



Advanced First Aid

Course Study Guide

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Commonwealth of Virginia
Virginia Department of Energy
Coal Mine Safety
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Article 1 of the **Coal Mine Safety Laws of Virginia** establishes requirements for certification of coal mine workers. The certification requirements are included in §45.2-515. through §45.2-534. in which the Board of Coal Mining Examiners is established for the purpose of administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examinations and certifications.

The Virginia Department of Energy's Coal Mine Safety team developed this study guide to better assist coal miners seeking certifications. The material included is not all-inclusive and should only be considered an aid in obtaining knowledge of the mining practices, conditions, laws, and regulations. This guide is based upon the Coal Mining Safety Laws of Virginia, Safety and Health Regulations for Coal Mines in Virginia, Title 30 Code of Federal Regulations (30 CFR), State and Federal Program Policy Manuals and other available publications. Nothing herein should be construed as recommending any manufacturer's products.

The study guide and materials are available through the Virginia Department of Energy. Each guide is available for download via the agency's website at www.energy.virginia.gov and printed copies are kept at Virginia Energy's Big Stone Gap office for purchase. Any questions concerning material in the study guide should be addressed to the Regulatory Boards Administrator at the Big Stone Gap Office.

Virginia Energy Advanced First Aid Course

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Introduction

First Aid is defined as immediate care provided to an injured or ill person. This definition holds true for those who render emergency care in the mining industry. In most cases, a rescuer will be administering first treatment for minor illness or injury. However, in some situations the rescuer may be involved in a serious emergency. In these situations, quality immediate care can mean the difference between life and death. Rescuers must have confidence and knowledge to provide care in life-threatening situations. This guide will provide you the knowledge and skills to gain the confidence to act in an emergency.

At the end of 2021 American Red Cross, American Heart Association, National Safety Council, and other organizations updated their First Aid\ CPR\ AED courses based on recommendations provided by ILCOR. These changes focused on gaining confidence to act in an emergency, administering high quality CPR, and when and how to control life threatening bleeding. Also included in the updates is responding to Opioid overdose victims as well as information on assisting with inhalers for asthma patients. In addition, when performing CPR on a drowning victim you will administer 2 rescue breaths before beginning chest compressions.



**BOARD OF COAL MINING EXAMINERS
CERTIFICATION REQUIREMENTS**

<http://www.energy.virginia.gov/dm/default.htm>

ADVANCED FIRST AID

PHOTO ID REQUIRED

Article 3 of the **Coal Mine Safety Laws of Virginia** establishes requirements for certification of coal mine workers. The certification requirements are included in §45.2-515. through §45.2-534. in which the Board of Coal Mining Examiners is established for the purpose of administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examinations and certifications.

CERTIFICATION CLASSIFICATION: *Advanced First Aid*

This certification authorizes the holder to meet standards for emergency care in the coal mining industry required by §45.2-863..

APPLICATION/EXPERIENCE REQUIREMENTS:

- Application (BCME-1) and \$40.00 fee 5 working days prior to examination
 - **Note:** Classes are limited to 20 people and tend to fill quickly. Application fees are due no later than 5 working days prior to the examination, but this will not guarantee that an opening will be available.
- 24 hour Advanced First Aid course taught by an Advanced First Aid Instructor (**class must be completed and paperwork submitted prior to taking an exam**)
- Hold a General Miner Certification - Surface or Underground

NOTE: TRANSFER OF EMT/FIRST RESPONDER CERTIFICATION TO ADVANCED FIRST AID MAY BE ACCOMPLISHED BY:

- Application (BCME-1) and \$40.00 fee 5 working days prior to examination
- Provide verification of valid EMT/First Responder certification issued by EMS-VA
- Attend 8 hours Advanced First Aid Reciprocity Training Course conducted by a DM certified Advanced First Aid Instructor
- Hold a General Miner Certification - Surface or Underground

EXAMINATION REQUIREMENTS: The examination for certification in Advanced First Aid requires a passing score of 80% on the written sections of the examination.

NOTE: If exam is taken three (3) times without a passing score or if certification is revoked due to not completing the continuing education requirements, the applicant must retake the 24 hour Advanced First Aid course.

ELEMENTS OF EXAM	NUMBER OF QUESTIONS
Section 1 (F1)	20
<ul style="list-style-type: none"> ▪ Respiratory Emergencies, Respiratory System ▪ Introduction to First Aid ▪ Wounds 	

ELEMENTS OF EXAM	NUMBER OF QUESTIONS
Section 2 (F2)	20

Circulatory System

- Control of Bleeding
- Shock

Section 3 (F3)

20

Musculoskeletal System

- | | |
|--|---|
| <ul style="list-style-type: none"> ▪ Abdominal Injuries ▪ Chest Injuries ▪ Dislocations ▪ Face & Throat Injuries ▪ Fractures ▪ Head Injuries | <ul style="list-style-type: none"> ▪ Lower & Upper Extremities Injuries ▪ Pelvic Injuries ▪ Spinal Injuries ▪ Sprains ▪ Transporting Victims |
|--|---|

Section 4 (F4)

25

Accidental Poisonings

Substance Abuse

Environmental Emergencies

- Burns
- Cold Exposure
- Stings & Bites

Emergency Rescue

- Electrical Circuits
- Hazardous Materials
- Irrespirable Atmosphere
- Machinery Entrapment
- Roof & Rib Entrapment

Sudden Illness

- Diabetes
- Epilepsy
- Heart Attack
- Stroke

NOTE: Each student must successfully complete:

- Course in Cardiopulmonary Resuscitation (CPR) i.e., heart saver or other four-hour equivalent
- Practical examination which includes forearm, lower leg, spine board

MANAGING AN EMERGENCY SCENE

Managing Dangers at an Emergency Scene

Some emergency scenes are immediately dangerous

Some emergency scenes may become dangerous while you are providing care

Personal Safety

Personal safety and the safety of all others assisting in rescue efforts must always be the first and foremost consideration.

To the extent possible within rescuer safety, action should be taken to preserve the safety of patients. *Example* - Setting additional roof support in an area where a patient is entrapped by a roof fall to help prevent more roof from falling on the patient.

Approach all emergency scenes cautiously until you have fully evaluated the situation for your personal safety and the safety of others helping you.

If at any time the scene appears unsafe, retreat to a safe location.

Never enter a dangerous scene unless you have qualified personnel, such as a mine foreman or electrician, to assist you.

Follow these guidelines when arriving on an emergency scene:

- 1) Take time to evaluate the scene and recognize existing and potential dangers
- 2) Never attempt to do anything you are not trained to do
- 3) Get the help you need to ensure your safety, safety of others assisting you, and to the extent possible, the patient.

Safety of Others

Discourage other people from entering an area that appears unsafe
Never move patients until you treat and stabilize unless immediate dangers threaten the patient or yourself. If necessary to move a patient, do so safely and quickly. Identify yourself, your level of training, what you think may be wrong, and what you can do to help.

Legal Considerations

Actual or informed consent: A person granting you, the rescuer, permission to treat

Implied consent: Legal authority to treat all unconscious patients or patients so seriously injured or ill that they cannot respond and minors who need medical care when a parent or guardian is not present

Refusal of care: The declining of a patient to allow you to provide medical care

Assault and battery: Intentional touching of someone without their permission

Abandonment: Ending care of an ill or injured person without that person's consent or failing to ensure that someone with equal or greater training will provide that care

Confidentiality: Protecting a patient's privacy by not revealing any personal information you learn about the patient except for information that other medical or law enforcement personnel may need

Never discuss the patient's condition or the care that you gave to anyone

LEGAL CONSIDERATIONS

Advanced first aid rescuer: May be the first person on the scene with advanced medical training

Duty to act: A legal responsibility to provide a reasonable standard of emergency care

Standard of care: The minimum and quality of care that you are expected to provide

Negligence: The failure to provide a reasonable standard of care that a person with similar training would provide thereby causing injury or damage to another person

Good Samaritan Laws: Laws that protect people who willingly provide emergency care without accepting anything in return

Apply when you:

- 1) Act in good faith
- 2) Are not negligent
- 3) Act within the scope of your training

Consent: Permission to provide care, given by an ill or injured person to a rescuer

BODY SYSTEMS

Body systems depend on each other to operate properly

Vital organs - Brain, Heart, and Lungs

Anatomical terms

Lateral, medial, anterior, posterior, superior, inferior, proximal, distal

Body cavities

Cranial cavity, spinal cavity, thoracic cavity, abdominal cavity, pelvic cavity

Body systems

- 1) Respiratory system - Responsible for breathing air/oxygen enters the lungs when you inhale and leaves the lungs when you exhale

Respiratory arrest - Condition when a person stops breathing

Cyanosis - Indicates a lack of oxygen in the blood (blue skin color of lips, nailbeds, etc.)

Rescue breathing - Breathing for a patient

- 2) Circulatory System - Responsible for circulation of blood and oxygen to all body organs

Consists of the heart, blood vessels and blood

Contraction - pumping action of the heart

Pulse - Feeling the heart's contractions at an artery that lies near the skin and over a bone

Cardiac arrest - The heart and breathing have stopped

CPR - Cardiopulmonary Resuscitation

- 3) Nervous System - Most complex and delicate of all body organs

Consists of the brain, spinal cord, and all nerves

Brain - Master organ of the body

Brain regulates all body systems including the respiratory and circulatory systems

Nerves extend from the brain, through the spinal cord to every muscle and every organ in the body

Brain - Center responsible for consciousness, breathing and heartbeat

Normal state of consciousness - 3 W's - who, where, what
A patient knowing who they are, where they are, and what is happening around them

Brain cells cannot regenerate or grow back

Paralysis - Loss of feeling or movement below an injury.

- 4) Musculoskeletal System - Consists of bones, muscles, ligaments, and tendons

Musculoskeletal System performs the following:

a - Supports the body

b - Protects vital organs

c - Allows body movement

d - Stores minerals and produces blood cells

e - Produces heat

- 5) Integumentary System - Consists of skin, hair, and nails

Skin is most important because it protects the body from germs and keeps fluids within

- 6) Endocrine System - Consists of glands that release fluid into other body systems. The best example of this would be the pancreas which produces insulin.

- 7) Digestive System - Called the gastrointestinal system - Consists of organs that work together to break down and eliminate waste

Damaged organs release contents and blood

Damaged organs cause severe pain and severe infections

- 8) Genitourinary System - Consists of urinary system and the reproductive organs

The kidneys (in lower back) and the urinary bladder are most injured

PREVENTING DISEASE TRANSMISSION

Bloodborne pathogens - Bacteria and viruses present in human blood and other body fluids that cause disease in humans

Pathogens - Hepatitis A and B, AIDS, herpes, Meningitis, Tuberculosis

Pathogen - A disease causing agent, such as a germ, virus, or bacteria

Immune system - A person's body (white blood cells in the blood) attack and attempt to destroy pathogens

4 conditions which must be present for a disease to spread:

- 1) A pathogen is present
- 2) Sufficient pathogen quantity to cause a disease
- 3) A person is susceptible to the pathogen
- 4) The pathogen is transmitted through the correct entry site

E - Pathogens enter the body in 4 ways:

- 1) Direct contact: A person touches an infected person's body fluids
- 2) Indirect contact transmission: A person touches objects contaminated by the blood or body fluids of an infected person
- 3) Airborne transmission: A person inhales infected droplets that become airborne when an infected person coughs or sneezes
- 4) Vector transmission: Occurs when an animal such as a dog or another person bites a person and transmits the pathogen through the bite.

Diseases that cause concern:

1 - Herpes:

A - Transmitted by direct contact with herpes sores

B - Cause infections of the skin and mucous membranes (mouth, lips, etc.)

C - Commonly called cold sores

Most serious forms of herpes - Sores form on the face, neck, shoulders, and genital area.

2 - Meningitis:

- A - Transmitted by direct, indirect, and airborne means
- B - A severe infection of the covering of the brain and spinal cord
- C - Highly contagious, easily spread
- D - Spread through secretions from the mouth or nose, an infected person coughing, indirect contact with an infected person's secretions, unprotected rescue breathing, unprotected CPR, etc.
- E - If treated early, is rarely fatal

3 - Hepatitis:

- A - A severe infection of the liver
- B - Transmitted through direct and indirect contact
- C - Hepatitis A:
 - 1) Common in children
 - 2) Transmitted by contact with food or stool from an infected person
 - 3) Patient has flu-like symptoms, with yellowing of the skin (jaundice)
 - 4) Usually not serious
- D - Hepatitis B:
 - 1) Severe infection, can be fatal
 - 2) Transmitted by blood-to-blood or sexual contact with an infected person
Not transmitted by casual contact such as shaking hands, or indirect contact from a drinking fountain, telephone, etc.
 - 3) Highest risk occurs with unprotected direct or indirect contact with infected blood

4) Tuberculosis:

- A - Infection of the respiratory system (bacteria live in an infected person's lungs)
- B - Transmitted by direct contact with saliva, respiratory secretions from coughing, spitting, speaking, singing, and inhaling airborne droplets from an infected person

5) HIV-AIDS

A - Virus that attacks and weakens a person's immune system

B - Causes severe pneumonia, infections of the mouth and esophagus and unusual cancers

C - Important to remember about AIDS:

- 1) Cannot be spread through casual contact
- 2) Virus is easily killed by alcohol, bleach, and other common disinfectants
- 3) Known to be transmitted only through infected blood, semen, vaginal secretions or rarely breast milk
- 4) Transmitted through:
 - a) - Unprotected sex with an infected person
 - b) - Exposed to blood or equipment contaminated with blood from an infected person that may enter your body through the mouth, nose, or broken skin
 - c) - Unborn child of an infected mother
 - d) - Sharing needles from drug use, ear piercing, etc.

Protecting yourself from disease transmission begins with preparation and planning

A - Protective equipment - prevents you from making direct contact with infected materials

- 1) Wear disposable, surgical gloves (single use) when you may contact blood or body fluids
- 2) Remove gloves by turning inside out, peeling off while avoiding direct contact with a contaminated surface
- 3) Discard torn or punctured gloves
- 4) Never clean or reuse disposable gloves
- 5) Change gloves when treating multiple patients
- 6) Always use disposable resuscitation masks when providing rescue breathing and/or CPR ventilations

B - Personal Hygiene - Important in Helping to Prevent Infections

- 1) Wash your hands thoroughly with soap and water immediately after treating a patient
- 2) Avoid eating, drinking, touching your mouth, nose or eyes while treating a patient before washing your hands

C - Equipment Cleaning and Disinfecting - Very important to clean and disinfect equipment to prevent infections

Handle all contaminated equipment very carefully until it's cleaned and disinfected

Wash contaminated equipment with a solution of $\frac{1}{4}$ cup chlorine bleach per gallon of water.

D - Exposure to Infectious Disease

- 1) Wash any area of contact as quickly as possible
- 2) Document the situation in which the exposure occurred
- 3) Notify your superior and any involved medical personnel immediately (The involved medical facility may test the patient to confirm a suspected infectious disease)
- 4) The medical facility will notify you and you can get exposure care, if a disease is confirmed
- 5) If ever in doubt, see your personal doctor

BLOODBORNE PATHOGENS

Bloodborne pathogens are microscopic organisms found in human blood or other body fluids of infected persons that can infect and cause disease in humans.

