HOW TO BEST USE THIS CLASS

Before you jump in, we have a few suggestions on how to get started.

To get the most out of this class you only need your computer and a desire to learn. Access to recommended equipment to practice is a plus.

The Crisis Medicine Tactical Casualty Care courses are the culmination of 30 years of training, experience, and research by Dr. Shertz resulting in an entertaining, science-based, cohesive curriculum gauged to the skill level of each group of students. This popular training includes the medical analysis to teach students the what, when, why, how, and how best to address life-threatening injuries in a high-risk environment.

Drawing on current and historical events from the military, law enforcement, and active violent incidents (previously referred to as active shooter events), Dr. Shertz uses photographs, demonstrative models, and hands-on examples applying the techniques to provide students the tools they need to save lives and prevent unnecessary deaths.

At the end of the lecture and skills station demonstrations, you’ll also see the techniques applied in theatrically enacted scenarios. The scenarios put all your skills together, combining into a successful casualty evaluation and treatment.

CLASS WORKBOOK
This is your printable PDF filled with lessons recaps, specific instructions, and suggested equipment.

SUGGESTED VIEWING SCHEDULE
This class when presented as an in-person training runs a long and tiring 10-hour day including skills stations and a scenario practical at the end. We recommend watching the online class over a few sittings, returning to specific portions once you have equipment to practice with.

EQUIPMENT*

Dr. Shertz lays out his essential equipment as the class progresses, but in an ideal world, students can follow along at home if they have access to:
- a proven commercially available tourniquet, CAT recommended
- cravats (for improvised tourniqueting)
- emergency trauma dressing
- Kerlix gauze

You’ll be walked through skills station demonstrations, where you can practice skills as they’re taught.

*Recommended sources can be found at the end of this workbook.
Intro to Crisis Medicine

“I want to give you a plan to manage preventable death...”

• Dr. Mike Shertz began his medical career in the United States Army as a Special Forces Medic (18D)

• He attended medical school in New York, rotating through some of the most crime and drug-ridden neighborhoods in NYC.

• After medical school, Dr. Shertz trained at Oregon Health Sciences University where he was selected to be the Chief Resident of the Emergency Medicine Department his final year

• Dr. Shertz currently works as a board-certified Emergency Medicine physician at one of the busiest Emergency Departments in Oregon.

• The Washington County Sheriff’s Office Tactical Negotiations Team (SWAT) runs a tactical medical program headed by Dr. Shertz. In that role, he trains and leads a cadre of four embedded medics.

• Dr. Shertz is also the medical director for several local fire agencies and companies, including the Hillsboro Fire Department, and Intel’s Oregon-based Emergency Medical Responder (EMR) program.

• Dr. Shertz regularly trains law enforcement, fire, and EMS including paramedics, and local citizens in tactical casualty care and tactical first aid techniques.

• Dr. Shertz has deployed and taught in far-flung locations including Korea, Afghanistan, Iraq, and East Africa.
Introduction to TC2

MISSION STATEMENT:
Identify immediately life threatening injuries that can be quickly managed with minimal equipment during or immediately after a high risk event.

How do we do that? What are the priorities?
1) Don’t get injured
2) Protect the casualty from further injury
3) MARCH
4) Get more help

Debunking the ABC model in tactical environments
The traditional ABC model assumes the injury profile comes from auto accidents. In this case, it makes sense to address airway and respiration first. In considering penetrating trauma, a casualty can bleed to death in under 5 minutes. We need to address massive hemorrhage first.

What’s a better model? M-A-R-C-H
Our priorities are to deal with massive hemorrhage which, left untreated, can kill a casualty before EMS arrives; then we check for an open airway, proper respirations, circulation, and lastly, hypothermia prevention measures.

Phases of Care
1. Care Under Fire / Direct Threat: What medical care would you provide in a burning building?
2. Tactical Field Care / Indirect Threat: What medical care would you provide across the street from the burning building?
3. Casualty Evacuation Care: The threat is largely over, the casualty is ready to be taken to the hospital.

