
UNIT 3: DISASTER MEDICAL OPERATIONS

— PART 1

In this module you will learn about:

- **Life-Threatening Conditions:** How to recognize and treat an airway obstruction, bleeding, and shock.
- **Triage:** Principles of triage and how to conduct triage evaluations.

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INTRODUCTION AND UNIT OVERVIEW

The need for CERTs to learn disaster medical operations is based on two assumptions:

- The number of survivors could exceed the local capacity for treatment.
- Survivors will attempt to assist others. As CERT members you will need to know lifesaving first aid or post-disaster survival techniques.

CERT medical operations can play a vital role in limiting deaths from trauma. The phases of death from trauma are:

1. Phase 1: Death within minutes as a result of overwhelming and irreversible damage to vital organs
2. Phase 2: Death within several hours as a result of excessive bleeding
3. Phase 3: Death in several days or weeks as a result of infection or multiple-organ failure (i.e., complications from an injury)

These phases underlie why disaster medical operations are conducted as they are (by identifying those with the most serious injuries as soon as possible and treating those with life-threatening injuries first). Some disaster victims in the second and third phases of death could be saved by providing simple medical care.

In a disaster there may be more survivors than rescuers, and assistance from medical professionals may not be immediately available. CERT personnel are trained to be part of disaster medical operations and to provide:

- Treatment for life-threatening conditions — airway obstruction, bleeding, and shock — and for other, less urgent conditions
- The greatest good for the greatest number of people by conducting simple triage and rapid treatment

INTRODUCTION AND UNIT OVERVIEW (CONTINUED)

START

Simple Triage And Rapid Treatment (START) is a critical concept for initially dealing with casualties in a disaster.

History has proven that 40% of disaster survivors can be saved with simple (rapid!) medical care. START is based on the premise that a simple medical assessment and rapid treatment based on that assessment will yield positive — often lifesaving — results.

STart = Simple Triage: The first phase of START is the process by which survivors are sorted based on injury and priority of treatment.

stART = And Rapid Treatment: The second phase of START consists of rapid treatment of the injuries assessed and prioritized in the first phase.

All CERT participants are encouraged to take basic first aid and CPR training; however, if you have taken first aid courses you will need to understand that CERT covers disaster medical operations where time is critical to conduct triage and treat many survivors. CPR is not taught in this course because it is labor intensive and not appropriate when there are many survivors and professional help will be delayed.

UNIT OBJECTIVES

At the end of this unit, you should be able to:

- Identify the “killers.”
- Apply techniques for opening the airway, controlling bleeding, and treating for shock.
- Conduct triage under simulated disaster conditions.

Remember, the goal of disaster medical operations is to do the greatest good for the greatest number. In a disaster with many survivors, time will be critical. CERT members will need to work quickly and efficiently to help as many survivors as possible.

UNIT TOPICS

This session will introduce you to the principles of triage, including treating the “three killers”: airway obstruction, excessive bleeding, and shock.

Throughout the unit, you will have opportunities to practice the treatment techniques and, at the end of the unit, you will have the opportunity to conduct triage evaluations in a simulated disaster.

TREATING LIFE-THREATENING CONDITIONS

In emergency medicine, airway obstruction, bleeding, and shock are “killers” because without treatment they will lead to death. The first priority of medical operations is to attend to those potential killers by:

- Opening the airway
- Controlling excessive bleeding
- Treating for shock

This section will train you to recognize the “killers” by recognizing their symptoms and their effects on the body.

APPROACHING THE SURVIVOR

Rescuers must first ensure that they are wearing safety equipment:

- Helmet
- Goggles
- Gloves
- N95 mask
- Sturdy shoes or boots
- Non-latex exam gloves

A good time-saving technique is to wear non-latex exam gloves under your work gloves. Then, when you find a survivor, you can remove your work gloves and are ready to work with the survivor.

Remember to use non-latex exam gloves to prevent potential reaction by individuals who are allergic to latex.