Dangerous Body Fluids

The body fluids that have been found to contain blood borne pathogens are:

- Blood
- Semen
- Vaginal secretions
- Breast milk
- Fluid from spine, lungs, and joints
- Urine
- Feces
- Saliva
- Vomit

However, only the first four have been proven to spread disease.
Treat all body fluids as dangerous.

Bloodborne Pathogens

The two bloodborne pathogens most likely to be encountered in the workplace are:

HIV, the human immunodeficiency virus which causes AIDS, acquired immune deficiency syndrome.

The Hepatitis B virus

HIV - A very fragile virus, usually dies by the time that it takes for blood to dry.

Hepatitis B - Can live in dried blood for up to 6 weeks.

HIV/AIDS

Aids affects the immune system of the infected person, limiting the ability of the body to fight off infection, parasites, and viruses.

Aids patients usually die from other infections.

HIV, the virus that causes AIDS, may be in the body many years before noticeable symptoms develop. Aids is a syndrome.

It is currently believed that everyone infected with HIV will eventually develop AIDS (the mean time is 8-10 years).

HIV/AIDS

Symptoms of HIV infection include:

- Fever
- Aches
- Swollen Glands
- Sore Throat
- Diarrhea
- Tiredness
- Rashes

Symptoms of AIDS include:

- Rapid weight loss
- Long-lasting fever
- Swollen Lymph glands
- Frequent diarrhea
- Continuous dry cough
- Brain dysfunction
- Purple or discolored growths on the skin

There is currently no cure for AIDS and no vaccine, so the emphasis must be on prevention.

Hepatitis B Virus

Some experts estimate that the Hepatitis B Virus is as much as 100 times more easily spread than HIV.

Hepatitis can either mean an inflammation or infection of the liver.

You hear more about Hepatitis B Viruses because it is the one you are most likely to encounter in the workplace, and there is an effective and safe vaccine to protect you from exposure to Hepatitis B Virus.

1 Teaspoon of contaminated blood contains at least one-half million particles that could cause Hepatitis B.

1 Teaspoon of contaminated blood contains 10 to 15 particles that could cause AIDS.

One third of those infected with Hepatitis B do not experience any symptoms.

One third only have mild flu-like symptoms.

Two thirds of the people that have Hepatitis do not know they have it.

One third have these symptoms:

Abdominal pain

Nausea

Fatigue

Jaundice

Dark urine

Joint pain

Other Hepatitis Viruses

The most common type of hepatitis in the U.S. is caused by the Hepatitis A Virus. It is usually spread by food or water that has been contaminated by sewage. Most people who contract Hepatitis A recover completely in a few weeks. 50% of the people will have it sometime in their lifetime.

Hepatitis C Virus is very similar to Hepatitis B Virus but there is currently no effective treatment or vaccine against Hepatitis C Virus.

Hepatitis D Virus causes infection only in those people who already have Hepatitis B Virus but not as contagious.

The Hepatitis E Virus is another hepatitis that is almost identical to Hepatitis A infection, but it is rare in the U.S.

Hepatitis B Virus Vaccines

The Hepatitis B Virus vaccine causes your body's immune system to develop special proteins called "antibodies". The antibodies attack the virus and neutralize it.

Full immunity to Hepatitis B Virus will not be achieved for at least 6 months after starting the Hepatitis B Virus vaccination series.

Hepatitis B Virus vaccine is effective in about 85% - 90% of people (average for all vaccines) who receive the recommended series of three injections.

There is another injection available for someone who has been exposed to Hepatitis B Virus called Hepatitis B Immune Globulin.

Hepatitis B Virus vaccines will protect you from Hepatitis B Virus and Hepatitis D Virus infection, but not from other bloodborne pathogens such as HIV.

There are no vaccines currently available for HIV or other types of hepatitis.

Ways You Cannot Be Exposed in The Workplace

- Shaking hands
- Casual touching
- Working in close conditions with others
- Sharing telephones, office equipment or furniture
- Sharing dishes, utensils, or food
- Sharing sinks, toilets, or showers
- Drinking from fountains
- Having close contact with someone who sneezes or coughs

As of today, none of the above have been proven to transmit diseases.

Ways You Can Be Exposed in The Workplace

Infectious fluids can enter the body through puncture wounds from contaminated materials such as broken glass, metal, etc.
Remember, even gloves do not prevent you from being stuck.
Infectious fluids can enter the body through wounds, cuts, rashes, or broken skin. You may not be aware your skin is broken.
Infectious fluids can enter the body through mucous membranes of the eyes, nose, and mouth.

Protecting Yourself

Understand and follow Universal Precautions, which means that all blood and body fluids should be treated as if known to be infectious for HIV, Hepatitis B Virus, and other bloodborne pathogens.

Have a properly equipped first aid kit handy to your worksite. It should contain the barriers needed to perform CPR without exposing yourself to danger from bloodborne pathogens.

Always place a barrier between you and the blood or body fluids of the injured person.

Barriers

Personal protective equipment, which can act as a barrier to the source of bloodborne pathogens, includes but is not limited to:

- Face shields/masks with one-way valves
- Gloves (disposable or reusable)
- Safety glasses
- Mouth pieces
- Resuscitation bags
- Fluid-resistant work clothes

Protecting Yourself

Wash your hands with soap and water for 10-15 seconds as soon as possible after contact with blood or other body fluids (even if gloves were used).

Washing your hands and arms up to the elbows has proven to remove 97% of exposed germs.

Clean-up

If equipment, tools and/or the work area becomes contaminated with blood or other body fluids, use bleach for decontamination because it is inexpensive, it is commonly available, and a 10% solution kills all known blood borne pathogens.

HIV dies rapidly when exposed to air; it dies shortly after the infected blood dries.

Hepatitis B Virus, however, lives in dry infected blood for several days.

Clean-Up

Dispose of contaminated materials in sealed containers to prevent leakage. The containers must have a fluorescent orange or orange-red biohazard label and should be handled by individuals who know how to handle hazardous wastes.

Post-Exposure Evaluation and Follow-Up

Immediately following an exposure incident, the following procedure should be followed:

An authorized person should conduct a follow-up evaluation with the exposed employee documenting:

The routes of exposure and how the exposure occurred

The identity of the source individual

Whether or not the employee has been vaccinated for Hepatitis B Virus

Post-Exposure Evaluation and Follow-Up

After obtaining consent, collect the exposed employee's blood as soon as possible after the exposure incident and test it for Hepatitis B Virus and HIV serological status.

If the exposed employee consents to having the blood drawn but does not give consent for the Hepatitis B Virus and HIV serological testing, the employer must preserve the blood sample for at least 90 days, allowing ample time for the employee to change his or her mind.

Obtain consent and test the source individual's blood. If consent was not obtained, document the effort to obtain it.

If available, provide the exposed employee with the source individual's test results and information about applicable disclosure laws and regulations.

With the consent of the exposed employee, the employer should coordinate post-exposure counseling sessions.

Substance Abuse Laws

§45.2-528 A

The Board of Coal Mining Examiners may suspend, revoke, or take other action regarding any certificate upon finding that the holder has

- (i) Failed to comply with the continuing education requirements within the period following the suspension of the certificate as provided in § 45.1-161.34.
- (ii) Been intoxicated while in duty status.
- (iii) Neglected his duties.
- (iv) Violated any provision of this Act or any other coal mining law of the Commonwealth.
- (v) Used any controlled substance without the prescription of a licensed physician.
- (vi) Other sufficient cause.

§45.2-528 B

The Board shall also suspend, revoke, or take other action regarding the first class mine foreman certificate of any mine foreman who fails to display a thorough understanding of the roof control plan and ventilation for the area of the mine for which he is responsible for implementing, when examined on-site by a mine inspector in accordance with guidelines promulgated by the Board. In such a case, the Board shall make a determination, based on evidence presented by interested parties, of whether the mine foreman had a thorough knowledge of such plans at the time of his examination by the mine inspector.

§45.2-528 C

Any person holding a certification issued by the Board shall report to the Chief, within 30 days of any criminal conviction in any court of competent jurisdiction for possession or use of any controlled substance without the prescription of a licensed prescriber. This conviction shall result in the immediate temporary suspension of all certificates held by such person pending hearing before the Board.

§45.2-528D

Any miner present at any mine shall be deemed to have given consent to reasonable search, at the direction of the Chief by employees of the Department, of his person and his personal property located at the mine. This search shall be limited to the investigation of potential violations of the Coal Mine Safety Act (§45.1-161.7 et seq.).

§45.2-528 E

All information regarding substance abuse test results of certified persons, written or otherwise received by the Department or Board, shall be confidential. Any hearing of the Board in which this information is presented shall be conducted as a closed session in accordance with the Virginia Freedom of Information Act (§ 2.2-3700 et seq.).

§45.2-528 H

Any hearing conducted after the temporary suspension of a miner's certificate due to

- (i) A criminal conviction in any court of competent jurisdiction for possession or use of any controlled substance without the prescription of a licensed prescriber as provided for in subsection C.
- (ii) A failure to pass a substance abuse test required by the Chief pursuant to § 45.2-556
- (iii) A failure to pass a pre-employment substance abuse screening test.
- (iv) A discharge for violation of the company's substance or alcohol abuse policies.
- (v) A positive test for the use of any controlled substance without the prescription of a licensed prescriber
- (vi) A positive test for intoxication while on duty status.
- (vii) A failure to complete a substance abuse program pursuant to §45.2-565, shall be conducted within 60 days of the temporary suspension. The Board shall make every effort to hold the hearing within 40 days of the temporary suspension.

§45.2-556 D

The Chief shall require substance abuse testing as part of an inspection or complaint investigation if there is reasonable cause to suspect a miner's impairment, due to the presence of intoxicants or any controlled substance not used in accordance with the prescription of a licensed prescriber or has been a contributing factor to any accident in which a serious personal injury or death occurs at a mine. The Chief shall require substance abuse testing of any miner killed or seriously injured and of any other person who may have contributed to the accident. Any substance abuse testing required by the Chief will be paid for by the Department. Refusal by any miner to submit to substance abuse testing, or the failure to pass such a test, shall result in the immediate temporary suspension of all certifications, pending hearing before the Board of Coal Mining Examiners.

§45.2-565 D

The mine operator shall implement a substance abuse screening policy and program for all miners that shall, at a minimum, include a pre-employment, 10-panel urine test for the following and any other substances as requested by the Board of Coal Mining Examiners.

- a. Amphetamines
- b. Cannabinoids/ THC
- c. Cocaine
- d. Opiates
- e. Phencyclidine (PCP)
- f. Benzodiazepines
- g. Propoxyphene
- h. Methadone
- i. Barbiturates
- j. Synthetic narcotics

Samples shall be collected by providers who are certified as complying with standards and procedures set out in the United States Department of Transportation's rule, 49 CFR Part 40. Collected samples shall be tested by laboratories certified by the United States Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA) for collection and testing. The mine operator may implement a more stringent substance abuse screening policy and program; and

Review of the substance abuse screening program with all miners at the time of employment and annually thereafter.

§45.2-565 E

The operator or his agent shall notify the Chief, on a form prescribed by the Chief, within seven days of any failure of a pre-employment substance abuse screening test and provide a record of the test showing such failure or violation. Notice shall result in the immediate temporary suspension of all certificates held by the applicant, pending hearing before the Board of Coal Mining Examiners.

§45.2-565 F

The operator or his agent shall notify the Chief, on a form prescribed by the Chief, within seven days of:

- (i) Discharging a miner due to violation of the company's substance or alcohol abuse policies.
- (ii) A miner testing positive for intoxication while on duty status.
- (iii) A miner testing positive as using any controlled substance without the prescription of licensed prescriber. An operator having a substance abuse program shall not be required to notify the Chief under subdivision (iii) unless the miner having tested positive fails to complete the operator's substance abuse program. The notification shall be accompanied by a record of the test showing such positive results or violation. Notice shall result in the immediate temporary suspension of all certificates held by the applicant, pending hearing before the Board of Coal Mining Examiners.

§45.2-565 G

The provisions of this chapter shall not be construed to preclude an employer from developing or maintaining a drug and alcohol abuse policy, testing program, or substance abuse program that exceeds the minimum requirements set forth in this section.

**Managing An Emergency Scene Legal Considerations Human Body Systems
Disease Transmission Substance Abuse/ Testing/Reporting**

1. Which of the following is the first thing to evaluate at the scene of all types of emergency situations?
 - A - Rescuer and bystander safety
 - B - Number of patients
 - C - Whether the patient is breathing
 - D - Whether the patient has a pulse

2. A rescuer decides to do something that they are not trained to do. What are they legally liable for?
 - A - Improper standard of care
 - B - Assault and battery
 - C - Attempted murder
 - D - Abandonment

3. Which of the following would be considered in negligence of a patient?
 - A – Obtaining consent
 - B - Giving incorrect first aid
 - C - Implied consent
 - D - Failing to do a procedure that you are not trained to perform

4. Which of the following would be covered by the Good Samaritan Laws?
 - A - Acting in good faith
 - B - Are negligent
 - C - Acting outside the scope of your training
 - D-Treating responsive patient without obtaining consent

5. Which of the following would be necessary when getting informed consent?
- A - Explain the signs of shock
 - B - Identify yourself, your level of training, what may be wrong, what you plan to do
 - C – Tell the bystanders that you have first aid training
 - D – Explain how to put on a tourniquet
6. Which of the following would be covered by implied consent?
- A - Unconscious patient
 - B - A conscious, alert patient that refuses treatment
 - C – An injured child with a parent present
 - D-A bystander at the scene of an accident you think might possibly need care
7. Which of the following would best describe abandonment?
- A - Failure to give the correct first aid treatment
 - B - Failure to get consent
 - C - Failure to continue first aid treatment once you have begun and until relieved by a person with equal or higher training
 - D - Failure to maintain confidentiality of a patient's medical condition.
8. Which of the following is a general first aid rule concerning moving the patient for treatment?
- A - Move all patients to where the first aid equipment is located.
 - B - Move only conscious patients to where the first aid equipment is located.
 - C - Move patients to secure to a spine board if it is easier for the rescuer.
 - D - Never move a patient until stabilized unless the safety of the rescuer or the patient is threatened.

9. Which of the following is a general first aid rule to always remember at the scene of any emergency?

A - Always check the patient's pulse first

B - Always control bleeding first

C - Never attempt to rescue or treat a patient in a location that you are not trained or familiar with

D - Always apply a tourniquet to control external bleeding

10. Which of the following is the first thing to do when you think a patient may be in contact with an electrical circuit?

