
Emergency Care And Treatment **- ECAT -** in Disasters



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**Pan American
Health
Organization**



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PREFACE

International statistics show that major accidents and disasters have become significantly more common in recent decades, parallel to and generated by social developments.

- Increased and more rapid transportation of people and goods and higher capacity modes of transport
- Concentration of a larger number of people in a limited areas, occasionally or permanently
- Growth of chemical and technical industries involving production and transportation of ever-increasing amounts of explosive and toxic agents often in and through densely populated areas with insufficient safety measures.
- Terrorists exploiting these risks for personal and political reasons
- Increase in armed conflicts.

Therefore, despite measures, we know that such major accidents will continue to occur and cost, in addition to material damage, human lives, permanent disablement, and considerable physical and mental suffering.

Education and training are not merely important, but essential for disaster management services. Good planning and equipment may be of little or no use if the staff has not received appropriate instruction in the function of the organization or the use of the equipment.

Education and training must be undertaken at many levels

- The general population
- Rescue workers (police and fire and army services)
- Ambulance staff
- Nurses, with scanty knowledge of pre-hospital care
- Doctors, with scanty knowledge of pre-hospital care
- Specialists, with scanty knowledge of pre-hospital care
- Disaster Coordinators

Instruction of the general population in basic first aid and response to major accidents is important, as members of the public often are the first on scene. Such instruction should be the responsibility of every community.

-Excerpts from the Scientific Committee of the International Society of Disaster Medicine-

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INTRODUCTION

This manual is developed to be a support module for persons receiving instruction in the PAHO/WHO "ECAT in Disasters" Course. It will provide forty (40) hours of skills-based training designed to improve the participant's ability to provide some level of emergency medical care and treatment in a non-hospital environment. Attempts have been made to simplify this presentation in order to maximize the number of persons who may benefit. The BRADY First Responder (6th Edition) Manual will be an excellent adjunct to this course; references to it will be made throughout this manual.

The manual is intended to guide the user through the important aspects and skills necessary to begin assessing and caring for a patient at the scene of injury, illness or catastrophe during the first few minutes following an emergency.

Objectives

At the end of the course, participants will be able to:

- i. Conduct an initial rapid needs assessment of the incident scene
- ii. Safely move an injured patient at and from the incident scene
- iii. To recognize critical or urgent versus non-urgent patients
- iv. To work in tandem with local health resources
- v. Conduct training activities with the assistance of standardized teaching materials provided

The trainee, in essence, performs the role of a *First Responder* in situations or communities where no organized immediate pre-hospital medical help exists, or when inadequate numbers exist. It is important that he/she develops the attitude that allows him/her to work under the direction of the more senior health care providers, thus helping to provide informed and concerted patient care.

All emergency response personnel likely to be first at the scene of an incident, such as police, firefighters or defense force will benefit from this course. It is well-established that quick and appropriate interventions on the scene will save lives, leading to better overall outcome with less mortality and morbidity.

Communities are encouraged to adapt the scope of this manual to better suit their local method of organization. The ECAT in Disasters-trained individual must still be considered part of your EMS (Emergency Medical Services) system and they should be guided to function accordingly.

Prior training in the following will be an asset and should be strongly encouraged:

- 1. BLS (Basic Life Support) i.e. By-stander CPR (Cardio-pulmonary Resuscitation)**
- 2. Basic First-Aid**

Both listed courses are usually accessible through the local Red Cross agencies or hospitals.

Other related PAHO/WHO disaster management courses include:

- MCM (Mass Casualty Management) or Medical Management of Disasters
- Incident Command System (ICS)
- SMID (Stress Management in Disasters)

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PROCEDURES, REQUIREMENTS, ASSESSMENTS AND GRADING

Procedures

This Manual will be made available to all participants to serve as a guide through the lessons.

The Brady Manual should be used to assist the participant in preparing for each lesson. Frequent references are made to Brady's Sixth edition in this manual. Reading ahead in preparation for each lesson will accelerate successful completion of this course material.

Lessons will utilize lecture methods, class discussions, in-class exercises, audiovisuals materials and field exercises. Group work will be emphasized.

Requirements

Active participation in forty hours of skills-based class activity is mandatory.

A timely completion of all tests and assignments is indicated.

Participants are required to attend all sessions in order to successfully complete this course.

Assessments

Exams will be utilized to evaluate the learner's ability to understand, retain and apply the material presented. Exams will usually be standardized objective type consisting of true/false, multiple choice, completion and matching, but may include essay or short answer type. Your instructor will indicate what type of exam you will be given. Exams may include material discussed, presented or assigned in the class. Make-up exams will not be given. You may be given a mid-course (mid-term) exam and a final exam or just one final exam. Your instructor will inform you of all the relevant details about the exams.

Quizzes may be utilized to evaluate learning. If in-class quizzes are given, participant must be present. Students who are not present may not make up an in-class quiz that is missed.

A pretest sample quiz will be provided to assist participants in preparing for the exams. Your instructor will tell you if your point system will be presented in a letter grade or a pass-fail basis.

Grading

Class drills	100 points	25%
Mid-course Exam	100 points	25%
Final Exam	200 points	50%
TOTAL	400 points	

Grade Distribution

A + = 96 - 100 %	A = 90 - 95%	A- = 84 - 89 %
B+ = 78 - 83%	B = 72 - 77%	B- = 66 - 71 %
C+ = 60 - 65%	C = 55 - 59%	C- = 50 - 54%
D+ = 45 - 49%	F = 0 - 44%	P = pass = >60%

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THINGS YOU SHOULD KNOW OR FIND OUT



What is the Emergency access telephone number in your area? If there is none available, what is the direct line to your Emergency Department?

Where are the hospitals and fire stations in your area?

How many ambulances work in your area, if any, and what is their average response time to various areas in your community?

How can you most effectively communicate with the available ambulance service while en route?

Is there a coastguard service in your area? If so, how can it be accessed?

What are the common risks in your communities based on terrain, available vehicles, typical local habits and social trends?

Do you have any health risks or challenges that would prohibit or prevent you from giving care to others? Discuss this with your ECAT-in-Disasters Instructor.

ALSO see glossary of important words and terms at the beginning of each chapter.

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Lesson 1 – Incident Size-up and Personnel Safety

Reference: Brady 6th Ed, Chapters 1, 2 and 15.



OBJECTIVES:

Upon completion of this lesson, you shall be able to:

1. Describe how your local command structure and response system works and how to perform within it.
2. Recognize the potential hazards in the emergency response and what can be done to remain safe.
3. Identify danger signs that may be observed at an emergency scene.
4. Describe several actions that may be taken to prevent injuries of the responder.

SKILLS:

You shall be able to perform the following

- ✓ Assess and initiate control at an accident/incident scene.
- ✓ Evaluate a scene in terms of safety and possible cause of an accident.
- ✓ Gather information from patients and by-standers
- ✓ Properly use all personal protective gear available.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

AIDS: A viral disease affecting the body's ability to fight off normal infections.

BSI: Body Substance Isolation: a form of infection control based on the presumption that all body fluids are infectious. (See personal protective gear, universal precautions.)

CISM: See SMID

Confidentiality: The privacy of a patient's information, including details of their behaviour and care used strictly in health professional circles.

Contagious: Can infect others, either by close contact (touching), respiratory (breathing same air), sexually (requiring sexual contact) or by blood (blood on broken skin).

Hazard: A situation, object or event which can cause harm to you, patients or by-standers.

Hepatitis: A disease that inflames and damages the liver, commonly caused by viruses. Some hepatitis viruses can cause lifelong illness or death.

Personal protective gear: Supplies such as gloves, masks, goggles or similar eye wear, gowns or helmets which protect the rescuer from infection and or exposure to hazardous materials. These may also be referred to as Personal Protective Equipment (PPE).

SMID: A stress management technique. Adapted from the (CISM) Critical Incident Stress Management program and is well-established in many communities. See page 590 of Brady 6th Ed.

Scene size-up: The first steps in rescue safety and patient assessment. An assessment of the scene conditions, number of patients, mechanism of injury and/or nature of the illness, and the resources needed.

Triage: A method of sorting patients for care and transport based on the severity of their injuries or illness and the likelihood of survival.

Tuberculosis: Also known as "TB", is an infection of the lungs, spread by the air.

Universal precautions: A recommendation to use all personal protective gear to provide a barrier from a patient's blood and body fluids.

List all the hazards likely to be found at each of the following scenes:



How many other hazards you can think of that were not reflected in the above scenes? List them below.

I. Communication

A. *First Impressions*

- You should appear confident, calm and reassuring.
- Develop a professional appearance and attitude.
- The victim will look to you for reassurance and you must win their trust.

B. *Communication Tools*

- Be appropriate to the individual or situation. Use eye contact.
- Watch out for non-verbal cues you may be giving off, i.e. your body language.
- Be honest, especially with children, explaining simply what is happening and what you are trying to do for them. It helps to bend down to their level so you do not appear too formidable.

