Operational K9s (OpK9s) consists of Law Enforcement canines of all disciplines (Federal, State and Local), Military Working Dogs, Force Protection canines, and Search and Rescue (SAR) canines. These animals have continuously proven to be a force multiplier in the success of many military, law enforcement, SAR, and humanitarian operations. The Operational K9 selflessly dedicates their lives to protect us, defend us, and lead the way in times of danger. Current active shooter, military operations, and disaster events over the past couple of decades, and even more recently, have increased the demand for these invaluable operators. The increased utilization of these operational working animals across the globe has also subjected them to an increase in risk of injury and death while in the line of duty. Similar to their human counterparts, working animals deployed in a tactical or high threat environment also remain at high risk for suffering life-threatening traumatic injuries.

Veterinary personnel and resources for provision of out-of-hospital, point of injury care for injured K9s remains grossly lacking as veterinary personnel do not deploy with a K9 team or as part of a rapid Tactical EMS response. Dedicated civilian EMS systems and evacuation assets do not currently exist for injured animals, nor are most civilian EMS providers (EMSPs) trained to render emergency medical aid to injured animals. This combined lack of readily available point of injury (POI) care and high-risk of traumatic injury are a recipe for high mortality rates for these invaluable K9s. As an irreplaceable member of the team, OpK9s require access to the same out-of-hospital care equal to the best human pre-hospital trauma care standards available in order to ensure their continued survival and value to our society.

Another major hindrance for providing timely and appropriate prehospital care to injured OpK9s, lies in that lack of knowledge and training OpK9 Handlers and EMSPs have in K9 first responder care. In the field, the handler, Tactical EMS (TEMS) medic or other LE Officer (LEO) assumes the roles of an OpK9 First Responder. Unfortunately, civilian OpK9 Handler courses dedicate very little, if any, time towards teaching OpK9 health and welfare, anatomy, or first aid to Handlers. Many civilian handlers are not even taught how to perform a basic physical examination or assess the basic vital parameters (pulse rate, respiratory rate, capillary refill time, etc.) on their OpK9 partner. Without this basic knowledge, it becomes impossible for handlers to delineate normal from abnormal or know when or how to intervene when their partner is in trouble.

Similarly, EMSPs receive little to no training in basic K9 first aid, let alone emergency trauma care. When EMS providers are faced with providing prehospital care to OpK9s, they have to fall back on their medical knowledge of humans; however, distinct anatomic and physiologic differences (e.g. sites for venous access, insertion sites for needle decompression, technique for endotracheal tube intubation, etc.) between the two species prohibits the direct extrapolation of human medicine to OpK9s. Some of the issue surrounding the lack of training for EMSPs falls upon the controversies surrounding the following: lack of EMS scope of practice for non-human patients; the state’s Veterinary Practice Acts (VPA) language regarding, “practice of veterinary medicine without a license”; and the potential concern for the transmission of zoonotic pathogens when handling animals.
The **scope of practice** for each EMSP level is defined on a State by State basis and is further defined by the medical director for each EMS organization. Currently, Colorado, Ohio, Wisconsin, and Maine have approved legislation granting limited authority to state EMSPs for rendering voluntarily emergency preveterinary care to dogs (to include Operational K9s) and cats. The exemptions for practicing veterinary medicine without a license is governed by each state’s VPA. At present, only Colorado’s VPA has language that specifically addresses the administration of emergency prehospital care to injured OpK9s by non-veterinary, paraprofessionals; however, many of the state’s VPAs has language that could be subjectively interpreted as allowing prehospital care by non-veterinary personnel under a “Good Samaritan” clause. Further discussion regarding the current issues surrounding EMS scope of practice and stipulations cited by current VPAs that limit EMS agencies from providing injured OpK9s prehospital care are addressed in the initial 2015 white paper entitled, “Challenges Facing Prehospital Care for Operational K9s Injured in the Line of Duty” available at: [http://www.k9tecc.org/assets/Operational_K9_TECC_Challenges_White_Paper_Final_dated_29_Sep_2015.pdf](http://www.k9tecc.org/assets/Operational_K9_TECC_Challenges_White_Paper_Final_dated_29_Sep_2015.pdf)