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

There are several steps to take when approaching a survivor. When ready to approach a survivor:

1. If the survivor is conscious, be sure he or she can see you.
2. Identify yourself by giving your name and indicating the organization with which you are affiliated.
3. ALWAYS request permission to treat an individual. If the individual is unconscious, he or she is assumed to have given “implied consent,” and you may treat him or her. Ask a parent or guardian for permission to treat a child, if possible.
4. Whenever possible, respect cultural differences. For example, in some Muslim traditions it is customary to address the male when requesting permission to treat a female member of his family.
5. Remember, all medical patients are legally entitled to confidentiality (HIPAA). When dealing with survivors, always be mindful and respectful of the privacy of their medical condition.

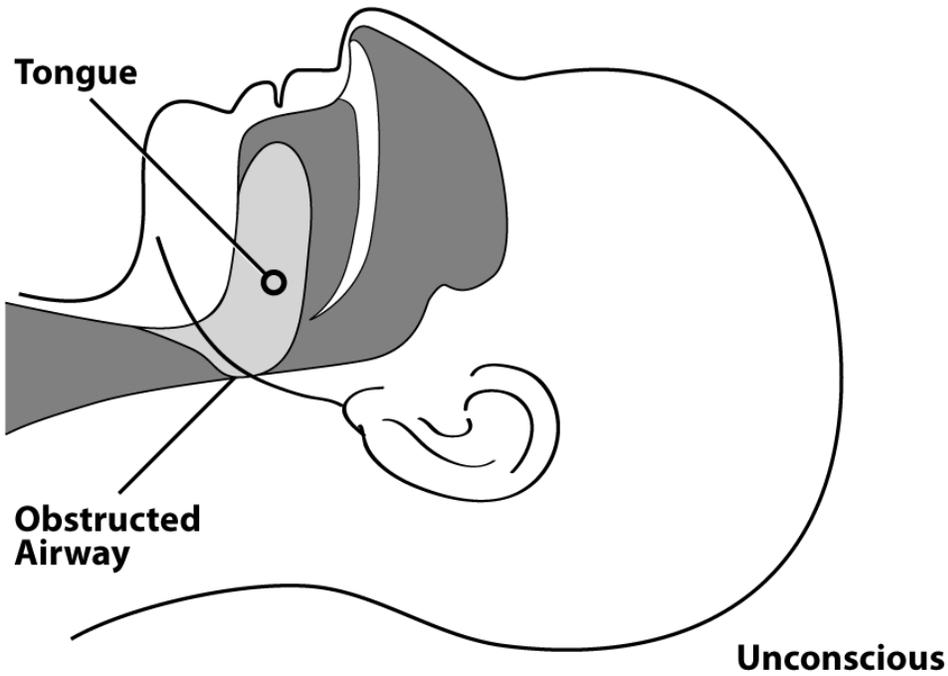
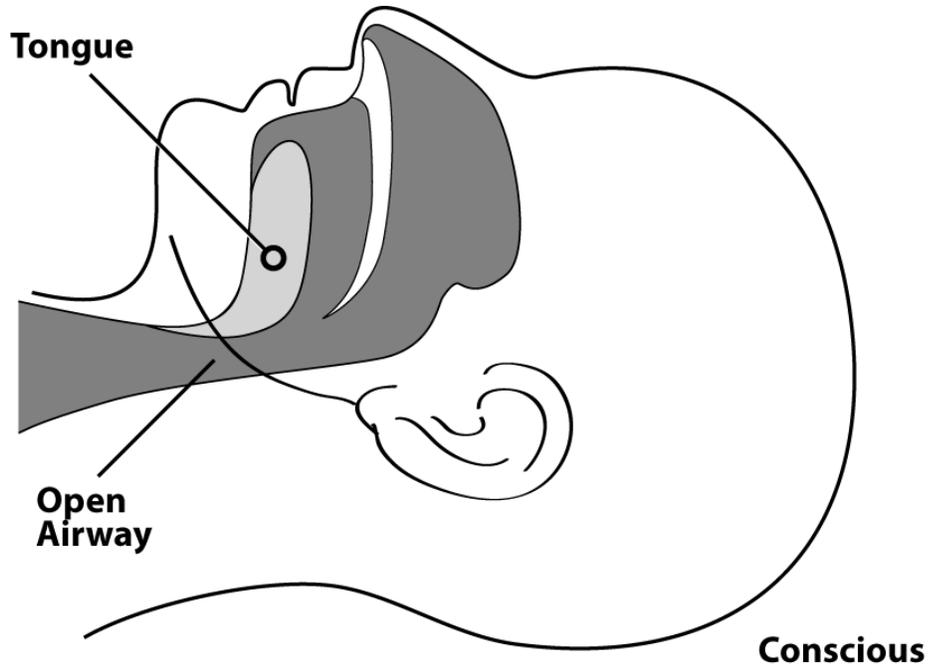
OPENING THE AIRWAY

