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**UNITED STATES MARINE CORPS**  
THE BASIC SCHOOL  
MARINE CORPS TRAINING COMMAND  
CAMP BARRETT, VIRGINIA 22134-5019

**CASUALTY EVALUATION  
AND EVACUATION  
B151256  
STUDENT HANDOUT**

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## Casualty Evaluation and Evacuation

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**Introduction** This lesson will teach you how to correctly diagnose injuries that are not immediately life-threatening but could become so if not properly treated. You will also learn about the prioritizing of casualties and their evacuation.

**Importance** Officers must be able to properly diagnose, triage, and evacuate those Marines wounded in action in order to best ensure their chances for survival. The skills that you will be introduced to in this lesson will be practiced throughout your time at The Basic School.

**In This Lesson** This lesson covers the following topics:

Topic	Page
Primary Survey	7
Four Basic Lifesaving Steps	11
Secondary Survey	24
Nine Diagnostics Signs	27
Triage Procedures	33
Transportation of Casualties	36
Casualty Reporting	38
Summary	38
References	38
Glossary of Terms and Acronyms	37
Notes	39

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## Casualty Evaluation and Evacuation

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### Learning Objectives

### Terminal Learning Objectives

1. Without the aid of reference, describe phases of Tactical Combat Casualty Care (TCCC) without omission. (MCCS-MED-1001)
2. Given a casualty and an Individual First Aid Kit (IFAK), perform Care Under Fire (CUF) to prevent additional casualties. (MCCS-MED-1003)
3. Given a casualty, equipment, and personnel, move a casualty to prevent further injury or death per the reference. (MCCS-MED-1004)
4. Given a casualty with no life threatening bleeding, an IFAK, and a secure position out of effective enemy fire, perform Tactical Field Care (TFC) to prevent further bleeding or death per the reference. (MCCS-MED-1006)
5. Given a casualty with a closed airway and equipment, keep the airway open to prevent further injury or death per the reference. (MCCS-MED-1007)
6. Given Marines, a casualty, communications equipment, and the authority to request a CASEVAC, conduct casualty evacuation to prevent further injury or death. (MCCS-MED-2102)
7. Given casualties within the unit's area of operations, unit corpsmen, and litter-bearers, supervise the evacuation of casualties to prevent further injury or death. (MCCS-MED-2103)

## **Casualty Evaluation and Evacuation (Continued)**

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### **Learning Objectives (Continued)**

#### Enabling Learning Objectives

1. Given a casualty and necessary equipment, identify methods of casualty movement, per MCRP 3-02G. (MCCS-MED-1004a)
  2. Given a casualty, individually or as part of a litter while moving and wearing individual field equipment, demonstrate the eight carries, per MCRP 3-02G. (MCCS-MED-1004b)
  3. Given a casualty and available materials, utilize available materials for field expedient litters, per MCRP 3-02G and evacuate a casualty. (MCCS-MED-1004c)
  4. Given a casualty with no life threatening bleeding, an IFAK, and a secure position out of effective enemy fire, evaluate the casualty's airway to prevent further injury or death per the reference. (MCCS-MED-1006a)
  5. Given a casualty with a closed airway and equipment, describe how to open the airway using the chin lift or jaw thrust technique to check for breathing without omission. (MCCS-MED-1007a)
  6. Given a casualty with restored breathing, describe how to place the casualty in the recovery position without omission. (MCCS-MED-1007b)
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## Primary Survey

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### Casualty Assessment

Casualty assessment is a systematic process for assessment of the trauma casualty and is essential for recognizing life-threatening conditions, identifying injuries, and determining priorities of care based on assessment findings. Upon arriving at the point of injury (either in a tactical or garrison environment), the Marine providing care will learn much from a quick, thorough, head-to-toe observation. Utilizing an organized, systematic approach when assessing each trauma casualty helps ensure that injuries will not be missed. Once identified, priorities can be set for each intervention based on the life threatening potential of each injury. The objectives for casualty care are the

- Treatment of the casualty.
- Prevention of additional casualties.
- Completion of the mission.

### Civilian versus Tactical Assessment

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Casualty assessment in a tactical environment and the care to follow are applied under very different circumstances than pre-hospital care in the civilian or medical treatment facility (MTF) setting; however, the format for offering that assessment and care is the same. Civilian and MTF care does not have to take into consideration incoming fire, darkness, environmental factors such as swamps and snow, casualty transportation problems, delays to definitive care, and command decisions based on mission.

### Primary Survey

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You should begin an initial survey of all casualties on arrival. During the primary survey, you need only to talk, feel, and observe. No diagnostic equipment is needed. Inquiry should be brief and pertinent; no detailed questioning is necessary at this time. Four diagnostic signs (pulse, respiration, skin color, and state of consciousness) should be evaluated in the primary survey of each casualty. This survey is intended to discover and correct any immediate life-threatening problems. All involved casualties must be assessed initially, stopping only to treat

- The pulseless, non-breathing casualty.
- The casualty with massive bleeding.
- Those in coma or shock.

## Primary Survey (Continued)

### Primary Survey (Continued)

During the primary survey, a definitive step-by-step outline of action must be followed. You must remain calm. This attitude will instill confidence in the casualties and others as to your knowledge and ability to handle the situation. A record of initial observations can be started. The Marine providing assistance needs to begin assessing the scene and asking himself/herself the following questions:

Step	Action
1	Is the scene safe? Scene safety is the primary concern. Any condition (environmental or tactical) that can be considered harmful to either the casualty or the Marine providing assistance must be addressed and corrected to produce the safest scene possible.
2	How many casualties do I have? Triage will be based upon the number a casualties, the access to those casualties, and medical gear available.
3	Do I have any help? The situation may require the Marine providing assistance to work alone.
4	Determine consciousness. Check for the level of consciousness.
5	Call for help. Call for professional medical assistance, by means of either a messenger or radio.
6	Position the casualty. If there is no sign of head, neck or spinal injury, roll casualties to their back.
7	Open the airway. Use head tilt/chin lift method or jaw-thrust, whichever is appropriate.
8	Check for signs of breathing. Look, listen, and feel for signs of exhalation.
9	If no breathing, immediately give two rescue breaths.
10	Check for signs of circulation. <b>Note:</b> Immediately treat any signs of life-threatening exsanguination.
11	What is the mechanism of injury (MOI)?
12	What caused the injuries?
13	How bad are the injuries?
14	Does the casualty have a C-spine injury? The Marine providing assistance will consider C-spine precautions even if the situation does not allow for proper treatment of a spinal injury.