Why does it matter?
40% of Vietnam combat casualty deaths occurred within two minutes of being wounded, 20% were dead by five minutes, and another 15% were dead within the first 10 minutes of wounding.
Wound Ballistics

“Barring CNS hits there is no physiological reason for an individual to be incapacitated by even a fatal wound, until blood loss is sufficient to drop blood pressure &/or the brain is deprived of oxygen.”  FBI Workshop, 1987

NOTES:

There are a lot of urban legends around gunshot wounds and we want to demystify them -

- for every one fatal firearms injury,
- there are two nonfatal injuries requiring hospitalization,
- and five nonfatal injuries not requiring hospitalization

Entrance and exit wounds are generally impossible for the average person to identify, and don’t matter in their treatment.

Col. Louis LaGarde, the man who literally wrote the book on Gunshot Injuries in 1916 said, “We are not acquainted with any bullet fired from a hand weapon that will stop a determined enemy when the projectile traverses soft parts alone. The requirements of such a bullet would need to have a sectional area like that of a 3-inch solid shot.” Nothing has changed.

In considering wound ballistics, there are two theories of wounding or stopping power: Psychological incapacitation and physiological incapacitation.

Psychological incapacitation is not predictable - it is completely unrelated to the potential for any given bullet to cause damage. That is, if the wounded person is motivated enough to fight, they will continue to do so.

On the other hand, physiological incapacitation is well documented and involves the mechanical effects of the projectile causing damage to the body. The only reliable way to incapacitate an individual is to interfere with the brain’s ability to command the body. There are two ways to do this: one, direct destruction of the brain / brain stem, or hypovolemic shock = blood loss.

Which load to carry?

The FBI conducts research to evaluate loads. Their conclusions were based on the following data: The average person (at the time of the workshop) was 9 inches thick at the chest from front to back; a cartridge may be required to penetrate through intervening barriers before reaching the target. Therefore it must penetrate 12-18” in tissue to ensure it has the potential to traverse vital organs.
Hemorrhage Control

“No one should bleed to death from extremity hemorrhage.”

Massive Hemorrhage is:
- Steady or squirting bleeding from a wound
- Blood pooling on the ground
- Blood soaked clothing
- Bandages soaked through with blood
- The casualty has stopped bleeding and now is now in shock

Casualties can bleed to death from massive hemorrhage in just a few minutes.

It’s not just how much blood you lose, it’s also how fast you lose it.

Red Cross blood donations are 500 mL or one pint. How badly do you feel afterwards? Once you’ve lost 2000 mL, you are in shock.

Extremity Wounds
In WWII, Korea, and Vietnam 53-55% of wounds were on arms and legs. 10% of all Vietnam combat deaths were from uncontrolled hemorrhage of an extremity wound.

HEMORRAGE CONTROL OPTIONS

DIRECT PRESSURE
Direct pressure can control massive hemorrhage if you can interlock your fingers and put a clamshell around the bleeding limb, squeezing as hard as one can. You can completely occlude arterial flow using this technique and stop bleeding. This technique is obviously more successful on smaller limbs.

BANDAGING
Bandaging using Kerlix, Israeli/ETD dressings, and other pressure dressings can be used to manage non-massive bleeding once the tactical situation is resolved.

TOURNIQUETS
Commercially available tourniquets are quick to apply and a hands free method to stop massive hemorrhage. There have been over 10,000 successful applications of tourniquets in the Global War on Terror (GWOT). The old dogma from the 1940’s about tourniquets causing amputations has been addressed and debunked. Tourniquets, when applied correctly, are safe and save lives.

WOUND PACKING
Tourniquets only work on extremity wounds. Bleeding to the neck, armpit, or groin cannot be controlled with a tourniquet, and will require packing gauze deeply into the wound at the point of bleeding.
Hemorrhage Control

“We have already learned these lessons in someone’s blood: Let’s not relearn them.”