The respiratory system includes the following components:

- Lung
- Bronchus
- Larynx
- Pharynx
- Nasal Cavity
- Trachea

In an unconscious or semiconscious survivor, especially one positioned on his or her back, the most common airway obstruction is the tongue. The tongue — which is a muscle — may relax and block the airway. A survivor with a suspected airway obstruction must be checked immediately for breathing and, if necessary, the airway must be opened.

Airway Obstructed by the Tongue



TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

THE HEAD-TILT/CHIN-LIFT METHOD

When an airway obstruction is suspected because a survivor is unconscious or semiconscious, CERT members should clear the airway using the Head-Tilt/Chin-Lift method.

In addition to opening the airway, this method causes little or no cervical-spine manipulation because only the head is manipulated.

Proper technique is always important in opening an airway, but so is speed.

Head-Tilt/Chin-Lift Method for Opening an Airway

Step	Action
1	At an arm's distance, make contact with the survivor by touching the shoulder and asking, "Can you hear me?" Speak loudly, but do not yell.
2	If the survivor does not or cannot respond, place the palm of one hand on the forehead.
3	Place two fingers of the other hand under the chin and tilt the jaw upward while tilting the head back slightly.
4	Place your ear close to the survivor's mouth, looking toward the survivor's feet, and place a hand on the survivor's abdomen.
5	<i>Look</i> for chest rise.
6	<i>Listen</i> for air exchange. <ul style="list-style-type: none">▪ Document abnormal lung sounds (wheezing, gasping, gurgling, etc.).
7	<i>Feel</i> for abdominal movement.
8	If breathing has been restored, the clear airway must be maintained by keeping the head tilted back. If breathing has not been restored, repeat steps 2-7.

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EXERCISE: OPENING THE AIRWAY

Purpose: Practice using the Head-Tilt/Chin-Lift method of opening the airway.

Be sure to use the steps in the Head-Tilt/Chin-Lift method.

MAINTAINING THE AIRWAY

If breathing has been restored, the clear airway still must be maintained by keeping the head tilted back. One option is to ask another person to hold the head in place; even another survivor with minor injuries could do this. The airway also can be maintained by placing soft objects under the survivor's shoulders to elevate the shoulders slightly and keep the airway open.

Remember that part of your mission is to do the greatest good for the greatest number of people. For that reason, if breathing is not restored on the first try using the Head-Tilt/Chin-Lift method, CERT members should try again using the same method. If breathing cannot be restored on the second try, CERT members must move on to the next survivor.

You should always be concerned with head, neck, or spinal injuries (all of which are common in structural collapses). Used properly, the Head-Tilt/Chin-Lift method for opening an airway causes little spinal manipulation because the head pivots on the spine.

Remember the importance of opening the airway as quickly as possible. When treating the three killers, checking for airway obstruction is always first.

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

CONTROLLING BLEEDING

Uncontrolled bleeding initially causes weakness. If bleeding is not controlled, the survivor will go into shock within a short period of time and finally will die. An adult has about 5 liters of blood. Losing 1 liter can result in death.

There are three types of bleeding and the type can usually be identified by how fast the blood flows:

- Arterial bleeding. Arteries transport blood under high pressure. Blood coming from an artery will spurt.
- Venous bleeding. Veins transport blood under low pressure. Blood coming from a vein will flow.
- Capillary bleeding. Capillaries also carry blood under low pressure. Blood coming from capillaries will ooze.