**WHY SHOULD WE TRAIN HANDLERS AND FIRST RESPONDERS IN POINT OF INJURY CARE?**

Advanced medical interventions and knowledge are not required to save K9 lives in the field. Similar to human trauma casualties, the majority of life-threats in OpK9s may be mitigated with implementing basic first aid techniques that can be taught to all first responders (e.g. hemorrhage control via direct pressure and pressure dressing, needle decompression, etc.) On the battlefield, a retrospective analysis by Baker et al. revealed that MWDs suffering gunshot wounds were successfully treated for life-threatening injuries at the point of injury (POI) by non-veterinary, paraprofessionals. Similarly, accounts of other OpK9s injured in the line of duty being provided life-saving medical care in the field by non-veterinary personnel have also been reported from other non-military organizations. It remains intuitive that without these basic life-saving first aid interventions, many of these K9s would have succumbed to their injuries before making it to a veterinary treatment facility. Once again, considering the invaluable role OpK9s play as a force multiplier, it remains imperative that K9 units as well as veterinary and EMS communities partner together to ensure emergency prehospital care is readily available for OpK9s injured in the line of duty.

It is known that the time elapsed between the POI and reception of definitive care plays a critical role towards influencing overall survival; this period of time has become known as the “Golden Period”. During this time, interventions to mitigate circulatory shock and traumatic injuries take priority to ensure the best survival potential for the casualty. For severely injured trauma patients (e.g. severe head injury, massive internal hemorrhage), it is imperative to limit scene time to as short as possible and direct efforts to hasten transport and evacuation to definitive care. On the human side, steps have been taken to provide LE Officers with basic medical training and equipment (e.g., tourniquets, hemostatic gauze, etc.) to provide self- and buddy-aid to injured officers at the POI. Various accredited courses [Tactical Combat (or Emergency) Casualty Care (TCCC / TECC) and Law Enforcement First Responder (LEFR)] have been developed to train and certify LE and EMS/Fire personnel to provide POI care while under a high threat situation.
WHAT ACCREDITED COURSES EXIST FOR K9 TECC/TEMS OR VETERINARY PHTLS?

Unlike in human EMS, standardized, accredited training programs [e.g. Prehospital Trauma Life Support (PHTLS)] specific to veterinary casualties do not currently exist. The American College of Veterinary Emergency and Critical Care, Veterinary Committee on Trauma (VETCoT) recently published, “Best Practice Recommendations for Prehospital Veterinary Care of Dogs and Cats” (Hanel R, Palmer L, et al. J Vet Emerg Crit Care. 2016 Mar-Apr;26(2):166-233.); these are considered relatively equivalent to the human PHTLS guidelines. These resources do not specifically address provision of care in a tactical, high threat environment.

The K9 TECC working group was formed in 2014 under the auspice of Committee of Tactical Emergency Casualty Care (www.c-tecc.org) with the goal of developing the best practice prehospital care recommendations for Operational Canines injured in the Line of Duty. The working group consists of experts in the field from veterinary medicine, human EMS/Fire, tactical medicine, military Special Operations, local and federal law enforcement, and search and rescue. The K9 TECC working group also takes on the role of evaluating best practice recommendations for field equipment and first aid kits, defining prolonged field care best practice recommendations, and fostering scientific research towards improving Operational K9 performance and health. (Palmer et al., JSOM 2015)

In 2016, the K9 Tactical Emergency Casualty Care Working Group Recommendations were peer-reviewed and accepted by C-TECC; these guidelines are available:
http://www.k9tecc.org/resources.html

RECOMMENDED TRAINING FOR OPK9 HANDLERS AND FIRST RESPONDERS

The K9 TECC working group recommends that all OpK9 Handlers, EMSPs and other first responders that support OpK9 Teams receive at least four to eight hours of basic OpK9 medical training. The training, at minimum, should include:

- Basic K9 comparative anatomy & physiology
- How to approach, restrain, and work around uninjured and injured OpK9s
- How to conduct a systematic thorough physical examination
- How to obtain and monitor Vital Parameters
K9 TECC Specific Training:

The Intent of K9 TECC:

K9 TECC is based on and in accordance with the principles of human Tactical Emergency Medical Support (TEMS) and Tactical Emergency Casualty Care (TECC). TEMS/TECC teaches EMS and other prehospital providers how to respond to, care for, and decrease preventable deaths in a civilian tactical or high-threat environment.

