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FELLOWSHIP REPORT – MATT PEPPER

THE WINSTON CHURCHILL MEMORIAL TRUST OF AUSTRALIA

Report by Matt Pepper - 2015 Churchill Fellow

To Research International Models and Innovation in Tactical Emergency Medical Support

Signed M. Pepper Dated 4/12/2015

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INTRODUCTION

This report sets out the findings of a Churchill Fellowship research trip that I conducted over 2 months in 2015, travelling through the USA, Canada and the UK to identify best practice in the field of Tactical Medicine. The research was focused on the prehospital response to high threat scenes such as terrorism, sieges and active shooter incidents, as well as the integration of Paramedics with law enforcement teams.

An overview of the trip will be detailed and the findings expressed in a thematic rather than chronological order. The themes are organised to express similar elements that have been clustered so that they can be seen in relevance to the Australian context. The overriding goal of this Fellowship is to distil the most appropriate and innovative models in tactical prehospital care so that a robust capability can be developed/enhanced in Australian Ambulance Services. Through my experiences overseas I have seen the lessons other agencies and individuals have learnt(often the hard way) and I hope that this report can bring these lessons to fruition locally.

ACKNOWLEDGEMENTS

The opportunity to conduct this valuable research would not be possible without the Winston Churchill Memorial Trust. On the occasion of the 50th anniversary of the foundation of the Trust it is a pertinent time to reflect on the huge contribution they have provided to Australian society. The sheer number and quality of the individuals engaged in Churchill Fellowships to conduct research in their fields over the past 50 years is humbling, and I am extremely grateful that this project was selected for its merit and potential. A huge thanks to the Trust and to the NSW Churchill Fellows Association for their support and the opportunity to conduct this project through such a wide range of settings outside of our borders.

I would like to acknowledge the support of New South Wales Ambulance in facilitating my availability for an extended period away in order to complete this research project. In particular the support of the Special Operations Unit and Superintendent Keith Williams has been instrumental in developing the concept of the project.

The generosity I experienced during my time conducting the Churchill Fellowship was both

unexpected and overwhelming. Every agency, organisation and individual I met went to great lengths to make me feel at home, and it was an absolute credit to the brotherhood of Emergency Services. I was picked up and dropped off at airports and hotels, taken to ice hockey games, shouted drinks, and had more accommodation, meals and coffees paid for than I can count. The collection of t-shirts, patches and challenge coins was almost heavier than my checked luggage by the end of the trip and I would like to express my massive thanks to all who hosted and met with me for making this Fellowship such an amazing experience. The camaraderie, expertise and resilience I saw amongst my Paramedic brothers and sisters is an absolute credit to the profession.

The most important acknowledgement is to my beautiful wife, Jo, who has unfalteringly supported me through all my endeavours and provides the stability that enables me to push forward. 2 months alone looking after our 3 boys is a massive achievement and no one can do it without complaint and as effortlessly as you Joey.

EXECUTIVE SUMMARY

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To research international models and innovation in Tactical Emergency Medical Support

In response to an evolving threat of terrorism and the subsequent potential for high threat scenes such as knife and firearms attacks, improvised explosive devices(IED's) and complex 'Mumbai Style' incidents, Australia has a current 'capability gap'. There is an urgent need for a well trained, expert, prehospital tactical response that founds itself on a scientific basis and established doctrine. Multiple examples of Ambulance Paramedics being staged outside of high threat scenes internationally has seen the preventable deaths of far too many victims of intentional violence. The USA, UK and Canada have reacted to this with varying models of Paramedic response that enables risk mitigation strategies to inject trained interagency teams into this type of incident to provide lifesaving interventions at or near to the 'point of wounding'. This Fellowship project has investigated a number of response models and the training, policy, equipment and personnel that underpin them, to find the following main themes that are relevant to the Australian context.

Consideration should be given in all Australian Ambulance services to establishment of three tiers of response capability to build preparedness for Hybrid Targeted Violence:

- **Level 1:** A core team of full time Tactical Paramedics who integrate with Police Tactical Groups(PTG's) and other first responders at high threat scenes, to respond in the warm zone and provide lifesaving interventions to casualties. The team should be able to respond in short timeframes, have appropriate individual Personal Protective Equipment(PPE), carry clinical equipment specifically for intentional mass casualty incidents and provide advice and leadership to other ambulance command and response elements.
- **Level 2:** A part time 'Uplift' capability of Paramedics trained in the response to Hybrid Targeted Violence who can work in the warm zone with law enforcement protection teams as a Rescue Task Force. Level 2 Paramedics may have some individual equipment, however PPE and further task specific kit will be issued prior to entering the scene. Level 2 can be called in from staff on duty shifts onroad as well as an on call register. These teams have the potential to provide cover for regional areas.
- **Level 3:** Awareness training for on road Paramedics in high threat incident response, covering the tactical, psychological and clinical fundamentals particular to this type of incident.

These capabilities must be supported by underpinning doctrine and evidence based training and curriculum, with ongoing maintenance of skills, knowledge and equipment.