There are three main methods for controlling bleeding:

- Direct pressure
- Elevation
- Pressure points

Direct pressure and elevation will control bleeding in 95% of cases.

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Procedures for Controlling Bleeding

Method	Procedures
Direct Pressure	<ul style="list-style-type: none">▪ Place direct pressure over the wound by putting a clean dressing over the wound and pressing firmly.▪ Maintain pressure on the dressing over the wound by wrapping the wound <u>firmly</u> with a pressure bandage and tying with a bow.
Elevation	<ul style="list-style-type: none">▪ Elevate the wound above the level of the heart.
Pressure Points	<ul style="list-style-type: none">▪ Put pressure on the nearest pressure point to slow the flow of blood to the wound. Use the:<ul style="list-style-type: none">• Brachial point for bleeding in the arm• Femoral point for bleeding in the leg• Popliteal point for bleeding in the lower leg

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

DIRECT PRESSURE

This is the procedure for controlling bleeding through direct pressure:

- Step 1: Place direct pressure over the wound by putting a clean dressing over it and pressing firmly.
- Step 2: Maintain pressure on the dressing over the wound by wrapping firmly with a bandage.

Direct pressure and elevation can take 5 to 7 minutes to stop the bleeding completely. The use of a dressing and pressure bandage allows the rescuer to move on to the next survivor.

A pressure bandage should be tied with a bow, so that it can be loosened — rather than cut — to examine the wound, and then retied. This procedure helps to conserve supplies and saves time. The bandage maintains the direct pressure needed to stop the bleeding. CERT members continue to assess the survivor's status. If the survivor's limb is turning blue or becoming numb below the bandage, then it should be loosened.

ELEVATION

Elevation can be used in combination with direct pressure. Elevate the wound above the level of the heart.

The body has great difficulty pumping blood against gravity; therefore, elevating a wound above the heart will decrease blood flow and loss of blood through the wound.

PRESSURE POINTS

There are also pressure points that can be used to stem the flow of bleeding.

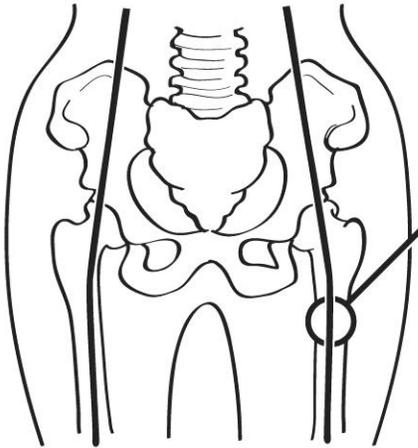
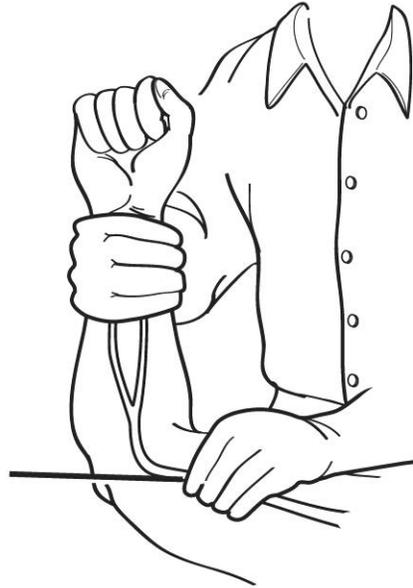
The pressure points most often used are the:

- Brachial point in the arm
- Femoral point in the leg
- Pressure point behind the knee

The pressure point to use depends on the location of the wound. The correct pressure point is between the wound and the heart.

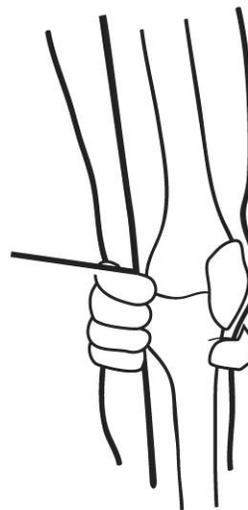
METHODS FOR CONTROLLING BLEEDING

Brachial Pressure Point
just above the elbow



Femoral Pressure Point
in the Upper thigh

Popliteal Pressure Point
behind the knee



TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EXERCISE: CONTROLLING BLEEDING

Purpose: This exercise will provide a chance to practice using the techniques for controlling bleeding.