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## Primary Survey (Continued)

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- **Care Under Fire.** In a tactical environment, the care rendered at the scene of the injury will most likely occur while the corpsman and the casualty are under effective hostile fire; the threat has not been reduced or the area has not been secured. It is for this reason that a medically correct intervention performed at the wrong time in combat may lead to further casualties. In other words, good medicine may be bad tactics. Because of this, ***fire superiority is the best medicine on the battlefield.*** Consider it the first and best measure to any casualty response plan. The casualty must remain engaged as a combatant if appropriate and return fire as needed or directed.

### Considerations

Below are considerations to take into account before the evaluation and evacuation of casualties is to begin

- Return fire/take cover. Less critical casualties may continue to help in order to suppress hostile fire.
- Direct casualty to move to cover and apply self-aid if able
  - Try to keep the casualty from sustaining additional wounds.
  - Direct casualty to control hemorrhage by self-aid if able.
- Medical personnel may assist in suppressing hostile fire before casualty care (usually in small unit operations) or moving the casualty to a safe position.
- Limited medical care should be attempted while exposed to hostile fire.
- ***Hemorrhage control is the top priority.***
  - Immediately apply tourniquet for life threatening hemorrhaging of the extremities.  
***Exsanguination from extremity wounds is the number one cause of preventable death on the battlefield.***
  - A casualty may exsanguinate before any medical help arrives; therefore, every combatant should carry both a tourniquet and hemostatic dressing.
  - Casualty may need to apply own tourniquet, if able.

## Primary Survey (Continued)

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### Considerations (Continued)

- Special dressings (hemostatic agents) for non-extremity life threatening hemorrhage:
  - Combat Gauze.
  - QuickClot.
  - HemCon.
- Other methods of hemorrhage control, such as direct pressure and pressure dressings may delay moving the casualty to a secure environment and are best used when the hemorrhage is *not* life-threatening.
- Medical equipment limitations:
  - You only have what you can carry.
  - Consider spread-loading medical equipment (i.e., IV bags, bandages, etc.) throughout the unit.
- Medical evacuation:
  - Delays subject to air superiority, weather, and terrain.
  - Delays may range from 30 minutes to several hours or days (dependent upon the mission).

**Note:** If a victim of a blast or penetrating injury is found without a pulse, respirations, or other signs of life, do *not* attempt cardiopulmonary resuscitation (CPR). Resuscitation on the battlefield will most likely not be successful and should not be attempted unless in a secure setting with no chance of enemy contact. CPR performers will unnecessarily risk themselves unless the scene has been secured.

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## Four Basic Lifesaving Steps

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### Overview

The physical process of breathing and blood circulation is so automatic and natural that a person is hardly aware of it. However, if the process were to be interrupted for even a few minutes, a victim would progressively pass through stages of discomfort, unconsciousness, brain damage, and death. An understanding of the cardiopulmonary process will help you select the proper course of action when confronted with a casualty whose breathing and/or heart has stopped. However, an understanding of the importance of oxygen and blood to the body's survival is crucial.

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### Importance of Oxygen

Oxygen is vital to all of the body's cells. Without it, the cells quickly deteriorate and die. The rate at which various cells deteriorate depends on their structure, function, and location. The cells of the brain and nervous system die in four to six minutes.

Time is critical:

0 – 1 Minute: Cardiac Irritability begins

0 – 4 Minutes: Brain Damage not likely

4 – 6 Minutes: Brain Damage possible

**6 – 10 Minutes: Brain Damage very likely**

**> 10 Minutes: Irreversible Brain Damage**

**Time is Critical! If the brain is deprived of oxygen for 4 to 6 minutes, brain damage is likely to occur. After 6 minutes without oxygen, brain damage is extremely likely**

Since the brain and nervous system control the other body functions, any interruption in the cardiopulmonary process is extremely dangerous. Opening the airway, rescue breathing, and cardiopulmonary resuscitation (CPR) moves oxygen to the brain and other organs. For convenience of memory, we call this the "ABCs of Basic Life Support."

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### Importance of Circulation

**The number one cause of preventable battlefield death is from extremity exsanguination.**

The average adult contains approximately 5 liters of blood and upon the loss of even 20%, the body will begin to go into hemorrhagic shock. The onset of this shock will happen quickly, as the body can bleed out from anywhere to 60 – 120 seconds.

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## Primary Assessment

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First, we must have a procedure for determining what treatment an apparent victim requires. This is known as the **primary assessment**. It allows us to check rapidly the most vital functions, breathing and heart activity, and enables us to decide exactly what to do next.

- Determine state of consciousness,
  - Send for help or report to higher
  - Positioning the victim on their back
  - Assess the Basic Life Support ABC's
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## Four Basic Lifesaving Steps

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The four basic lifesaving steps are:

- 1: (A) Open the airway.
- 2: (B) Check for *breathing*.
- 3: (C) Check for signs of *circulation*.
- 4: Treat for shock.

**1 (A) Open the Airway** Use the head tilt/chin lift technique to open the airway if there is no sign of head, neck, or spinal injury as shown in the following figure. To open the airway, you must position the victim because there is a natural tendency for the tongue to fall back and close off the airway in an unconscious victim.

Step	Action
1	Place the hand nearest the victim's head on his or her forehead and apply firm backwards pressure with your palm to tilt the head backward.
2	Place the fingers of your other hand under the bony part of his or her lower jaw at the chin and lift to bring the chin forward.

**Note:** If a neck/back injury is suspected, do *not* move the head or neck but use the mouth-to-nose technique, which will be discussed later.