PROGRAM

Date and Location	Overview of visit
10-16/09/15 Alameada County, California. USA	**Urbanshield**, 48hr scenario based SWAT exercise. - Observed, participated and instructed with the EMS Branch over the exercise period in high fidelity, immersive scenarios. Scenarios were mass casualty situations generated by violent terrorist attacks with the need for integration of Doctors, Nurses and Paramedics with SWAT teams to effectively treat patients in the 'warm zone'. All EMS participants initially trained for 1 hour in Tactical Emergency Casualty Care(TECC) concepts and skills such as tourniquets, chest seals, wound packing and rapid trauma assessment and triage. Training was then directly applied in high stress scenarios with explosions, smoke and large numbers of moulaged(Special effects make up and fake blood haemorrhage devices) patients. - Lecture series from subject matter experts on: • Improvised Explosive Device(IED) threats, overview of 2010 Times Square attack, vehicle based IED's, secondary IED's and improvised grenades. • Bank of West robbery overview, where multiple ambushes on police were effected and hundreds of rounds fired by the perpetrators from assault rifles during a 1 hour pursuit in urban and semi rural settings. • Nuclear/Radiological threat overview from US Nuclear Dept. Emphasised the small size of a radiological dispersion device/nuclear explosive device, can be as small as a coffee can with a devastating impact. Lecturer was a member of the team that miniaturised US nuclear devices to be contained in howitzer shells and later in briefcases. • Overview of Aurora Theatre Massacre by Aurora Police Chief.
16-22/09/15 Las Vegas, Nevada. USA	**EMS World Expo** Attended a number of lectures on active shooter response, high threat care, haemorrhage control, integration of law enforcement and paramedics and tactical medicine. Main learning points: - Evidence based guidelines for use of tourniquets and wound packing now published showing strong scientific basis for these interventions. (Bulger, 2014) Recommendation for wound packing training to be rolled out to all onroad prehospital first responders. - Bleeding fistulas another situation where tourniquets can be used. - Overview of alternate models of tactical medics, Alcohol Tobacco and Firearms(ATF) Special Response Team train their operators in medical care. Difficulties in maintaining skills, however helps bridge

	the gap between point of wounding and EMS rendezvous. More low acuity medical support to operators undertaken than high acuity trauma care. - Direct threat care pneumonic for immediate action: Fight/Flee, Uncontrolled haemorrhage, Communicate, Keep moving. - Increasing threat level and number of active shooter incidents seemingly having snowballing effect on moving previous non players into action as perpertrators. - Presentation and videos on Israeli bus attacks showing paradigm of 'getting off the X'. Minimal interventions in warm zone, then rapid extrication due to previous experience with secondary IED's. - Assisted with engineering workshop for Zoll on the Autopulse eCPR device, and met with duty Paramedic supervisor from **Las Vegas Fire Department(LVFD**) EMS.
22-28/9/15 Washington DC and Arlington County, Virginia. USA	- Visit with **Arlington County Fire Department(ACFD**) High Threat Director John Delaney: Overview of Rescue Task Force model, equipment used, and Unified Command model. - Visit with **Department of Homeland Security(DHS)** Ray Mollers, overview of medical first responder program.
28/9-1/10/15 Boston, Massachusetts. USA	- Visit to **Boston EMS Special Operations** unit. - Ridealong with Watch Supervisor, tour of Special Ops facility. - Tour of Marathon bombing site with a Paramedic who was involved in the reponse.
1-5/10/15 New York City, New York. USA	- Visit to **Fire Department New York(FDNY) Counter Terrorism Division**. Meeting with Sean Newman and Tim Carroll. - Tour of FDNY academy and EMS education facility
5-9/10/15 Oriskany, New York. USA	**Division of Homeland Security and Emergency Services(DHSES) State Preparedness Training Centre**, Advanced Active Shooter 3 day course. - Training in high threat concepts and interventions, then applied over multiple high fidelity, immersive scenarios with consequence based response from moulaged actors(ie incorrect treatment and they deteriorate and die). Scenarios develop over multiple day/nights to simulate a protracted 'Mumbai style' complex attack by multiple terrorists at multiple locations utilising a variety of attack methods.
9-14/10/15 Ottawa, Ontario. Canada	**Ottawa Paramedic Service**, Paramedic Tactical Unit(PTU). - Ridealong shift with PTU members. - Training day with PTU and Ottawa Tactical Police. - Tour of Special operations and regular operations facilities.

14-19/10/15 Toronto, Ontario. Canada	**Toronto Paramedic Services**, Special Operations. - Meeting with Leo Tsang, Director Special Operations and Mike O'Donnell. - Ridealong shift with Tactical Paramedic crews. - High risk warrant raid with Toronto Tactical Police and Tactical Paramedics, then response to a gunman in an apartment complex with same teams.
19-22/10/15 Oriskany, New York. USA	**Division of Homeland Security and Emergency Services(DHSES) State Preparedness Training Centre**, EMS Special Situations 2 day course. - Training on prehospital response to remote, high threat, austere environment scenes. Application of training in high fidelity scenarios in various outside and difficult settings such as woodlands, active shooter, rubble piles, unstable structures, smoke filled areas etc.
22/10-7/11/15 Sacramento, California. USA	- Meeting with Dan Smiley, **California Emergency Medical Services Authority(EMSA) Chief Deputy Director**: Overview of California statewide Tactical Paramedic program and active shooter response. - **International School of Tactical Medicine**, 2 week course. Subjects covered in theory, practical and scenario based education: - Principles and concepts of tactical medicine - Tactical medical equipment - Tactical gear and equipment - Tactical team concepts and planning - Slow and deliberate team movement - Introduction to the tactical pistol - Medical aspects of distraction devices - Dynamic building clearing techniques - Tactical casualty care - Medical aspects of wound ballistics - Haemostatics and tourniquets - Team health management - Medical aspects of clandestine drug labs - Forensics and evidence preservation - Introduction to the M4 Carbine - Chemical munitions in the tactical environment - Medical threat assessment and barricade medicine - Paediatric trauma management in the tactical environment - Anaesthesia in the tactical environment - Medical management of blast injuries - Advanced tactical pistol and M4 carbine - Advanced airway management

	- Environmental injuries - Weapons of Mass Destruction(WMD) in the tactical environment - Medical issues of less lethal weapons - Low light tactics and team movement - Advanced tactical pistol and M4 carbine field course - Special operations aeromedical evacuation - Medical management of canine emergencies - Disguised weapons and street survival - Legal and psychological aspects of officer involved shootings
9-10/11/15 Winterbourne Gunner, United Kingdom	**National Ambulance Resilience Unit(NARU),** Education Centre. - Presentation on HART response to Marauding Terrorism Firearms Attack(MTFA) with Dave Bull, head of NARU Education. - Observing on Incident Response Unit(IRU) Assurance course.
11/11/15 West Midlands, Birmingham, United Kingdom	West Midlands Ambulance Service **Hazardous Area Response Team(HART)** - Tour of facilities, overview of equipment and approach to Hybrid Targeted Violence.