Instructions:

1. After breaking into pairs, identify one person to take the role of the survivor.
2. Respond as if the survivor has an injury on the right forearm, just below the elbow.
3. Apply a pressure bandage and elevate the arm.
4. Repeat the process twice.
5. Swap roles and have the new rescuer complete the above steps.

TOURNIQUETS (OPTIONAL)

CERTs will use direct pressure on pressure points and elevation to manage most bleeding. However, if bleeding cannot be stopped using these methods and professionals are delayed in responding, a tourniquet may be a viable option to save a person from bleeding to death. However, a tourniquet is absolutely a last resort (life or limb) when other preferred means have failed to control bleeding in an arm or a leg.

While the use of a tourniquet is extremely rare, it may have a use when part of an extremity is amputated or crushed and bleeding cannot be stopped by any other preferred means.

- A tourniquet is a tight bandage which, when placed around a limb and tightened, cuts off the blood supply to the part of the limb beyond it.
- A tourniquet can do harm to the limb, but it can halt severe blood loss when all other means have failed and professional help will not arrive in time to help stop the bleeding before the person dies.
- Use any long, flat, soft material (bandage, neck tie, belt, or stocking). Do not use materials like rope, wire, or string that can cut into the patient's flesh.

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

- To tie a tourniquet:
 1. Place the tourniquet between the wound and the heart (for example, if the wound is on the wrist, you would tie the tourniquet around the forearm).
 2. Tie the piece of material around the limb.
 3. Place a stick, pen, ruler, or other sturdy item against the material and tie a knot around the item, so that the item is knotted against the limb.
 4. Use the stick or other item as a lever to twist the knot more tightly against the limb, tightening the bandage until the bleeding stops.
 5. Tie one or both ends of the lever against the limb to secure it and maintain pressure.
 6. Mark the patient in an obvious way that indicates that a tourniquet was used and include the time it was applied.
 7. Do not loosen a tourniquet once it has been applied.
 8. Only proper medical authorities should remove a tourniquet.

CONTROLLING BLEEDING REVIEW

The three main ways to control excessive bleeding:

- Direct pressure
- Elevation
- Pressure points

Bleeding must be controlled as quickly as possible so as not to endanger the survivor's life from blood loss.

You should always wear your non-latex exam gloves, goggles, and an N95 mask as a protection against blood-borne pathogens, such as hepatitis and HIV.

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

Shock is a condition that occurs when the body is not getting enough blood flow. When blood doesn't circulate, oxygen and other nutrients are not carried to tissues and organs. Blood vessels begin to close and organs are damaged and, if left untreated, will shut down completely. Shock can worsen very rapidly.

Remaining in shock will lead to the death of:

- Cells
- Tissues
- Entire organs

The main signs of shock that CERT members should look for are:

- Rapid and shallow breathing
- Capillary refill of greater than 2 seconds
- Failure to follow simple commands, such as "Squeeze my hand"

EVALUATE BREATHING

Note if the survivor's breathing is rapid and shallow, i.e., more than 30 breaths per minute.

EVALUATE CIRCULATION

One way to test for circulation is the blanch test. A good place to do the blanch test is the palm of one hand. Sometimes, a nail bed is used. The blanch test is used to test capillary refill. You should see the color return to the tested area within 2 seconds.

Because the blanch test is not valid in children, mental status should be used instead as the main indicator.

Another way to check for circulation is the radial pulse test. This is an alternative to the blanch test and can be used in the dark or where it is cold.

To perform the radial pulse test, place your middle and ring finger over the interior of the survivor's wrist where the thumb meets the arm. A normal pulse rate is 60-100 beats per minute.

EVALUATE MENTAL STATUS

There are several ways to evaluate mental status.

- Ask, “Are you okay?”
- Give a simple command such as “Squeeze my hand.”