A - Check the pulse

B - Control severe bleeding

C - Check the airway

D - Ensure that the electrical circuit is de-energized

11. Which of the following is distal to the elbow?

A - Hand

B - Shoulder

C - Collarbone

D - Chest

12. Which of the following are considered the vital organs?

A - Spleen, kidneys, stomach

B - Brain, heart, lungs

C - Brain, kidneys, stomach

D - Heart, spleen, kidneys

13. Which of the following systems is responsible for getting air into the lungs?
- A - Circulatory
 - B - Digestive
 - C - Respiratory
 - D - Muscle system
14. Which of the following systems is responsible for getting oxygen from the lungs to all parts of the body?
- A - Respiratory system
 - B - Circulatory system
 - C - Digestive system
 - D - Muscle system
15. How many times does an adult breathe per minute?
- A - 5 to 10
 - B - 10 to 20
 - C - 25 to 30
 - D - 60 to 80
16. Which of the following would best describe respiratory arrest?
- A - Breathing 0 to 5 times per minute
 - B - Breathing 5 to 10 times per minute
 - C - Breathing 12 to 20 times per minute
 - D - Absence of breathing
17. Which of the following would best describe cyanosis?
- A - Absence of breathing
 - B - Absence of breathing and pulse
 - C - A bluish discoloration of the skin, especially the lips and nailbeds
 - D - Slow breathing rate

18. Which of the following may be present in a patient having breathing difficulties?
- A - Irregular heart rate
 - B - Noisy breathing
 - C - Rapid Pulse
 - D - Unequal pupils
19. What can be felt in a major artery each time the heart contracts?
- A - Blood pressure
 - B - Pulse
 - C - Electric signal
 - D - Swelling of a blood vessel
20. Which of the following is the master organ of the body?
- A - Brain
 - B - Heart
 - C - Lungs
 - D - Liver
21. Which of the following organs controls the state of consciousness?
- A - Heart
 - B - Brain
 - C - Lungs
 - D - Spleen

22. Which of the following organs regulates all body functions?
- A - Heart
 - B - Brain
 - C - Liver
 - D - Kidneys
23. Which of the following is used to evaluate a patient's state of consciousness?
- A - 3 W's (who, what, where)
 - B - Pulse rate
 - C - Breathing rate
 - D - Amount of blood lost
24. Which of the following is used to evaluate a patient's state of responsiveness?
- A - Blood Pressure
 - B - AVPU Evaluation (Alert, Verbal, Painful, Unresponsive)
 - C - Pulse Rate
 - D - Amount of blood loss
25. Which of the following injuries must always be considered as serious?
- A - Severe pain in the knee
 - B - Head injury causing loss of consciousness
 - C - Severe pain in the shoulder
 - D - Severe pain in the elbow

26. Which of the following is defined as paralysis?
- A - Parallel fracture
 - B - Permanent loss of feeling and movement below an injury
 - C - Absence of a pulse
 - D - A compound fracture
27. Which of the following connect bones to bones?
- A - Tendons
 - B - Ligaments
 - C - Muscle
 - D - Nerves
28. Which of the following connect muscles to bones?
- A - Tendons
 - B - Ligaments
 - C - Muscle
 - D - Nerves
29. What are dislocations associated with?
- A - Long bones
 - B - Straight bones
 - C - Bones that can bend
 - D - Joints
30. Which of the following organs is the controlling center of the nervous system?
- A - Heart
 - B - Brain
 - C - Lungs
 - D - Liver

31. Which of the following can cause a rescuer to become seriously sick?
- A - Germs, bacteria and viruses in a patient's blood or body fluids
 - B - The sight of a compound fracture
 - C - The sight of blood
 - D - The smell of vomitus
32. Which of the following is what a rescuer will see?
- A - Symptom
 - B - Sign
 - C - Vital functions
 - D - Body evaluations
33. Which of the following is what a patient tells you?
- A - Symptom
 - B - Sign
 - C - Vital functions
 - D-Body evaluations
34. Which of the following is always required for a disease to be spread to a rescuer?
- A – The rescuer has a cold
 - B – An ample amount of contact with the carrier of the germs
 - C - A rescuer susceptible to the germs (pathogens)
 - D-The rescuer has a serious headache
35. Which of the following may occur when a person touches an infected person's body fluids?
- A - Direct contact transmission
 - B - Indirect contact transmission
 - C - Airborne transmission
 - D - Vector transmission

36. Which of the following may occur when a person touches an object that has been contaminated with blood or body fluid from an infected person?
- A - Direct contact transmission
 - B - Indirect contact transmission
 - C - Airborne transmission
 - D - Vector transmission
37. Which of the following may occur when a person inhales infected breaths when an infected person coughs or sneezes?
- A - Direct contact transmission
 - B - Indirect contact transmission
 - C - Airborne transmission
 - D - Vector transmission
38. Which of the following may occur when a person is bitten by an animal, tick or another person?
- A - Direct contact transmission
 - B - Indirect contact transmission
 - C - Airborne transmission
 - D - Vector transmission
39. Which of the following diseases would cause swelling and blister like sores around the lips and mouth?
- A - Herpes
 - B - Meningitis
 - C - Hepatitis B
 - D - Tuberculosis

40. Which of the following diseases causes a severe infection of the brain and spinal cord?
A - Herpes
B - Meningitis
C - Hepatitis B
D – Tuberculosis
41. Which of the following most commonly affects the “respiratory system”?
A - Herpes
B - Meningitis
C - Hepatitis B
D - Tuberculosis
42. Which of the following causes a severe infection of the liver?
A - Herpes
B - Meningitis
C - Tuberculosis
D - Hepatitis B
43. Which of the following weakens a patient’s immune system and destroys a body’s ability to fight infections?
A - Meningitis
B - Tuberculosis
C - Hepatitis B
D - HIV-AIDS

44. Which of the following is correct concerning HIV-AIDS?
- A - Can be spread through a patient's sweat
 - B - Can be spread by casual contact
 - C - The virus can still be present in dried blood for up to two weeks
 - D - Transmitted through exposure to blood and particular body fluids
45. Which of the following should be worn when a rescuer treats a patient?
- A - Protective disposable gloves
 - B - Surgical gown
 - C - Safety glasses
 - D - Surgical mask
46. Which of the following must always be used when giving rescue breaths to a patient?
- A - Mouth to mouth
 - B - Mouth to nose
 - C - Jaw thrust
 - D - Resuscitation mask
47. Which of the following is very important if you think that you have been exposed to an infectious disease?
- A - Call the local rescue squad
 - B - Call the local hospital
 - C - Wash the contact area as quickly as possible and document the exposure details
 - D - Take 12 aspirins during the next 24-hour period (1 every 2 hours)

48. What should you do if you think you have been exposed to an infectious disease?
- A - Notify your supervisor and involved medical personnel immediately
 - B - Call your local doctor
 - C - Call your next of kin
 - D - Contact your family
49. Which of the following may occur when a person becomes unconscious?
- A - The heart stops beating
 - B - The tongue relaxes, falls to the back of the throat, and blocks the airway
 - C - The patient's kidneys fail
 - D - The patient's liver fails
50. What does R-B-B represent when a rescuer is performing an initial assessment on a patient?
- A – Red skin, Bad breath, Broken bone
 - B – Responsiveness, Breathing, Bleeding
 - C – Rapid, Blue skin, Bleeding ulcer
 - D – Responsiveness, Broken, Bleeding
51. Which of the following is the correct order of events that a rescuer should take at the scene of an emergency?
- A - Check the patient, survey the scene, call for advanced medical help
 - B - Check the patient's pulse, control bleeding, call for advance medical help
 - C - Control bleeding, survey the scene, call for advanced medical help
 - D – Verify that EMS has been notified, Survey the scene, safely gain access to patient, conduct initial assessment, check RBB, treat life threatening injuries, treat for shock, transport ASAP

52. A rescuer is treating a patient and the scene suddenly becomes unsafe. What should a rescuer do?
- A - Retreat to a safe distance
 - B - Keep treating the patient
 - C - Call for more help
 - D - Check the patient's pulse
53. Which of the following organs is referred to as the center of consciousness?
- A - Heart
 - B - Brain
 - C - Lungs
 - D - Liver
54. What must be considered when you arrive at an accident scene where the mechanism of injury reveals that the patient may have sustained a spinal injury?
- A-Check the skin color immediately
 - B-Conduct a head-to-toe survey before you treat any injuries
 - C- Check the pelvis, hips, and lower back immediately
 - D-Use the clothes drag method if you must remove the patient to a safe location, use Jaw Thrust method if you must open the airway, use log roll method to load on backboard
55. Which of the following has the greatest potential to be the most serious?
- A-Sprained ankle
 - B-Dislocated little finger
 - C-A mild nosebleed
 - D- Head, neck, back, chest injuries, and breathing difficulties

56. What is the danger of cerebrospinal fluid and blood accumulating between the skull and brain tissue?

A-Profuse sweating

B-Simple nosebleed

C-Hearing loss will occur

D- When pressure builds up between the skull and the brain tissue the supply of oxygen to the brain tissue becomes limited which will cause damage to the tissue

57. How much air does an average adult person inhale with each breath?

A-1 pint

B-1 quart

C-1 gallon

D-3 liters

Substance Abuse Testing, Policies, and Programs

58. Any person holding a certification issued by the Virginia Board of Coal Mining Examiners shall report to the Chief, Coal Mine Safety, of any criminal court conviction in any court of competent jurisdiction for the possession or use of any controlled substance without the prescription of a licensed prescriber. The conviction shall result in:

A-The conviction information being posted on the Virginia Energy web site and made available to all Virginia mine operators and officials.

B-The conviction information being provided to the Commonwealth Attorney of the county in which the person resides.

C-The immediate temporary suspension of all BCME certifications held by such person pending a hearing before the Board of Coal Mining Examiners.

D- The conviction will be published in monthly newsletter for all interested parties to view.

59. In accordance with BCME regulations, a miner's certifications may be temporarily suspended for:
- A-A miner moving from Virginia to work in a coal mine in another state without obtaining an official transfer.
 - B-A miner failing to pass a substance abuse screening test if requested by the Chief or the BCME.
 - C-A miner performing the duties of a mine foreman in another state and is reported to the Chief for not attending annual retraining.
 - D. A miner working in another state as a mine foreman and is reported to the Chief for failure to comply with the Virginia Emergency Evacuation Training requirements.
60. The Virginia Board of Coal Mining Examiners (BCME) may suspend, revoke, or take other action regarding any miner's coal mining certifications upon finding that the certificate holder has:
- A- Found guilty of being intoxicated while on duty status during employment
 - B- Moved from Virginia to another state to work in the mining industry without first notifying the Chief to receive an official transfer
 - C- Found guilty of failure to report to the Chief of any persons not attending annual retraining.
 - D- Failure to promptly notify the Chief of any person who possess any other coal mining certification.
61. The mine operator or his/her agent shall notify the Chief on a form prescribed by the Chief for any person failing a pre-employment substance abuse screening test within:
- A- One year
 - B- Thirty days
 - C- Seven days
 - D- Seven weeks

62. The operator or his\her agent shall notify the Chief of any person for failing a pre-employment substance abuse screening test. Failure of this test shall result in:

A-An open hearing before the BCME within one year

B-The immediate temporary suspension of all Virginia mining certifications held by that person pending a hearing before the BCME

C-The permanent suspension of all Virginia coal mining certifications held by that person.

D-A closed hearing before the BCME within one year.

63. The mine operator or his\her agent shall notify the Chief on a form prescribed by the Chief within seven (7) days of specific events as related to substance abuse. Which of the following describes these type events?

A-The mine operator or his\her agent receiving an anonymous substance abuse complaint and failed to report the event to the Commonwealth Attorney in the county in which the person resides within thirty (30) days.

B-An employee who completes the company alcohol abuse rehabilitation program and the operator fails to report this information to the Commonwealth Attorney in the county in which the employee resides within seven (7) days of completion.

C-Notification by a mine operator or his\her agent of discharging an employee for violations of the company's substance and alcohol abuse program/ policy or an employee testing positive for a controlled substance without a prescription of a licensed prescriber.

64. A mine operator is required to develop, implement, and maintain a substance alcohol abuse program/policy which requires a minimum of a pre-employment substance abuse drug screen. The operator may also choose to:
- A. Develop a policy that exceeds the minimum requirements as set forth by the Coal Mine Safety Laws of Virginia.
 - B. Develop a policy that exceeds the minimum requirements as set forth by the National Substance Abuse Task Force.
 - C. Develop a policy that would require any employee who testing positive for large amounts of caffeine to be tested for synthetic narcotics.
 - D. Develop a policy that would require an employee who tested positive for large amounts of insulin to be tested for synthetic narcotics.

RESPIRATORY EMERGENCIES

Respiratory emergencies - Treatment begins the same as any other emergency situations

- 1) Evaluate the scene for safety
- 2) Check Responsiveness (R)
- 3) Check breathing (B)
- 4) Check circulation (B) and bleeding

Respiratory distress - A patient who has breathing difficulty

Respiratory arrest - A patient who has stopped breathing

BREATHING PROCESS

- 1) Air enters the mouth and nose
- 2) Passes through the pharynx (throat)
- 3) Passes through the larynx (voice box)
- 4) Passes through the trachea
- 6)-Passes through bronchi and into the lungs

THE BRAIN IS THE CONTROL CENTER FOR BREATHING.

The brain adjusts the rate and depth of breathing based on the amount of oxygen and carbon dioxide in the blood.

BREATHING EMERGENCIES CAN BE CAUSED BY:

- 1) Obstructed airway (choking)
- 2) Illness such as pneumonia
- 3) Respiratory conditions such as emphysema, asthma, etc.
- 4) Electrocutation
- 5) Shock
- 6) Drowning
- 7) Heart attack or heart disease
- 8) Injury to the chest or lungs
- 9) Allergic reactions, such as food, insects, poison ivy, etc.
- 10) Drugs (penicillin, etc.)
- 11) Poisoning (such as inhaling or ingesting toxic substances)

Respiratory distress is the most common type of breathing emergency.

The signs and symptoms of respiratory distress are usually obvious.

SIGNS AND SYMPTOMS OF RESPIRATORY DISTRESS:

- 1) Patients look like they cannot catch their breath
- 2) Patient may be gasping for air
- 3) Unusual breathing patterns: fast, slow, deep, shallow, shortness of breath
- 4) Unusual breathing noises: wheezing, gurgling or high pitched, shrill sounds
- 5) Initially, flushed (red) and moist skin Later, pale or bluish skin (especially lips, nail beds, toe beds)
- 6) Patient may feel dizzy or light-headed
- 7) Pain in the chest
- 8) Tingling in the hands and feet
- 9) Patient may be fearful, apprehensive

CYANOSIS - A bluish discoloration of the skin (lips, mouth, nail beds, etc. due to a lack of oxygen in the blood)

Causes of respiratory distress:

- A) Injuries
- B) Asthma
- C) Emphysema
- D) Hyperventilation
- E)-Anaphylactic shock (allergic reaction)

INJURIES

Injuries that affect any parts of the respiratory system may cause breathing problems (*Examples:* mouth, nose, throat, trachea, lungs, etc.)

ASTHMA

Asthma is a condition that narrows the air passages and makes breathing difficult; wheezing when patient inhales; asthma attacks cause the air passages to become narrow, swell or become constricted

Asthma is more common in children and young adults

C) EMPHYSEMA

Emphysema is a disease when the lungs lose their ability to exchange oxygen and carbon dioxide effectively.

Usually develops over years and is often caused by smoking

Patients may have:

- 1) Shortness of breath
- 2) Extreme difficulty when inhaling
- 3) Coughing, cyanosis, or fever
- 4) Restlessness, confusion, weakness
- 5) Patients usually get worse over time

D) HYPERVENTILATION

Hyperventilation occurs when a patient breathes faster than normal and causes an imbalance of the oxygen and carbon dioxide in the blood.