"Out of intense complexities intense simplicities emerge"

- **Winston Churchill**

BACKGROUND AND CONTEXT

There are three major factors that drove the idea behind this Fellowship project: the evolving terrorism threat level, the events of the Lindt Café siege in Sydney 2014 and the current level of preparedness within New South Wales Ambulance and the rest of Australia to future terror attacks.

Terrorism Threat Level

In an environment of heightened security and a dramatic recent history of violence against civilian populations in Western countries, the likelihood of terror attacks on our soil have increased substantially. Planning for the immediate medical response to these horrific events must evolve with the change in threat profile.

The attacks of 9/11 saw the use of devastating terror in the form of enormous numbers of dead and injured and the destruction of national symbols. Similar attacks in London, Madrid and Bali have created an environment of heightened security, as well as a collaborative and proactive intelligence/law enforcement stance to prevent the proliferation and use in Western countries of IED's.

With the death of Osama bin Laden and a 'changing of the guard' in the conflicts in Syria and Iraq, new tactics have been used with horrific consequences such as lone wolf and paramilitary style small group attacks. The incidence of the lone wolf attack is increasing in prevalence, and the Federal Bureau of Investigation(FBI) has cited them as an area of grave concern in the operation of al Qa'ida.

There has been commentary citing the evolution of fifth generation warfare, where "super-empowered" individuals use open access internet materials to launch terror attacks or cyber operations. (Ramakrishna, 2014) McCauley and Moskalenko dissected the characteristics of lone wolf participants, and found that whilst radical opinion is common in Western society, it is only rarely converted into any violent form of radical action. (McCauley, 2014) They found the two factors moving the participant toward committing a lone wolf attack is the means and the opportunity. With an array of instructions and

direction now available on the internet, the means and the opportunity are increasingly accessible. Combined with the targeted radicalisation of individuals via the internet, a tactic used increasingly by Islamic State of Iraq and the Levant(ISIL), there is an emerging threat that encourages and enables attacks by domestic terrorists.

The 2 brothers who conducted the Boston Marathon Bombings in April, 2013 were not radicalised externally, but used online instructions from al Qa'ida Inspire magazine article "How to build a bomb in your mothers kitchen" to create the pressure cooker IED's that would kill 3 and injure 250 more. (Gunaratna, 2013) This is a prime example of the influence the internet can have on providing the means and opportunity to turn from radical opinion to radical action. Recent attacks in London, Norway, Paris, Tunisia, Canada and the United States have followed this evolution with lone wolf actors utilising knives, firearms, explosives or a combination of methods to cause maximum effect and media attention.

Australia has had an increasing number of executed and thwarted terrorism incidents in recent times. Since the Australian Terrorism Public Alert was increased to High in September 2014 there has been six foiled terror attacks as well as 3 that have been carried out, including the Lindt Café siege, the stabbing attacks on Melbourne Police and the shooting of a NSW Police accountant in Parramatta. (Business Indsider, 2015) The Australian Security Intelligence Organisation(ASIO) 2014-15 Report to Parliament states that terrorism is the number one threat to Australia's security, and warns that whilst recent attacks have been by lone actors with unsophisticated means, the possibility of a coordinated complex attack is very high. (Australian Security Intelligence Organisation, 2015) The attacks in Mumbai(2008) and the recent attack in Paris(2015) show the devastation that can occur when multiple sites are targeted by multiple terrorists using an array of weaponry and coordinate their strikes through mobile phone and internet connectivity.

A distinguishing feature of the Australian threat landscape is that a traditional active shooter incident(ASI) involving a school shooting or disgruntled employee is less likely due to restricted access by the general population to firearms. Whilst at times *opportunity* may

be there, the *means* may not, and the complete absence of ASI's since the introduction of the National Firearms Agreement would support this theory. (Chapman, 2013) Criminal links amongst terror groups and individuals, as shown in the acquisition of the weapon used in the shooting of a Police account in Parramatta, give a higher level of access to illegal firearms in Australia.

Martin Place – Lindt Café siege

In December 2014 a lone gunman took a large number of hostages in the Lindt Café in Sydney's Central Business District(CBD). The events that unfolded over the next day and night were extraordinary in the experience of all involved. After the Tactical Operations Unit(TOU) Police breached the café at approximately 2am, shooting and killing the gunman, a small team of Special Operations Paramedics entered the 'warm zone' wearing ballistic vests and helmets.

They instigated rapid treatment of the patients and then began to extricate them to the footpath outside as a Casualty Collection Point(CCP), where more SOT Paramedics assisted with treatment, alongside three Paramedic crews with stretchers from ambulances, which were staged approximately 100m away. The Paramedics were faced with 7 gunshot wound(GSW) patients of whom two died at the scene and one on arrival at hospital.

The gunman was also wearing a backpack with wires hanging from it. This caused a huge safety issue for all involved as it could not be ascertained whether an improvised explosive device was present until after all patients had been moved from the vicinity of the café.

There are a few issues that the incident highlighted for future improvement:

- SOT Paramedics conduct initial training however do not have the opportunity for regular, ongoing training in operating in high threat environments and responding to Hybrid Targeted Violence.
- SOT Paramedics have informal tactics, techniques and procedures(TTP's) around the way they operate in high threat environments, however there is little in the way of formal, written doctrine.

- Some of the equipment used was not in line with international best practice for the specific response to Hybrid Targeted Violence.
- Road crews who worked in the casualty collection point and transported patients to hospital from the scene had little or no training in working in high threat environments or treating multiple patients in mass violence incidents.

