conditions) may increase the potential for ventricular arrhythmias particularly in the presence of phencyclidine and cocaine. Although

[29] Fish R, Geddes LA (2001). Effects of stun guns and tasers. Lancet; Vol 358; 687-689.

individuals in a quiescent, relaxed state after Taser use and exertion would be expected to compensate the metabolic acidosis quickly, those that remain agitated or are restrained in a way that could compromise normal breathing may remain vulnerable from potentially fatal quantities of ingested drugs. They recommend that the acid-base status of patients subjected to Taser should be checked if they are agitated or unwell, and steps should be taken to restore the normal status.

Pacemakers

The evidence for the damage or disturbance to implanted electrical equipment such as pacemakers is limited and equivocal – be aware of the potential risk of damage to the device.

Use in Great Britain

Up to the end of December 2006, over 200 persons had been subjected to the Taser in GB. There were no serious or unexpected medical consequences. All uses of Taser are reviewed by the independent medical panel.

For additional information
Please Contact

PSNI Operational Support Department
Chief Inspector, Conflict Management Development Unit
Telephone: 028 9065 0222 Extension 21021

RISK ASSESSMENT

Appendix D

Generic Risk Assessment

Taser Use

WORK ACTIVITY		HAZARD	RISK (H-M-L)	CONTROL MEASURES REQUIRED	IN PLACE	FURTHER ACTION REQUIRED	
Ref. No	Description					By when	Person responsible
1.	Taser use	Injury to body from probes. Injury from falling due to incapacitation, ignition of flammable / explosive material by spark. Injury to eyes caused by taser sighting device.	M	Only trained staff to instruct in the use of Taser, in accordance with the ACPO national Taser training package. Only authorised staff to use operationally.	ACPO training package	Review GRA Annually	By senior firearms officer
2.	Control of Taser and cartridges	Malfunction of taser or cartridge – leading to explosion or unexpected discharge.	L	Taser and cartridge to be maintained in accordance with manufacturers instructions and regularly inspected. Taser to be kept pointed in a safe direction. Taser should be kept securely when not in use. Taser and cartridges showing signs of wear or damage should be removed from use.	National Policy on inspection and maintenance		
3	Post discharge - care of subjects	Injury to persons due to probes receiving further pressure against subjects body or by probes being removed and used as a weapon	M	Persons should be prevented from exerting further pressure towards subjects body with probes after discharge. Officers have a duty of care to the wellbeing of individuals under their control. Consideration should be given to removing probes at the earliest opportunity to prevent further penetration or prodes being removed by subjects and used as a weapon against officers.	ACPO training package	Review GRA Annually	By senior firearms officer

Appendix D

Risk Assessment Taser
Taser Training

WORK ACTIVITY		**HAZARD**	**RISK (H-M-L)**	**CONTROL MEASURES REQUIRED**	**IN PLACE**	**FURTHER ACTION REQUIRED**	
Ref. No	**Description**					**By When**	**Person Responsible**
1.	Taser Training	Injury to body from probes. Injury from falling due to incapacitation, ignition of flammable material by spark. Injury to eyes caused by laser sighting device	M	Only trained staff to instruct in the use of taser, in accordance with the ACPO National Training package.	ACPO Training Package	Review GRA Annually	By senior firearms officer
2.	Control of Taser and Cartridges	Malfunction of taser or cartridge leading to explosion or unexpected discharge		Taser and cartridge to be maintained in accordance with the manufacturers instructions and regularly inspected. Taser to be kept pointed in a safe direction. Taser and cartridges showing signs of wear or damage should be removed from use	National Policy on Inspection and Maintenance		

3.	Tactical training	Eye injuries from cartridge discharges at close quarters Injury to eyes caused by laser sighting device.	M	Provide students with suitable eye protection, and require it to be worn			
4.	Control of Taser and cartridge during training	Risk of being effected by training cartridge (Blue) being mixed with live cartridge (Black and Yellow)	L	Ensure that all live cartridges are removed prior to commencement of training All tasers to be proved to be unloaded prior to issue of training rounds Student and instructor to visually check rounds are training rounds before issue			

Appendix E

Relevant Health and Safety at Work Legislation.

Health and Safety at work Legislation.

Since 1 July 1998, all police activities have been subject to health and safety at work legislation. This legislation is criminal law and breach of the legislation can result in criminal prosecution by the Health and Safety Executive (HSE) who are the enforcing authority.
The main pieces of health and safety legislation that cover the use of less lethal options are:-

The Health and Safety at Work (Northern Ireland) Order 1978
The Health and Safety (First Aid) Regulations (Northern Ireland) 1982
The Electricity at Work Regulation (Northern Ireland) 1991
The Personal Protective Equipment (PPE) Regulations (Northern Ireland) 1993
The Manual Handling Operations Regulations (Northern Ireland) 1992
The Police (Health and Safety) (Northern Ireland) Order 1997
The Police (Health and Safety) Regulations (Northern Ireland) 2000
The Provision and Use of Work Equipment Regulations (Northern Ireland) 1999
The Control of Substances Hazardous to Health (COSHH) Regulations (Northern Ireland) 2003
The Management of Health and Safety at Work Regulations (Northern Ireland) 2000
The Pressure Systems Safety Regulations (Northern Ireland) 2004
Workplace (Health Safety and Welfare) Regulations (Northern Ireland) 1993
Work at Height Regulations (Northern Ireland) 2005
Dangerous Substances and Explosive Atmospheres Regulations (Northern Ireland) 2003
Reporting of Injuries Diseases and Dangerous Occurrences Regulations (Northern Ireland) 1997

All near misses/ accidents in the workplace should be reported via force reporting systems.