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## Four Basic Lifesaving Steps (Continued)

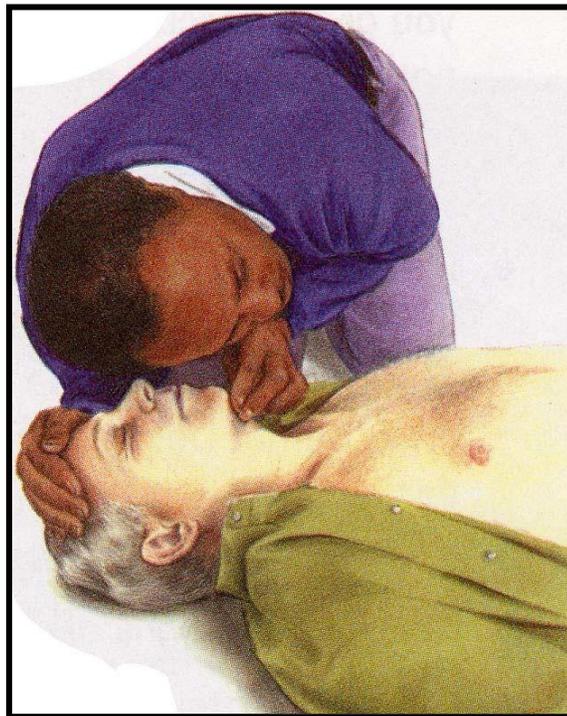
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### 2 (B) Check for Breathing

Once the airway is open, "look, listen, and feel" for breathing. This means placing the side of your face close to the victim's mouth, looking at his or her chest for movement, listening for escaping air, and feeling for exhalation on the side of your face (see following diagram).

Step	Action
1	<b>Give two breaths.</b> Give two full breaths to the victim. Seal your mouth over the victim's mouth. The nose of the victim should be pinched while giving breaths and released immediately afterwards.
2	<b>Look, listen, and feel.</b> After giving two breaths, check to make sure you were effective in inflating the victim's lungs and are not hampered by an obstructed airway.

**Note:** Involuntary muscular action may cause chest movement even when the airway is obstructed. Therefore, it is easy to be misled into thinking that a casualty is adequately breathing by merely watching the victim's chest rise and fall. Remember to listen and feel as well as look.



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## Four Basic Lifesaving Steps (Continued)

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### 3 (C) Check for Signs of Circulation

Finding signs of circulation can be difficult under even normal circumstances, so look first for signs of movement from the casualty. If there is none, assume that they do not have a pulse. If you are not entirely sure, make a manual check for circulation by means of the carotid or the radial pulse.

Find the carotid artery by sliding the fore and middle fingers down the centerline of the neck until it rests in the groove on the side of the neck closest to you. The radial pulse is the one found on the wrist. Feel for a pulse for 5 to 10 seconds. This step completes our assessment.

- **Clearing the Airway.** Early in your primary assessment, when attempting to give two breaths, you may find that the victim's airway is obstructed. Obviously, you must correct this problem before you can attempt any other treatment. If your attempted breaths will not inflate the victim's lungs, suspend your primary assessment at this point and concentrate on clearing the airway before continuing.

### Abdominal Thrusts (Unconscious Victim)

To clear the airway of an unconscious victim, use abdominal thrusts:

Step	Action
1	Open the airway using the head tilt/chin lift method.
2	Attempt two mouth-to-mouth or mouth-to-nose breaths. Ensure airway is open during attempts.
3	If successful, continue mouth-to-mouth (or mouth-to-nose) resuscitation until the casualty resumes breathing or until competent medical assistance arrives.
4	If unsuccessful in ventilating the victim, quickly reopen the victim's airway using the head tilt/chin lift method again and conduct finger sweep to dislodge objects in the mouth if necessary.
5	If unsuccessful in dislodging the obstruction, attempt six to ten abdominal thrusts.

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## Four Basic Lifesaving Steps (Continued)

### Abdominal Thrusts

Here is how to execute abdominal thrusts (see following diagram):

Step	Action
1	Kneel at his or her side or straddle the individual.
2	Place one of your hands on top of the other with the heel of the bottom hand in the middle of the abdomen, slightly above the navel and below the rib cage.
3	Move forward so that your shoulders are directly over the victim's abdomen and press toward the diaphragm with a quick thrust.



### Manual Checks

Use these steps to clear the airway with manual checks.

Step	Action
1	Check the mouth for objects.
2	Turn the head up and open the mouth by placing your thumb on the tongue.
3	Pull the jaw out and down toward the chin.
4	Sweep deeply into the mouth and along the cheek with a hooked finger if necessary.
5	Attempt to give two breaths.
6	Continue with abdominal thrusts, sweeps, and breaths until trained medical personnel arrive.

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## Four Basic Lifesaving Steps (Continued)

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### Clearing the Airway: Abdominal Thrusts (Conscious Victim)

Also known as the Heimlich Maneuver, abdominal thrusts are also effective in treating a conscious choking victim. The technique is altered to accommodate the victim, who should be moved to a standing position if not already so. If the victim can speak, even slightly, or cough forcefully on demand, he or she has the capability to breathe sufficiently. Keep him or her calm and get him or her to the nearest medical facility where skilled medical personnel can remove the object.

### Abdominal Thrusts/Heimlich Maneuver

Here are the steps to execute the Heimlich Maneuver.

Step	Action
1	While positioning yourself behind the victim, quickly explain the procedures you are going to perform.
2	Stand behind the victim, wrap your arms around the person's waist, and place the thumb side of your fist against the individual's abdomen slightly above the navel and below the tip of the breastbone.
3	Compress the victim's abdomen with a quick upward thrust toward your shoulders.
4	Attempt abdominal thrusts until the obstruction is cleared or the victim becomes unconscious. If this occurs, be prepared to clear the airway while they're unconscious.

### Chest Thrusts

The chest thrust is an alternate technique to use in cases of advanced pregnancy or by small persons on large victims when it is impossible to encircle the victim's abdomen.

Step	Action
1	Place both hands in the middle of the sternum, making sure the hands are above the lower tip of the breastbone (xiphoid tip).
2	Exert quick thrusts with the hands, which will compress the chest cavity.
3	Attempt chest thrusts until the victim begins to breathe, cough, or loses consciousness.  <b>Note:</b> Remember, this technique may not be as effective as the abdominal thrusts because air is not pushed out as forcefully.

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## Four Basic Lifesaving Steps (Continued)

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- **Rescue Breathing.** Once you have cleared the airway or your primary assessment reveals that the victim has a pulse but is not breathing, perform rescue breathing.