The safety of all Paramedics, even though operating in high threat areas, must be paramount. To ensure this, rigorous and ongoing training must be implemented and equipment reviewed to ensure it is the best fit for task.

Current preparedness within Australian ambulance

Terror attacks through the modern era have evolved in delivery, motivation, impact and tactics, just as the tactics used to counter them by state agencies have evolved in response. Whilst Police groups are looking to international best practice and implementing programs that evolve to the threat, the prehospital medical sector has a 'capability gap' that needs to be addressed. NSW Police has just begun training to bring the response to active shooter incidents in line with international best practice, with the Active Armed Offender policy to dictate officers team up and head towards the sound of shooting to eliminate the threat. (The Australian, 2015) There is no medical element to this training.

Whilst this has been the paradigm amongst Police in North America for a number of years, there has also been a shift in the deployment of Paramedics to provide lifesaving care earlier rather than staging until the scene is declared safe by Police. This shift has not occurred in Australia and leaves both the Emergency Services and the public in grave danger.

Military data has displayed a direct correlation between fatal combat injuries and time from point of wounding, with the majority dying within 30 minutes. (Carey, 1987) This preeminent study from Vietnam showed the following trend of combat deaths:
- Immediate: 42%
- Within 5 minutes: 26%
- Within 30 minutes: 16%
- Within 2 hours: 8-10%

This clearly demonstrates the ability of 'point of wounding' trauma care to save lives. The tenets of Tactical Emergency Casualty Care are based on the fact that waiting for scenes to be cleared and patients to be evacuated will cost lives that could otherwise be saved through the rapid application of prehospital medical interventions. The application of tourniquets to the point of wounding in Iraq and Afghanistan by US soldiers reduced mortality from extremity haemorrhage by 66% in 5 years. (Eastridge B. J.-G., 2012) The implementation of these lessons to the civilian sector will save lives if they are brought forward to the point of wounding where the most victims die in the early minutes. Staging ambulance resources outside of a Hybrid Targeted Violence incident will leave patients at high risk of death from preventable causes.

The purpose of this Fellowship is to identify best practice in prehospital medical response to high threat violent incidents in the context of an increasing threat level and change in the threat profile.

DEFINITIONS

The type of incident faced by first responders where mass violence, aggressive actors and elevated danger come together has struggled to be defined in the prehospital and response literature. During the course of the Fellowship I met with a number of different opinions on how the definition should be framed. All of these opinions were backed by well written, peer reviewed, published literature by the people that I met. The following table presents an overview of current definitions in the field:

Definitions of High Threat incidents:
- **Active Shooter Incident(ASI)**: An individual actively engaged in killing or attempting to kill people in a confined and populated area. (Blair, 2014)
- **Hybrid Targeted Violence(HTV)**: An intentional use of force to cause physical injury or death to an identified population through a coordinated and multifaceted approach using a multitude of conventional weapons and tactics (Frazzano, 2014)
- 'Mumbai Style' Complex Attack: A swift-moving, coordinated terrorist attack using either barricade- or siege-like assault methods by several operatives, enabled by wireless communications, converging on a series of targets (proximate or remote) in a high-density, urban area, combining an dynamic array of weapons, such as firearms and explosives, including the deliberate use of fire and smoke, in an attempt to maximize civilian casualties and media exposure, while confusing and overwhelming local responders over a possible multiday operational period if not neutralized. (Newman, 2011)

The high end of complexity of these definitions present an operational range of hazards, confronting first responders with a wide range of weapons and coordinated small unit tactics, requiring a more complex response strategy that blurs the lines between traditional law enforcement, fire, and EMS duties and responsibilities. The lower end could be one offender with a knife. In the Australian context, as outlined earlier in this report, I believe it is important to exclude the 'active shooter' term, as this has implications in the collective Australian psyche as an 'American' problem. Including these words in a definition invoke the image of a school shooter or disgruntled employee. Likewise the high end of definitions such as a Complex Attack can be too specific to large and overwhelming terrorism incidents.

To overcome these definitional issues this report will use the term **Hybrid Targeted Violence** as a standard; encompassing scenes from a single offender with a bladed weapon or a vehicle with intent to cause harm, right through to 'Mumbai style' Complex Attacks with multiple trained offenders at multiple sites using a variety of weapons systems in an organised manner. The implication in these scenes is that there is a high threat level, to responders as well as the public.

The term **High Threat Incidents** will also be used, and refers to the scenes where Hybrid Targeted Violence is taking place.

TEMS: Tactical Emergency Medical Support refers to the embedded medical support for SWAT Teams or Tactical Police. The goal of effective TEMS is to enable law enforcement to operate more efficiently, more effectively, and with reduced risk. TEMS ranges from embedded, SWAT trained medics carrying weapons and participating directly in the operation, to specialist Paramedics on standby nearby to the operation without weapons and not participating in law enforcement activities.

TCCC: Tactical Combat Casualty Care is a set of evidence based trauma protocols devised to provide life saving interventions during the appropriate tactical phase to address the burden of preventable deaths on the battlefield. Developed in 1996 for the US Special Forces community, TCCC was based on a study of preventable battlefield deaths in Vietnam that showed:

- 9% of preventable deaths were from extremity haemorrhage
- 5% of preventable deaths were from tension pneumothorax
- 1% of preventable deaths were from airway obstruction

Data from previous wars showed that 90% of battlefield patients died prior to accessing medical care. (Eastridge B. J., 2012) As a result of the implementation of TCCC across the US Military there has been a significant decrease in the case fatality rate in the setting of increasing injury severity. (Bailey, 2013) An example of the success of TCCC implementation is the widespread use of tourniquets. In the Iraq and Afghanistan theatres in 2003-2006, prior to widespread implementation of tourniquets, 7.8% of all US combat deaths were as a result of extremity haemorrhage. (Kelly, 2008) Due to the introduction of TCCC and ubiquitous tourniquet use across US forces in war zones, an 85% reduction in mortality was observed. (Eastridge B. J., 2012)

TECC: Tactical Emergency Casualty Care is the interpretation of TCCC to the civilian prehospital sector. Taking into consideration differences in injury patterns, evacuation times, pre existing comorbidities and varied patient populations, TECC brings the lessons from the battlefield to bear in civilian high threat environment's through a series of evidence based trauma guidelines.