C. *Interview Techniques*

- Try to get as much information as possible from any eye witnesses at the scene
- Use open-ended questions.
- The Conscious patient who is able to speak can give valuable information

II. Driving and Traffic Safety

A. *Driving for Safety*

1. Basic Safety Tips.

- High speed must always be a last resort.
- Stabilize the patient as much as is possible before transport. This allows a safer transport to take place.
- Seat Belts
 - Wearing seatbelts can save lives.

B. Staying Safe in Traffic on Foot

1. Park for Maximum Safety
 - Your vehicle should not provoke further incident.
 - Avoid bending where other vehicles may be reversing.
 - Assign someone to, or take control of, Crowd and Traffic flow
2. Get out of the Vehicle Safely
 - Be especially cautious when working at night. If you are not wearing light-coloured or reflective outer clothing you will not be readily visible to on-coming traffic.
3. Wear Personal Protective Equipment (PPE)
 - Treat every patient as though they are potentially infectious.
4. Channel Traffic Away from the Scene
 - Assign someone to conduct traffic, if necessary

C. Protecting those in the Patient Compartment

You may be called upon to either transport a patient or assist in the transportation of a victim. Each of the following is important:

1. Hanging on and bracing
2. Securing the patient
3. Securing the equipment
4. Performing CPR in a moving ambulance

III. Scene Safety

Your own safety is most important. If you are hurt, you will be of no help to anyone.

A. Plan your access carefully.

B. Observe the scene and carefully size- up everything around you.

C. React promptly to any evolving situation. Look for obvious hazards, possible hazards and potential hazards.

1. **Retreat** from threatening danger
2. **Radio** or call for help or back-up, if needed
3. **Reevaluate** the situation continually and act accordingly.

D. Controlling the Scene

1. Introduce yourself effectively to victims, relatives and/or witnesses.
2. Be professional in conduct, appearance and speech.
3. You may need to initiate triage if there are multiple victims.

VI. Take Control of Personal Safety

A. Protecting Yourself from Hostile People

1. The hostile scene
2. Protect your health



B. Infectious Disease Precautions

1. The process of transmission
2. Universal precautions
3. Identifying infectious diseases

C. Diseases of Concern

1. Hepatitis B
 - a) Signs and symptoms include abdominal pain, nausea, jaundice and dark urine in the acute or early phase. In later stages liver failure can develop leading to death.
 - b) Is transmitted by blood and sex. Barrier protective procedures needed. Immunization is available.

2. Tuberculosis
 - a) Signs and Symptoms includes cough with a bloody sputum and weight loss.
 - b) Is transmitted by air droplets from coughing. Barrier protective procedures are needed. Immunization is available.

3. Acquired Immunodeficiency Syndrome (AIDS)
 - a) Signs and Symptoms are not very specific and include marked weight loss, skin diseases, lung and intestinal infections in the late stages.
 - b) Is transmitted by blood and sex. Barrier protective procedures needed. No immunization is currently available.



D. Preventing Infection

1. CPR and infection: Practice universal precautions whenever possible.
2. Recommended immunizations: Hepatitis B, tuberculosis and tetanus vaccines will be an asset.
3. Hand washing guidelines: Hand washing is your **best** protection.
4. General guidelines: Be aware of cross contamination from one victim to another.

Discuss how the local command structure and response system works and how best you can perform within it.

Discuss what you should do if you arrive on a scene first and you are not part of the normal response system.

Consider:

1. What is the current situation?
2. Observe for hazards to you, the exposed population, or the victims.
3. Is it a medical situation?
4. Is it Trauma? What is the mechanism of injury involved?
 - a. High speed vs. low impact?
 - b. Falls from higher than 3 feet or lower?
 - c. Exposure to fumes?
 - d. Exposure to electrical shock?
 - e. Exposure to dangerous animals?
 - f. Exposure to on-coming vehicles?
5. Where is it going?
6. What are the possibilities – the obvious, possible and potential hazards?
7. How could you control it?
8. What resources are needed?

Discuss what is involved in Stress Management in Disasters (SMID) also known as Critical Incident Stress Debriefing (CISD).

Is it available in your area?

How can you access it if you feel the need or you see a colleague who appears to be in need?

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Lesson 2 – Kinematics of Trauma

References: Brady 6th Ed, Chapter 15



OBJECTIVES:

Upon completion of this lesson, you shall be able to:

1. Identify mechanism of injury as an important part of the assessment of a trauma patient.
2. Identify the injuries associated with common vehicular accidents.
3. Explain the types of trauma caused by falls, stabbings, bullet wounds, and blast injuries.

SKILLS

You shall be able to perform the following:

- ✓ Recognize specific types of injuries as they relate to types of trauma.
- ✓ Detect and provide care for injuries to soft tissues and long bones

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Anterior: The front of the body or body part. (See posterior.)

Bilateral: Existing on both sides of the body.

Distal: Further away from the torso. When used with the word proximal (closer to), distal means more distant from. (See proximal.)

Inferior: Away from the head; usually compared with another structure that is closer to the head. e.g. the chin is inferior to the nose. (See superior.)

Kinematics: The graphics of motion.

Lateral: To the side, away from the midline of the body.

Mechanism of injury: A force or combination of forces that may have caused injury. Consideration is given to the type of force, its intensity and direction and the body part it affects.

Midline: An imaginary line drawn vertically down the centre of the body, dividing it into right and left halves.

Penetrating wound: A puncture with only an entrance wound.

Posterior: The back of the body or body part. (See anterior.)

Prone: Lying face down. (See supine.)

Proximal: Closer to the torso. Used with the word distal, meaning away from. (See distal.)

Puncture: An open wound that tears skin and damages tissues in a straight line.

Soft tissues: The structure that make up skin, muscles, nerves, blood vessels, fatty tissue, organs and glands. Bones cartilage and teeth are hard tissues.

Supine: Lying flat on the back. (See prone.)

Superior: Towards the head e.g. chest is superior to the abdomen. (See inferior.)

Trauma: Any external force applied to the body, either deliberate or accidental resulting in injury to the body.

I. Common Mechanisms of Injury

The type and degree of injury to the body is directly related to the forces that are applied at or during impact. At the scene of an accident, it is important to gather information about the manner in which the incident occurred in order to understand the likely types of injuries you have to look out for.

Consider the pattern of movement in each of the following situations in *A* to *G* and examine the types of injuries that would result to individual(s) in the given scenarios.

A. Auto Accidents (including rear passengers on open pick-up trucks)

1. Head-on impact
2. Rear impact
3. Side impact
4. Rotational impact
5. Rollover
6. Ejection
7. Restraints – child seats and seatbelts
8. Pedestrians

B. Motorcycle and Bicycle Accidents

1. Head-on impact
2. Angular impact
3. Ejection/Projection
4. Laying the bike down / towards or away from rider

C. Recreational Vehicle Accidents

1. All Terrain Vehicle (ATV)
2. Personal water craft
3. Skiers
4. Skaters/Rollerbladers

D. Boating Accidents

1. The sailor(s)
2. The swimmer/diver

E. Falls

1. Feet-first falls
2. Head-first falls
3. Angular falls: Partially interrupted falls e.g. fall from tree hitting branches on the way down.

F. Penetrating Trauma

1. Low-velocity injuries – stabbing, punctures
2. Medium and high velocity injuries – gunshot injuries

G. Blast Injuries - Explosions

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Lesson 3 – Airway and Breathing with Spinal Management

Reference: Brady 6th Ed, Chapter 6



OBJECTIVES

Upon completion of this lesson, you shall be able to:

1. List the initial steps of opening the airway of a patient with a spinal injury.
2. Describe how to maintain spinal immobilization when maintaining an open airway of a patient with a spinal injury.
3. Describe the signs of respiratory distress.
4. Demonstrate the steps to use an oral airway and bag-valve-mask.
5. Understand the need for supplemental oxygen and how to properly and safely deliver it.

SKILLS

You shall be able to do the following:

- ✓ Recognize the signs and symptoms of respiratory distress.
- ✓ Open the patient's airway, provide airway care and perform rescue breathing for adults, children and infants.
- ✓ Utilize pocket facemask with a one-way valve.
- ✓ Detect and care for possible injury to the neck and spine.
- ✓ Deliver supplemental oxygen when it is available, where appropriate.
- ✓ Apply or assist in the application of a bag-valve mask.
- ✓ Apply or assist in the application of rigid cervical collar.
- ✓ Assist in securing a patient on along backboard or spine board or other device used to immobilize the patient's spine.
- ✓ Review basic CPR (inside back cover Brady 6th Ed)

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Airway: The passageway for air from the nose and mouth to the exchange level of the lungs. The term oral airway is also used to refer to artificial plastic devices used to help keep the airway open by keeping the tongue away from the air passage.