**Mouth-to-Mouth Rescue Breathing** To conduct rescue breathing:

Step	Action
1	Determine unresponsiveness. Tap or gently shake the person, and ask if he or she is okay.
2	Call for help.
3	Turn or position the casualty on his or her back on a firm surface.
4	Use the head tilt/chin lift method to open the airway.
5	Check for breathing. Look, listen, and feel. If there is no sign of breathing, pinch the nose, seal the mouth with yours and give two full breaths.
6	Check for pulse. If the casualty has a pulse, continue to deliver 12 breaths per minute or one breath every 5 seconds. This is the rate of breathing of an average adult at rest.

**Mouth-to-Nose Rescue Breathing**

The mouth-to-nose method is used if you cannot perform mouth-to-mouth breathing because the victim has a severe jaw fracture/mouth wound or his jaws are tightly closed by spasms.

Step	Action
1	Blow into the nose while you pinch the lips closed or cover the mouth with your hand.
2	It may be necessary to separate the casualty's lips to allow air to escape during exhalation.
3	The rate of breaths is one every 5 seconds.

**Note:** The mouth-to-nose technique requires the rescuer to blow almost twice as hard as in the mouth-to-mouth technique.

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## Four Basic Lifesaving Steps (Continued)

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**Chest Pressure/Arm Lift Method** The chest pressure/arm lift method is used when operating in a Chemical, Biological, Radiological, and Nuclear (CBRN) environment and the casualty and rescuer are masked.

Step	Action
1	Place the casualty in a face-up position. Maintain an open airway by placing something under the casualty's shoulders to raise them several inches, allowing his or her head to drop backward.
2	Kneel at the top of the casualty's head. Grasp the victim's wrists and cross them over his or her lower chest in the same location as you place your hands for cardiopulmonary resuscitation (CPR).
3	Rock forward until your arms are almost straight up and down. Allow the weight of the upper part of your body to push with steady, even, downward pressure to force air out of the casualty's lungs.
4	Immediately release the pressure by rocking back. Pull the casualty's arms outward, upward over his or her head, and backward as far as possible to allow air to flow into the lungs.

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- **Cardiopulmonary Resuscitation (CPR).**

If, during the course of your primary assessment, you discover that the victim has no pulse and is not breathing, cardiopulmonary resuscitation is warranted. CPR is easily learned, but it must be performed correctly in order to provide the brain with oxygen and to avoid further injury to the victim.

It is possible to achieve effective artificial compression because the heart is located between the solid bone surfaces of the sternum (or breastbone) and the spine. However, as you compress the heart between these surfaces, you must be aware of the location of other vital organs lying under the breastbone and the ribs.

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## Four Basic Lifesaving Steps (Continued)

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### Locating Proper Hand Position

Follow these steps to locate the proper hand position for CPR.

Step	Action
1	Run your fingers up the edge of the rib cage until your middle finger fits right into the notch in the center of the chest and your index finger is lying beside it across the lower end of the sternum (in line with the chin).
2	Keep the middle finger in this notch and the index finger on the sternum (breastbone).
3	Place the heel of the hand closest to the head on the sternum next to but not covering the index finger.
4	Place the second hand on top of the first.
5	Fingers may be interlaced or extended. Do not rest your fingers on the casualty's ribs.

**Caution:** As you perform external cardiac compression, you must apply enough pressure to compress the heart between the breastbone and spine without injuring the other organs lying in the same area. The ribs are quite fragile and can crack easily. The pressure of external cardiac compression on a broken bone could drive the splintered edges into the organs lying beneath it. The xiphoid tip, the lower tip of the breastbone, is also a concern. Xiphoid, which means "sword shape," is an appropriate name for this tip because it is a bony point that extends beyond the main bone of the sternum and lies directly over the liver and stomach. Pressure on the xiphoid tip could drive it into these organs, causing serious injury.

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## Four Basic Lifesaving Steps (Continued)

### Chest Compressions

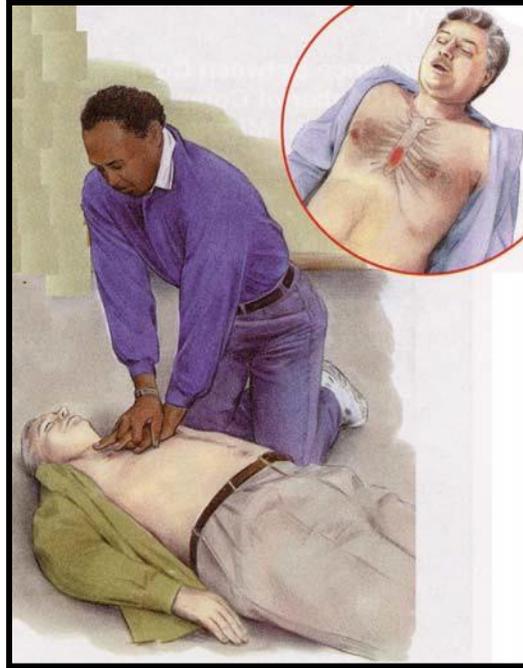
Follow these steps to perform chest compressions in CPR.

Step	Action
1	Bend from your hips with your arms straight. Compress the chest with your upper body weight falling straight down from your shoulders.
2	Keep your shoulders over your hands and your elbows straight and locked. Remember, the position of the rest of your body is equally important for maximum effectiveness with minimal strain. External cardiac compression requires a good deal of exertion; you must do it as efficiently as possible to maintain your energy and strength to keep the cardiac arrest victim alive.
3	While keeping your hands in place on the chest, position your shoulders directly over the victim's sternum again without bending your arms. If you have very short arms, you may have to kneel several inches away from the victim's side to achieve this position (see following diagram). You must keep your arms straight throughout compression. Bending the elbows tires you out much more quickly and requires a great deal more arm and shoulder strength than when you use your whole body to exert the downward pressure.
4	For an adult, depress the sternum 1.5 to 2 inches.
5	Between compressions, release the pressure completely. Do <i>not</i> <ul style="list-style-type: none"> <li>• Lift your hands off the chest.</li> <li>• Bounce against the chest.</li> <li>• Change your position in any way.</li> </ul> <p>You will lose too much time relocating the area for compression if you move your hands; bouncing might injure the ribs.</p>
6	Just rock up, back from your hips, and release the weight of your body so the sternum can then rise and allow the heart to refill.
7	Count aloud to establish a rhythm, i.e. "one-and-two-and-three-and-four-and...."