NOTES:

Proven commercially available tourniquets should be bought directly from their manufacturers to avoid problems with counterfeits, even if it costs more. At least 6 companies are making counterfeit CAT tourniquets, including one purporting to be North American Rescue on Amazon (and isn’t).

TOURNIQUET APPLICATION
To apply a commercially available, off-the-shelf tourniquet in a tactical situation, put it

- high and tight for direct threat/care under fire - OR - 2-3” above the wound for indirect threat/tactical field care
- Secure the device around the limb (per manufacturer’s instructions)
- Take all the slack out of the band
- Twist the windlass until all bleeding is stopped.

We go as high as possible for a reason: because we don’t know where all those holes are, and while the threat is ongoing is not the time to look for holes and injuries.

“A properly applied tourniquet is going to be pretty damned tight.”

IMPROVISED TOURNIQUETS
If a commercially available tourniquet is not available and the tactical situation permits, an improvised tourniquet can be created from a 2-4 inch wide strip of fabric, wrapped around the limb above the wound, secured with a square knot, and most importantly, tightened with a windlass made from a solid object like a metal pen. Jump ahead to see Dr. Shertz’s method for using the casualty’s own clothing as a tourniquet.

TAKE HOME MESSAGE
Moral Number 1: No one should bleed to death from an extremity wound.
Moral Number 2: Direct pressure will stop almost all massive bleeding but it requires two hands.
Moral Number 3: When good direct pressure isn’t working, or the tactical station requires your hands, you need a tourniquet.
(M)ARCH Pneumonic

“Starting with the “ABC’s” is a failure of root cause analysis: You want an open airway to oxygenate blood, which is best done while it is still inside the body.”

Having addressed the issue of M-massive hemorrhage, you’ll want to turn your attention to the remainder of the MARCH pneumonic:

A-Airway
Is the casualty able to answer your questions? Is the casualty gurgling? Is his voice muffled? Is he snoring? All are signs of partial airway obstruction. Is there something occluding the airway? Open the airway with head-tilt, chin-lift.

Care under fire is not the time for CPR and rescue breathing. If he can't breathe on his own, he's likely dead. CPR is used to circulate blood: If the casualty has bled out, CPR will not accomplish the desired task of circulating blood because there isn’t any.

You can put the casualty in a position to ensure their airway is open. Learn about the recovery position in §3.3.

R-Respiration
Is the casualty struggling to breathe? Are they speaking in 2-3 word sentences? Take note of their current status so you can easily monitor changes. Sucking chest wounds generally suck and blow, which is the sound of not dying of tension pneumothorax. Do all chest wounds need to be sealed? Probably not.

C-Circulation
Does the casualty have a radial pulse and can they follow instructions? If so, they have a 0.1% chance of dying. If they have neither, their likelihood of dying is 41%.

H-Hypothermia Prevention
Cold blood does not clot. For every 1°C Celsius drop in temperature, the death rate goes up by 10%. Is there a blanket? A jacket? Can you get the casualty out of wet clothing? Can you get the casualty off of the ground and put something under them? Do you have a hypothermia prevention kit, blizzard bag, or emergency blanket?

Skills: Head Tilt, Chin Lift
This is standard, Red Cross procedure: Place one hand on the casualty’s forehead, the other hand cupping the chin. Gently tilt the head back pressing away and down on the forehead and up on the chin. This should move the tongue away from the back of the throat and allow better breathing.
Casualty Positioning & Movement

“Casualty movement is dangerous business... Getting wounded recovering casualties is not combat effective.”

NOTES:

Move the casualty if there is an immediate danger or you can't render aid in their location. Don't work them where they were injured; it's dangerous there. The first rule of casualty care is: Don't get hurt.

- Can the casualty come to you?
- Drags - can you drag the casualty by an arm? By his tactical gear or shirt?

TCCC guidelines: “there is no requirement to immobilize the spine prior to moving a casualty out of a firefight if he has sustained only penetrating trauma.”