Agonal breathing: Sporadic noises made by the patient airways with little or no chest movement.

Apical pulse: The pulse felt and heard over the apex of the heart.

Apnea: Absence of breathing.

Asphyxia: Suffocation resulting in loss of consciousness caused by too little oxygen reaching the brain.

Aspiration: To inhale materials into the lung. Commonly, the accidental breathing in of vomit into the airway and/or lungs.

Asystole: When the heart stops beating.

Artificial respiration: The process of the forcing air or oxygen into the lungs of a patient who is not breathing adequately. AKA artificial breathing, artificial ventilation or rescue breathing.

Bag-Valve Mask: A mask with a bag and one way-valve which can be firmly applied over the nose and mouth of a victim allowing the rescuer to breathe for the patient.

Blanch: To become pale or to turn white.

Cervical spine: The bones of the spine in the neck region.

Cyanosis: When the skin colour changes to blue or gray because of too little oxygen in the blood.

Expiration: The passive process of breathing out (See inspiration)

Inspiration: The active process of breathing in (See expiration)

Laboured Breathing: A struggle to breathe usually because of pain or inadequate air exchange. See respiratory distress.

Log roll: A procedure for moving a patient while keeping the head, neck and torso aligned straight. Two to four rescuers are needed to carry out this procedure smoothly. See spinal immobilization.

Lumbar spine: The bones of the spine in the lower back

Rescue breathing: See artificial breathing.

Respiratory distress: Difficulty breathing resulting in ineffective air exchange.

Signs: What you see hear, feel, and smell in relation to a patient's illness or injury. (See symptoms)

Spinal cavity: The area within the spinal column that contains the spinal cord and its coverings.

Symptoms: What a patient reports to be experiencing about their illness or injury.

Spinal Immobilization: To fix or hold the spine in a straight line in order to reduce or eliminate motion.

I. Spinal Management

If the mechanism of the injury suggests trauma to the head or torso leading to unnatural flexing of the neck, then aggressive attempts must be made to keep the spine immobilized.

A. *Manual immobilization*

This is the first phase of establishing immobilization

B *C-collar*

The use of cervical collar, in conjunction with a backboard, is an acceptable means of immobilizing the spine.

C *Other ways to immobilize the C-spine*

D. *Use of a backboard (will be covered in more depth in Lesson 5)*

II. Airway

A. *Patient Assessment*

1. Determine unresponsiveness
 - a) Adults
 - b) Infants and children
 - c) Head, neck and suspected spinal injuries

2. Open the airway

Protect the spine in the event of trauma by use the chin-lift without a head-tilt.



III. Breathing

A. Assessment

1. Signs of effective breathing
Is there good, pink colour to the lips?
2. Signs of ineffective breathing
Is there evidence of cyanosis?
Are there ineffective breathing attempts?
Is the rate of breathing less than 10 per minute?

IV. Assisting Breathing of the patient

A. Oral airway (see Brady 6th Ed, page 116)

B. Pocket face mask (see Brady 6th Ed, pages 96- 101)

C. Bag-valve-mask (see Brady 6th Ed, page 558)

D. Oxygen Delivery Equipment

1. Safety precautions
2. Oxygen Administration equipment from tanks with regulators (see Brady 6th Ed, pages 562 and 566-568)
 - a) Nasal cannula (see Brady 6th Ed, page 564)
 - b) Plastic face masks (see Brady 6th Ed, page 559)
 - c) Non re-breather masks (see Brady 6th Ed, page 565)
 - d) Venturi masks

Review Cardio-Pulmonary Resuscitation (CPR) at Basic Life Support (BLS) level OPTIONAL

I. Consider the following:

- A. How the heart works
- B. When the heart stops
- C. Signs of successful CPR
- D. Mistakes performing CPR
- E. Complications caused by CPR
- F. CPR for infants and children
- G. Pre-hospital defibrillation. Discuss Automatic External Defibrillators (AEDs) if they are available in your area.
- H. Maintenance
- I. When to terminate or withhold CPR

II. Obstructed Airway Emergencies (see Brady 6th Ed, Chapter 6)

- A. Type of airway obstruction
- B. Emergency care for airway obstruction

Heimlich maneuver

- i. Adult
- ii. Child
- iii. Infant

III. Use of the AED (Automatic External Defibrillator) – if available in your area.

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Lesson 4 – Patient Head-to-Toe Exam and What Vital Signs Mean

Reference: Brady 6th Ed, Chapter 7



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Understand the organization of proper patient assessment.
2. Describe the steps of the initial assessment.
3. Understand normal and recognize abnormal vital signs
4. Understand the sequence and application of the physical examination
5. Describe how to conduct a head-to toe examination
6. Understand the difference between a Patient Assessment Plan for a trauma patient and one for a medical patient.

SKILLS:

You shall be able to perform the following

- ✓ Utilize the Patient Assessment Plan in the back of this manual to guide you through a methodical patient exam.
- ✓ Check a patient's pulse.
- ✓ Recognize ineffective breathing versus effective breathing.
- ✓ Assist in the measuring of a blood pressure (optional).
- ✓ Conduct an Initial Assessment.
- ✓ State the importance of looking for Medical Information devices.
- ✓ Conduct a primary and secondary physical examination.
- ✓ Conduct a patient history using S.A.M.P.L.E. format.
- ✓ Conduct On-going Assessment on a patient.
- ✓ Do an efficient hand-off report.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Allergy: Any substance which causes the body to react to its presence in an abnormal way resulting in any a range of severity of reactions from skin eruptions to full allergic (anaphylactic) shock.

Arteries: Blood vessels that carry blood away from the heart. These vessels are usually very thick-walled and tend to run close to bones except in a few instances where they can be felt close to the skin surface as a pulse. (See veins and capillaries.)

Arterial bleeding: The loss of bright red blood from an artery. The flow may be rapid, spurting as the heart beats. (See capillary bleeding and venous bleeding.)

AVPU: A system for measuring the level of responsiveness of a patient. The letters represent alert, verbal response, pain response, unresponsive.

Blood pressure: The measurement of the highest and lowest force exerted on the walls of arterial blood vessels caused by the blood that is forced out of the beating heart. The higher value, recorded above, results from peak contraction of the heart and is called the systolic pressure; the lower value, recorded below, is a result of relaxation of the heart and is called the diastolic pressure. It is measured in millimeters of mercury. E.g. 120/75 mmHg.

Blood pressure cuff: An instrument used the measure blood pressure also known as a sphygmanometer.

Brachial pulse: The pulse felt on the inside aspect of the upper arm of the patient. (See pulse.)

Capillaries: An extremely small thin-walled system of blood vessels that connect arteries to veins and allow exchange of nutrients and waste between the body tissues and the bloodstream. (See arteries and veins.)

Capillary bleeding: The slow oozing of blood from a capillary bed. (See arterial bleeding and venous bleeding.)

Capillary refill: The return of blood into skin capillaries after it has been forced out by fingertip pressure applied to the surface of the patient's skin or nail bed by the rescuer. Normal capillary refill time should be 2 seconds or less.

Carotid pulse: The pulse felt on each side of the neck. (See pulse.)

Central nervous system: The brain and spinal cord.

Circulatory system: The system that moves blood around the body to organs and tissues consisting of the heart, blood vessels and blood.

Coma: The state of complete unconsciousness. There are different depths of unconsciousness.

Cyanosis: When the skin colour changes to blue or gray because of too little oxygen in the blood.

Distal pulse: A pulse measured at the far end of a limb. e.g. The radial pulse at the wrist.

Jaundice: A yellow discolouration in the body fluids resulting from liver disease.

Medical patient: A patient whose symptoms is as a result of an infection of or malfunctions with one or more body parts, organs or systems.

MCM system: Mass Casualty Management system, a system developed by PAHO to deal with a large number of casualties which overwhelms the normal emergency services of a community.

Palpate: To feel a part of the body as to palpate the abdomen or the radial pulse.

Pulse: The wave motion of blood being squirted along inside arteries from each beat of the heart. It can be felt in arteries that come close to the surface of the skin and are named after the artery it is felt in. E.g. the radial pulse can be felt over the radial artery at the wrist and the carotid pulse can be felt over the carotid artery in the neck.

Pupil: The dark central area in the eye that allows light to go to the back of the eye allowing vision. The size is controlled by nerve impulses.

Radial pulse: The pulse felt at the side of the wrist. (See pulse.)

Respiration: The act of breathing. Measured by the number of inspiration-expiration cycles done per minute. Normal rate is 12 – 20 per minute in an adult.

Respiratory arrest: The cessation of breathing.

Respiratory distress: Any difficulty in breathing. This is sometimes severe enough to require emergency care.