If you are concerned that there might be a language barrier or hearing impairment, reach out with both hands and squeeze one of the survivor’s hands. The person will squeeze back if they can.

TREATING FOR SHOCK

The body will initially compensate for blood loss and mask the symptoms of shock; therefore, shock is often difficult to diagnose. It is possible — and, in fact, common — for an individual suffering from shock to be fully coherent and not complaining of pain. Pay attention to subtle clues, as failure to recognize shock will have serious consequences.

Avoid rough or excessive handling. It is important to maintain the survivor’s body temperature. If necessary, place a blanket or other material under and/or over the survivor to provide protection from extreme ground temperatures (hot or cold). Position the survivor on his or her back and elevate the feet 6 to 10 inches above the level of the heart to assist in bringing blood to the vital organs.

Although survivors who are suffering from shock may be thirsty, they should not eat or drink anything initially because they may also be nauseated.

Procedures for Controlling Shock

Step	Action
1	<ul style="list-style-type: none">▪ Maintain an open airway.
2	<ul style="list-style-type: none">▪ Control obvious bleeding.
3	<ul style="list-style-type: none">▪ Maintain body temperature (e.g., cover the ground and the survivor with a blanket if necessary).
Notes	<ul style="list-style-type: none">▪ Avoid rough or excessive handling.▪ Do not provide food or drink.

TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EXERCISE: TREATING SHOCK

Purpose: This exercise offers you a chance to practice the steps for treating shock.

Instructions:

1. Break into the previous groups.
2. The person who was the survivor first in the previous exercise will now be the rescuer first.
3. Pretend that you are in the following situation:
 - You have come upon an unconscious survivor who has been bleeding profusely from a wound of the upper arm for an undetermined period of time. You have controlled the bleeding.
 - What do you need to do next?
4. Switch places and have the survivor become the rescuer.

TRIAGE

In mass casualty events, medical personnel:

- Identify the dead and those who are too severely injured to be saved
- Send those with relatively minor injuries and wounds to a holding area to await treatment
- Identify those who would die from life-threatening injuries and treat them immediately

The term for this is triage — a French term meaning “to sort.”

During medical triage, survivors’ conditions are evaluated and the survivors are prioritized into four categories:

- Immediate (I): The survivor has life-threatening injuries (airway, bleeding, or shock) that demand immediate attention to save his or her life; rapid, lifesaving treatment is urgent. These survivors are marked with a red tag or labeled “I.”
- Delayed (D): Injuries do not jeopardize the survivor’s life. The survivor may require professional care, but treatment can be delayed. These survivors are marked with a yellow tag or labeled “D.”
- Minor (M): Walking wounded and generally ambulatory. These survivors are marked with a green tag or labeled “M.”
- Dead (DEAD): No respiration after two attempts to open the airway. Because CPR is one-on-one care and is labor intensive, CPR is not performed when there are many more survivors than rescuers. These victims are marked with a black tag or labeled “DEAD.”

From triage, survivors are taken to the designated medical treatment area (immediate care, delayed care, or the morgue).

CERT members do not rescue those tagged DEAD. If the scene is deemed safe and it is appropriate to do so, CERT members may move the DEAD to the morgue.

It is crucial to the physical and mental well-being of disaster survivors that the morgue be placed away from the other groups. Traditionally, blue tarps are used to identify and conceal the morgue area.

RESCUER SAFETY DURING TRIAGE

If hazardous materials are present, rescuer safety is paramount. CERT members should leave the scene to avoid harm to themselves and to reduce the risk of spreading the contamination.

Rescuer safety is crucial during triage. Rescuers must wear all safety equipment, including non-latex exam gloves, goggles, a helmet, and an N95 mask when examining survivors and should try to change gloves between survivors. Because of limited supplies, it may not be possible to use a new pair of gloves for every survivor. If this is the case, gloves may be sterilized between treating survivors using 1 part bleach to 10 parts water. Your disaster kit should have a box of non-latex gloves. Bleach and potable water should also be available at the CERT's medical treatment area.

EXERCISE: REMOVING EXAM GLOVES

Purpose: This exercise will allow you to practice proper technique for removing soiled exam gloves without spreading contaminants.