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## Four Basic Lifesaving Steps (Continued)

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### Cycle of Compressions

Give 30 compressions at the rate of 80 to 100 per minute, then two rescue breaths. Although the average pulse of an adult at rest is 60 to 80 beats per minute, you must compress at a more rapid rate to compensate for the pauses incurred during rescue breaths.

Check the pulse and breathing after 1 minute (every fourth cycle) and then every 2 minutes thereafter.

If a pulse returns but breathing does not, continue with rescue breathing at a rate of 12 breaths per minute.

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### Recovery Position

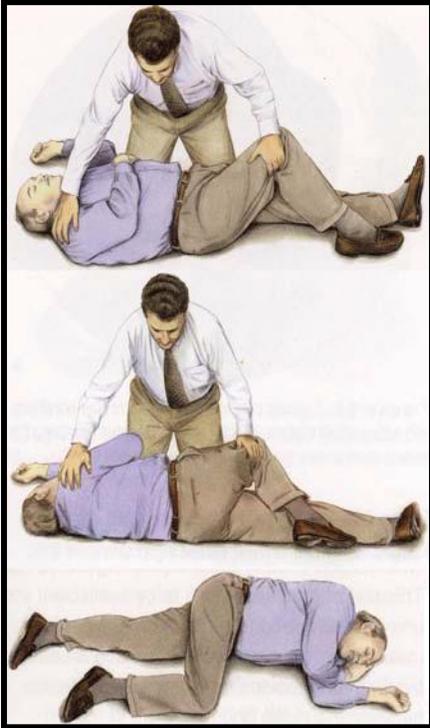
If rescue breathing or CPR efforts have been effective and the casualty regains consciousness and the ability to breathe, immediately place him or her in the recovery position (see following diagram).

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## Four Basic Lifesaving Steps (Continued)

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### Recovery Position



### When to Stop CPR

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Continue rescue breathing or CPR until

- The mission does not permit further efforts.
- More competent medical assistance help arrives.
- You are physically unable to continue due to fatigue.
- The casualty recovers.

While in a tactical environment, the priority for CPR is reduced. If a victim of a blast or penetrating injury is found without a pulse, respirations, or other signs of life, do *not* attempt CPR. Resuscitation on the battlefield will most likely not be successful and should not be attempted unless in a secure setting with no chance of enemy contact. CPR performers will unnecessarily risk themselves unless the scene has been secured.

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### 4. Treat for Shock. Refer to Combat Life Saving Student Handout (B151196).

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## Secondary Survey

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**Secondary Assessment** Goals of a secondary assessment are to:

- Prepare the casualty or casualties for transport to the next level of care.
- Reassess all life threatening injuries and treatments.
- Manage problems associated with the airway and breathing.
- Ensure pressure dressings, bandages, splinting, or tourniquets are secure enough to withstand rough, rugged transport.

## Reassessment

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Consider the following in your secondary assessment:

- Level of consciousness:
    - What is the level of consciousness?
    - Has it changed?
  - Airway: Is the airway still open?
  - Breathing: Reassess the chest, insuring rise and fall during respirations.
  - Circulation:
    - Pulse rate and rhythm.
    - Skin color and temperature.
  - Reassess previous treatments:
    - Reassess status of hemorrhage control.
    - If you had to move the casualty for any reason (tactical situation, scene hazards), ensure that dressings are intact and hemorrhage control was maintained.
    - Open fractures commonly bleed severely prior to being immobilized and may require re-dressing or re-aligning. Pay particularly close attention to occlusive dressings.
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## Secondary Survey (Continued)

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### Head to Toe Assessment (DCAP-BTLS)

During the secondary assessment, expose only the areas that are completely necessary; cover the casualty when not necessary to prevent hypothermia. Start by gently feeling scalp, moving down to neck, collarbones, ribcage, abdominal area, arms, pelvic area, and finishing with legs.

Use the acronym *DCAP-BTLS* to guide the exam of the head, neck, chest, abdomen, pelvis, extremities and posterior body surface. DCAP-BTLS stands for:

- Deformities.
- Contusions.
- Abrasions.
- Punctures/penetrations.
- Burns.
- Tenderness.
- Lacerations.
- Swelling.

The following table identifies certain items that should be kept in mind when conducting the head-to-toe examination.

<b>Body Part/Area</b>	<b>Considerations</b>
Head	<ul style="list-style-type: none"> <li>• Inspect and palpate the scalp, skull, and facial bones.</li> <li>• Assess the pupils. Be alert for raccoon eyes.</li> <li>• Assess the mouth and nose for potential airway compromising injuries.</li> <li>• Assess the ears and nose for blood and cerebral spinal fluid.</li> </ul>
Neck	<ul style="list-style-type: none"> <li>• Inspect/palpate/treat the C-spine.</li> <li>• Dress any injuries prior to applying a C-collar.</li> </ul>
Chest	Inspect the rise and fall during respiration.

## Secondary Survey (Continued)

### Head to Toe Assessment (DCAP-BTLS) (Continued)

Body Part/Area	Considerations
Abdomen	<ul style="list-style-type: none"> <li>Look at the abdomen for obvious injuries, i.e., distended abdomen, open wounds, bruising, etc. Abdomen should be soft and supple; feel for areas that are hard, firm, and rigid. If distention is noted, do <i>not</i> palpate the abdomen.</li> <li>Secure open eviscerations.</li> </ul>
Pelvis	<ul style="list-style-type: none"> <li>Palpate pelvis for stability and note the casualty's response. Potential pelvic fractures should not be examined repeatedly.</li> <li>If obvious deformity is noted, <b>do not</b> palpate the pelvis.</li> </ul>
Posterior	<ul style="list-style-type: none"> <li>With the help of an assistant, log-roll the casualty over and inspect and palpate the posterior. <i>Remember your casualty's injuries and log-roll to the appropriate side!</i></li> <li>Reassess the casualty after completion of the log roll.</li> </ul>
Lower extremities	<ul style="list-style-type: none"> <li>Look for major injuries.</li> <li>Be sure all long bone fractures have been splinted at this time.</li> <li>Look for hemorrhage.</li> </ul>

### General Impression of Casualty

After secondary assessment, a decision must be made regarding the need for evacuation versus the casualty's need for further stabilization.