In conventional emergency medical services protocols, scene safety is the first priority. However, this algorithmic tenet does not account for unsecure scenes. Civilian first responders are increasingly required to operate in high-threat environments. Traditional care guidelines are inherently limited in that they are solely patient- focused, without acknowledgement of the surrounding operational or tactical constraints. The TECC principles are a sound compilation of trauma guidelines, integrating operational and medical requirements into a consolidated set of best practices specific to high- threat prehospital care. As with the battle-tested concepts of Tactical Combat Casualty Care (TCCC), the TECC principles are just that: principles, not inflexible or rigid protocols. - Committee for Tactical Emergency Casualty Care. (Callaway, 2011)

EMS: Emergency Medical Services is an umbrella term in North America which covers the range of prehospital ambulance services. Although the term is not used traditionally in Australia this report will interchangeably use EMS, Paramedic and Ambulance Service to

describe the spectrum of prehospital medical services.

RESEARCH METHODS

In order to identify international best practice, the program was designed to utilise mixed methods in information collection. Meetings with individuals from various agencies gave overview of local models and capability however were constrained by a lack of experiential or observational learning. To overcome this I also conducted ridealongs with Paramedic teams, undertook courses and attended lectures and presentations. Agencies and departments were chosen primarily for the type of high threat response or tactical capability they utilised, so that the full spectrum of available models could be assessed to understand what elements will work best in the Australian context.

The experience of the Fellowship developed and influenced my thinking on many aspects of high threat care, and I have distilled this into the findings through this report. Whilst many of the ideas I have directly linked to the part of the Fellowship in which it was developed or discovered, much of the experience has more subtly effected my thinking, and contributed to the recommendations contained herein. Many conversations with experts in the field of tactical medicine have enriched my knowledge and built a good understanding of how a high threat program might focus training and capability to be well prepared for future attacks.

THEMES AND RECOMMENDATIONS

Across the agencies I worked or met with, a number of differing models of response to Hybrid Targeted Violence were apparent, summarised as follows:

Agency	High threat response model
California EMS(Various local EMS, county and private)	- Tactical medics undertake 80 hour medical and tactical course to qualify to work with SWAT teams. - Paramedics are armed and integrated into SWAT operations. - Tactical medics work onroad undertaking normal prehospital duties until SWAT callouts. - Active shooter response does not fall under the responsibility of Tactical teams, they are focused on the mission and SWAT members only. - Active shooter response being addressed with rollout of 8 hour training program on escorted warm zone care for all EMS. Decision on ballistic protection up to individual agencies.
Arlington County FD	- Rescue Task Force model for active shooter incidents - All medics trained in warm zone operations, with individually issued ballistic vest and helmet, as well as active shooter kits.
Boston EMS	- All medics trained for warm zone operations, with ballistic protection held by supervisors to be issued at an active shooter incident prior to escorted Rescue Task Force operation.
Toronto and Ottawa Paramedic Service's	- Tactical Paramedics undertake 4-6 week initial course and continuous ongoing training, support tactical police teams "in the stack", but are not armed. - Tactical Paramedics undertake normal onroad ambulance duties until tactical tasking arises. - Response to active shooter incidents undertaken by tactical medics only, regular operations Paramedics receive no warm zone training.
New York State: County and private EMS	- Varying models across county's, however generally tactical Paramedics are solely employed in TEMS roles, and Department of Homeland Security and Emergency Services provides courses to increase preparedness to all EMS. Coverage by these courses is certainly not complete and many EMS providers have little to no training for active shooter incidents or Hybrid Targeted Violence.
UK Hazardous Area Response Teams	- HART works in 6 man units responding to all difficult access or hazardous jobs. They carry ballistic protection and treatment gear specifically tailored for high threat incidents, and will enter the warm zone without police escort. - 'Uplift' capability of tactically trained staff, with a vehicle responding with ballistic PPE and specific treatment gear for them to enter warm zones in high threat scenes.

Taking the best elements of the models that I observed, the following is a recommended plan for the Australian context:

LEVEL 1: CORE CAPABILITY FOR PREHOSPITAL RESPONSE TO HIGH THREAT SCENES

The most effective overseas models that I worked with or observed during the Churchill Fellowship were those that maintained a fulltime capability for high threat response and trained often with their interagency partners. These agencies were able to be present in high threat incidents at or very near the point of wounding to provide lifesaving interventions.

A core team of responders should be raised from within each Australian Ambulance Service to provide a capability to respond effectively and safely with Police teams and work in the warm zone of high threat incidents. These incidents can range from single armed offender's right through to the high end of complexity, responding to Hybrid Targeted Violence.

The logical start would be Special Operations Paramedics from units such as NSW Ambulance Special Operations Unit or South Australian Ambulance Service Special Operations Response Team. These Paramedics have the following characteristics that make them well suited to transitioning to working in high threat scenes, integrating with Law Enforcement teams and providing care in 'warm zones':

- Special Operations Paramedics have already 'volunteered' for high risk work, by virtue of the other roles they undertake such as vertical rescue, CBRNE 'warm zone' patient access and fire ground operations.
- Many team members already have an extensive history of working with Police Tactical Groups(PTG's), bringing a familiarity with cover, concealment, tactical movement and Tactical Emergency Casualty Care(TECC) concepts and interventions.
- Special Operations Paramedics typically undergo job specific and fitness testing, as well as further training in austere and difficult environment patient care, both of which can aid in the progression to a full time tactical team.