- Provide the best medicine, at the right time … Even the appropriate medicine, provided at the tactically wrong time = Bad Medicine and High Probability of Death.
- OpK9 Handlers & First Responders must be capable of providing basic first aid until they are relieved by veterinary personnel.

K9 TECC Goals:

The goal of prehospital K9 TECC interventions is to eliminate THE MAJOR PREVENTABLE CAUSES OF DEATH with the intent of only providing the medical or surgical procedures necessary to manage problems that immediately threaten life, limb, or eyesight, and to prepare the OpK9 for evacuation to definitive veterinary care. The K9 TECC guidelines and principles are intended to provide interventions that are affordable and sustainable and that require minimal training and minimal additional resources to what the first responder already carries with them to treat themselves or other human casualties.

K9 TECC Course Scope:

The K9 TECC course intends to afford Handlers, non-veterinary First Responders and Veterinary personnel with the knowledge required to provide basic, life-saving veterinary prehospital trauma care under tactical or high-threat situations. The course follows the principles, guidelines and mission of the K9 Tactical Emergency Casualty Care (K9 TECC) working group. It incorporates current TCCC and TECC guidelines with adaptations relative to canine anatomy and physiology. Training includes didactic and hands-on, scenario-based training. The course consists of didactic and hands-on training that focuses on prehospital care for tactical and non-tactical emergencies common to OpK9.

Training should include an additional four to eight hours specifically-related to the concepts of K9 TECC to include the appropriate non-veterinary first responder application of K9 TECC in relation to active threats. The skills trained will depend upon the scope of practice and level of training of the responder (e.g. licensed paramedics may be trained in advance techniques such as IV/IO catheterizations and surgical cricothyrotomy); recommendations are provided in the K9 TECC guidelines linked above.

K9 TECC Phases of Care

TEMS/TECC recommendations are divided into three DYNAMIC Phases of Tactical Medical Care based upon maintaining situational awareness (Know your Surroundings!!):

- Direct Threat Care (Hot zone)
  - Care rendered while under attack or in adverse conditions.
  - 90% Tactics and 10% Medicine
- Indirect Threat Care (Warm Zone)
  - Care rendered while the threat has been suppressed, but may resurface at any point.
  - 50% Tactics and 50% Medicine
- Evacuation Care (Cold Zone)
  - Care rendered while the casualty is being evacuated from the incident site.
  - 10% Tactics and 90% Medicine
K9 TECC Primary Assessment = $M^3$-A-R-C-H$^2$ – P-A-W-S

Direct Threat Care:
- **Muzzle**
- **Move** – (Get off the ‘X’)
- **Massive Hemorrhage**: Direct Pressure

Indirect Threat Care
- **Massive Hemorrhage** (Recheck) + Dressing / Hemostatics
- **Airway**: Position Head +/- Surgical Airway (Cric, Trach)
- **Respiration**: Chest Seal +/- Needle Decompression
- **Circulation**: Recheck for major bleeds + Address Shock
- **Hypothermia**
- **Head Injury**

Evacuation
- REASSESS – M-A-R-C-H$^2$
- Add in: **PAWS** (Pain, Antibiotics, Wounds, Splinting)
- Techniques for dragging and carrying victims to safety.
- Full Vitals + Full Head to Tail + Full Interventions

K9 TECC Agenda Topics:
- Phases of Medical Care (Direct Threat, Indirect Threat, Evacuation)
- Hemostasis / Hemorrhage control
- Airway management (+/- Advanced Airway Procedures)
- Respiration – Open Chest Wound, Needle Decompression
- Circulation and Shock Management
  - Prevent hypothermia
  - IV + IO Catheterization
  - Fluid therapy
- Stabilization of Head / Spine Trauma in the field environment
- Gastric Dilatation & Volvulus (GDV) (aka. “Bloat”)
- Heat & Cold Injuries
- Expedient lifts/moves/carries and evacuations techniques