Evacuation considerations are based on the level of injuries. Other factors that must be considered are

- Determining the casualty's estimated blood loss.
- Keeping the casualty warm. Casualties frequently suffer from hypothermia upon their arrival at a higher echelon treatment facility.
- Maintaining continual awareness of the tactical situation.

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## Nine Diagnostic Signs

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A rapid but accurate examination of an injured or critically ill casualty is essential for adequate emergency medical care. Such an examination includes observation of:

- Diagnostic signs: manifestations of changes in body functions.
- Evaluation of symptoms: evidence of changes in body functions apparent to the casualty that are determined by questioning.

The following nine essential diagnostic signs can be observed rapidly during an examination.

### **Pulse**

The usual pulse rate in adults is 60 to 100 beats per minute; in children, 80 to 100 beats per minute.

The pulse can be palpated (felt by touch) at any area where an artery passes over a bony prominence or is close to the skin. The carotid artery in the neck is the best site to palpate the pulse. Always check the pulse with the casualty lying down or seated.

Changes in the rate and volume of the pulse are important findings. The pulse rate is easily checked and reflects the rapidity of the heart contractions. The pulse volume describes the sensation the contraction itself gives to the palpating finger. Normally the pulse is a strong, easily felt impulse reflecting a full blood volume.

A rapid, weak pulse can be the result of shock from loss of blood, while a rapid, bounding pulse is present in fright or hypertension. The absence of a pulse means that

- The specific artery is blocked or injured.
- The heart has stopped functioning (cardiac arrest).
- Death has occurred.

### **Respiration**

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Usually respiration is between 12 and 20 breaths per minute, but well-trained athletes may breathe only six to eight times a minute. Rarely does the rate exceed 20 breaths per minute. Normal respiration is not usually shallow or deep.

Record the initial rate and character of respiration when the casualty is first seen; any changes should also be recorded.

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## Nine Diagnostic Signs (Continued)

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**Respiration (Continued)** Rapid, shallow respirations are seen when a casualty is suffering from shock. Deep, gasping, labored breathing may indicate partial airway obstruction or pulmonary disease. In respiratory depression or respiratory arrest, the chest and abdomen will move very little or not at all with respiration, and the nose and mouth will have little air flow.

Frothy sputum with blood at the nose and mouth accompanied by coughing indicates lung damage. Fractured ribs can tear the lungs; foreign bodies (e.g., bullets, knives) can penetrate and lacerate them. In each instance, bleeding within the lung may appear as coughed-up pink froth. Frothy pink or bloody sputum is also an indication of pulmonary edema, which can accompany acute cardiac failure or severe lung contusion.

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### Blood Pressure

Blood pressure is the pressure of the circulating blood against the walls of the arteries. Since the normal person's arterial system is a closed system, changes in the pressure indicate changes in the:

- Volume of the blood.
- Capacity of the vessels.
- Ability of the heart to pump.

Changes in blood pressure, like those in the pulse, can be rapid. However, they are not as rapid as pulse changes because normal protective mechanisms exist to maintain blood pressure in spite of injury or disease.

Blood pressure is determined with the use of a sphygmomanometer and stethoscope. Because specialized testing equipment must be used, the corpsman, not the Marine, will normally determine the blood pressure.

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### Temperature

Normal body temperature is 98.6 degrees Fahrenheit (37.0 degrees Centigrade). The skin is largely responsible for regulating this temperature by radiation of heat from blood vessels near the skin and the evaporation of water as sweat. Changes in temperature occur as a result of illness or injury.

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## Nine Diagnostic Signs (Continued)

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### Temperature (Continued)

Cool, clammy (damp) skin is indicative of a general response to a trauma to the body (i.e., blood loss, shock, or heat exhaustion). Because of nervous stimulation, sweat glands become hyperactive and skin blood vessels contract, resulting in cold, pale, wet, or clammy skin. These signs are often the first indication of shock, and they must be recognized as such.

Exposure to cold will produce a cool, dry skin. Dry, hot skin may be caused by fever or by exposure to excessive heat, as in heatstroke.

Temperature measurement by the use of a thermometer is not normally practical for the Marine in the field. Placing the back of the hand on the casualty's forehead to determine a "normal" temperature is all that can be expected.

### Skin Color

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Skin color depends primarily on the presence of circulating blood in subcutaneous blood vessels. In deeply pigmented people, skin color depends primarily on the pigment. Such pigment may hide true skin color changes resulting from illness or injury. In casualties with deeply pigmented skin, color changes may be apparent:

- In the fingernail beds.
- In the sclera (white portion of the eye).
- Under the tongue.

In lightly pigmented casualties where changes may be seen more easily, colors of medical importance are

- Red: May be present in:
  - High blood pressure. The casualty who has severe high blood pressure may sometimes be plethoric (the casualty will have dark reddish-purple skin color and all visible blood vessels will be full).
  - Certain stages of carbon monoxide poisoning. The casualty with carbon monoxide poisoning is usually cherry red.
  - Heatstroke. Like carbon monoxide poisoning, the casualty with heatstroke is usually cherry red.

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## Nine Diagnostic Signs (Continued)

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- Skin Color (Continued)**
- **White:** A pale, white, ashen, or grayish skin is indicative of insufficient circulation (there is literally not enough blood circulating in the skin) and is seen in casualties who are:
    - In shock.
    - Having an acute heart attack.
    - In certain stages of fright.
  
  - **Blue:** A bluish color, cyanosis, results from poor oxygenation of the circulating blood. As a result, blood is very dark, and the overlying tissue appears blue. Cyanosis is caused by respiratory insufficiency due to airway obstruction or inadequate lung function. It is usually first seen in the fingertips and around the mouth. Cyanosis always indicates a significant lack of oxygen and demands rapid correction of the underlying respiratory problem.

Chronic illness may also produce color changes such as the yellow color (jaundice) in liver disease. In such cases, *bilirubin*, a reddish-yellow pigment normally present in the liver and the gastrointestinal tract, is deposited in the casualty's skin.

## Pupils

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The pupils, when normal, are regular in outline and usually the same size. In examination of the pupils, the presence of contact lenses or prostheses (glass eyes) must be considered. Changes and variation in size of one or both pupils are important signs in emergency medical care.