Patients may have:

- 1) Rapid, shallow breathing
- 2) Patient feels they cannot get enough air and have feelings of suffocation
- 3) Fearful, apprehensive, confused, dizzy
- 4) Tingling or numbness feelings of the fingers and toes

E) ANAPHYLACTIC SHOCK

Anaphylactic shock is a severe allergic reaction

The air passages swell, restricts a patient's breathing and may cause extreme breathing difficulty

Anaphylactic shock may be caused by:

- 1) Insect stings (bees, wasps, etc.)
- 2) Contact with plants (poison ivy, etc.)
- 3) Medications (penicillin, etc.)

Known patients may carry an anaphylactic kit

ANAPHYLACTIC SHOCK - A life-threatening emergency that requires advanced medical care as soon as possible.

Signs and symptoms of anaphylactic shock:

- 1) Rash and/or skin irritations
- 2) Feeling of tightness in the throat and/or chest
- 3) Swelling of the tongue, face, and neck
- 4) Dizziness, confusion
- 5) Possible changes in consciousness

If a person has an epinephrine injector you may assist or administer the Person's own injector. If the person does not respond to the first injection and arrival of advanced care will exceed 5 to 10 minutes a repeat dose may be considered.

TREATMENT FOR RESPIRATORY DISTRESS

- A) Evaluate and treat the ABC's
Ensure an open airway and adequate breathing
If patient is breathing, the heart is beating
Control severe bleeding
- B) Notify advanced medical personnel (rescue squad, hospital, etc.) and begin planning to transport as soon as possible.
- C) Help the patient rest, reassure, and make as comfortable as Possible.
Sitting position is usually more comfortable than lying down because breathing is easier
- D) Conduct a secondary survey after you have treated the ABC's
- E) Assist the patient with prescribed medication such as oxygen, inhalant, Etc.
- F) Maintain normal body temperature (Keep the patient warm)
- G) If a patient has signs of an injury or illness, call for advanced medical help immediately

If a patient's breathing is rapid and caused by excitement, emotions, etc., try to calm and slow the breathing rate. Encourage patient to breathe at a normal rate to prevent hyperventilation, unconsciousness, etc.

IV RESPIRATORY ARREST

The condition when a patient stops breathing.

Can be caused by illness, injury, obstructed airway, etc.

The body can function only for a few minutes without oxygen before body systems begin to fail

Without oxygen, the heart muscle stops working and in turn, all the other body systems will fail.

A) RESCUE BREATHING

Breathing air into a patient to provide oxygen necessary to survive.

Normal air contains about 21% oxygen

Exhaled breaths contains about 16% oxygen

RESCUE BREATHING - HOW TO DO

- 1) Open the airway - Look, listen and feel
 - Look for the rise and fall of the chest
 - Listen and feel at the patient's mouth and nose for signs of breathing at least 5 seconds and no more than 10.

Open airway - Using the proper technique

Head tilt - chin lift if no spinal injuries are suspected

Jaw-thrust if spinal injuries are suspected

If not breathing, Begin CPR by administering 30 chest compressions followed by 2 rescue breaths'

Continue with CPR until one of the following occurs:

- A) The patient begins to breathe on their own
- B) Another rescuer with equal or more advanced training takes over for you
- C) You become exhausted and are unable to continue
- D) The scene becomes unsafe, and you must retreat to a safe location

SPECIAL CONSIDERATIONS FOR RESCUE BREATHING

AIR IN THE STOMACH - GASTRIC DISTENTION

Air in the stomach may cause a patient to vomit.

Vomiting by an unconscious patient may cause airway obstruction or aspiration of vomitus into the lungs causing severe pneumonia.

Aspiration may be fatal.

Air may enter the stomach when a rescuer gives rescue breaths.

The following may cause air to enter the stomach:

- a) Breathing into a patient longer than 2 seconds
- b) Overinflating the lungs
- c) Not tilting the head back far enough or an airway not completely open
- d) Giving more forceful breaths than is necessary to make the chest rise

THINGS TO DO TO AVOID FORCING AIR IN THE STOMACH

- A) Keep the patient's head tilted back far enough (airway must be completely open)
- B) Breathe slowly into the patient, just enough to make the chest rise
- C) Pause between breaths long enough to allow the patient's lungs to empty and for you to take another breath

VOMITING

When you give rescue breathing and/or CPR, whether there is gastric distention, a patient may vomit.

TREATMENT FOR VOMITING - Turn the patient's head and body (as a unit) to one side. Wipe the patient's mouth clean. Reposition the patient on their back and continue rescue breathing.

PATIENTS WITH DENTURES

Never automatically remove dentures from a patient just because you know or see them.

Dentures, if left in place, help rescue breathing by supporting a patient's mouth and cheeks during rescue breathing.

Remove dentures only if they become so loose that they block the airway or make it difficult for you to give breaths.

SUSPECTED HEAD OR SPINE INJURIES

A rescuer must always suspect and treat for possible spine injuries when a patient has a head injury or other injury (mechanism of the accident) that may have caused a possible spine injury.

SPECIAL NOTE: If ever in doubt, always treat and stabilize as if a spine injury is present, including how to open the airway, how to stabilize, secure and transport

AIRWAY OBSTRUCTION

Airway obstruction - most common cause of respiratory emergencies

Two types of airway obstruction:

1. Anatomical obstruction (blockage by the tongue or swollen tissues of the mouth or throat) Tongue - Most common obstruction in an unconscious patient
2. Mechanical obstruction (blockage by a foreign object such as food, blood, vomit, etc.)

PARTIAL AIRWAY OBSTRUCTION

Classified as such when a patient can move air by the obstruction
Verified when a patient is wheezing or coughing forcefully

NEVER INTERFERE OR DO ANYTHING AS LONG AS THE
PATIENT IS WHEEZING OR COUGHING FORCEFULLY

COMPLETE AIRWAY OBSTRUCTION

- Classified as such when a patient cannot speak, cry, breathe, cough forcefully, or making a high-pitched noise during breathing attempts
- Deliver 5 back blows followed by 5 abdominal thrusts for conscience patients with complete airway obstruction

UNIVERSAL CHOKING SIGNAL - One or both hands clutching the throat

CONSCIOUS CHOKING ADULT

Give 5 back blows followed by 5 abdominal thrusts

Responsive choking adult who becomes unresponsive:

1. Lower the patient to the ground
2. Grasp the lower jaw, lift the jaw up and perform a finger sweep only if you can visually see the object in the mouth
3. If the object is not visible, attempt to ventilate 2 times
4. If ventilation attempts are unsuccessful, give chest compressions.
5. Repeat steps 2,3 and 4 until the obstruction is relieved or ventilation attempts are successful

Unresponsive choking adult who was found unresponsive:

1. Check for unresponsiveness—5 to 10 seconds
2. If the patient is unresponsive, then give 30 chest compressions
3. Tilt the head back and look in the mouth for any foreign object
4. Do a finger sweep if you can see the object in the mouth
5. If you do not see the object, open airway and give 2 rescue breaths
6. Repeat steps 3, 4 and 5 until the obstruction is relieved or ventilation attempts are successful

RESPONSIVENESS / OROPHARYNGEAL AIRWAYS / RESUSCITATION MASKS / AED:

RESPONSIVENESS:

A Patient's level of responsiveness is evaluated by using the AVPU level of awareness.

The letters A, V, P, U with corresponding words are used to evaluate a patient's level of responsiveness.

A - for ALERT - Patient is Alert, aware of 3W's (Who they are, Where they are, and What happened to them)

V - for VERBAL - Patient Responds to Verbal Stimuli and reacts when rescuer speaks to them; patient may appear to be Lapsing into Unresponsiveness - BUT - may open eyes, groan, move or talk when they hear you voice

P - for PAINFUL - Patient Responds to Painful Stimuli - withdraws when rescuer inflicts very slight pain on them - such as pinching their earlobe or skin above the collarbone

U - for UNRESPONSIVE - Patient does not respond to any stimuli. patient is unresponsive. You will check unresponsiveness by putting your ear to their mouth and placing your hand on their chest. For 5 to 10 seconds, you will feel for signs of breathing against your ear while watching for the rise and fall of the chest.

If you do not detect any signs of responsiveness, then it is time to call for help and begin CPR.

OROPHARYNGEAL AIRWAYS AND RESUSCITATION MASKS:

OROPHARYNGEAL AIRWAY:

The tongue is the most common cause of airway obstruction in unresponsive patients. The tongue is attached to the lower jaw and when a patient is lying down on their back, especially face - up; the lower jaw drops backward. The tongue, being attached to the lower jaw, drops back against the throat, and blocks the airway.

An oropharyngeal airway is used to keep the airway open by holding the tongue away from the back of the throat.

An oropharyngeal airway is only inserted into a patient that does not have a gag reflex.

Testing for a gag reflex.

If a patient's lower eyelid contracts (attempts to close) when you gently rub the upper eyelid, it is a good sign the patient will have a gag reflex and you should not attempt to insert an oropharyngeal airway.

Oropharyngeal airways are made in a variety of sizes.

A rescuer selects the proper length by measuring from the corner of the mouth to the tip of the earlobe. You insert it into the mouth until properly seated against the lips.

Nasopharyngeal airways are also another option if they are available. Unlike the oropharyngeal airway they will not cause a gag reflex. You select the proper length by measuring from the tip of the earlobe to the corner of the nose. You lubricate the airway and insert it into the nose until it is in the correct position.

RESUSCITATION MASK:

- 1) It is used as a barrier device; helps prevent disease transmission.
- 2) It will fit over a patient's mouth and nose for a rescuer to ventilate thru while giving rescue breaths during CPR.
- 3) The mask is equipped with a one-way valve that protects the rescuer from a patient's body fluids, blood, vomitus, and diseases.
- 4) Most masks are equipped with an oxygen inlet port that allows supplemental oxygen to be administered to the patient
- 5) Requires initial training and periodic retraining to be able to use Effectively.

TO USE A RESUSCITATION MASK:

Wrap your thumb and forefinger around the inlet of the mask while allowing the other 3 fingers to rest on the side of the mask.

Place the mask over the patient's mouth and nose. Press down to make a seal With the other hand use the thumb and forefinger to seal the bottom of the mask against the chin.

This method allows you to tilt the head and lift the chin while sealing the mask.

AED:

- 1) AED stands for Automated External Defibrillator.
- 2) An AED is a portable device that can detect an abnormal heart rhythm or arrhythmia requiring an electrical shock
- 3) An AED delivers a shock designed to stop the heart to allow it to start back with a normal rhythm

AED USE - RELATIVELY SIMPLE:

- 1) Turn it on
- 2) Attach the pads to the patient's bare dry skin
- 3) Plug in the pad connector
- 4) Follow the voice prompts. It will tell you everything that you need to know

1. What are Signs and or Symptoms of Respiratory Distress?
 - A. Normal breathing
 - B. Unusual wheezing or gurgling sounds (airway)
 - C. Person complaining of sharp pain in the right arm
 - D. Abdominal pain

2. What does a bluish skin color (CYANOSIS) indicate?
 - A. Low oxygen level in arterial blood
 - B. Low carbon dioxide level in venous blood
 - C. Partial airway obstruction
 - D. Lung infection

3. What is the condition that causes a patient's skin such as the nail beds of the fingers or toes, lips, etc. to have a blue color?
 - A. Liver disease
 - B. Lung disease
 - C. Heart disease
 - D. Cyanosis

4. What is the primary concern that a rescuer should have for a patient having a severe allergic reaction?
 - A. The tongue / airway may swell and restrict and or obstruct a patient's breathing
 - B. The type of food that may have caused the reaction
 - C. The type of insect sting that may have caused the reaction
 - D. The type of medication that may have caused the reaction

5. How should a rescuer breath into a patient while performing CPR?
 - A. As forceful as possible
 - B. As rapidly as possible
 - C. Slowly and gently until you see the patient's chest rise
 - D. Breathe one time every three (3) seconds

6. How long in duration should each breath last when a rescuer is giving rescue breaths while performing CPR?
 - A - Until you see the chest rise and fall
 - B - The larger the patient, the longer in duration
 - C - As much time as you feel necessary
 - D - 5 to 10 seconds

7. What may cause air to enter a patient's stomach while a rescuer is giving rescue breaths while performing CPR?
 - A. The rescuer chewing gum while attempting to give rescue breaths
 - B. Overinflating the lungs (ventilating with too much force)
 - C. Giving rescue breath every 3 seconds
 - D. Pausing for five (5) seconds between breaths

8. A Rescuer is preparing to start CPR on an unresponsive patient that is not breathing. If this patient is wearing dentures or partials, what should the rescuer do?
 - A. Remove the dentures/partials immediately when you realize the patient is wearing them
 - B. Remove the dentures/partials ONLY if they become loose and or block the airway making it difficult to give rescue breaths
 - C. Remove only if patient vomit
 - D. Remove only if you suspect the patient has a "NECK" injury

9. A patient has an obstructed airway and falls due to becoming Unresponsive / Unconscious. The patient strikes their head against a standing timber and is bleeding from the forehead. How would you open the airway?
 - A. Head Tilt - Neck Lift
 - B. Head Tilt - Chin lift
 - C. Jaw Thrust
 - D. Modified chin pull

10. How would you open the airway in any unresponsive / unconscious patient that has a serious head injury?
- A. Jaw Thrust
 - B. Head Tilt - Chin Lift
 - C. Head Tilt - Neck Lift
 - D. Modified Chin Pull
11. What is the most common respiratory emergency?
- A. Allergic reaction
 - B. Lung disease
 - C. Croup
 - D. Airway obstruction
12. What is the most common cause of airway obstruction in an unresponsive / unconscious patient lying in a face - up position?
- A. Vomitus
 - B. Swelling of the heart tissue
 - C. Lower Jaw with the Tongue attached falls to back of the throat allowing the tongue to block the airway
 - D. Saliva
13. A patient has a partial airway obstruction and is coughing loudly and forcefully. What should a rescuer do?
- A. Give abdominal thrusts while standing
 - B. Lower the patient to the ground and start giving abdominal thrusts
 - C. Give back blows between the shoulder blades
 - D. Do not interfere with any patient that is coughing loudly forcefully; encourage patient to continue coughing
14. What is the universal choking signal?
- A - Cyanosis
 - B - Patient's skin is turning cherry red color
 - C - Patient clutching the throat with one or both hands
 - D - Shock

15. What would be classified as a complete airway obstruction?
- A. Patient can talk
 - B. Patient can cough forcefully
 - C. Patient cannot breathe, talk, cry, etc.
 - D. Patient may have a cough with gurgling sound
16. Where are abdominal thrusts delivered on a patient?
- A - Slightly below the navel
 - B - Slightly above the navel - well below the breastbone
 - C - Slightly below the sternum (breastbone)
 - D - Middle part of the sternum
17. How long are abdominal thrusts given to a conscious choking adult?
- A. Until the patient starts vomiting
 - B. Until the patient shows signs of shock
 - C. Until the patient starts getting weak
 - D. Until the obstruction is dislodged, the patient becomes unresponsive / unconscious, the patient can breathe, speak, or cough,
18. What is the first thing that a rescuer should do after a responsive conscious choking adult becomes unresponsive, and you lower the patient to the ground?
- A - Open the airway and do a finger sweep
 - B - Attempt to ventilate
 - C - Give 5 abdominal thrusts
 - D - Begin CPR, starting with compressions
19. What should a rescuer do if a responsive choking adult cannot speak or breathe and you cannot reach around the patient to give abdominal thrusts?
- A - Lower the patient to the ground and give 5 abdominal thrusts
 - B - Nothing, because only abdominal thrusts can be given to a choking patient
 - C - Wait until the patient becomes Unresponsive / Unconscious and then start abdominal thrusts
 - D - Give chest thrusts until the object is dislodged, patient can speak or breathe, or the patient becomes unresponsive / unconscious