Shock: The reaction of the body to the failure of the circulatory system to provide enough blood to all the vital organs of the body. A variety of situations can give rise to failure of the circulatory system such as excessive bleeding or loss of body fluids in vomiting and diarrhea.

Side effect: Any unwanted action or reaction to a drug other than the desired effect.

Sphygmomanometer: (SFIG-mo-mah-NOM-eh-ter) An instrument used to measure blood pressure, commonly called a blood pressure cuff.

Stethoscope: An instrument used to amplify body sounds, such as heart sounds and bowel sounds.

Trauma patient: A patient whose illness is as a result of mechanical forces exerted on the body.

Vascular: Referring to blood vessels.

Veins: Any blood vessel that returns blood back to the heart's capillaries and arteries.

Venous bleeding: The loss of blood from a vein. It is dark red to maroon in colour. The bleeding is a steady flow and can be very heavy.

Vital signs: At the first responder level, these include pulse respiration and relative skin temperature, colour and condition. It may also refer to blood pressure and pupils. They give key information about the patient's immediate well-being as it relates to the ABC's. Poor vital signs may be a precursor to death.

Wheeze: A whistling breathing sound. This sound is often associated with asthma when air is trapped in the air sacs and cannot be expired easily. This can cause a medical emergency if left untreated.

I. Personal and Scene Safety

A. Arrive at the Scene

1. What is the current situation?
2. Where is it going?
3. How do you control it?

B Control the Scene

1. Establish authority
2. Gather information at the scene
3. Build rapport with the patient
4. Do you need to start triaging patients? (Refer to PAHO MCM course work).

II. The Initial Assessment of the Patient

A. General Impression. Check for life-threatening conditions methodically.

1. Check **R**esponsiveness, then examine the “**A**BCDE’s”

a) For responsiveness, use the AVPU system.

(1) Are they **A**lert? – looking at you and/or the surroundings, following simple commands such as “Open your eyes” or “Squeeze my fingers” .

(2) Are they responding **V**erbally? - Answering questions, making appropriate noises.

(3) Are they responding to **P**ain? – trying to withdraw when pinched or crying when injured body part is touched/moved.

(4) Are they **U**nconscious? – no movement to voice, pressure or pain.

2. Check **Airway and Cervical Spine**. Is the airway clear? Does the mechanism of injury make the cervical spine potentially affected? If you have to open the airway for the victim, always think of the cervical spine.
3. Check **Breathing**. Can they breathe effectively? Is there a good skin colour?
4. Check **Circulation and Bleeding**. Is there any evidence of external bleeding? Then stop it! Is there any suspicion of internal bleeding? Is there a good, strong, regular pulse?
5. Check for **Disability**. Can they wriggle the toes and grip your fingers on each side? Can they move each limb?
6. **Expose and Examine the patient**. Carefully check all over the patient, touching and squeezing to see if there is pain. Cut away any clothing that may be in the way.

III. Physical Examination

A. The Primary Survey

Look for **D.O.T.S.** from head to toe, methodically.

Head and neck → Face → Shoulders and Clavicles → Chest → Abdomen
→ Pelvis and lower back → Lower limbs and Feet → Arms, Wrists and
Hands → Back .

- Deformity
- Open Wounds
- Tenderness
- Swelling

B. The Secondary Survey

Vital Signs

Vital signs are vitally important. Any change from the normal (too high or too low) may indicate a potential threat to **life, limb or sight**. This constitutes a medical emergency i.e. an acute patient. In a MCM triage system, such a patient with threat to life, limb or sight should be labeled as RED.

1. Respiration.

A measure of the rate the patient breathes. Note the rhythm, depth sound and ease of breathing. Normal adult: 12 – 20 times per minute.

OBSERVATION re RESPIRATION	POSSIBLE PROBLEM
Rapid and shallow	Shock, heart problems, heat emergency, diabetic emergency (insulin shock), pneumonia
Deep, gasping and laboured	Airway obstruction, heart problems, lung disease, chest injury, diabetic emergency (diabetic coma)
Too slow	Head injury, stroke, chest injury, drug overdose
Snoring	Skull fracture, stroke, drug or alcohol abuse, partial airway obstruction
Crowing	Airway obstruction, airway injury due to heat
Gurgling (liquid in the airway)	Airway obstruction, lung disease, heat damage to lungs, heart problems, depressed conscious level
Wheezing	Asthma, emphysema, airway obstruction, heart failure
Coughing blood (Hemoptysis)	Chest wound or infection, fractured rib, punctured lung, internal injuries

2. Pulse.

A measure of the rate the heart beats creating a pulse wave in the arteries. It can be palpated (felt) where arteries come close to the skin surface, like at the wrist (radial pulse). Normal resting adult: 55 – 75 times per minute.

Feel the nature of the pulse wave. Is it rapid, full, thready, slow or absent? If abnormal, does it feel the same on the other side of the body as well?

As the heartbeat gets weaker, the pulse wave does not make it all the way to the distal (far end of the) extremities. Less than systolic pressure (upper value) 80 mmHg, the radial (wrist) pulse is typically absent; less than systolic pressure 70 mmHg, the femoral (groin) pulse is typically absent; less than systolic pressure 60 mmHg, the carotid (neck) pulse is typically absent. Therefore, the presence and character of the pulse can give us good information of the blood pressure of the patient if it falls below normal. It cannot reliably indicate whether the blood pressure may be higher than normal.

OBSERVATION re PULSES	POSSIBLE PROBLEM
Rapid and full	Early stage hemorrhage internal or external, fear/ anxiety, pain, heat emergency, overexertion, fever, high blood pressure
Rapid and thready	Shock, heat emergency, diabetic emergency (diabetic coma), heart problem, falling blood pressure
Slow and full	Stroke, fractured skull, brain injury, drug overdose
No pulse	In carotids is cardiac arrest; distal to an extremity injury such as fracture or dislocation is major vessel damage to the area; shock with very low pressure

3. Skin Temperature, Colour and Condition

A comparative skin temperature is best appreciated at the forehead or abdomen using the back of your hand. Note if it is hot, cool or cold, dry, moist or clammy. Normal body temperature is 98.6°F, measured with a thermometer, but this is rarely available in the field.

Check the skin colour around the nail beds, lips and inside the mouth. Note if it is the normal pink colour or pale, blue, flushed, or yellowish. Check for goose pimples, shivering, blotchiness or mottling.

OBSERVATIONS re SKIN	SIGNIFICANCE/ POSSIBLE CAUSES
Cool and clammy	Shock, heart attack, anxiety
Cold and moist	Body losing heat e.g. fever or heat emergency
Cold and dry	Exposure to cold
Hot and dry	High fever, heat emergency, spinal injury, chemical exposure
Hot and moist	High fever, heat emergency, infectious disease
Goose bumps and shivering	Chills, communicable disease, exposure to cold, pain or fear
Pink, esp. at lips, nail beds	Normal
Pale (constricted blood vessels)	Shock, emotional stress, pain, intestinal spasms, heart attack, insulin shock
Blue (cyanotic; lack of oxygen to blood cells and tissues)	Inadequate oxygen intake (breathing problem) or inadequate distribution (heart problem), certain poisonings
Red (flushed; dilated blood vessels in skin)	Minor burn, emotional excitement, heat exposure, fever, allergic reactions, high blood pressure, late stages of carbon monoxide poisoning, diabetic coma
Yellow tinge (jaundiced)	Liver abnormalities
Blotchiness (mottling)	Occasionally in shock, especially in infants

4. Blood Pressure (Optional)

The blood pressure is the measurement of the highest and lowest forces exerted on the inner walls of arteries as a result of the blood that is forced through them, out of the beating heart. An instrument called a sphygmomanometer is used with a stethoscope to do this measurement. The higher value, recorded above, results from peak contraction of the heart and is called the systolic pressure; the lower value, recorded below, is a result of relaxation of the heart and is called the diastolic pressure. It is measured in millimeters of mercury. E.g. 120/75 mmHg
Blood pressure readings are never static. They change from moment to moment with physical activity, emotions and condition of the heart.

You would have noticed that the other vital signs gives you a good indication whether the blood pressure may be fall low, and this is very helpful in critical cases.

Normal blood pressure in an adult averages 100 + age (in yrs) mmHg systolic, over 70 to 90 mmHg diastolic. You are not required to know how to measure blood pressures in this course but it is helpful to know how to, so that you can be of help to others. See Brady 6th Ed., page 553-557.

5. Pupils

The pupils are the black circles in the every centre of the eye. It is the space in the iris (the coloured part of the eye) that allows light to enter the back of the eye for seeing. Circular muscles to squeeze the circle smaller and radial muscles pulling it bigger control it. The size of the circle and how it responds to light gives useful information on how the brain is working at that nerve level.