Additional consideration for expanded training should be given to the following, depending on the missions of the K9 team(s) and EMS agencies:
- Non-Tactical Related Injuries / Techniques
  - Environmental Injuries
    - Altitude
    - Bites / stings and envenomation
  - Field Management of Wounds and Fracture & Bandaging
  - Burn Wounds and Ocular Injuries
  - K9 CBRN Decontamination procedures
- Basic concepts of triage and mass casualty management
• K9 Pre-Mission Threat Analyses (MTA)
  o Identifying locations and capabilities of local Veterinary Treatment Facilities
  o Identifying evacuation routes and assets for injured K9s
    • Traditional fire/EMS transportation versus rapid transport via police or other non-medical vehicles
• Scene Size-up – Scene Safety
• Standard precautions/principles of body substance isolation (BSI)
• Scenario-based practical applications

★REFRESHER TRAINING: it is highly recommended that K9 Handlers and non-veterinary paraprofessionals receive at least four to eight hours of refresher or continuing education training in K9 FIRST RESPONDER care on an annual basis★
## K9 TECC Phases of Care – MARCH² PAWS

### Direct Threat Care
- Personnel remain engaged against the threat before caring for K9
- Attend to human casualties first
- Rapidly Move the K9 to safety
- Muzzle the K9 if conscious and no upper airway obstruction present
- Rapidly evaluate the injured K9 for massive hemorrhage
- Control Massive hemorrhage control of any life-threatening bleeds:
  - Direct pressure
  - Pressure bandage
  - Avoid windlass tourniquets (TQ)
  - Consider Elastic TQ (e.g. SWAT-T™)

### Indirect Threat Care
- CPR only in with hypothermia, electrocution, or drowning
- Muzzle if no suspected airway issues or heat stress; Handle cautiously if mentation is altered; K9 may have increased aggression;
- Reassess Massive Hemorrhage
  - Direct pressure,
  - Hemostatic agents,
  - Pressure bandage
- Airway management:
  - Clear oral cavity
  - Manual Airway Maneuvers
  - Advanced Airways
    - ETT/OTT
    - Needle/Sx Cricothyrotomy
- Breathing management:
  - Open chest wound and PTX management:
    - Chest seal
    - Burp Seal
    - Needle Decompression
  - Assess vital signs
- Circulation
  - IV/IO
  - Fluid Resuscitation
  - TXA / EACA
- Hypothermia Management
  - Minimize exposure to elements
  - Apply survival blanket; use any cover available
- Head Trauma Management
- Pain / Analgesia
- Antibiotics
- Wounds
  - Bandage open abdominal wounds;
  - moisten / protect exposed organs and bones
- Splint Fractures
- Eye trauma / irritation
  - Flush
  - Protect
  - Secure impaled objects
- Burn injury management
  - Remove burning process
  - Cover with dry, sterile dressing

### Evacuation
- Reassess all interventions
- Massive Hemorrhage
- Airway management:
  - Continue as for ITC
- Breathing:
  - Seal open chest wounds
  - Manage PTX and tension PTX as for Tactical Field Care phase
  - Provide supplemental oxygen if available
- Circulation
  - Ongoing shock therapy
- Hypothermia Management
  - Minimize exposure to elements
  - Apply survival blanket; use any cover available
- Head Trauma Management
- Pain / Analgesia
- Antibiotics
- Wounds
  - Bandage open abdominal wounds;
  - moisten / protect exposed organs and bones
- Splint Fractures
- Eye trauma / irritation
  - Flush
  - Protect
  - Secure impaled objects
- Burn injury management
  - Remove burning process
  - Cover with dry, sterile dressing
K9-IFAK

On a final note, care for the K9 casualty may be hampered by lack of evacuation resources and/or medical supplies as these resources may be allocated too and exhausted by the concurrent presence of mass human casualties. The Interagency Board (IAB) recommends that an individual first aid kit (IFAK) be issued to each LEO trained in POI medical care. The recommendation for all K9 Handlers to obtain and carry an IFAK specifically for their K9 (K9-IFAK) is also a recommendation made by the K9 TECC working group.