Blunt Trauma

There is a difference between penetrating trauma and blunt trauma, such as that from a car accident or vehicle attack. In penetrating trauma, either the spine is hit, or it isn't. In blunt trauma, the likelihood of other injuries to the torso, head, and spine are much more likely. See, Crisis Medicine blog for a further discussion.

BLOOD SWEEP

Once the tactical situation is resolved, and care providers are in an indirect threat environment, a blood sweep can be conducted to determine whether there are additional injuries that can or should be attended to. In any active violent incident, activate the EMS system as soon as possible. Having more good people with guns and medical supplies always makes bad situations better.

RECOVERY POSITION

Once you get the casualty where you want them, put them in the recovery position. It helps the casualty:

- Breathe, keeps his airway open, allows for drainage of blood &/or vomit
- Allows rescuer to examine the casualty
- Keeps the casualty safe and comfortable
Blast Injuries

“Which cause of injury does the casualty have? It doesn’t matter. Medical treatment remains the same. Get the casualty to a safer place, spin your M-A-R-C-H pneumonic, and activate EMS.”

Civilian bombings are 3 times more destructive than in military settings. This is thought to be due to decreased situational awareness, lack of protective gear or vehicles, and lack of perimeters.

There are 4 major effects blasts will have on your casualties, which affect your ability to treat them:

**Primary Blast Injuries** - from the pressure wave: Causes eardrum rupture, ringing in the ears, and there may be a related lung injury in 50% of these casualties

**Secondary Blast Injuries** - from fragments: There is a high likelihood of bleeding and therefore surgery. Ensure there is no massive hemorrhage from an extremity, or junctional hemorrhage, then get the casualty to the hospital NOW.

**Tertiary Blast Injuries** - blunt trauma: these are injuries caused by the casualty being thrown by the explosion and impacting something else, like a wall, vehicle, etc.

**Miscellaneous Blast Injuries**: Including burns and crush injuries. Although burns are painful, there is no special care required for the first 1-2 hours. Airway occlusion from facial burns can occur, so ensure airway is open. Hypothermia can occur with large burns: Prevent hypothermia even in burned casualties.

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*represents 155mm tank shell
NOTES:

**CARE UNDER FIRE / DIRECT THREAT**
You and the casualty are under a direct threat to life: i.e., burning building, being shot at. Goal? Make it as brief as possible. Eliminate the threat, seek cover, take the casualty with you. Maybe tourniquet high & tight over clothing.

Care under fire is not the time to be focusing on medical procedures if there is a threat that needs to be eliminated. Unless there is a dedicated rescuer and others can focus on the threat, the best way to keep everyone safe is to neutralize the threat.

**TACTICAL FIELD CARE / INDIRECT THREAT**
You and the casualty are in danger but not immediately being shot at, are across the street from the burning building. Goal? Keep the casualty alive until the evacuation phase. Blood sweep, MARCH - expose the wounds and tourniquet 2-3” above them, recovery position, better cover. What’s the evacuation plan?

**MIST REPORT - Mechanism - Injury - Signs - Treatment**
For example: Adult male with a gunshot wound to the thigh (mechanism), massive hemorrhage (injury) treated with a single tourniquet high and tight (treatment), following commands, palpable radial pulse (signs).
“I have no disclosures. That’s because I hate everything. But I will tell you what I think the best solution is, what has the most data to support its use.”

**REMEMBER**

Decide what medical emergencies you plan to be able to manage, obtain those supplies, and then find a bag to fit those items.

**Suggested items for an Individual First Aid Kit (IFAK):**

- ✔ Commercially available tourniquets - at least 2
  - ✔ CAT
  - ✔ SOFT-W
- ✔ Disposable gloves
- ✔ Kerlix gauze x2 (4.5” x 4.1 yards)
- ✔ Israeli dressing or Emergency Trauma Dressing
- ✔ Medical shears

**PUBLIC ACCESS HEMORRHAGE CONTROL KITS**

The US Department of Homeland Security would like a public access hemorrhage control kit placed along side every AED in the country. Each device manufacturer makes their own version of the kits, and so there is no consistency as to what type of tourniquet (if any) is in the kits. Many do come with helpful, just-in-time instructions.