OBSERVATION re PUPILS	POSSIBLE PROBLEM
Dilated, unresponsive to light	Unconscious, shock, cardiac arrest, head injury, heat stroke, drug effect
Constricted, unresponsive to light	Central nervous system damage, drugs (heroin, morphine, codeine)
Unequal pupils	Stroke, head injury

C. Medical Information Devices

These can provide important information if the patient is unresponsive and the history cannot be obtained. Common medical ID devices are worn on a necklace or a wrist/ankle bracelet. One side of the device has a Star of Life emblem and the other has the patient's medical problems or allergies engraved on it along with a phone number. Always check for these devices.

D. Patient History

It is important that you try to get as much details as possible surrounding your patient's illness or accident. S.A.M.P.L.E. is a memory aid to help you remember what the important questions to ask are. Direct the questions to the patient if he is alert and responsive or to any informed bystander if he is not.

Look at the patient and make frequent eye contact. Ask your questions clearly and with a normal rate and tone of voice. Do not ask leading questions. Do not give false reassurances such as "Everything will be fine." It is more appropriate to say instead, "I am here to help." or "I am ECAT-trained and I am doing everything I can to help you." or "Please cooperate with me so that I can do all in my power to help you."

Start by getting the patient's name and age. Find out what is wrong, what are the symptoms and signs – that is, the chief complaint. How did it happen? When or how long ago? How long has the patient felt that way? When did it get worse? Has it happened before? Are there any current medical problems? Are there any medications being taken – when last was it taken? Are there any known allergies? When last did he eat or drink and how much?

1. S.A.M.P.L.E.
 - a) Signs and symptoms
 - b) Allergies
 - c) Medications
 - d) Pertinent past medical history
 - e) Last oral taken
 - f) Events leading to illness

E. Ongoing Assessment

The patient's vital signs will need to be monitored intermittently as they will always be changing. The sicker or more unstable the patient the more frequent that assessment need to be.

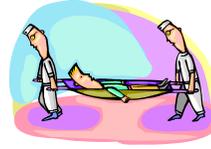
F. Patient hand-off Report

Be prepared to hand over your patient to the next available higher trained medical person, stating all your history, findings, interventions and latest assessments you have acquired.

Emergency Care and Treatment (ECAT) in disasters

Lesson 5 – Lifting and Moving Patients

Reference: Brady 6th Ed, Chapter 5



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Understand the general guidelines for lifting and moving patients.
2. Describe and demonstrate how to use the various lifts, carries, and equipment when moving patients.

SKILLS:

You shall be able to perform the following:

- ✓ Understand and define body mechanics.
- ✓ Explain the rationale for an emergency move.
- ✓ Discuss the various devices associated with moving a patient in the out-of-hospital arena.
- ✓ Demonstrate an emergency move.
- ✓ Demonstrate a non-emergency move.
- ✓ Demonstrate ways of immobilizing the cervical spine.
- ✓ Demonstrate how to Log Roll a victim.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Axilla: The armpit.

Breastbone: The sternum or breastbone.

Clavicle: The collarbone.

Emergency move: A patient move that is carried out quickly when the scene is hazardous, care of the patient requires repositioning, or you must reach another patient needing lifesaving care.

Log Roll: A procedure for moving the patient that keeps their head, neck and torso in straight alignment.

Stabilize: To steady a body part in order to help reduce involuntary movement caused by pain or muscle spasm.

Traction: A part of the action taken to pull gently along the length of the limb to stabilize a broken bone to preventing any additional injury.

I. General Guidelines for Moving Patients

A. When to make an emergency move

Emergency moves rarely provide any protection to patient injuries and may cause great pain for the patient. The greatest danger in moving a patient quickly is the possibility of making a spinal injury worse hence wherever possible, drag the patient in the direction of the long axis of the body to provide as much protection to the spine as possible.

An emergency move should take place when:

- There is immediate danger to the patient, if not moved.
- Lifesaving care cannot be given because of the patient's location or position.
- You are unable to gain access to other patients who need lifesaving care.

B. When to make a planned move

C. Lifting techniques

II. Basic patient moves

A. One-Rescuer Techniques. See Brady 6th Ed. Page 63-64.

1. The Blanket Drag
2. The Shirt Drag
3. The Sheet Drag
4. The Firefighter's Carry
5. Other Emergency Moves

B. Two- and Three-Rescuer Techniques. See Brady 6th Ed. Pages 65 - 71

1. Seat Carries (Two Rescuers)
2. Extremity Lift (one or Two Rescuers)
3. Chair Litter Carry (Two Rescuers)
4. Flat Lift (Two or Three Rescuers)

C. Stretches and Backboards. See Brady 6th Ed Pages 74-75

1. The Canvas Litter/Pole Stretcher
2. Backboards
3. Blanket Stretcher
4. Improvised Stretcher
5. Stretcher Transportation

D. Putting a patient on a backboard

The patient must have their cervical spine immobilized either before or after being placed on the backboard. Commercial devices used for this purpose can be seen in Brady 6th Ed pages 78 -80, however the neck can be immobilized using a variety of materials that perform the same task.

1. From the side
2. In line

Emergency Care and Treatment (ECAT) in disasters

Lesson 6 – Basic Injuries and Treatment

Reference: Brady 6th Ed, Chapter 11



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Describe the various types of open wounds and the treatment for them.
2. Describe the various types of closed wounds and the treatment for them.
3. Describe how to care for amputated parts.

SKILLS:

You shall be able to perform the following:

- ✓ Demonstrate direct pressure as a method of emergency care for external bleeding.
- ✓ Demonstrate the use of pressure points as a method of emergency care for external bleeding.
- ✓ Demonstrate the steps in emergency care of a patient with open soft tissue injuries.
- ✓ Demonstrate the steps in emergency care of a patient with an impaled object.
- ✓ Demonstrate the steps in the care of a patient with an amputation and for the amputated part.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Abdomen: The region of the body between the diaphragm and the pelvis.

Abrasions: The simplest form of an open wound consisting of scratches and scrapes that damage the skin surface but do not break all layers of skin.

Amputation: Soft tissue injury that involves the cutting or tearing off of a limb or one of its parts.

Analgesia: A pain reliever.

Avulsion: A soft-tissue injury in which flaps of skin are torn loose or torn off.

Bandage: Any non-adhesive material that is used to hold a dressing in place.

Bowel: The intestine.

Bruise: Simple closed wound in which blood flows between soft tissues under the skin, causing a discolouration.

Bulky Dressing: A thick, single dressing or a build-up of thin dressings used to help control profuse bleeding, stabilize impaled objects or cover large open wounds.

Burn: Damage caused to the skin, eyes, stomach or lungs by heat, light or chemicals.

Clavicle: The collar bone

Closed injury: An injury with no associated opening of the skin.

Closed wound: An internal soft-tissue injury where the skin is not broken.

Contusion: A bruise

Crush injury: Soft tissue injury produced by crushing forces, there is usually damage to underlying tissues including soft tissues, internal organs and sometimes hard tissues.

Cut: Soft tissue injury in which all the layers of skin are open and the tissues immediately below the skin is damaged to varying depths. See incisions and lacerations.

Dermis: The inner layer of the skin. It is the layer that is rich in blood vessels and nerves found below the epidermis.

Direct pressure: The quickest, most effective way to control most forms of external bleeding. The pressure is applied directly over the wound site.

Dressing: Any material used to cover a wound that will help control bleeding and reduce contamination.

Epidermis: The outer layer of skin.

Epistaxis: A nose bleed

Evisceration: (e-VIS-er-a-shun) Usually applies to the intestine protruding through an incision or a wound.

Femoral artery pressure point: The pressure point in the inner aspect of the thigh that can be used to help control serious external bleeding from the lower limb.

First-degree burn: A mild partial-thickness burn, involving only the outer layer of skin.

Flail chest: The condition in which multiple fractures of ribs and possibly the breastbone, separate a loose segment from the rest of the chest wall. This segment will move in opposite direction of the chest during breathing.

Fracture: Any break, crack, split, chip or crumpling of a bone.

Full-thickness burn: A burn that damages all the layers of skin. Deep structures may also be burned. See third degree burns.

Haematoma: (hem-ah-TO mah) The collection of blood under the skin or in tissues as a result of an injured blood vessel.

Hemorrhage: Internal or external bleeding

Incision: A smooth cut produced by a sharp object. See cut.

Laceration: A jagged cut with rough edges. See cut.

Occlusive Dressing: A dressing used to create an airtight seal or to close an open wound of a body cavity. Usually, it is made of plastic or similar water-tight material.

Open injury: an injury with an associated opening of the skin.

Open wound: An injury to the body in which the skin or its outer layers are opened.

Partial thickness burns: A second-degree burn in which the outer layer of skin (epidermis) is burned through and the second layer (dermis) is damaged. Also known as a second-degree burn.

Pneumothorax: (Nu-mo-THO-raks) The collection of air in the chest cavity to the outside of the lungs caused by punctures to the chest wall or the lungs.