20. What may cause a breathing emergency”?
- A. An obstructed airway
 - B. A broken bone in the arm
 - C. A minor cut to the facial area
 - D. The patient took 2 aspirins before breakfast
21. Why does the tongue cause an airway obstruction in an unresponsive patient lying in a face - up position?
- A. The patient swallows their tongue
 - B. The patient’s tongue will not cause an airway obstruction
 - C. The patient’s tongue is attached to the lower jaw and the lower jaw falls backward thus allowing the tongue to also falls backward toward the back of the throat which will restrict or block the airway.
 - D. The patient’s tongue falls forward
22. What is an Oropharyngeal Airway used for?
- A. To check a pulse rate
 - B. To check blood pressure
 - C. To keep the tongue positioned away from the back of the throat and to keep the airway open
 - D. To prevent the transmission of diseases
23. When can an Oropharyngeal Airway be inserted in a patient?
- A. Only in unresponsive patients who do not have a gag reflex
 - B. Only after a patient’s dentures / partials have been removed
 - C. Only when the patient shows signs of going into shock
 - D. Only in patients that have no head and or no chest injuries
24. How does a rescuer select the proper size of an Oropharyngeal Airway?
- A. Measure as the same length from the tip of the nose to the earlobe
 - B. Measure as the same length from the corner of the mouth to the tip of the earlobe
 - C. Three inches in length for large adults
 - D. Two inches in length for small adults

25. What should a rescuer do if a patient starts gagging as an Oropharyngeal Airway is being positioned in the back of the throat or is already positioned in the back of the throat?
- A. Leave the airway in place
 - B. Pull back slightly and leave in place
 - C. Remove the airway immediately
 - D. Remove the airway and put in another airway that is one-half inch shorter
26. What does responsive mean to you while performing an initial assessment on a patient?
- A. Patient has enough brain control to have seizures
 - B. Patient has enough brain control to vomit
 - C. Patient has clear, watery-like fluid draining from the nose and ears that has sustained a serious head injury during a roof fall accident
 - D. Patient can move, speak, blink, or otherwise react to a rescuers or coworker's voice or touch
27. What is an agonal gasp?
- A. Patient is breathing normal except for accidental excitement
 - B. Patient is breathing more than 20 times per minute
 - C. Stray neurologic impulses that are triggered by the brain from oxygen depletion
 - D. A condition which is usually associated with shingles
28. What does unresponsive mean to you while performing an initial assessment on a patient?
- A. Patient cannot move, speak, blink, or otherwise react to a rescuer's voice or touch.
 - B. Patient opens their eyes and mouth every couple minutes
 - C. Patient cannot breathe normally if unresponsive
 - D. When you ask questions, a patient does not give good answers

29. You arrive at the Scene of an Accident and have three (3) patients. First patient says he received an electrical shock when he touched his buddy who was lying across the bolter cable on the mine floor. Second Patient is sick and vomiting (in shock) because he thinks his buddy is dead. Third Patient appears to be unresponsive and is lying across the bolter cable but has not been examined. After ensuring the correct cable has been de-energized, which patient should you treat first?
- A. First patient that was shocked when he touched his buddy because he may go into cardiac arrest at any time
 - B. Second patient because he has the best chances of the three to survive
 - C. The third patient because he is suspected to be unresponsive and could possibly already be in cardiac arrest
 - D. Leave the scene and go for help
30. In question #29: During the initial assessment, the rescuer determines that the suspected un-responsive person is not breathing. What equipment does a rescuer need ASAP?
- A. Medication for your nerves
 - B. Two tourniquets (one to tie on each leg at mid-thigh to keep blood flowing to the vital organs)
 - C. AED (Automated Electrical Defibrillator), because electric shock victims will have an abnormal heart rhythm that requires the use of an AED to stop the heart
 - D. A small tank of oxygen to calm the boss down
31. What does a pale skin color indicate in a patient?
- A - Mild/Partial airway obstruction with patient coughing forcefully
 - B - Lack of blood circulation
 - C - Lung infection
 - D - Seizures are about to begin

32. Which of the following injuries should also be suspected if the mechanism of injury forces have damaged any components of the respiratory system that may cause abnormal breathing noises and or difficult breathing, etc.?
- A. Spinal injuries (especially cervical spine injury in the neck)
 - B. Stomach rupture
 - C. Small intestine rupture
 - D. Large intestine rupture
33. Which of the following best describes a responsive patient?
- A. A patient that cannot speak, move, blink, or otherwise react when a rescuer touches or speaks to the patient
 - B. A patient that can speak, move, blink, or otherwise react when a rescuer touches or speaks to the patient
 - C. A patient that has a severe / complete airway obstruction
 - D. A patient that has severe pelvis and abdominal injuries
34. Which of the following best describes an unresponsive patient?
- A. A patient that cannot speak, move, blink, or otherwise react when a rescuer touches or speaks to the patient
 - B - A patient that can speak, move, blink, or otherwise react when a rescuer touches or speaks to the patient
 - C - A patient that has spinal injuries
 - D - A patient that has severe trauma injuries to both legs
35. What is the most serious mistake that a rescuer can make as related to a patient experiencing agonal gasps?
- A. Interpret the airway groaning sounds and movement of the face, neck and jaw as normal breathing and delay starting CPR
 - B. Failure to recognize that patient is breathing normal and treat for a stroke
 - C. Failure to recognize that patient is breathing normal and is suffering from a lung disease
 - D. Failure to recognize that patient is breathing normal and treat for asthma

HEART ATTACKS

KEY TERMS:

- 1) Cardiac Arrest - A Condition in which the Heart has stopped beating or is beating too irregular to pump blood
- 2) CPR - (Cardiopulmonary Resuscitation) A technique that combines rescue breathing and chest compressions to a patient whose breathing and heart have stopped functioning.
- 3) Coronary Arteries - Blood vessels that supply the heart with blood
- 2) Heart Attack - A Sudden Illness Involving a blockage and or a clot that causes damage to the heart muscle
- 3) Sternum – Breastbone--The heart is located in the middle of the chest, behind the lower half of the sternum (Breastbone).

Heart Attacks are usually caused by Cardiovascular Disease, Cholesterol, Hardening of the Arteries, High Blood Pressure, etc.)

Heart Attacks are the Leading Cause of death for adults in the United States Most People who die from Heart Attack, die within one to two hours after the onset of signs and or symptoms.

A) SIGNS AND SYMPTOMS OF A HEART ATTACK:

- 1) Persistent chest pain and discomfort (usually First and Most Notable Symptom).
- 2) Unbearable, crushing type pain felt in the chest.
- 3) Uncomfortable pressure, squeezing, tightness, aching, constricting or heavy sensation in the chest, and or back.
- 4) Pain that may radiate to the shoulder, arm, neck, back or jaw. Women usually experience different symptoms than men in that the pain usually is in the back

- 5) Pain that is constant and not relieved by resting, changing position, or taking oral medication
- 6) Breathing difficulty; shortness of breath; possible noisy breathing.
- 7) Pale or bluish skin color of the face and or lips.
- 8) Sweating (may be profuse in some patients).
- 9) Changes in pulse rate.
- 10) Patient's denial of the seriousness of the signs/symptoms.

ANGINA PECTORIS - Pain experienced by a patient has that has coronary artery disease. This pain usually lasts less than 10 Minutes

Patients with Angina usually are known to have such disease and have been diagnosed by a doctor and given oral Nitroglycerin to take for episodes of chest pain.

Nitroglycerin is usually prescribed for Angina Patients. This medication is placed under the tongue for dissolving when these patients have chest pain.

TREATMENT FOR A HEART ATTACK:

- 1) Notify EMS / MED-VAC, etc. – Immediately.
- 2) Recognize the Signs / Symptoms of a Heart Attack.
- 3) Have the patient stop what they are doing and rest. Try to make patient as comfortable as possible.
- 4) If you have oxygen available, then start administering it.
- 5) Help the patient rest comfortably, talk to patient and try to keep calm to help relieve stress demands on the heart.

TREATMENT FOR A HEART ATTACK (cont.):

- 6) Attempt to obtain information about the patient's condition from the patient and other people at the scene.
- 7) Assist with medication, if prescribed.
- 8) If patient is responsive, alert, and not allergic to aspirin, give one adult aspirin (325 mg) or two (2) to four (4) low dose baby aspirins (81 mg) to chew and swallow.
- 9) Monitor the patient very closely - especially breathing - may become rapid, irregular, or may progress into respiratory or cardiac arrest.

Ask the following questions to a Responsive Patient that has Persistent Chest Pain:

- a) When did the pain start?
- b) What brought the pain on?
- c) Does anything reduce the pain?
- d) What does the pain feel like?
- e) Where does it hurt?
- f) Have you ever had this pain before?
- g) Does the pain radiate to any other location in the body?
- h) Have you ever had any type of heart problems before?
- i) What type of medications do you take?

REMINDER: Angina patients are often treated by doctors with Nitroglycerin. Some patients may not know the name of the medicine, but they may only know and have been instructed to place it under their tongue when they have chest pain.

CARDIAC ARREST:

Cardiac Arrest - Is when the heart stops for whatever reason (Heart Attack, Accident, Trauma, Electrocutation, etc. The most common cause of heart attacks is cardiovascular disease. The primary signs of Cardiac Arrest are unresponsiveness and not breathing. patient may be gasping

AGONAL GASPS - A person in cardiac arrest will not be breathing normal or may be gasping - (Agonal Gasps). Agonal gasps result from the brain sensing low oxygen and sending stray neurologic impulses to the diaphragm and chest muscles to operate due to the brain being deprived of oxygen. These agonal gasps are not regular or normal breathing and frequently occur within the first few minutes following cardiac arrest. If the person is gasping, then it usually looks like they are trying to inhale. Agonal gasps may cause a person to open their mouth as if they are trying to breathe. Agonal gasps may Sound like a snort, snore, or groan and may be forceful or weak. As time passes following cardiac arrest, the time interval between gasps will increase as the gasps will progress to a slower rate.

DO NOT GET AGONAL GASPS CONFUSED WITH NORMAL BREATHING AND DELAY STARTING CPR.

TREATMENT OF CARDIAC ARREST - CPR:

CLINICAL DEATH - Patient's Breathing and Heartbeat have
have Stopped; This is when we start CPR.

Clinical Death - can be reversed with Effective CPR.

The brain and other vital organs will continue to live for a few minutes until the oxygen in the blood is used up.

CPR - Keeps the patient's brain supplied with oxygen until the patient receives advanced medical care

Without oxygen and CPR, the brain will begin to start dying within 4 to 6 minutes, except in some special situations.

BIOLOGICAL DEATH - Is irreversible and usually starts occurring when the brain is deprived of oxygen approximately Four (4) to Six (6) minutes or more.

Biological death is usually certain when the brain is deprived of oxygen for 10 minutes or more.

Always give the patient the benefit of the doubt as to how long the state of cardiac arrest has been and start CPR immediately.

A rescuer who is qualified and performs CPR within 6 minutes determines whether a patient will live.

CPR Performance: ADULTS

1. Check for unresponsiveness (breathing and movement) 5-10 Seconds. If unresponsive, begin CPR
2. Adult compression depth - 1 ½ to 2 inches
3. Rate – 100-110 per minute
4. 2 ventilations (each ventilation about 1 second until chest rises)
5. Compression count 1, 2, 3, 4, 5, etc.
6. Continue CPR

When to stop CPR:

1. When another person trained in CPR takes over
2. When personnel with advanced medical training (EMT's, paramedics) arrive and take over
3. When you are exhausted and unable to continue
4. When signs of life reappear
5. When the scene suddenly becomes unsafe

Heart Attack signals

1. Unknown Heart Disease
 - a. Recognize signals of a heart attack
 - b. Stop activity and rest
 - c. Give 1 adult aspirin or 4 baby aspirin if patient can take
 - d. Wait 2 minutes to see if pain goes away
 - e. If pain does not go away in 2 minutes, make plans to get to hospital
2. Known Heart Disease
 - a. Recognize signals of a heart attack
 - b. Stop activity and rest
 - c. Assist patient with oral nitroglycerin and adult aspirin
 - d. If pain does not go away in 10 minutes, make plans to get to hospital.

Risk Factors and Prudent Heart Living

Risk Factors That Can Be Changed:

1. Cigarette smoking
2. High blood pressure
3. Cholesterol
4. Diabetes
5. Exercise
6. Stress

Risk Factors That Cannot Be Changed:

1. Heredity
2. Sex
3. Race
4. Age

Cigarette smoking, high blood pressure and high cholesterol level increase the risk of heart attack 5 times greater than those who do not have these risks.

1. Smoking (Effects)

- a. Nicotine constricts blood vessel size resulting in an increased blood pressure
- b. Nicotine makes the heartbeat faster
- c. Carbon monoxide (inhaled in smoke) cuts down on amount of oxygen in blood
- d. Smokers are more likely to develop hardening of the arteries than nonsmokers
- e. Smokers are more than twice as likely to suffer a heart attack than a nonsmoker

2. High Blood Pressure (Contributing Factors)

- a. Obesity
- b. Smoking
- c. High salt diet
- d. Heredity
- e. Emotions

Also, high blood pressure is caused by kidney disease, amphetamines (uppers), diet pills and oral contraceptives.

Uncontrolled high blood pressure affects:

- a. Eyes
- b. Nervous system
- c. Kidneys
- d. Heart (enlargement)

Ways to control high blood pressure:

- a. Maintain normal body weight
- b. Decrease salty foods
- c. Don't smoke or drink
- d. Take medication if prescribed

High Cholesterol intake

Cholesterol - Manufactured by the body and found in animal fats
Contributes to hardening of the arteries

Ways to control cholesterol intake:

- a. Avoid saturated fats
 - b. Encourage use of polyunsaturated fats such as corn oil, soybean oil, fish, chicken and white meats, low-fat dairy products and more vegetable products
 - c. Discourage use of saturated fat cooking oils, whole milk and dairy products, organ and red meats, egg yolks, shrimp and oysters.

Diabetes

Associated with obesity and chain reaction effects from obesity including:

- a. Increased heart rate
- b. Increased blood pressure
- c. Increased risk of heart attack

The risk of heart attack in diabetic men is twice as great (women, three times as great) as for a nondiabetic.