Instructions:

1. Put on a pair of gloves.
2. Remove and dispose of your gloves as instructed.

TRIAGE IN A DISASTER ENVIRONMENT

Here is the general procedure for CERTs to conduct triage:

- **Step 1: Stop, Look, Listen, and Think.** Before your team starts, stop and size up the situation by looking around and listening. Think about your safety, capability, and limitations, and decide if you will approach the situation. If you decide to proceed, quickly make a plan about your approach that all members understand.
- **Step 2: Conduct voice triage.** Begin by calling out, "Community Emergency Response Team. If you can walk, come to the sound of my voice." Speak loudly and firmly. If there are survivors who are ambulatory, tag them M and direct them to a designated location. If rescuers need assistance and there are ambulatory survivors, then these survivors should be asked to provide assistance. These persons may also provide useful information about the location of the survivors.
- **Step 3: Start where you stand, and follow a systematic route.** Start with the closest survivors and work outward in a systematic fashion.

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- Step 4: Evaluate each survivor and tag them “**I**” (immediate), “**D**” (delayed), “**M**” (minor), or **DEAD**. Remember to evaluate the walking wounded. Remember to ASK for permission to treat if the individual is conscious.
- Step 5: Treat I survivors immediately. Initiate airway management, bleeding control, and/or treatment for shock for Category **I** survivors.
- Step 6: Document triage results for:
 - Effective deployment of resources
 - Information on the survivors’ locations
 - A quick record of the number of casualties by degree of severity.

Remember that your safety is paramount during triage. It is important to wear proper protective equipment so as not to endanger your own health.

EVALUATING A SURVIVOR DURING TRIAGE

Step	Procedures
1	<p>Check airway/breathing. At an arm’s distance, make contact with the survivor and speak loudly. If the survivor does not respond:</p> <ul style="list-style-type: none">▪ Position the airway.▪ Look, listen, and feel.▪ Check breathing rate. Abnormally rapid respiration (above 30 per minute) indicates shock. Maintain the airway and treat for shock and tag “I.”▪ If below 30 per minute, then move to Step 2.▪ If the victim is not breathing after two attempts to open airway, then tag “DEAD.”
2	<p>Check circulation/bleeding.</p> <ul style="list-style-type: none">▪ Take immediate action to control severe bleeding.▪ Check circulation using the blanch test (for capillary refill) or a radial pulse test.<ul style="list-style-type: none">• Press on an area of skin until normal skin color is gone. Time how long it takes for normal color to return. Treat for shock if normal color takes longer than 2 seconds to return, and tag “I.”• Or check the radial pulse.<ul style="list-style-type: none">• If present, continue to step 3.• Note if the pulse is abnormal (rapid, thready, weak, etc.)• If absent, tag “I” and treat for bleeding and shock.
3	<p>Check mental status. Inability to respond indicates that immediate treatment for shock is necessary. Treat for shock and tag “I.”</p>

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Sample Triage Documentation

Status	Location			
	A	B	C	D
I	1	2	0	1
D	0	2	5	3
M	10	11	7	15
Dead	3	7	1	0

EVALUATING A SURVIVOR DURING TRIAGE (CONTINUED)

Time will be critical in a disaster. You will not be able to spend very much time with any single survivor. Remember that you want to do the greatest good for the greatest number of survivors.