Plaster: Adhesive material used to keep dressings or devices in place.

Rigid splint: A stiff device made of a material with very little flexibility (such as metal, plastic or wood) that is long enough to immobilize an extremity and the joints above and below the injury site.

Rule of Nines: A system used for estimating the amount of skin surface that is burned. The body is divided into 12 regions. Each of 11 regions equals 9% of the body surface and the genital section is quantified as 1%.

Second degree burns: A partial thickness burn. The layer of skin (epidermis) is burned through, and the second layer (dermis) is damaged.

Sling: A large triangular bandage or other cloth device that is applied as a soft splint to immobilize possible injuries to the shoulder girdle and upper extremity.

Soft splint: A device, such as a sling and swathe or a pillow secured with cravats that can be applied to immobilize a painful, swollen, deformed extremity.

Splinting: To apply a device that will immobilize a painful, swollen deformed extremity. See soft splint and rigid splint.

Sprain: A partial or complete tearing of a ligament.

Strain: The over-stretching or tearing of a muscle.

Subcutaneous: (SUB-ku-TA-ne-us) Beneath the skin. It refers to the fats and connective tissues found immediately below the dermis.

Superficial burn: A first degree burn involving only the outer layer of skin (epidermis). See first-degree burn.

Third-degree burns: A full thickness burn involving all layers of the skin. Muscle layers below the skin and bones may also be damaged. See full-thickness burn.

Tourniquet: A last resort used to control bleeding from an extremity. A wide, flat band or belt is used to constrict blood vessels to help stop the flow of blood.

Triangular bandage: A piece of triangular cloth material, about 50” to 60” long at its base and 36” to 40” on each of its sides. It can be folded and used as a sling, a swathe, or a cravat.

I. Soft-Tissue Injuries: Closed Wounds

These usually do not require emergency care in the field but large bruises may be warning signs of internal injury.

Assume there is internal bleeding whenever any of the following signs are detected:

- Wounds have penetrated the skull
- Blood or bloody fluids in the ears and/or nose.
- The patient vomits or coughs up blood (coffee grounds or frothy red in appearance)
- Bruises on the neck
- Bruises on the chest, possible fractured ribs and wounds that have penetrated the chest
- Bruises or penetrating wounds to the abdomen
- Hardness or spasms of the abdominal muscles
- Abdominal tenderness
- Bleeding from the rectum or the vagina
- Fractures of the pelvis, long bones of the limbs or the ribs

A. Contusions (bruises)

B. Blunt Trauma

II. Soft-Tissue Injuries: Open Wounds See Brady 6th Ed pages 332-33

These should be exposed, their surface cleared, then bleeding controlled. Prevent further contamination with sterile dressing and a bandage. Keep the patient still and use sling, swathe or soft splinting for patient comfort. Watch for signs of shock and care for it. Do not remove impaled objects in the field; stabilize it used bulky dressing or a paper cup and secure firmly with bandage or cravats. If evisceration occurs or organs protrude from a wound do not try to replace it. Simply place a plastic covering and cover with a thick pad dressing on top to conserve heat.

Exceptions:

- Do not remove impaled objects from the cheek if the object has penetrated the cheek wall and may become an airway obstruction.
- Do not attempt to clear the surface of a scalp wound.
- Do not apply finger pressure to a scalp wound if there is any chance of a skull fracture.
- Do not apply direct pressure on a cut eyeball; use a loose bulky dressing.

- A. Abrasions
- B. Incisions
- C. Lacerations
- D. Punctures
- E. Avulsions
- F. Bites

III. Traumatic Amputation

Control bleeding with direct pressure and elevation. A bulky dressing may be required. Amputated part can be placed in plastic and kept cool.

1. Emergency care for the wound
2. Emergency care for the amputated part

IV. Crushing and Penetrating Injuries

Consider:

A. *Crushing Injuries*

B. *Penetrating Trauma:*

1. Stab Wounds
2. Gunshot Wounds

C. *Impaled Objects*

V. Burns

Burns can be caused by heat (thermal) e.g. fire, steam, and hot objects; chemicals e.g. acids and alkalis; electrical e.g. electrical outlets or appliances, frayed wires and faulty circuits; lightning e.g. during electrical storms; light e.g. burns to the eye/skin by intense light sources as arc welding or sunlight; radiation usually from nuclear sources.

The Rule of Nines may be applied to an adult to guess-timate the percentage of the total body surface that is burnt. You are not required by this course to know the Rule of Nines but it is helpful to know about it. The following burns must be considered critical, i.e. major:

- Hands, feet, face, groin, buttocks, thighs and major joints.
- Any burn that encircles a body part.
- Burns likely to be involving greater than 15% of the patient's body.

1. Types of Burns

May be listed according to the agent causing it. E.g.. thermal burn, chemical burn.

2. Degree of burns

First degree or superficial burns are red and cause some pain at the site.

Second degree or partial thickness burns and appear moist and red or mottled with blisters. They generally involve intense pain.

Third degree or full thickness burns are dry and leathery and may be white, dark brown or charred. Since there is often nerve damage, there may be no sensation of pain at the site.

Type of Burn	Skin depth burned		Tissues Below Skin	Colour Changes	Pain	Blisters
	Outer layer	Second layer				
Superficial	Yes	No	No	Red	Yes, some	No
Partial	Yes	Yes	No	Deep red	Yes	Yes
Full	Yes	Yes	Yes	Charred black or white	No	No/Yes

Minor Burns:

- Immerse in cold water
- Cover entire burn with dry sterile dressing.
- Moistened dressing if less than 9 % of body surface is involved. If large areas are burnt, extensive moist dressing may lead to hypothermia (loss of too much body heat).

Major Burns:

- Stop the burning process by removing the causative agent or source.
- Wrap area with dry clean dressing.
- Separate digits (fingers or toes) with sterile gauze pads, if they are affected.
- Elevate the affected extremity, when appropriate.
- Do not open eyelids, if burned.
- If eyes burnt by a chemical, flush eye for 20 minutes then cover with moistened pads.
- If eyes burnt by heat, apply moist sterile gauze pads to both eyes.
- If there is an electrical burn, look for exit site as well as the entry site.

Emergency Care and Treatment (ECAT) in disasters

Lesson 7 – Injuries to the Head, Face and Neck

Reference: Brady 6th Ed, Chapters 11 and 12



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Recognize the signs and symptoms of head injuries.
2. Describe and demonstrate the proper emergency care for head, neck and face injuries.

SKILLS:

You shall be able to perform the following

- ✓ Demonstrate the steps in the emergency care of head injuries.
- ✓ Demonstrate the steps in the emergency care of the neck and face.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Amnesia: A short or long term loss of memory. This loss usually has a sudden onset and may be due to head trauma.

Cerebrospinal fluid (CSF): (ser-e-bro-SPI-nal) The clear watery fluid that flows around the outside of the brain and spinal cord providing nourishment and acting as a buffer.

Cerebrovascular accident (CVA): See stroke.

Concussion: Injury to the brain that results from a blow or impact from an object that does not cause open head injury.

Convulsion: Uncontrolled skeletal muscle spasms, often violent and generalized, usually starting as an irritable nervous focus in the brain.

Cranial cavity: Braincase of the skull that houses the brain and its specialized membranes.

Delirium tremens: A severe, possibly life-threatening reaction related to alcohol withdrawal. The patient's hands tremble, hallucinations (seeing things) may be present, behaviour may be unusual and convulsions may occur.

Epilepsy: A medical disorder characterized by attacks of unconsciousness, with or without convulsions. (See convulsion)

Fainting: The simplest form of shock, occurring when the patient has a temporary, self-correcting loss of consciousness caused by a reduced supply of blood to the brain.

Gag reflex: A retching action, hacking or vomiting that is induced when something touches a certain level of the patient's throat.

Grand Mal: A severe epileptic seizure.

Mandible: The lower jaw

Paralysis: Complete or partial loss of the ability to move a body part. Sensation in the area may also be lost.

Priapism: (PRI-ah-pizm) Uncontrollable persistent erection associated with spinal damage in the male patient.

Seizure: In general, an event in the brain that causes uncontrolled muscle contractions (See convulsions).

Spinal cavity: The area within the spinal column that contains the spinal cord and its coverings.

Stroke: The interruption of blood flow to the brain, damaging or killing the portion of the brain involved.

I. Injuries to the Head

A. Neurological Assessment of the Patient

1. Conscious or Unconscious
2. Level of alertness. Use the AVUP system. See Lesson 4

There are various models to document levels of consciousness, the most common of which is the Glasgow Coma Scale (GCS), however, this course adapts the following simple format:

- Brief or transient unconsciousness, patient now alert and oriented in time, place and person
- Confused, patient alert and conversant but disoriented in person, and/or place, and/or time, and is repetitive or answers questions inappropriately
- Stuporous, patient is not alert but can be aroused. Makes inappropriate verbal sounds or grunting and moves spontaneously but not appropriately.
- Comatose, patient unresponsive to voice. May have reflex movements to pressure or pain.