Constricted pupils are often present in a drug addict or a casualty with a central nervous system disorder. Dilated pupils indicate a relaxed or unconscious state; such dilation usually occurs rapidly, within thirty seconds after cardiac arrest. Head injury or prior drug use, however, may cause the pupils to remain constricted even in casualties with cardiac arrest.

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## Nine Diagnostic Signs (Continued)

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### Pupils (Continued)

Variation in the size of the pupils is seen in casualties with head injuries or strokes. In a small percentage of normal persons, *anisocoria* (unequal pupil size) is found. The incidence of this is so small, however, that in a casualty pupil variation is regarded as a reliable sign of brain damage.

Ordinarily, pupils constrict promptly when light shines into the eye; this is a normal protective reaction of the eye. Failure of the pupils to constrict when a light shines into the eye occurs in:

- Disease.
- Poisoning.
- Drug overdose.
- Injury.

In death, the pupils are widely dilated and fail to respond to light.

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### Level of Consciousness

Normally, a person is alert, oriented (knows time, place, and what day it is), and responsive to vocal or physical stimuli. Any change from that state is indicative of illness or injury. Recording such a change is extremely important in emergency medical care. Such changes may vary from mild confusion to deep coma.

The state of consciousness of a casualty is probably the single most reliable sign in assessing the status of the nervous system. The level of responsiveness aids in the determination of the casualty's baseline.

The responsiveness of the casualty can begin to be assessed from a distance as the Marine providing assistance is approaching a casualty, i.e., "Hey, if you can hear me, crawl towards my voice!" Coupled with the vital signs, the AVPU scale is one of the best rudimentary diagnostic tools that the Marine providing assistance has in a tactical setting.

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## Nine Diagnostic Signs (Continued)

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### Level of Consciousness (Continued)

AVPU stands for:

- *Alert and awake.* If casualty is alert, determine what happened.
- Responds to *verbal* stimuli.
- Responds to *painful* stimuli.
- *Unresponsive.* If the casualty is unresponsive, assessment and treatments will continue according to the casualty's injuries.

It is extremely important to note the state of consciousness of a casualty at once, and all subsequent changes must be noted.

Increasing difficulty in rousing a casualty are signs that indicate an urgent need for prompt attention. This is especially true in the casualty who is unconscious following an injury, rouses and seems normal for a varying period of time (lucid interval), and then suddenly becomes unconscious and collapses. Such a casualty has bleeding inside the skull and needs immediate surgery.

### Ability to Move

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The inability of a conscious casualty to move voluntarily is known as paralysis. It may occur as a result of illness or injury. Paralysis of one side of the body (*hemiplegia*) may occur because of bleeding within the brain or a clot in a vessel (i.e. a stroke). Some drugs, if used over long periods, may also cause paralysis.

Inability to move the legs or arms after an accident should be interpreted as injury to the spinal cord until proved otherwise. Inability to move the legs while the arms remain normal indicates a spinal injury below the neck. Paralysis is a particularly important sign, and its presence and onset with regard to an injury must be recorded.

The casualty who has a completely severed spinal cord will be paralyzed below the level of the injury immediately and permanently. The casualty who has a spinal injury, in which gradual compression of the cord occurs, experiences a progressive onset of paralysis.

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## Nine Diagnostic Signs (Continued)

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### Reaction to Pain

Reaction by vocal response or body movement to painful physical stimulation is a normal function of the body. Changes in this reaction may result from loss of sensation following an injury or illness.

The loss of voluntary movement of the extremities after an injury is usually accompanied by loss of sensation in these extremities. Occasionally, however, movement is retained, and the casualty complains of numbness or tingling in the extremities. This is an important sign of probable injury of the spinal cord, so ensure mishandling does not occur and aggravate the condition.

Severe pain in an extremity with loss of skin sensation may be the result of occlusion of the main artery of the extremity. In such a case, the pulse in the extremity is absent. The ability to move the extremity is usually retained, although it is often held immobile because of pain.

Frequently, casualties suffering from hysteria, violent shock, or excessive drug or alcohol use may feel no pain from an injury for several hours. This is not accompanied by paralysis, and usually other signs will support a diagnosis of hysteria or other such reaction.

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## Triage Procedures

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The actions previously described are for use with a single casualty. Quite often, however, the unit leader will be faced with multiple casualties. The leader must decide who will be treated and evacuated first and who can wait. We call this triage—a French word meaning "*picking, sorting, or choice*" and is used to mean the *sorting or allocation of casualties according to a system of priorities*. Triage is a continuing process and is the responsibility of the best-trained individual at a disaster.

The Marine who first arrives on the scene is responsible to begin a screening process and, as soon as or before this action has been taken, to contact the field medical unit for additional equipment and personnel needed.

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## Triage Procedures (Continued)

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Casualties with certain conditions or injuries have a priority for treatment and transportation over others. The three categories in which a casualty may be sorted into are:

- Urgent.
- Priority.
- Routine

### **Urgent**

A severe injury; threatening to life, limb, or eyesight—casualties marked as *urgent* must be treated first at the scene and transported immediately. Such injuries/problems include the following:

- Airway and breathing difficulties.
- Gunshot wounds.
- Spinal or pelvic fractures.
- Cardiac arrest.
- Uncontrolled or suspected severe hidden bleeding.
- Open chest or abdominal wounds.
- Severe head injuries with evidence of brain damage, no matter how slight.
- Several medical problems:
  - Poisonings.
  - Diabetes with complications.
  - Cardiac disease with failure.