In Australian services without a current Special Operations capability consideration should be given to the instigation of a tactical response capability out of their Paramedic pool. The current threat level is such that it could be considered negligent to not have a capability to insert well trained and equipped Paramedics to provide early intervention to the victims of high threat violence. Use of staff with military and law enforcement experience will value add substantially to the capability.

Consideration should be made for this team to:

- Provide an immediate response to Hybrid Targeted Violence both in support of PTG's and as part of the Ambulance plan for terrorism related events. An on call response should also be implemented to cover protracted and large scale high threat events.
- Support Police agencies in higher risk taskings such as warrants, raids, large scale events or riots; undertaking a TEMS role.
- Respond to ambulance tasking's that involve any weapons related violence. This model is used in both Canada and the UK.
- Follow the Ottawa model of undertaking ambulance transfers of any military personnel. This builds trust and improves the interagency working relationship.
- Seek out any opportunities to train and operate across agencies with military or law enforcement roles to expand the teams experience and relationships.
- Have access to clinical equipment that may not be used through the rest of the Ambulance Service. This may include equipment such as chest seals for the rapid treatment of any penetrating trauma in a warm zone, or use of extrication litters designed specifically for high threat environments. The nature of the work this team may be called upon to perform means that they should be given the freedom to custom build equipment inventories to some extent. Additionally it would provide a small cohort to test equipment being considered for the wider Ambulance Service.
- Potentially operate under a wider scope of practice when in a tactical environment. Examples of this are found in some agencies through the USA, Canada and the UK. The high rate of penetrating trauma may dictate that the implementation of interventions such as surgical airways may be mandated, or other interventions that

could be lifesaving in the context of high threat scenes. One agency that used this system was the Ottawa Paramedic Tactical Unit, which operated under a standard scope of practice in support of city and state tactical police groups, however when supporting special forces military units was able to operate with a much wider scope.

Training

- Initial training would be required of at least 1-2 weeks to gain equipment familiarity and mastery of TECC principles and skills. Ongoing training should be prioritised and preferably coordinated with PTG's training to maximise interoperability and teamwork. An excellent working model is that of the Ottawa Tactical Paramedic Unit, who have 2 members of their team attend training for the Tactical Police every Monday. Every Friday the PTU run Tactical Medicine training with the Police often attending to assist.
- Initial selection and recruitment should consider having a member of the state PTG present with veto rights to build both buy in and oversight.
- TEMS training based on curriculum from the Emergency Medical Services Association of California Tactical Paramedic program, the Canadian Chiefs of Canada Tactical Paramedic Training Competency Profile and the 2014 Competency Based guidelines for Tactical Medicine (Schwartz, 2011). This element of the training will be to standardise and improve the integration of full time Tactical Paramedics into law enforcement operations.
- High threat incident training in line with current TECC guidelines, adapted as best as practical for the circumstances and setting of the team. This should involve high fidelity, stress inoculation, immersive scenario based training. I undertook this form of training through numerous exercises and courses in the USA and it is by far the best way to prepare for the extremes of responding to Hybrid Targeted Violence.
- Psychomotor skills such as tourniquet application, rapid haemorrhage assessment and wound packing should be trained and drilled to the stage where these skills can be undertaken in difficult, sensory deprived environments in short timeframes.
- Due to the skills attrition of TECC interventions and the various skills to operate

effectively in high threat environments, continuing training should be undertaken on a regular basis. Interagency and scenario based training opportunities should be implemented wherever possible to maximise the benefit of the ongoing training.

- The use of TECC as an underpinning philosophy takes on the advantages inherent in an international, evidence based, regularly reviewed and updated set of guidelines.

Equipment

- Without exception every Tactical Paramedic Unit or individual I met during the Fellowship had their own issued equipment which they kept with them at all times on duty or on call, including ballistic PPE and clinical equipment. For a team that has a fulltime TEMS and high threat response capability it is highly recommended that they have individually issued equipment so that it is available at short notice to respond to Hybrid Targeted Violence incidents. This allows the equipment to be trained in by the Paramedic, so it can be fitted and setup for best use in a high threat scene.
- Ballistic PPE should be rated to Level IV in accordance with the US Department of Justice Ballistic Resistance of Body Armor NIJ Standard-0101.06. This allows for protection up to that of armour piercing rounds of .30 calibre, and is the standard most often worn by Police Tactical Groups. Any less than this standard is exposing Paramedics to a greater deal of risk than is necessary. PPE should also include a ballistic rated helmet and protective glasses.
- Consideration should be given to the use of Nomex gloves and balaclavas as well as use of fire extinguishers, due to the possibility of explosive environments. Tactical Paramedics in Ottawa were supporting Police during an Explosive Forced Entry(EFE) training day and a shaped charge accidentally formed a large fireball in a confined space, causing a number of casualties, including 2 Paramedics who spent many days hospitalised in ICU. Since then Nomex balaclava's are standard issue and required as PPE on all tactical operations. Tactical Paramedic teams also carry "Cold Fire Gen 3 Tactical Quick Response extinguishers".
- Standard issue Ambulance uniforms will not be appropriate for the work environment of tactical Paramedics. The requirement for noise and light discipline,

use of concealment and environmental hazards such as explosions, obstacles and broken glass require a protective and specialised uniform. The standard across most agencies I visited is a similar uniform to regular operations, with subdued insignia and no reflective stripes or tape. The reflective stripes on some uniforms can be removed from Velcro patches when transitioning from regular operations to tactical environments. Some agencies also utilize a "BDU" or "under armour" style uniform shirt, which is designed for comfort when used in conjunction with a plate carrier for ballistic PPE.