OBSERVATIONS re CONSCIOUS LEVEL	POSSIBLE CAUSES
Brief unconscious	Head injury, fainting, epilepsy
Confused, may be combative	Fright, anxiety, minor head injury, alcohol and drug abuse, shock, epilepsy, mental disease
Stupor, may be combative	Head injury alcohol and drug abuse, stroke
Coma	Stroke, head injury. Shock, severe allergic reaction, poisonings, drug and alcohol abuse, diabetic emergencies, heat stroke, advanced heat exhaustion, heart attack

Part of a neurological exam is to check for movement and sensation in each limb. This is usually accomplished as part of the screening physical examination. Touch the patient on various levels of the limbs and ask :

- Can you feel me touch you here?
- Does it feel the same on both sides and does it feel normal?
- Can you squeeze my fingers really hard with this hand ? (Then the other.)
- Can you wriggle your toes?
- Can you push your sole against my hand? (Then the other.)

OBSERVATIONS re MOVEMENT	POSSIBLE CAUSES
Paralyzed on one side only	Stroke, head injury
Paralyzed in arms only	Spinal injury at the neck level
Paralyzed legs only	Spinal injury at the level of the back
Paralyzed both arms and legs	Spinal injury in the neck and possibly back
No pain, obvious loss of movement or sensation or both	Spinal cord or brain damage, shock, hysteria, drug and alcohol abuse

B. Specific Types of Head Injury

1. General signs and symptoms
2. Skull fractures
3. Injuries to the brain
 - a) General signs and symptoms
 - b) Concussion, resulting from swelling of the brain
 - c) Cerebral contusion, bruising into the brain tissue
 - d) Subdural haematoma, blood collected under the inner lining of the skull
 - e) Epidural haematoma, blood collected over the inner skull lining
 - f) Penetrating wound; essentially an open fracture
 - g) Open and closed head injuries

II. Injuries to the Face

A. *Trauma to the mouth and jaw*

1. Signs and symptoms
2. Emergency care

B. *Fractures to the face and lower jaw*

1. The Face
2. The lower jaw

C. *Objects impaled in the Cheek.*

Always remove if it is hampering breathing.

D. *Injuries of the nose.*

Usually results in epistaxis. Firm pressure on the nose bridge for 15 minutes with rest and cold compresses to forehead and back of neck will stop almost all nosebleeds.

E. *Injuries of the ears.*

Never attempt to remove foreign objects or clots from the ear while in the field. Blood or watery fluid may indicate fracture of the base of the skull and is a medical emergency.

F. *Injuries to the eye*

1. Foreign objects in the eye
2. Injuries to the orbit
3. Lid injuries
4. Injuries to the globe
5. Chemical burns to the eye

6. Impaled objects to the eye
7. Eviscerated eyeball
8. Removing hard and flexible Contact lenses
9. Basic rules for Emergency eye care

III. Injuries to the Neck

- A. Signs and Symptoms
- B. Emergency Care

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Lesson 8 – Injuries to the Chest and Back

Reference: Brady 6th Ed, Chapters 4, 11 and 12



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Recognize the signs and symptoms of injuries to the chest and back.
2. Describe and demonstrate the proper emergency care for injuries to the chest and back.

SKILLS:

You shall be able to perform the following

- ✓ Demonstrate the steps in the emergency care of a patient with an open chest wound.
- ✓ Demonstrate the steps in the emergency care of a patient with a closed chest wound.
- ✓ Demonstrate the steps in the emergency care of a patient with penetrating chest injury.
- ✓ Demonstrate the steps in the emergency care of fractured ribs and flail chest.
- ✓ Assist in the administration of supplementary oxygen to a patient with ineffective breathing.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Asthma: A condition in which the airways to the lungs constrict and narrow, causing a reduction in airflow and creating congestion. Air will usually enter but cannot be exhaled easily and the chest cavity becomes more and more hyper-inflated.

Drowning: Death caused by water reaching the lungs and either causing lung tissue damage or spasms of the airway that prevent the inhalation of air.

Heart attack: A general term used to indicate a obstruction to blood flow going directly to heart muscle wall resulting in reversible or irreversible damage to a portion of heart.

Thoracic Cavity: The anterior body cavity that is above the diaphragm. It protects the heart and lungs.

Trachea: The windpipe

I. General Guidelines for Patient Care

- A. Anatomy of the chest
- B. Major signs and symptoms
 - 1. Open and closed injuries
- C. Principles of emergency care

II. Specific Chest Injuries

- A. Flail chest
- B. Severe blunt Injuries, compression injuries and traumatic asphyxia
- C. Broken ribs
- D. Sucking chest wound

In this situation a plastic or occlusive dressing is needed over the wound with three sides sealed and one side open, to form a flap-like seal.

- E. Pneumothorax (air between outer lung lining and inner chest wall lining) and Tension pneumothorax (progressive build-up of air between outer lung lining and inner chest wall lining)
- F. Haemothorax (blood in the thoracic cavity between lung and chest wall)
- G. Subcutaneous emphysema. Formed by air that is trapped under the skin. The commonest caused is from a leak in a punctured lung. The air can track along the subcutaneous tissues causing alarming swelling.
- H. Penetrating injury

III. Injuries to the spine

IV. Care for Spinal Injury

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Lesson 9 – Injuries to the Abdomen and Pelvis

Reference: Brady 6th Ed, Chapter 11



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Recognize the signs and symptoms of injuries to the abdomen and pelvis.
2. Describe and demonstrate the proper emergency care for injuries to the abdomen and pelvis.

OBJECTIVES:

Upon completion of this lesson, you shall be able to:

Describe how your local command structure and response system works and how to perform within it.

SKILLS:

You shall be able to perform the following

- ✓ Demonstrate the steps in the emergency care of a patient with an open abdominal wound.
- ✓ Demonstrate the steps in the emergency care of a patient with a closed abdominal wound.
- ✓ Demonstrate the steps in the emergency care of a patient with penetrating abdominal injury.
- ✓ Demonstrate the steps in the emergency care of a patient with evisceration of bowel contents.
- ✓ List the steps in the emergency care of the patient with signs and symptoms of internal bleeding.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Abdomen: The region of the body between the diaphragm and pelvis.

Acute abdomen: The sudden onset of severe abdominal pain. Abdominal distress related to one of many medical conditions or specific injuries to the abdomen.

Chronic: The opposite of acute. It can mean long and drawn out or recurring.

Spleen: A soft organ located to the left of the upper abdominal cavity behind the stomach. It stores blood and destroys old blood cells. Has the potential to cause excessive internal bleeding.

Sucking Chest Wound: An open chest wound in which air is sucked through the wound opening and into the chest cavity each time the patient breathes.

Vertebrae: Each individual bone of the spinal column.

V. Abdominal Injuries

Injuries to this part of the body almost always involve the soft organs and internal bleeding is often a major problem. Because internal bleeding is “hidden” we must depend on other signals to cue us in to the possibility. The mechanism of injury will be the most valuable cue. Remember that shock from internal bleeding can occur at various times following an injury so the on-going assessment is vitally important even if initial values seem within normal limits. Close monitoring of the vital signs is extremely important.

Symptoms of shock associated with internal bleeding are:

- Patient feels weak and has dizziness
- Patient feels thirsty
- Patient may feel cold
- Patient feels anxious and restless
- Patient may feel nauseous

There may also be:

- Altered levels of consciousness
- Restlessness or combative behaviour
- Shallow, rapid breathing
- Rapid, weak pulse
- Pale, cool, clammy skin, with or without profuse sweating.
- Dilated pupils in the eyes

General Management Guidelines.

- ❑ Always start with scene size-up and initial assessment.
- ❑ Keep the patient in an appropriate position and lying still.
- ❑ Loosen restrictive clothes.
- ❑ Apply bulky dressing if there are open wounds.
- ❑ Report as soon as possible to more highly trained medical personnel.
- ❑ Ensure the ABC's are monitored and managed.
- ❑ Elevate the extremities, if possible.
- ❑ Prevent loss of body heat by covering.
- ❑ Do not give anything by mouth to eat or drink.

A. The Abdominal Cavity

B. General guidelines for patient care

1. Patient assessment

- a. Open wounds
- b. Closed wounds

2. General signs and symptoms

- a. Open wounds
- b. Closed wounds

3. General Emergency care

C. Specific Abdominal injuries

1. Abdominal evisceration
2. Hernias
3. Impaled objects

D. Pelvic injuries

1. Fractures
2. Impaled objects

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Lesson 10 – Injuries to the Extremities

Reference: Brady 6th Ed, Chapters 12



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Recognize the signs and symptoms of injuries to the extremities.
2. Describe and demonstrate the proper emergency care for injuries to the extremities.