Exercise

- a. Improves circulation and efficiency of the heart and lungs
- b. The heart needs exercise as does all muscles of the body
- c. Cardiovascular fitness reduces the risk of heart disease
- d. A strong heart does not have to work as hard to circulate the blood demanded by the body
- e. Exercise promotes cardiovascular and body fitness and helps control obesity
- f. Exercise helps to alleviate emotional stress and strain

Prudent heart living - Lifestyle that minimizes the risk of heart disease

- a. Avoidance of cigarette smoking
- b. Control of high blood pressure
- c. Sensible nutrition
- d. Weight control
- e. Reduction of saturated fats and cholesterol
- f. Get regular exercise
- g. Avoid undue emotional stress and strain, if possible

1. What is the leading cause of death of adults in the United States?
 - A - Automobile accidents
 - B - Heart attacks due to cardiovascular disease
 - C - Strokes
 - D - Infectious diseases

2. What is the key symptom and usually the most prominent symptom of heart attack?
 - A - Persistent chest pain
 - B - Sharp pain in the abdomen
 - C - Unbearable pain relieved by patient taking an antacid
 - D - Pain that is relieved when the patient walks around

3. Which of the following is usually a symptom of heart attack pain?
 - A - Uncomfortable pressure in the left foot.
 - B - A tightness, aching, constricting heavy sensation in the chest
 - C - Pain felt in the center of the hips
 - D - A lot of bloating or gas

4. What is the first thing that should be done when a rescuer feels a patient may be having a heart attack?
 - A - Walk the patient around to stimulate the heart muscle.
 - B - Attempt to find some nitroglycerin tablets to give 2 immediately and 1 every hour until the pain is relieved.
 - C - Have the patient stop all activities and rest in the position most comfortable.
 - D - Check the pulse to determine if the heart rate has slowed due to the damage of the heart attack

5. Which of the following is nitroglycerin usually associated with?
- A - Heart attack
 - B - Liver disease
 - C - Angina
 - D - Kidney infection
6. Which of the following best describes clinical death?
- A - Condition when the heart stops beating and breathing stops
 - B - Irreversible
 - C - Permanent death in all cases
 - D - Vital organs have been permanently damaged
7. What is the most common cause of cardiac arrest in adults?
- A - Accidents
 - B - Drug overdose
 - C - Respiratory arrest that progresses to cardiac arrest
 - D - Diseases of the heart and blood vessels
8. What is the primary sign of cardiac arrest?
- A - When checked the patient is unresponsive (not breathing and no heartbeat)
 - B - Absence of fluid draining from the ears
 - C - Capillary refill in all extremities
 - D - Paralysis in all four extremities
9. Which of the following is described as irreversible damage caused by brain death?
- A - Clinical death
 - B - Biological death
 - C - Temporary brain function loss
 - D - Cyanosis

10. How does CPR increase a patient's chances of survival?
- A – Allows the body temperature to remain at a normal level
 - B - Reestablishes the functions of the liver and kidneys
 - C - Provides blood to the skeletal and digestive organs
 - D - Keeps the brain supplied with oxygen until the patient receives advanced medical help
11. What of the following is a major risk factor that cannot be controlled to help reduce the risks of heart attacks?
- A - Old age
 - B - Smoking
 - C - High blood pressure
 - D - High blood cholesterol
12. What are Agonal Gasps?
- A. Gasping caused by failure of the liver
 - B. Stray neurological impulses sent by the brain to the diaphragm when the brain is depleted of oxygen. It will usually sound like a snore, snort, or groan.
 - C. Gasping caused by too much insulin in the body
 - D. Sounds usually made by a patient who is choking
13. What does an AED do to an unresponsive patient when the rescuer depresses the shock button?
- A. It will shut off the AED immediately
 - B. It will stop the heart only if an irregular heart rhythm was detected by the AED.
 - C. It will instruct the rescuer to immediately notify EMS personnel.
 - D. It will start the heart by stimulating the chest muscles.

14. A responsive talking patient is complaining of severe chest pain. During your observation you see the patient is sweating profusely and his breathing is more rapid. What treatment can the rescuer give this patient?
- A. Notify the patient's immediate family to tell them the patient is having a heart attack and will most likely die.
 - B. Administer one adult aspirin or 2 to 4 baby aspirins if the patient is not allergic to them.
 - C. Have the patient run around the room a couple of times at 20-minute intervals
 - D. Give the patient some hot coffee to see if that will help with his breathing

WOUNDS

TYPES: Open and Closed

Open - Break in the skin

Closed - Skin is not broken (Bruise)

4 types of open wounds:

1. Abrasion - Skin is rubbed or scraped away
2. Laceration - Skin and tissue cut from something that results in a smooth or jagged edge
3. Avulsion - A portion of skin or tissue partially or completely torn away
4. Amputation - A complete severing of a body part
5. Puncture - The skin, tissue, etc. is pierced with a pointed object such as a knife, bullet, piece of metal, etc.

Impaled object - An object remains embedded in an open wound

Puncture - Most dangerous of all open wounds due to risk of infection

DRESSINGS AND BANDAGES

All open wounds need some type of covering to help control bleeding and prevent infection.

DRESSINGS: Sterile to help prevent infection and used to help control bleeding

Example: 2 inch x 2 inch gauze pads, 4 inch x 4 inch gauze pads, and other materials wrapped in individual containers and classified as sterile

Universal dressing - Large dressings, 12 inches x 24 inches, etc.

BANDAGE:

Triangular bandage, etc. used to hold dressings in place, slings and swathes

Bandage compress - A thick gauze dressing attached to a gauze bandage

Roller bandage - Commonly called roller gauze, Kling gauze, etc. that sticks to previous layer

Elastic bandage - Ace bandage or elastic wrap

APPLYING A BANDAGE AND DRESSING

1. Elevate the injured part above the heart, if practicable
2. Completely cover all dressings with a bandage and tie in place
3. Never cover fingers or toes, if possible, to evaluate if the bandage has been tied too tight and to evaluate circulation.
4. If blood soaks through a dressing, apply more dressings and bandages

TREATMENT FOR CLOSED WOUNDS:

1. Direct pressure, and elevation help to control bleeding and swelling.
2. Cold (ice packs, cold packs, etc.) can be used to help control pain and swelling

TREATMENT FOR OPEN WOUNDS:

1. Never waste time trying to wash a wound
2. Control bleeding with direct pressure (a hemostatic dressing may be used with direct pressure if the provider has been trained in the proper application).

NOTE: Completely severed body parts - Wrap in a sterile gauze and place in a plastic bag on ice or cold pack. Try to keep cold but do not freeze. Never place amputated parts in water to keep cool.

IMPALED OBJECTS:

1. Never remove impaled objects unless it involves the cheek and interferes with breathing
2. Use bulky dressings to stabilize in place
3. Control bleeding by bandaging dressings in place around the object

BURNS:

Burns occur when skin is exposed to temperatures Greater than 110 Degrees Fahrenheit

Severity of a burn depends upon:

- 1) Temperature of the source of burn.
- 2) Length of exposure to the source.
- 3) Location of the burn.
- 4) Extent of the burn.
- 5) Patient's age and medical condition.

The most important factors affecting burns are:

- (1) Depth of burn.
- (2) Extent of burn.
- (3) Area of Burn - facial burns are critical (airway and breathing may be affected)

Burns are classified by their source:

- (1) Heat (thermal)
- (2) Chemicals
- (3) Electricity
- (4) Radiation (sunburn).

SEVERE BURNS:

- (1) break in the skin results in risk of infection, fluid loss and loss of body temperature control
- (2) may damage the respiratory system (especially burns of the face area)
- (3) Facial burns may also damage the eyes

Burns of the face are critical: singed facial hair, eyebrows and nasal hair are indicators that the airway may be affected.

Patients that are older, have medical conditions, or have heart or kidney problems are more susceptible to effects of severe burns.

Burns cause more body damage than just isolated soft tissue injuries.

Burns affect various critical body organs and systems, including the heart, blood volume, blood vessels, respiratory system, breathing and kidneys, to name a few.

THREE (3) CLASSIFICATIONS OF BURNS:

- 1) Superficial Burn (Old 1ST degree) - A burn of the outer skin, sunburn / reddened skin - no blisters)
- 2) Partial - Thickness (Old 2nd degree) - A partial thickness burn involves both layers of skin and is very painful (has blisters and is red)
- 3) Full Thickness (Old 3rd degree) - A full thickness burn. It destroys / damages both layers of skin and fat, muscle, nerves, bones, and organs. Full Thickness burns appear brown or black with a charred appearance and underlying tissue may have a white color.

A full thickness burns may be extremely painful or will be relatively painless if nerve endings are destroyed

NOTE: Full thickness burns can be life – threatening, large amounts of body fluids are lost, infection and shock are dangerous are most likely to occur.

Critical Burns are life - threatening, including:

- 1) Burns causing breathing difficulty or suspected burns of the airway breathing noises indicates airway is swelling and may progress to a complete Airway Obstruction.
- 2) Burns covering more than one body part or a large surface area (chest or back)
- 3) Burns to the head, neck, hands, Feet or genitals
- 4) Partial or Full Thickness burn of a patient 60 years of age or older.
- 5) Burns encircling a complete arm or leg.
- 6) Burns resulting from chemicals, explosions, electricity, and lightning.
- 7) Inhaling hot steam or other hot vapors.

NOTE: Electrical Burns: usually cause deep tissue damage that may show very little surface damage. Electrical burns must always be treated as life threatening because the heartbeat and breathing may be affected even in a responsive patient who may appear to be ok after surviving contact with an electrical circuit

TREATMENT FOR THERMAL (HEAT) BURNS:

- 1) Evaluate the scene for personal safety.
- 2) Remove the patient from the source of heat contact. This may include extinguishing flames or remove smoldering or smoking clothing from a patient.
- 3) Conduct an initial patient assessment- Responsiveness, Breathing, Bleeding. Pay close attention to soot or burns around the mouth, nose, or face. These burns must be treated as life-threatening. The airway or lungs may have been burned also.

Anytime a patient has burns of the face, the airway and breathing passages may have also been burned causing swelling and\ or airway blockage and is a very dangerous condition.

General Treatment for Thermal Burns:

- 1) Cool the burn area with large amounts of water.
- 2) For burns of arms and legs, promptly remove all rings, bracelets, and watches. These items become difficult to remove after swelling occurs.
- 3) Treat for shock. Keep the patient warm but do not overheat.
- 4) Give oxygen if available.

Cooling a Burn Area:

- 1) Be sure to remove the source of heat as soon as possible
- 2) Cool with large amounts of water for at least 10 to 15 minutes or until the pain is relieved or until delivered to EMS personnel. If the burn is to an extremity, then immerse in cool water until pain subsides.
- 3) For large areas of the body or body parts that cannot be put in water, apply sheets or other large cloth material, and apply cold water but not ice or ice water.

Treating for Shock Caused by Burns

Maintain patient body temperature by keeping patient warm but make sure to not overheat. Damaged or destroyed skin means the body can no longer maintain body heat.

Administer oxygen if available. It is vital if patient is not responsive and alert.

SPECIAL SITUATIONS:

Chemical Burns of the Body:

Caused by Acids, Alkalis, Bleach, Drain Cleaners, Petroleum Oil Base mining products (hydraulic oil, brake fluid, etc.)

Contact the Poison Control Center (PCC) for treatment directions.

Treatment:

Remove the Chemical from the Skin as fast as possible by flushing with large amounts of water for at least 15 minutes or until delivered to EMS Personnel.

Remove contaminated clothing from the patient.

SPECIAL SITUATIONS:

Chemical Burns of the Eyes

Flush both eyes if affected. If one is affected, flush outwards (away from the nose and unaffected eye) with large amounts of water for at least 15 minutes or until delivered to EMS Personnel.

Call the Poison Control Center (PCC) for treatment info.

Electrical Burns:

The body tissue, muscle, bones, etc. create resistance which causes heat when electrical current flows through the body. This heat causes electrical burns along the path of current flow. This flow of current which results in heat causes thermal burns. Respiratory and or cardiac arrest and death may occur because of those type burns.

Current flow through the heart may cause fatal heart rhythms. The use of an AED to provide a shock can help to return the heart to a normal rhythm.

Electrical Burns:

The Severity of an Electrical Burn Depends on:

- a) Type and Amount of current.
- b) Current path through the body.
- c) Duration of current passing through the body.

Lightning Injuries:

- 1) Evaluate the environment. Ensure the scene is safe. If not safe or you are unsure, move the patient to a safe location
- 2) Evaluate state of responsiveness and breathing.
- 3) Look for and treat any life-threatening conditions.
- 4) Treat entrance and exit wounds
- 5) Suspect spinal injuries and do not move until stabilized on a backboard, if possible.

Patient needs to be transported to a medical facility as soon as possible.

WOUNDS - SOFT TISSUE INJURIES

1. Which of the following would be the most serious effects of electrical current passing through the body?
 - A - Effects on the heart and brain that control breathing and heart function
 - B - Electrical current entry point
 - C - Electrical current exit point
 - D - Electrical current surface burns
2. Which of the following patients would be treated as the most serious?
 - A - A patient with spinal injuries that says that they have numbness and tingling in their toes
 - B - A patient with second degree burns of the abdomen
 - C - A patient with a suspected, closed fracture of the forearm
 - D - An apparent, unresponsive patient that has received a serious electrical shock
3. A bruise is classified as what type of wound?
 - A - Abrasion
 - B - Avulsion
 - C - Closed wound
 - D - Puncture
4. Which of the following is the most common open wound that results in skin being rubbed or scraped away?
 - A - Laceration
 - B - Abrasion
 - C - Puncture
 - D - Avulsion
5. Which of the following is a cut from a sharp object that results in smooth or jagged edges?
 - A - Abrasion
 - B - Puncture
 - C - Laceration
 - D - Avulsion

6. Which of the following results in skin or tissue partially or completely torn away and may be hanging like a flap?
 - A - Abrasion
 - B - Avulsion
 - C - Puncture
 - D - Laceration

7. Which of the following results when a body part is completely torn away or cut from the body?
 - A - Abrasion
 - B - Bruise
 - C - Laceration
 - D - Amputation

8. What type of wound is caused when a nail, knife, splinter etc. penetrates the skin where soft tissue at the wound area close around the Object?
 - A - Laceration
 - B - Puncture
 - C - Amputation
 - D - Bruise

9. Why are puncture wounds dangerous?
 - A - Because major blood vessels are usually cut causing severe internal bleeding
 - B - Because nerves are always damaged in puncture wounds
 - C - Because puncture wounds have a high risk to become infected
 - D - Because extensive soft tissue damage results from puncture wounds

10. What is an impaled object?
 - A - A side effect of shock
 - B - An infection complication
 - C - Lack of the body's ability to fight infections
 - D - An object that remains embedded in an open wound

11. Why do all open wounds need dressings and bandages?
 - A - To help control bleeding and prevent infection
 - B - To prevent swelling
 - C - To prevent any type of deformity
 - D - To reduce the risk of disease transmission

12. What is sterile and used to absorb blood and prevent infection?
- A - Bandages
 - B - Dressings
 - C - Tourniquet
 - D - Roller bandage
13. Which of the following is used to hold dressings in place and to apply pressure to help control bleeding?
- A - Elastic bandage applied as tightly as possible
 - B - Plastic wrap
 - C - Petroleum jelly-soaked gauze
 - D - Bandages
14. What are general rules for applying a bandage?
- A - Tie all bandages as tight as possible
 - B - Never cover the fingers or toes, if possible, leave exposed to evaluate for circulation and sensation after splinting
 - C - Bandages help support an injured area
 - D - Bandages will keep the patient from going into shock
15. Why are fingers and toes left exposed, if possible, when applying dressings and bandages?
- A - Fingers and toes are always left exposed because they contain only small blood vessels
 - B - Because nerve damage can occur if fingers or toes are bandaged
 - C - So the rescuer can evaluate as to whether a bandage has been tied too tight and to evaluate circulation/sensation.
 - D - Because fingers and toes are necessary to evaluate the heartbeat
16. A rescuer has applied a splint with bandages to a suspected fractured lower leg. The patient's toes start turning blue. What has happened and what should the rescuer do?
- A - The bandages are too loose. Tighten the bandages and add more bandages
 - B - The bandages are too tight and should be loosened
 - C - Apply a tourniquet between the injury and the heart
 - D - The toes have been bruised by the injury and the rescuer should do nothing