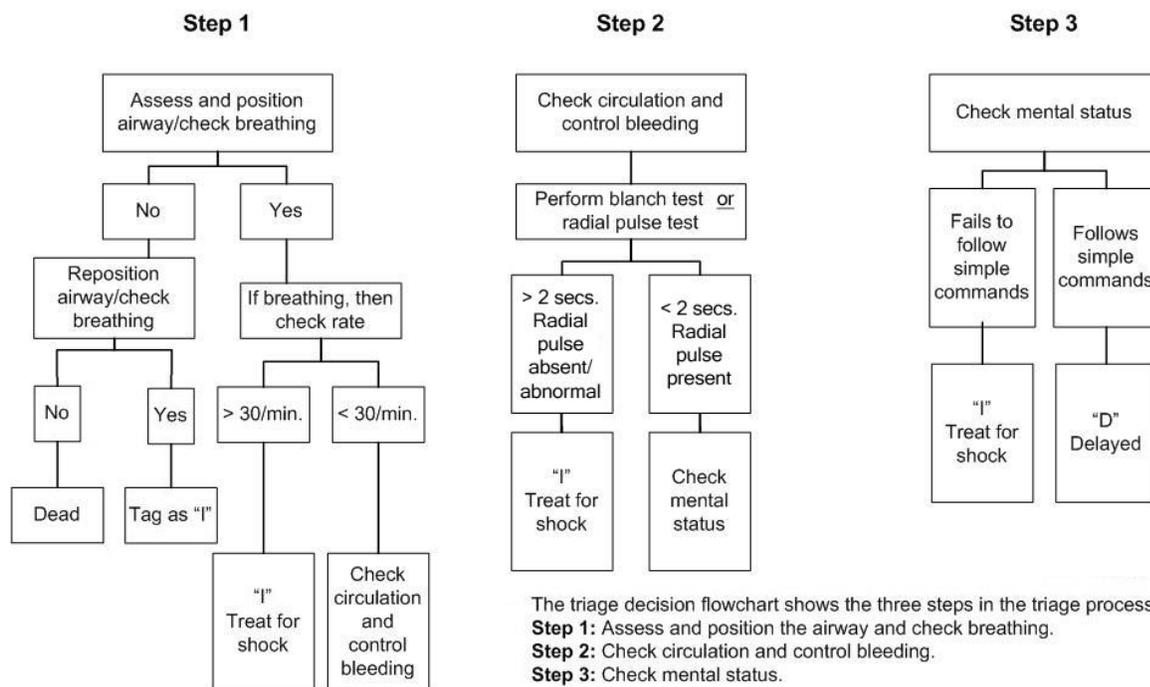
In order to respond effectively in a mass casualty event CERT members must:

- Have a plan based on a thorough sizeup
- Follow that plan
- Document actions throughout

Triage must be practiced to avoid triage pitfalls. Triage pitfalls include:

- No team plan, organization, or goal
- Indecisive leadership
- Too much focus on one injury
- Treatment (rather than triage) performed

Triage Decision Flowchart



EVALUATING A SURVIVOR DURING TRIAGE (CONTINUED)

EXERCISE: CONDUCTING TRIAGE

Purpose: This exercise will allow you to practice conducting triage in a high pressure situation.

Instructions:

1. Divide into three groups. Tape your medical status card to your shirt.
2. There will be three rounds. In each round, one group will be rescuers and the other two will be survivors.
3. The rescuers will have a limited amount of time to:
 - Size up the situation and develop a plan of action
 - Conduct triage and tag each survivor for treatment
 - Document the number of survivors in each category of triage (Immediate, Delayed, Minor, Dead)

UNIT SUMMARY

- CERT members' ability to open airways, control bleeding, and treat shock is critical to saving lives.
 - Use the Head-Tilt/Chin-Lift method for opening airways.
 - Control bleeding using direct pressure, elevation, and/or pressure points.
 - If there is a question about whether a survivor is in shock, treat for shock as a precaution.

- Triage is a system for rapidly evaluating survivors' injuries and prioritizing them for treatment.
 - There are 4 triage categories:
 1. Immediate
 2. Delayed
 3. Minor
 4. Dead

- Triage in a disaster environment consists of 6 important steps:
 1. Stop, Look, Listen and Think, and make a quick plan.
 2. Conduct voice triage.
 3. Begin where you stand and work systematically.
 4. Evaluate and tag all survivors.
 5. Treat those tagged "I" immediately.
 6. Document your findings.

UNIT SUMMARY (CONTINUED)

- The procedure for conducting triage evaluations involves checking:
 - The airway and breathing rate
 - Circulation and bleeding
 - Mental status

HOMEWORK ASSIGNMENT

Read and become familiar with Unit 4: Disaster Medical Operations — Part 2 before the next session.

Remember to bring a blanket, roller gauze, adhesive tape, duct tape, and cardboard to the next session.