SKILLS:

You shall be able to perform the following

- ✓ Demonstrate the steps in the emergency care of a patient with an open fractures.
- ✓ Demonstrate the steps in the emergency care of a patient with a closed fractures.
- ✓ Demonstrate the steps in the emergency care of a patient with impaled objects in the limbs.
- ✓ Point out the pressure points that may be used as a last resort to control excessive bleeding from a limb injury.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Angulation: The angle formed above and below a break in a bone. The fracture changes the straight line of a bone into an angle.

Closed fracture: A simple fracture where the skin is not broken by the fractured bones. The fracture site is not exposed to the environment.

Clavicle: The collarbone.

Femur: The thighbone. When broken, it is capable of excessive bleeding.

Musculoskeletal system: All the muscles, bones, joints and related structures such as tendons and ligaments that enable the body and its parts to move and function.

Open fracture: When a bone is broken, and the bone ends or fragments cut through the skin. Also called a compound fracture.

Scapula: The shoulder blade

Tendon: A fibrous tissue that joins muscles to bones

I. Anatomy of the Musculo-skeletal System

See Brady 6th Ed. page 376-377

II. Causes and types of Musculo-skeletal injuries.

- A. Forces that cause injury
- B. Sprains and strains
- C. Fractures – open and closed
- D. Dislocations

III. General Principles of Care

A. Types of splints

1. Improvised splint and sling
2. Self – splint
3. Sling and swathe
4. Pillow splint
5. Fixation splint
6. Air splint

B. Splinting of fractured or dislocated limbs

C. Control of bleeding

1. Dress open wounds
2. Before and after bandaging or splinting any injured limb, check:
 - a. Distal pulses
 - b. Sensation
 - c. Function

IV. Emergency Care for Specific Injuries in the Upper Extremities

1. Dislocation of the shoulder
2. Fractures of the clavicle
3. Fractures of the scapula
4. Fractures of the humerus
5. Dislocations of the elbow
6. Fractures of the forearm and wrist
7. Fractures of the fingers and hand

V. Emergency Care for Specific Injuries to the Lower Extremities

1. Fractures of the pelvis
2. Fractures of the hip
3. Fractures of the femur
4. Dislocations of the knee
5. Fractures of the leg
6. Fractures of the ankle and foot

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Lesson 11 – Medical Concerns in the Field

Reference: Brady 6th Ed, Chapter 10



Objectives:

Upon completion of this lesson, the participants shall be able to:

1. Recognize the signs and symptoms of common medical problems in the field.
2. Describe and demonstrate the proper emergency care for common medical problems in the field.

SKILLS:

You shall be able to perform the following

- ✓ Demonstrate the steps in providing emergency care of a patient with a shock.
- ✓ Demonstrate the steps in providing emergency care of a patient with an altered mental status.
- ✓ Demonstrate the steps in providing emergency care of a patient with seizures.
- ✓ Demonstrate the steps in providing emergency care of a patient with heat exposure.
- ✓ Demonstrate the steps in providing emergency care of a patient with diabetic emergencies.
- ✓ Demonstrate the steps in providing emergency care of a patient signs of a heart attack.

IMPORTANT WORDS AND PHRASES FOR THIS LESSON

Acute myocardial infarction: A heart attack. The sudden death of heart muscle due to oxygen starvation. Usually caused by a narrowing or blockage of one of the blood vessels supplying the heart muscle itself.

Dehydration: Excessive loss of body water. May result from excessive vomiting, diarrhoea or high fevers or prolonged heat exposure.

Diabetes: Usually refers to diabetes mellitus. This is a condition in which there is a decrease or absence of insulin in the pancreas. The glucose level in the blood will increase, causing hyperglycaemia (high blood sugar).

Diabetic coma: Severe hypoglycaemia (low blood sugar). It results from inadequate insulin that leads to unconsciousness, coma and eventually death if left untreated.

Heat stroke: Prolonged exposure to heat, which creates dry or moist skin that may feel warm or hot to the touch.

Hyperglycaemia: Excessive glucose in the bloodstream.

Hypoglycaemia: Too little sugar in the bloodstream.

Insulin: A hormone, produced in the pancreas that is needed to move glucose from the bloodstream into cells. Too much insulin will cause the blood glucose to go too low causing hypoglycaemia.

Oral Glucose: A form of glucose that comes in a gel and is packaged in different-sized tubes like toothpaste. It can be given to a patient with altered mental state and a history of diabetes by placing it inside the mouth.

I. The Scene

- a. Arrive at the scene – think safety
- b. Control the scene
 - i. Establish authority – the command structure
 - ii. Gather information
 - iii. Build rapport with the patient

II. Scene Safety

- a. Removal of medical patient from hazardous environment
- b. Triage area, if indicated

III. Recognizing Medical Conditions in the Field

- a. Types of medical conditions you may encounter
 - i. Heart attack (AMI)
 - ii. Stroke (CVA)
 - iii. Heat stroke – exhaustion
 - iv. Diabetic emergencies
 - v. Shock
 - vi. Seizures (may also be as a result of head injury)
- b. Treatment of medical problems
 - i. Priority
 - ii. Ambulatory
 - iii. Not treatable

IV. The Primary Survey

- a. Check for life-threatening conditions
 - i. Airway and C-spine
 - ii. Breathing
 - iii. Circulation and bleeding
 - iv. Disability
 - v. Expose and examine

V. The Secondary Survey

- a. Medical Survey
 - i. Appearance
 - ii. Level of Consciousness
 - iii. Chief Complaint
- b. History of Present illness
 - i. Pain
 - ii. Quality
 - iii. Radiation
 - iv. Severity
- c. Field check of Vital signs
 - i. Respiration
 - ii. Pulse
 - iii. Skin Quality
 - iv. Blood Pressure
 - v. Pupils
- d. Conduct head-to-toe exam
 - i. Look for Medical Information Devices if patient is unconscious and history not readily available.

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Lesson 12 – Problem-solving in the Field



Objective:

Upon completion of this lesson, the participants shall be able to:

1. Learn how to use what is at hand to provide reasonable and acceptable care for the patient in a disaster situation.

SKILLS:

You shall be able to perform the following

- ✓ Assess and initiate control at an accident/incident scene.

Overtaken vehicles or equipment with trapped victims may pose a significant threat to rescuers if the environment is not stable. It is imperative that scene safety is always ensured before rescue is attempted.

I. The Scene

- A. Arrive at the Scene – safety
- B. Size-up
- C. Situational Awareness
- D. Gaining Access to the Scene
- E. Stabilizing the environment
 - 1. Stabilizing cars, boats, and heavy equipment
 - 2. Stabilizing buildings

II. Patient Treatment

- A. Recognizing and locating medical supplies
- B. Recognizing and locating splinting materials
- C. Short distance transfers of patients
 - 1. Patient carries
- E. Stretchers in the field
 - 1. Finding Materials
 - 2. Building a stretcher

III. Patient Care

- A. Organizing the moving of the patient
 - 1. Use of By-standers
 - 2. Vehicles such as boats for transportation
- B. Moving the patient to a safe area
- C. Basic Water rescue
 - 1. safety of the rescuer
 - 2. Removal of patient from the water

PATIENT ASSESSMENT PLAN

SCENE SIZE-UP	INITIAL ASSESMENT	PHYSICAL EXAMINATION	PATIENT HISTORY	ONGOING ASSESSMENT	PATIENT HAND-OFF
What is the current situation? Medical or trauma? Mechanism of injury Observe for hazards	General Impression “ A.B.C.D. ”	Expose and Examine Look for D.O.T.S. i.e. <u>D</u> eformities <u>O</u> pen injuries <u>T</u> enderness <u>S</u> welling	S.A.M.P.L.E.	Repeat Initial Assessment	Patient age and sex
Where is it going? What are the possibilities?	Check Responsiveness (AVPU) <u>A</u> lert? Responses to <u>V</u> oice? Responses to <u>P</u> ressure (deep touch)? <u>U</u> nresponsive?	Head	<u>S</u> igns and <u>S</u> ymptoms	Repeat Physical Exam	Chief complaint
How do I control it? What resources are needed?	Check Airway	Neck	<u>A</u> llergies	Reassess treatment and interventions	Level of consciousness
	Check Breathing	Chest and Back	<u>M</u> edications	Calm and reassure the patient	Airway status
	Check Circulation	Abdomen	<u>P</u> ast History		Breathing status
	Check Disability	Pelvis	<u>L</u> ast meal		Physical exam findings
		Extremities	<u>E</u> vents		S.A.M.P.L.E history
		Vital Signs Respiration, quality Pulse/BP Skin Pupils	Medical Information device/bracelet.	Patient history	Treatment Intervention

NOTES