Some kits even come with non-rigid fabric litters.

Suggested Suppliers:
- North American Rescue
- TacMed Solutions
- Chinook Medical
- Tramedic Kits
Scenarios

“You’ve known how to stop the threat, now you know how to stop the dying.”

First Day Back at the Office
- Rule #1: Don't get hurt. It's bad enough we have one casualty.
- Lock the door, barricade it if you can.
- Make sure 911 has been called or EMS activated.
- Apply the tourniquet high and tight: This is care under fire, we don't have time to cut windows or search for the holes.
- Blood sweep the neck & other extremities.
- Check A-R-C: Airway, Respiration, Circulation
- Hypothermia prevention: what can you do to keep the casualty warm? Blanket? Coat?

Breach Gone Bad, or hand in the wrong place at the wrong time
- Pull the casualty around a corner, to cover, find a safe place to quickly evaluate him/her.
- Have someone call 911 and activate the EMS system, he's going to the hospital
- In this instance, it's pretty obvious where the injury is: That hand looks pretty bad and there is a lot of blood. Tourniquet the wound high and tight (2-3” above the wound if you fully expose it).
- You can minimize the arm flopping around by pinning the sleeve to his shirt, or otherwise securing it to him.
- Get him to the hospital.

Mind Your Manners
- Rule #1 of Tactical Casualty Care is don’t get hurt. Don’t act like a jerk & you’re less likely to get hurt.
- Barring that, this is massive hemorrhage and needs to be dealt with or the casualty will bleed to death in under 5 minutes. Grab your IFAK.
- This wound is too high for a tourniquet, so it will have to be packed.
- You have to get the gauze to the site of the bleeding inside the body, it should feel like a squirt gun on your fingertip.
- Continue putting wads of gauze in the cavity, keeping pressure on it (if using Combat Gauze, 3-5 minutes of direct pressure).
- Make sure EMS or 911 has been activated, but you can’t do it until the massive hemorrhage has been dealt with because he could bleed to death while you’re on the phone.
Conclusion

“You’ve been taught RUN-HIDE-FIGHT, now you have another tool: TREAT.”

You have just finished the Tactical Casualty Care course presented by Crisis Medicine and taught by Mike Shertz, MD-18D.

We hope you’re feeling empowered to use your new skills to be a #ForceMultiplierForGood in your community.

This is the hemorrhage control flow sheet for all pre-hospital medical providers which is supported by the American College of Surgeons and Committee on Trauma:

**Prehospital External Hemorrhage Control Protocol**

1. **Apply direct pressure/pressure dressing to injury**
   - Direct pressure effective (hemorrhage controlled)
   - Direct pressure ineffective or impractical (hemorrhage not controlled)

2. **Wound amenable to tourniquet placement**
   - Apply a tourniquet*

3. **Wound not amenable to tourniquet placement**
   - Apply a topical hemostatic agent with direct pressure

*Use of tourniquet for extremity hemorrhage is strongly recommended if sustained direct pressure is ineffective or impractical. Use a commercially-produced, windlass, pneumatic, or mechanical device which has been demonstrated to occlude arterial flow and avoid tissue, elastic, or burn-type devices. Utilize improvised tourniquets only if no commercial device is available. Do not release a properly applied tourniquet until the patient reaches definitive care.

**Want more information?** Email us at logistics@crisis-medicine.com to find out about our in-person training courses, or check the website, www.crisis-medicine.com for information on other online classes and updates.

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**Want to encourage a buddy to come to class?** Have them enter your name in the “referred by” blank when they sign up to get a referral gift and our thanks.

**Think your agency, school, workplace should sponsor a class?** Shoot us an email about that too. Or, use the contact form on the website to inquire about agency/institution pricing.