17. What should a rescuer do if blood soaks through dressings and bandages applied to an open thigh Wound?
- A - Apply a tourniquet between the heart and injury
 - B - Loosen the bandages
 - C - Remove the bandages and apply more dressings
 - D - Leave the bandages in place and apply additional dressings and bandages
18. What precautions should be taken when a Rescuer applies ice or cold pack to a closed wound?
- A - Put the ice or cold pack in a plastic bag; wrap in wet cloth material before applying to the skin add water to ice in plastic container
 - B - Never place a cold pack over a closed wound
 - C - Apply a tourniquet before applying ice or a cold pack if the fingers or toes are not discolored
 - D - Place a wet gauze pad or other wet cloth between the skin and ice or cold pack application
19. A rescuer responds to a belt drive emergency and finds a responsive, talking, breathing patient with an amputated (Severed) hand. The rescuer has treated and stabilized the patient What should the rescuer do with the amputated hand?
- A - Nothing because hands cannot be reattached by doctors
 - B - Place the amputated hand in water and transport to the hospital with the patient
 - C - Place the amputated hand in a waterproof plastic bag and keep cool by placing the plastic bag in a second plastic bag containing ice, ice water, cold pack, etc.
 - D - Conceal the hand, prior to discarding, to keep the patient from seeing it and going into shock
20. What are the only two conditions that a rescuer is authorized to remove an impaled object?
- A - In the cheek and in the chest
 - B - In the thigh and in the lower leg
 - C - In the abdomen and in the pelvis
 - D - In the upper arm and in the forearm

21. What must be affected before a rescuer is authorized to remove an impaled object?
- A - Thigh and lower leg: remove only when wound has severe bleeding – spurting from around the object
 - B – The abdomen and pelvis: remove only if wound is not bleeding and the smell of ruptured small or large intestines is not present
 - C – In the cheek if it affects the airway and, in the chest, if it interferes with performing CPR
 - D -The upper arm and forearm: remove only if bleeding is serious and life threatening
22. What is required when treating an impaled object that will remain in the wound?
- A - Use bulky dressings to stabilize the object in place
 - B - Continuously monitor how the nail beds look
 - C – Avoid letting the patient lay down and get comfortable
 - D – Look for signs of the patient to go into kidney failure
23. What affects the severity of a burn?
- A - Temperature of the source of the burn
 - B - Length of exposure to the burn source
 - C - Location and extent of the burn
 - D – All the above are correct
24. Which of the following is correct concerning burns?
- A – All burns are not serious
 - B - Burns have serious effects on the heart, blood volume, blood vessels, respiratory system, breathing and kidneys
 - C - Only burns that involve the hands or feet are serious due to disability
 - D - Burns are never serious unless they cover more than one body part / area
25. Which of the following burns involves only the top layer of skin and usually only causes the skin to appear red?
- A - Full Thickness (Old Third degree)
 - B - Partial Thickness (Old Second degree)
 - C - Superficial (Old First degree)
 - D - Electrical burn

26. Which of the following is a burn that causes red skin, blisters, and is very painful?
- A - Full Thickness (Old Third degree)
 - B - Partial Thickness (Old Second degree)
 - C - Superficial (Old First degree)
 - D - Electrical burn
27. Which of the following is a burn that has a charred brown or black appearance and involves muscles, fat tissue, nerves, bones and organs?
- A - Full Thickness (Old Third degree)
 - B - Partial Thickness (Old Second degree)
 - C - Superficial (Old First degree)
 - D - Electrical burn
28. What Type burns would be classified as a serious burns?
- A - Burns causing breathing difficulty and breathing noises
 - B - Signs of burns (soot) around the ankles and or knee
 - C - Burns covering a small area of the body
 - D - Superficial (Old First degree) burns of the back
29. What would also be classified as a serious burn?
- A - Superficial (Old First degree) burns of one arm
 - B - Burns to the head, neck, hands, feet, or genitals
 - C - Burns from a cigarette
 - D - Burns caused by overexposure to the sun
30. After evaluating the scene for personal safety, what should a rescuer do next at the scene of a burn patient that is responsive, talking and breathing?
- A - Check the pulse on a burned extremity
 - B - Check capillary refill on a burned extremity
 - C - Apply cold packs directly to the area only for electrical burn
 - D - Remove the patient from the source of heat (extinguish clothes on fire or remove smoking, smoldering clothing, heat source, etc.)

31. Which of the following would represent the most serious burn?
- A - Superficial burns of one arm in a responsive talking patient
 - B - Partial Thickness burns of one foot in a responsive talking patient
 - C - Soot and or signs of burns around the mouth, nose, and face
 - D - Superficial burns of one leg in a responsive talking patient
32. Why are burns of the mouth, nose or face classified as serious burns?
- A - Because of the risk of skin infection
 - B - Because the throat, air passages or lungs may have been burned causing swelling and or breathing difficult; respiratory distress. complete airway obstruction, etc.
 - C - Because of the risk of a heart attack
 - D - Because of the risk of a spinal cord infection
33. How should superficial burns be treated?
- A - Cool the burn area with large amounts of cool water (Except Electrical burns)
 - B - Apply an occlusive dressing to the burn area
 - C - Apply a cold pack directly to skin of the burn area
 - D - Apply MSHA - Foille burn ointment that is required / stored in the first aid box
34. What is correct concerning the treatment of burns?
- A - Apply burn ointments (MSHA Foille), butter, oil or any other home remedy
 - B - Cool the burn area - ASAP - with large amounts of water except electrical burns
 - C - Always use home remedies, if available to treat burn wounds
 - D - Bandages should be applied very tightly around the burn area
35. Which of the following is very important to help minimize shock for a patient that has serious burns?
- A - Apply MSHA, Foille, burn ointment
 - B - Give the patient lots of water to drink
 - C - Encourage the patient to lie down while maintaining body temperature
 - D - Walk them around the room to keep their mind off the pain

36. How should chemicals and or petroleum products (Battery Acid, Hydraulic Oil, Brake Fluid, etc.) splashed into one eye of a responsive talking, breathing patient be treated?
- A - Bandage both eyes and transport to the surface at the end of the shift
 - B - Apply MSHA Foille burn ointment
 - C - Flush the affected eye with large amounts of water, from the nose outward to protect the unaffected eye. Also call the PCC for specific treatment, guidance, and instructions
 - D - Do nothing but monitor breathing
37. What is correct as related to electrical shock and associated burns”?
- A - Electrical burns have no effect on breathing and heart function
 - B – Always use water to cool electrical burns
 - C - Electrical burns may have entry and exit wounds
 - D – Electrical burns cause no other damage than what can be seen at the entry and exit wounds
 - E –Electrical burns do not have any influence on heart rhythms
38. What should a rescuer suspect in a patient struck by lightning?
- A - Life Threatening Conditions; Unresponsiveness; Abnormal or Absent Breathing; Spinal Cord Injuries
 - B - Collapsed lungs
 - C - Damaged liver
 - D - Damaged kidneys
39. What is considered as general treatment of open wounds?
- A - Evaluate and stabilize responsiveness, breathing and bleeding then control the bleeding with a sterile dressing
 - B – Give the patient 2 aspirins
 - C – Have the patient take off his tee shirt and cover the wound with it
 - D - Dressings and bandages should look neat whether they are effective or not

40. Which of the following is correct concerning the application of a Tourniquet?
- A - Tourniquets should be loosened every 10 minutes for at least One (1) Hour
 - B - Used for Life or Limb situations - because a tourniquet usually causes permanent damage to nerves, muscles, and blood vessels
 - C - May be applied over a joint to try and save as much of the extremity as Possible
 - D - May be applied to the head to help control profuse bleeding
41. What is the most harmful effect of applying an air splint?
- A - Mostly effective only for venous bleeding and not appropriate for arterial bleeding until Systolic Blood Pressure is 50 mm-HG - a dangerously low Systolic Blood Pressure
 - B - Causes too much pain while applying
 - C - Too difficult to apply
 - D - Causes the patient to itch when applied
42. What factors determine the severity of an electrical burn?
- A - Type and amount of current
 - B - Current path
 - C - Duration of current passing through the body area
 - D - All the above are correct

BLEEDING

Bleeding is either internal or external.

Internal bleeding is often difficult to recognize.

Uncontrolled bleeding, whether internal or external is life-threatening.

Severe bleeding is life-threatening and must be treated during the primary survey.
RBB - Responsiveness, Breathing, and Bleeding

Clotting - The process by which blood thickens at a wound site. Normal clotting takes place in about 10 minutes.

BLOOD VESSELS

- Arteries: Carry oxygen-rich blood away from the heart (bright red in color and spurts from an open wound)
- Veins: Carry blood back to the heart from the organs and tissue (dark, bluish red in color and flows steady from an open wound)
- Capillaries: Small blood vessels where the exchange of oxygen and carbon dioxide takes place (oozes from an open wound)

External bleeding - occurs when a blood vessel is opened externally

Most external bleeding will be minor.

Signs of Severe External Bleeding:

- Blood spurting from a wound
- Blood that fails to clot after you have taken all measures to control bleeding

Bleeding from arteries is rapid, profuse and is life-threatening.

Arterial bleeding is under direct pressure from the heart and spurts from an open wound with each heartbeat.

Arterial blood is bright red in color because it contains a high concentration of oxygen.

Arterial bleeding is harder to control than venous bleeding.

Controlling External Bleeding:

Direct pressure: Applying pressure with your hand

Most external bleeding can be controlled with direct pressure

Tourniquet: A tight band placed around the arm or leg to stop blood flow to a wound.

Hemostatic Dressing: a special dressing that is treated with a clotting agent that is an accepted treatment to control bleeding.

To Control External Bleeding:

- 1 - Place direct pressure on the wound with a sterile gauze pad or clean cloth. Apply firm pressure over the gauze pad or clean cloth.
- 2 - Elevate the injured area above the level of the heart if you do not suspect a broken bone (fracture).

NOTE: If blood soaks through, add additional dressings and bandages. Never remove any blood-soaked dressing or bandage unless the bleeding is considered life threatening bleeding. If using direct pressure on life threatening bleeding you always remove the second blood soaked pad and replace with new pad.

Recognizing Life Threatening Bleeding

Do two things immediately:

Call 911 or get someone else to do so

Obtain a bleeding or first aid kit and an AED as soon as possible

A person with life threatening bleeding can lose their life before help arrives. By acting you could save their life.

Applying Direct Pressure to Life Threatening Bleeding

Apply a sterile dressing, hemostatic dressing, or other clean material to the wound

Place the palm of your hand over the dressing with your fingers interlaced

You want to push hard on the wound. The position you use is the same as if you were going to do CPR

Hold pressure on the wound until the bleeding stops, someone relieves you, you are too exhausted to continue, or the scene becomes unsafe

If the life threatening bleeding is on an extremity, use a tourniquet. If no tourniquet is available, then use direct pressure.

Preventing Disease Transmission When Controlling Bleeding:

- 1 - Avoid contacting a patient's blood, both directly and indirectly by using examination gloves, goggles, etc.
- 2 - Avoid eating, drinking, or touching your mouth, nose, or eyes while providing care before washing your hands.
- 3 - Always wash your hands thoroughly after providing care, even if you wear gloves, etc.

INTERNAL BLEEDING

Internal bleeding - Bleeding into spaces inside the body

Severe internal bleeding - Will produce signs and symptoms similar to shock

Signs and Symptoms:

- 1 - Discoloration of the skin, bruising in the injured area
- 2 - Tender, swollen or firm tissues that are normally soft
- 3 - Anxiety or restlessness
- 4 - Rapid weak pulse
- 5 - Rapid breathing
- 6 - Skin that feels cool or moist or looks pale or bluish
- 7 - Nausea and vomiting
- 8 - Excessive thirst
- 9 - Declining level of consciousness
- 10 - Drop in blood pressure

Controlling Minor Internal Bleeding:

Apply ice or a chemical cold pack to the injured area to help reduce pain and swelling.

When applying ice, place a gauze between the source of cold and the skin.

Controlling Serious Internal Bleeding:

- a - Stabilize the patient immediately and make arrangements to transport to the hospital as quickly as possible
- b - Protect the patient from further harm
- c - Monitor RBB and vital signs
- d - Help the patient rest in the most comfortable position
- e - Maintain normal body temperature by keeping the patient warm
- f - Reassure the patient
- g - Continue providing care for other conditions

SHOCK

Shock: A life-threatening condition that occurs when the circulatory system fails to provide adequate oxygenated blood to all parts of the body.

VITAL ORGANS: Heart, Lungs, and Brain

The signs and symptoms of shock are a series of responses by the body to maintain adequate blood flow to the vital organs.

Three conditions are necessary to maintain adequate blood to all body parts:

- 1 - The heart must be working well
- 2 - An adequate amount of blood must be circulating in the body through blood vessels
- 3 - The blood vessels must be intact and able to adjust blood flow

When either one of the three is not in proper working condition, shock develops because the body cannot meet its demands for oxygen through the failure of adequate circulation.

REMEMBER: Shock is a life-threatening condition

Signs and Symptoms of Shock:

- 1 - Restlessness or irritability (usually occurs first)
- 2 - Rapid and weak pulse
- 3 - Rapid breathing
- 4 - Pale or bluish, cool, moist skin
- 5 - Excessive thirst
- 6 - Nausea and vomiting
- 7 - Drowsiness and loss of consciousness
- 8 - Drop in blood pressure

Types of Shock:

Anaphylactic Shock - Life threatening allergic reaction to a substance, food, bee sting, etc.

Cardiogenic Shock - Failure of the heart to pump effectively, heart attack, cardiac arrest, etc.

Hemorrhagic Shock - Severe loss of blood associated with serious bleeding or loss of blood plasma associated with burns; occurs with internal or external wounds or burns.

Metabolic Shock - Loss of body fluids through vomiting, diarrhea, or a heat illness.

Neurogenic Shock - Failure of the nervous system to control the size of blood vessels causing them to dilate; occurs with brain, spinal cord, or nerve injuries.

Psychogenic Shock - Fainting, temporary loss of adequate blood to the brain

Respiratory Shock - Failure of the lungs to transfer oxygen into the blood; occurs with respiratory distress, obstructed airway, collapsed trachea, respiratory arrest, etc.

When Shock Occurs:

The body will prioritize its needs for blood by ensuring adequate blood flow to the vital organs.

The body (nervous system) does this by reducing the amount of blood circulating to the less important body parts such as the arms, legs, and skin.

Blood from these less important organs are diverted to the vital organs - Heart, Brain, and Lungs

The body attempts to compensate for inadequate blood flow to the vital organs by speeding up the heart and breathing rates. Anticipate that shock will be present in some degree with all injuries to the body.

Always anticipate and start treating for shock before signs and symptoms develop.