- Clinical equipment would ideally follow the recommendations of the Committee for TECC. This would indicate the use of kits on the providers person for indirect threat(warm zone) care, with the following as a minimum:
    - An effective, non bulky tourniquet such as the CAT, SOFFT-Wide or SWAT-T.
    - Pressure bandages and wound packing gauze, with haemostatic agent if allowed under local guidelines/protocols.
    - Decompression needles
    - Nasopharyngeal airways
    - Chest seals
- For further, evacuation or extended TEMS care a kit should be available with a full complement of Paramedic clinical equipment.

LEVEL 2: PART TIME CAPABILITY FOR PREHOSPITAL RESPONSE TO HIGH THREAT INCIDENTS

The Hazardous Area Response Teams(HART) of the UK Ambulance Trusts maintain the capability to respond to a Hybrid Targeted Violence incident, however would usually only have approximately 6 staff on duty at any one time in any one trust. To enable the capability to respond effectively to a terror attack of a large or protracted nature there is also an 'Uplift' capability. This consists of regular on road Paramedics who have undergone further training specifically for high threat response, with yearly ongoing training to maintain skills. The teams are known as Ambulance Intervention Teams(AIT) and provide a

valuable resource to provide enough skilled prehospital providers in a large scale terror attack. The recent attacks of November in Paris show that there is a potential for huge numbers of patients in unsecured locations requiring treatment, and the ability to call on the resources of a team like AIT provides substantial boost to Ambulance capability.

The team could be raised through an Expression of Interest(EOI) to onroad Paramedics to receive additional training and be oncall for high threat, large scale incidents where they could move to a predesignated point, be issued ballistic PPE and additional clinical equipment and be briefed. From there Uplift Paramedics would form into teams with law enforcement and perform a Rescue Task Force. This would entail moving under the direction of a unified command into areas which had been cleared but not secured, and begin treating patients with rapid lifesaving interventions only. Once supplies were exhausted or all patients treated, extrication would be initiated to move patients to casualty collection points.

Additionally the Uplift team members once called in could site and staff CCP's outside the warm zone, as well as provide relief and standby for teams already working in the warm zone.

In rural areas having an Uplift capability could provide a response to potential terror attacks or other intentional mass casualty incidents. Often in more remote areas there would be a significant delay in getting any specialist prehospital resources onscene, and the part time tactical Paramedics could close this gap. In NSW Ambulance regional areas have Rescue teams, who could undergo the Uplift training as another part of their skill set. Similar teams in other states should be sought out as well.

Training

- Initial training can be shorter than for Level 1, as there is no requirement for TEMS and the focus is specifically on response to Hybrid Targeted Violence. The training should, however, be standardised to the Level 1 competencies in provision of TECC and working in high threat environments. Similiarly high repetition skill training should progress into high stress, immersive scenario based training.
- Continuing training will be required, however not to the same frequency as

Level 1. 1-2 days every 6-12 months should be sufficient to maintain skills and knowledge.

Equipment

- The requirement for individually issued equipment is not high for a part time high threat capability. HART stores ballistic PPE and clinical stores specific for TECC interventions in a truck which can be mobilized to a scene as the AIT is being called in.
- TECC 'Grab bags' should be personally issued with chest seals, tourniquets, wound packing gauze or haemostatic agents and some basic airway adjuncts. These bags give the Paramedics the ability to respond if they are in the first response to Hybrid Targeted Violence.
- Standardising equipment used with Level 1 would provide a logistic and interoperable advantage.

LEVEL 3: HIGH THREAT FAMILIARITY TRAINING

The traditional designation of a scene into zones of danger is used across many types of scenes encountered by Prehospital providers. Most commonly Hazardous Materials(Hazmat) or Chemical, Biological, Radiological, Nuclear or Explosive(CBRNE) emergencies utilize the terminology of hot, warm and cold zone, as does the rescue approach to a motor vehicle accident(MVA).

The use of the zone approach in a diverse range of hazardous area environments has become normal parlance, with a hot zone or direct threat area being one where active shooters or explosive devices create an immediate threat to life. The warm zone or indirect threat area is unsecured but cleared for threats, and the cold zone or evacuation area is clear of all threats and secured. In the traditional approach Paramedic teams would stage in the cold zone at a high threat scene until it was cleared by other agencies and declared a cold zone.

The model established to respond to active shooter incidents and enter the warm zone in Arlington County Fire Department(ACFD) is that of a Rescue Task Force. I was able to observe the way this model is established in the county, with every Fire fighter/EMT

equipped with Ballistic vests as well as active shooter grab bags stowed in the cabin of the fire trucks. As ACFD is a small service the ability to train and equip all members is an easier undertaking than in a large service such as NSW Ambulance with upwards of 3500 Paramedics. Smaller services may be able to train all Paramedics in Level 1 or 2 of these recommendations, and fully equip their staff with PPE, however the larger services will most likely find the costs involved prohibitive.

Whilst not every Paramedic in every service in Australia needs to be trained to Level 1, there is a clear need for awareness training on high threat incidents for regular operations. There is a strong case based on the following rationale:

- Preparedness for high threat incidents, particularly terrorism generated mass violence
- Psychosocial protection of first responders
- Generalisability of training to a range of case presentations

Preparedness: There are, unfortunately, numerous examples of where a lack of training in the prehospital response to high threat scenes exposed staff to great risk or caused preventable death. Each of the following examples were described to me by Paramedics and Police who were present at the incidents:

2011 IHOP shooting, Carson City:

After a gunman entered an IHOP Restaurant and shot a number of customers, one of the responding law enforcement officers identified a patient requiring immediate intervention for a bleeding, extremity gunshot wound. The Officer handed the patient over to an Ambulance crew and continued clearing the building. At a later time the patient was noted to be deceased due to exsanguination with no tourniquet placed, in the care of EMS.

- Although no Paramedic would ever want to allow a preventable cause of death due to lack of appropriate intervention, without training they may not be armed with the knowledge and ability to do so in the environment of high threat trauma care.