The K9-IFAK should be solely dedicated to the K9 and not be incorporated or considered the same as the Handler’s personal IFAK. In other words, the Handler should carry two IFAKs, one for their personal use and one for their K9. The contents of the K9 IFAK do not need to meet any specific military or TCCC specifications; however, prior to purchasing equipment and stocking the K9 IFAK consultation with a veterinarian versed in prehospital trauma care is recommended to ensure selection of the most applicable contents for the K9-IFAK.

Handlers should carry the K9-IFAK during all missions to provide immediate point-of-injury (POI) care for mitigating immediate life-threats. Options for carrying the K9 IFAK may include attaching to the K9’s harness or other outerwear or having the handler carry their K9’s IFAK in conjunction with their personal IFAK. At minimum, the K9 IFAK should include equipment necessary to mitigate the following POI life threats:

- Massive hemorrhage
- Tension pneumothorax
- Open chest wound
- Gastric decompression (GDV)

A suggested pack list for a K9 IFAK are available at [http://www.k9tecc.org/resources.html](http://www.k9tecc.org/resources.html) and include:

<table>
<thead>
<tr>
<th>Component</th>
<th>Unit</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muzzle, quick release</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>Non-latex, Nitrile Glove</td>
<td>PR</td>
<td>1</td>
</tr>
<tr>
<td>Gauze, Z-fold, hemostatic impregnated, (QuickClot®, Celox™, or ChitoGauze®)</td>
<td>PKG</td>
<td>1</td>
</tr>
<tr>
<td>Compressed, packaged, roll gauze 4.5” W x 4.1 yds L</td>
<td>ROLL</td>
<td>1</td>
</tr>
<tr>
<td>Commercial Trauma/Emergency Dressing, (OLEAS®, Israeli, etc.)</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>SWAT-T® or ACE® Wrap</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>Occlusive chest seal/dressing (e.g. SAM®, Halo®, plastic sheet, etc.)</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>Duct tape, 12” strips, folded (Securing chest seal)</td>
<td>EA</td>
<td>4</td>
</tr>
<tr>
<td>iTClamp® [or 4 - 5 Safety pins, heavy duty, 4 - 5” (wound closure)]</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>Needle Decompression Device, 10 - 14 gauge x 2 to 3.25 inch</td>
<td>EA</td>
<td>2</td>
</tr>
</tbody>
</table>
Further K9 IFAK explanations:

- Do not need ALL items listed above. Select a product items based on provider level of experience, training and ability (both authorized as well as skill/knowledge-related) to accomplish the skill.

- Consider appropriate substitutions when funding and availability of resources are limiting factors:
  
  o Standard Roll or compressed gauze, 4.5 in. x 4.1 yd, is less expensive item that can serve the same function as the more expensive hemostatic dressings (e.g. CombatGauze, Celox, ChitoGauze). Since no hemostatic agent is present in standard roll or compressed gauze, when packing a hemorrhaging wound consider holding direct pressure for a minimum of 10 minutes versus 3 minutes to allow a sufficient time for thrombus formation.

  o Commercial trauma dressings (e.g. OLEAS modular bandage or Israeli trauma bandage) work effectively as a single bandage/dressing unit for managing a bleeding head wounds and / or ear laceration. When commercial trauma bandages are not available, consider that an ACE™ elastic bandage with 4x4 gauze pads (or similar absorbent material) serves the same function.

  o SWAT-T tourniquet (LongLink @ www.amazon.com...) in K9s serves as an effective circumferential pressure wrap / bandage for severely bleeding extremity wounds (to include tail).

  o Battle Wrap + Battle Bandage (LongLink @ combatmedical.com...) Newer products that serve as adhesive trauma wrap and dressing.

  o Either the iTClamp® or large (4 - 5 inch), steel safety pins (4 - 5 ct) work well for closing large open skin lacerations/wounds along the trunk, apposing open wounds into the abdominal cavity, and / or apposing junctional wounds after packing with hemostatic dressing or standard roll gauze.

Please contact the chair of the K9 TECC working group at lee@k9tecc.org with any comments, feedback, and questions.
REFERENCES:

16. Veterinary Committee on Trauma. Committee members. Accessed August 2015. Available at: https://sites.google.com/a/umn.edu/vetcot/home/committee-members.