### **Priority**

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An injury that requires immediate medical attention, but is not threatening to life, limb, or eyesight—for casualties marked as *priority*, transportation and hospital treatment can be delayed slightly. The following are typical problems or injuries:

- Burns without complications.
  - Major or multiple fractures.
  - Back injuries without spinal damage.
  - Heat/cold injuries—*not* counting heat stroke.
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## Triage Procedures (Continued)

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### Routine

An injury that is not threatening to life, limb or eyesight. Routine casualties are transported or treated last. Examples of routine injuries are

- Injuries of a minor nature, i.e. sprains, small fractures, minor lacerations, etc.
  - Obviously mortal wounds where death appears reasonably certain.
  - Obviously dead.
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- **Mass Casualties.** A mass casualty event is declared when the number and nature of casualties exceeds the skill level, resources, and personnel of those present. It becomes apparent that the philosophy of emergency medical care must change in a disaster with mass casualties. Time spent on one casualty with too many severe injuries will deprive other casualties with less severe but dangerous injuries of the care necessary for survival.
  - **Chemical, Biological, Radiological or Nuclear (CBRN) Casualties.** A separate category of triage should also be noted, as it supersedes all others. Casualties as a result of a chemical, biological, radiological or nuclear (CBRN) event are potentially contaminated and must be segregated immediately as an initial step. They must not be allowed to contaminate other casualties, ambulances, or the hospital.
  - **Triage Requirements.** Leadership is paramount during triage. Someone must be in command to guide what is being done and to utilize any help as it arrives. This is the duty of the most highly trained Marine or the corpsman. The Marine must establish priorities and, depending on the availability of transport vehicles and local conditions, determine how the casualties will be managed.
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## Transportation of Casualties

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**Casualty Movement in a Tactical Situation** Transporting casualties is normally the responsibility of medical personnel, i.e., corpsmen. However, when the situation is urgent, and you are required to move the casualty to a casualty collection point or to the casualty evacuation (CasEvac) site, you have to consider the most appropriate means of doing so.

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### Minimizing Risk

To minimize the risk,

- Control the tactical situation. If hostile fire is not effectively suppressed, it may be necessary to move casualties to cover before they are prepared for transport.
- Be aware of available assets:
  - Litters.
  - Improvised litter material, i.e., ponchos, bivy sacks, ladders, plywood, etc.
- Make sure everyone understands their role in the movement.
- Determine which manual carry technique will be most appropriate to the injury:
  - Fireman's carry.
  - Drag: One person or two person.
  - Two-person rifle or pack carry.
  - Poncho drag.
  - Litter carry (two-person or four-person).
  - Improvised litters.

Transporting a casualty by litter is safer and more comfortable for him/her than by manual means; it is also easier for you. Manual transportation may be the only feasible method because of the terrain or the combat situation. Casualties carried by manual means must be handled carefully and correctly. Otherwise, their injuries may become more serious or possibly fatal.

### Manual Carries

Review MCRP 3-02G, First Aid, pages B-1 through B-28 for explanations and examples of manual carries and field expedient litters.

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## Transportation of Casualties (Continued)

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- **TacEvac** is an umbrella term used by higher that encompasses both CasEvac and MedEvac platforms.
- **CasEvac:** Is conducted by COMBAT aircraft or ground vehicles; does not provide, or provides very limited medical support; is not protected by the Geneva Convention as a medical platform/personnel.
- **MedEvac:** Is conducted by medical aircraft or ground vehicles; does provide medical life saving support; and is protected by the Geneva Convention as a medical platform/personnel; marked with the red cross/crescent.
- **Types of TacEvac Transportation.** Depending on the urgency of the casualties and the assets available, call for a ground or air TacEvac.

Evacuation times may vary from minutes to days. The multitudes of factors that will affect the ability to evacuate a casualty via ground or air transportation are:

- Availability of aircraft or vehicles.
- Availability of treatment facilities.
- Weather.
- Tactical situation.
- Mission.
- Status of the casualties.

**Ground Transportation** Planning considerations when calling for TacEvac via HMMWV ambulance capabilities are

- M997: Hard back/high back; 4 litters or 8 ambulatory.
  - M1035: Soft back/low back; 2 litters or 3 ambulatory.
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## Air Transportation

Planning considerations when calling for air TacEvac are

- UH-1 Huey: Lightweight transport helicopter; 6 litters or up to 10 ambulatory.
- CH-46E Sea Knight: Medium transport helicopter; 15 litters or 22 ambulatory.
- CH-53D/E Sea/Super Stallion: Heavy transport helicopter; 24 litters or up to 37 ambulatory.
- V-22 Osprey: Tilt rotor aircraft; 12 litters or 24 ambulatory.
- HH-60M Blackhawk: Medium transport; 4 litters.

With enough advance notice, helicopters sent in support of a TacEvac can be prepared with additional medical personnel and supplies

- Nurses, independent corpsmen (IDCs), or doctors.
- Electronic monitoring equipment.
- Oxygen.
- IV solutions or blood.
- Automated external defibrillator (AED).
- Medications.
- Bandages.
- Splints.
- Spine boards.

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## Casualty Reporting

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Two methods of casualty reporting are:

- 9-line Casualty Evacuation / Medical Evacuation (CasEvac/MedEvac) Request
- Casualty Report (CasRep)

### **9-line CasEvac/MedEvac Request**

1. Grid coordinates of pick up site (8 digit grid).
  2. Radio frequency/NET ID and call sign.
  3. Number of casualties by precedence.
  4. Special equipment requirement.
  5. Number of casualties by type litter/ambulatory.
  6. Security at pick up site.
  7. Method of marking.
  8. Patient nationality and status.
  9. Casualty Information / CBRN
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**Casualty Rep**

1. Name, grade, SSN, unit.
2. Time of incident.
3. Location of incident.
4. Type of wound.
5. Location of wound.
6. Casualty status.
7. Casualty evacuation required? (Y/N).
8. Activity in which casualty engaged.

**Summary**

Remember the information presented in this lesson and use it to train your Marines. Proper triage, preparation, and evacuation of casualties will save lives. The difference between life and death is measured in minutes after a Marine suffers a severe injury. An individual who is trained in the rapid assessment and evacuation of casualties will be critical in a tactical environment where every second will count. This lesson will prepare you to render effective first aid for combat-related injuries and to teach your Marines the same skills.

**References**

Reference Number or Author	Reference Title
FM 21-11	First Aid for Soldiers
MCRP 3-02G	First Aid
PHTLS	Pre-Hospital Trauma Life Support: Mil. Edition, 6 <sup>th</sup> Ed. 2006

**Glossary of Terms and Acronyms**

Term or Acronym	Definition or Identification
AED	Automated external defibrillator
AVPU	<ul style="list-style-type: none"> <li>• <i>Alert and awake.</i></li> <li>• Responds to <i>verbal</i> stimuli.</li> <li>• Responds to <i>painful</i> stimuli.</li> <li>• Unresponsive.</li> </ul>
CasRep	Casualty report
CBRN	Chemical, biological, radiological, nuclear
CPR	Cardiopulmonary resuscitation
IDC	Independent corpsman