2013 Boston Marathon bombings:

Boston EMS had staged staff for the Marathon event, and when the first IED exploded many of these staff began treating blast victims and responding into the area of damage. The second IED was intended to be set off 5 minutes after the first to maximise the effect on first responders, however it was detonated approximately 30 seconds after the first. The route for EMS resources into the area would have taken them straight past the second IED.

- This highlights the fact that zone designation cannot often be well controlled and the first staff onscene will usually not be specialist Paramedics.

2014 Ottawa Parliament Hill shootings:

Shortly after a gunman killed the Canadian Soldier at Parliament Hill, an onroad, non-specialist Ambulance attended to him at the point where he had been shot. This area had not been searched or secured, and with a gunman at large would certainly be designated a warm zone.

- Regardless of the intention to stage Ambulance resources they often will enter indirect or even direct threat areas.
- This may happen inadvertently due to lack of situational awareness or deliberately due to a Paramedic's desire to help. Awareness training on the dangers of high threat scenes and the interventions specifically required will significantly build preparedness amongst non-specialist Paramedics who are likely to be first onscene.

Psychosocial: A survey of Canadian Paramedics found that the most emotionally distressing scene that they might encounter is that of terror attacks and malicious violence, more than doubling the emotional impact of the event. (Kollek, 2010) Considering the burden of Post Traumatic Stress Disorder and suicide amongst Paramedics, there is a level of responsibility to ensure that steps are taken to protect the responding emergency services psychologically as well as physically. A paramedic involved in the school shootings at Columbine in 2001 who inadvertently entered the warm zone and was exposed to a high level of potential threat was noted to be off work indefinitely due to psychological issues. (Mell, 2005)

Awareness training to equip first responders with the skills and knowledge to competently and safely respond in high threat incidents can have a significant effect on inoculation against the psychological burden that violent settings bring.

A pilot 4 hour Active Shooter Incident(ASI) training program for Paramedics in Boston saw significant improvements in attitudes, perceptions and comfort levels to integrate with law enforcement teams and enter the warm zone to provide lifesaving interventions at the point of wounding. (Jones, 2014) Ninety three percent of Paramedics that undertook the training stated that they felt comfortable and prepared to work in the warm zone of an active shooter incident.

Meeting with a number of Paramedics in Boston EMS and discussing the training I had the strong impression that they felt well prepared psychologically and practically for future high threat incidents. This was replicated across a number of Paramedics I interacted with who had undergone some form of high threat training including New York, Alamaeda County, Arlington County, Sacramento and Las Vegas.

All Australian Paramedics should receive a form of similar training to this program as a preparedness primer for events that will undoubtedly be beyond the normal experience of usual prehospital care.

Generalisability: The concepts of Tactical Emergency Casualty Care are generalisable to many scenarios that first responders face on a daily basis. Undertaking further training in this field enables Paramedics with a solid approach to penetrating trauma(shootings, stabbings, industrial accidents), as well as scenes with safety issues such as MVA's, and excited delirium patients. Undergoing training to develop responder's skills with rapid trauma assessment and haemorrhage control can have great benefit in areas that may not be immediately obvious.

An example was demonstrated at a lecture I attended at the EMS World Expo by Dr Peter Taillac. A case study was described where a provider used a tourniquet to stop life threatening haemorrhage from a patient's fistula. The tourniquet had been provided during active shooter training the EMT had undertaken and he cited this training as valuable in recognising the need and the ability to undertake the intervention.

In the current environment of increasing violence against Paramedics, the usefulness of a high threat training package would be very pertinent. Recognition of danger, ability to move tactically, tools to maintain situational awareness and the skills to undertake lifesaving interventions both on the patient and oneself are of great relevance to this issue.

The following table outlines suggested core competencies that should be covered in high threat familiarity training:

High Threat Familiarity training core competencies:

- Current threat profile and terrorism characteristics
- Communication with Police and unified command principles
- Use of Casualty Collection Points, siting considerations
- Cover, concealment, tactical movement, maintaining situational awareness
- TECC concepts and interventions(eg. Tourniquets, pressure dressings, chest seals, wound packing, rapid triage, rapid extrication and carrying techniques)
- Awareness of IED's, Secondary IED's, Vehicle based IED's
- Scenario based training to consolidate learning points, preferably with high fidelity simulation and stress inoculation

UNIFIED COMMAND

The response to high threat incidents requires an integrated, unified approach. The Inter Agency Board recommends that Unified Command is a 'bottom up' concept with the first responders beginning the process and handing off up to further scene managers as the incident progresses.

Consideration should be made for a separate module either during the Level 3 training or in a separate training package that addresses the specific requirements of a unified command approach to Hybrid Targeted Violence. Targeted training for scene commanders should be incorporated to provide a level of understanding and familiarity to those Ambulance staff that will be assuming command roles as scenes progress.

DISSEMINATION AND IMPLEMENTATION

The aim of this fellowship was to identify best practice in the area of high threat prehospital medicine. To disseminate these findings the following strategies will be utilised:

- Submission for publication of a research paper on Australian preparedness for the prehospital response to Hybrid Targeted Violence.
- Presentation of the findings to appropriate interested parties, beginning with management in my own service.
- Identification of members in other Australian Ambulance services who can champion the cause locally and push for the implementation of the findings.
- Application to present the findings at relevant Paramedic conferences.
- Dissemination of the report to relevant parties to create a case for change.
- Article in NSW Ambulance monthly magazine on the trip and findings.
- If approved, the raising of the three levels of training and equipment in NSW Ambulance as laid out in this report. Any curriculum, doctrine and TTP's created through this process will be disseminated out to other Ambulance Services for their own use in building tactical medical capability.

If implementation of the plan for capability and training becomes a reality then there is a multitude of training materials, guidance documents and anecdotal findings that can be incorporated into the establishment of doctrine and curriculum.

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