Treatment for Shock:

- 1 - Evaluate and treat the- RBB's (Respiration, Breathing, Bleeding) in the primary survey
- 2 - Perform a secondary survey and start treating for shock

General Shock Treatment:

- 1 - Protect the patient from further injury
- 2 - Monitor the RBB's and provide treatment for any airway, breathing, circulation or bleeding problems
- 3 - Help the patient rest comfortably. Pain increases stress on the body and accelerates the effects of shock
- 4 - Help the patient maintain normal body temperature by keeping the patient warm
- 5 - Reassure the patient
- 6 - Provide care for specific injuries or conditions

Further Treatment to Help Manage Shock:

Control external bleeding as soon as possible to minimize blood loss

Never give the patient anything to eat or drink, even though they may be extremely thirsty.

Stabilize the patient on a backboard and transport as quickly and safely as possible.

NOTE: Shock cannot be managed effectively by first aid alone. Advanced medical care is usually required to effectively treat shock.

Never wait for shock to develop before beginning to treat.

Anticipate that shock will develop with all injuries and plan to treat after life-threatening conditions (primary survey) and a secondary survey have been completed.

Stabilize a shock patient as quickly as possible and transport as rapidly and safely as you can to the hospital.

BLEEDING AND SHOCK

1. When is minor bleeding controlled and treated on a patient?
 - A - Before surveying the scene
 - B - During the head-to-toe survey
 - C - After checking for obstructions in the mouth
 - D - During the initial assessment

2. What are signs of severe external bleeding?
 - A - Bleeding that oozes from an open wound and is dark in color
 - B - Bleeding that stops after applying a sterile dressing
 - C - Upon arrival at the scene you observe the patient has lost a substantially amount of blood.
 - D - Bleeding that stops after a rescuer has taken measures to control it

3. Why is arterial bleeding more difficult to control than venous bleeding?
 - A - Arteries are always larger
 - B - Blood in arteries travels faster and is under more pressure than venous bleeding and causes loss of blood quickly
 - C - All arteries are closer to the heart
 - D - Bleeding from veins is more serious than bleeding from arteries

4. Clotting associated with minor bleeding usually occurs within:
 - A - 1 minute
 - B - 3 minutes
 - C - 5 minutes
 - D - 10 minutes

5. What describes arterial bleeding?
- A - Bleeding that flows from an open wound and is dark red in Color.
 - B - Bleeding that spurts from an open wound and is bright red in Color.
 - C - Bleeding that is often slow and oozing.
 - D - Bleeding that is not considered life threatening.
6. Why does arterial bleeding from an open wound have a bright red color?
- A - Because of the high pressure and flow rate
 - B - Because of the high concentration of oxygen
 - C - Because of the high concentration of carbon dioxide
 - D - Because of the amount of cholesterol in the blood
7. What is usually the first choice that should be considered when controlling external bleeding?
- A - Pressure point or elevation; your choice
 - B - Splinting of the injured area
 - C - Roll patient onto a backboard and elevate the feet-end 12 inches
 - D - Apply Direct Pressure with gauze/trauma dressing and constricting bandage however if you consider the bleeding life threatening, then apply a tourniquet.
8. What is a tight band placed around the arm or leg to control life-threatening bleeding?
- A - Pressure point dressing
 - B - Pressure bandage
 - C - Direct dressing bandage
 - D - Tourniquet

9. What should a rescuer do if blood soaks through dressings and bandages that have been applied to control minor bleeding from an open wound?
- A - Remove the blood-soaked dressings and apply new dressings to help prevent infection
 - B - Remove the blood-soaked dressings and apply a tourniquet
 - C - Remove the blood-soaked dressings and apply pressure on a pressure point
 - D - Add additional dressings and bandages on top of the blood soaked ones except for a sucking chest wound or life-threatening bleeding in which case you would remove and replace with a new dressing.
10. What would help a rescuer reduce the risk of infection while controlling external bleeding?
- A - Not using protective examination gloves if they interfere with applying dressings and bandages
 - B - Contacting a patient's blood / body fluids will reduce the risk
 - C - By eating or drinking or touching your mouth, nose, or eyes while providing patient care
 - D - Always washing your hands thoroughly after treating a patient, even if protective gloves were worn
11. Which of the following is the most difficult to recognize and most difficult to treat?
- A - External bleeding from an "open forearm injury"
 - B - External, venous bleeding
 - C - Internal bleeding
 - D - Capillary bleeding

12. What serious injury will eventually produce signs and symptoms similar to shock?
- A - Immediately following a serious head / suspected brain injury
 - B - Severe internal bleeding
 - C - Heat stroke
 - D - Immediately before a stroke
13. Which of the following is very often the first indications that an injured, responsive, talking patient has severe chest injuries and has suspected severe internal bleeding?
- A - Restlessness, anxiety, and chest pain
 - B - Normal breathing
 - C - Red, hot dry skin
 - D - Slow, deep breathing
14. What are signs of severe internal bleeding progressing into shock?
- A - Slow, deep breathing
 - B - Anxiety, restlessness, agitation
 - C – Sharp pain in their right foot
 - D – Cold sores forming around the lips
15. What is another sign or symptom of severe internal bleeding?
- A – A mild rash appearing around the nose
 - B – Patient complains that their eyes are very sensitive to light
 - C - Swollen, tender or firm tissues especially associated with injuries of the abdomen
 - D - Red, hot dry skin

16. What is another sign or symptom of severe external bleeding?
- A - Excessive thirst
 - B – Patient is very hyperactive
 - C - Extreme hunger
 - D – Patient complains of cramps in their left arm
17. A rescuer is treating a patient that responds to verbal stimuli. You suspect the patient has severe internal bleeding based on the accident. The patient awakens every several minutes and is begging for something to drink. What should the rescuer do?
- A - Give the patient only coffee to help stimulate the heart rate
 - B - Never give such injured patients anything to drink.
 - C - Never give more than 16 ounces of water per hour to any injured person
 - D - Give water, only if the patient has not vomited in the past five (5) minutes
18. Which of the following is very important while treating a patient with suspected severe internal bleeding?
- A - Notify the patient's next of kin
 - B - Wait until enough properly trained personnel are available to help you perform CPR
 - C - Maintain normal body temperature by keeping the patient warm with blankets, etc.
 - D - Save any vomitus to evaluate for possible food poisoning
19. Which of the following best describes shock?
- A - heart disease caused by high cholesterol and high blood pressure
 - B - A life - threatening condition in which adequate blood / oxygen is not being provided to body organs / body system
 - C - A condition that cannot be treated
 - D - An illness caused by lung disease over a prolonged period

20. What conditions are required to maintain adequate blood flow to all organs and other parts of the body?
- A - A patient must not have any type of lung disease
 - B - A patient's heart must be working properly, adequate blood flow circulating in the body, and the blood vessels must be intact and able to adjust blood flow
 - C - An adequate amount of insulin must be present in the body
 - D - You must have at least 1 hour of exercise each day
21. Which type of shock is associated with a severe allergic reaction to a substance, food, medication, chemical, sting / bite injection, etc.?
- A - Cardiogenic shock
 - B - Anaphylactic shock
 - C - Psychogenic shock
 - D - Hypovolemic shock
22. Which type of shock is associated with severe bleeding or loss of blood plasma from burns?
- A - Hypovolemic shock
 - B - Anaphylactic shock
 - C - Psychogenic shock
 - D - Respiratory shock
23. Which type of shock is associated with an obstructed airway and or respiratory distress?
- A - Hypovolemic shock
 - B - Anaphylactic shock
 - C - Psychogenic shock
 - D - Respiratory shock

24. Which type of shock is associated with failure of the nervous system to control blood vessel size, common with brain and or spinal cord injuries?
- A - Respiratory shock
 - B - Neurogenic shock (nerve shock)
 - C - Cardiogenic shock
 - D - Psychogenic shock
25. Which type of shock is associated with a heart attack, cardiac arrest, heart injuries, etc.?
- A - Respiratory shock
 - B - Neurogenic shock
 - C - Cardiogenic shock
 - D - Psychogenic shock
26. Why does the skin of a patient in shock appear pail, cool, and moist?
- A - Because the lungs have stopped operating
 - B - Because the kidneys are failing
 - C - Because the liver has stopped operating
 - D - Because the body reduces the blood circulation to the arms and legs to allow increased blood flow to the vital organs
27. What does the progression of shock usually cause in a patient?
- A - Cyanosis (bluish discoloration of the lips, nailbeds, etc.)
 - B - Liver disease
 - C - Kidney disease
 - D - Pancreas disorder that stops the production of insulin
28. What is a good description of shock?
- A - Shock is a Life-Threatening Condition
 - B - The first signs of shock is the patient snoring
 - C - Welts forming around the mouth
 - D - Red, hot dry skin

29. Which of the following is a sign or symptom of shock?
- A - Pale, cool, moist skin
 - B - Welts forming around the mouth
 - C - Deep, slow breathing
 - D - Patient complaining of pain in their ankle
30. What is another sign and or symptom of shock?
- A - Excessive thirst, nausea and vomiting, drowsiness, or loss of responsiveness
 - B - Very alert and hyperactive
 - C - Pain and soreness in the hands
 - D - Inability to urinate or have a bowel movement
31. When should treatment for shock begin on a patient?
- A - After treating life-threatening conditions
 - B - Shock treatment is not necessary until breathing stops
 - C - Shock treatment is not necessary until the heart stops beating
 - D - Shock treatment is not necessary until a patient becomes Unresponsive / Unconscious
32. What are general treatments for a patient progressing into shock?
- A - Treat and monitor all life - threatening conditions - ASAP
 - B - Help the patient rest comfortably to help minimize pain
 - C - Try to cool the patient as much as possible
 - D - Give the patient plenty of water to drink; at least one (1) glass every 10 minutes

33. What would help a rescuer manage the effects of a patient progressing into shock?
- A - Control any external bleeding as soon as possible, keep the patient warm, reassure the patient, and never give any food or drink
 - B - Keep the patient warm only after the patient becomes unresponsive
 - C - Give the patient plenty to eat or drink
 - D - Tell the patient he is bad off and you don't know what to do
34. What is a true statement as related to shock?
- A - Always wait for shock to be severe before beginning to treat
 - B - Shock will not develop with all types of injuries or illness
 - C - Always make sure the patient is ready to transport before treating for shock
 - D - The key to managing shock effectively is recognizing that shock will usually develop, in some degree, with all type of injuries and illnesses
35. What would usually cause severe shock?
- A - Fainting due to good news
 - B - When the vital organs get plenty of blood flow
 - C - Very minor external bleeding
 - D - Internal bleeding associated with serious chest and or abdominal Injuries (especially compression - type injuries)
36. How does the heart react when a patient suffers a severe injury or sudden illness that reduces the flow of blood to various organs in the body?
- A - The heart beats slower
 - B - The heart beats faster and stronger at first
 - C - The heart beats slower only after breathing has stopped
 - D - The heart beats stronger just before it stops

37. What effect does injuries or illnesses have on blood vessels especially those that affect the brain and or spinal cord?

- A - The blood vessels totally collapse
- B - The blood vessels rupture causing severe internal bleeding
- C - The blood vessels may lose their ability to change in size, (usually dilate) causing a drop in blood volume / pressure circulated
- D - The blood vessels are not affected by injuries or illnesses

38. A Rescuer responds to the scene of an accident where a patient has severe injuries and suspected to be in shock. What should a rescuer do after surveying the scene and realizing that the patient has very serious injuries?

- A - Verify that advanced medical personnel (EMS, MED-VAC, etc.) have been notified
- B - Wait for the patient's condition to improve before splinting suspected fractures and dislocations
- C - Wait for the patient's condition to improve before securing on a backboard
- D - Treat for shock only if a patient begins to have breathing problems, breathing noises and or respiratory distress

39. What are the recommended ways to control external bleeding - as defined in the 2015 and 2021 Revised Field First Aid Treatment?

- A - Elevation and tourniquets
- B - Pressure points and tourniquets
- C - Elevation and pressure points
- D - Direct pressure with gauze / constricting bandage, hemostatic dressing with direct pressure, tourniquet if life-threatening bleeding

40. A patient has a closed forearm injury. You suspect a fractured forearm based on patient's level of pain. How should you treat?
- A - Apply a tourniquet immediately
 - B - Elevate the arm above the head to reduce swelling
 - C - Splint as for a fracture with a padded board / sling and swathe. apply cold applications (ice or cold pack) - wrapped preferably in a waterproof plastic container and then wrapped in a wet cloth before applying to the skin
 - D - Apply pressure on pressure point in upper arm (brachial artery)
41. A bolter operator got his hand entangled around the machine drill head steel when he got free, three fingers had been amputated at his knuckles. What would be your order of treatment while attempting to control external bleeding?
- A - Direct pressure with gauze and constricting bandage except if a visual, close - up examination / evaluation of scene and patient reveal that patient has life-threatening bleeding; in this situation, apply a Tourniquet on the Lower Forearm to prevent patient from bleeding out
 - B - Don't think twice; elevate the arm above the head and splint immediately
 - C - Hold all the pressure you can on the brachial pressure point in the upper arm and let the wound bleed freely to prevent clots from traveling to the brain and causing a possible stroke-
 - D-Cover with a blanket and hope they don't bleed out before EMS arrives
42. How do you treat the amputated fingers in question. No. 41?
- A - Place fingers in the coldest water that you have access to
 - B - Place fingers in milk, if available
 - C - Place fingers in plastic container containing water and try to maintain close to body temperature
 - D - Rinse amputated fingers with water; cover with a dressing, place fingers in a waterproof plastic container, place waterproof container in a second plastic container and add ice, ice water, cold packs, etc. Do not allow amputated fingers to come in direct contact with ice, ice water, cold packs, etc.

43. A patient has a lower leg injury – open fracture with external bleeding. You have been applying gentle direct pressure with gauze. Blood starts soaking through two (2) gauze pads. How should you treat now?

A - Apply more gauze pads unless if a visual, close - up exam. / evaluation of the scene and patient reveal that that patient has lost a substantial amount of blood. If substantial apply a tourniquet approx. two inches above the injury site

B - Always apply pressure on the femoral artery pressure point. first treatment for all open fractures of the Lower Leg

C - Put patient on backboard; elevate feet - end of backboard 12 inches and transport

D-Cover with a warm blanket and hope EMS arrives soon

44. When should a tourniquet be applied to any patient?

A - For serious, life - threatening bleeding and the wound is on the arm or leg

B - Always as the first choice of treatment for external bleeding

C – Anytime there is profuse bleeding from the head

D-Anytime someone is complaining of pain in their elbow

45. A patient has a severe chest wound with external bleeding. How would you treat?

A - Apply multiple gauze pads and tie a tourniquet (TK) between the wound and heart

B - Put patient on a backboard and apply a pillow or blanket splint between the legs and elevate the feet-end of backboard 12 inches

C - Apply direct pressure with a large trauma dressing and apply very gentle pressure on dressing so as not to restrict breathing efforts. Apply a hemostatic dressing if available

D-Cover with a warm blanket and hope EMS arrives soon

46. A patient has an open fracture of the forearm and has serious, external, arterial bleeding. . A visual, examination / evaluation of the scene and patient reveals that the patient has signs of life-threatening bleeding. How should you treat this serious, life - threatening, arterial bleeding?

A - Apply pressure on the Brachial Artery pressure point located on the inside of the Upper Arm

B - Apply a tourniquet. No time to apply direct pressure and to wait to evaluate effectiveness

C - Elevate the arm immediately while stabilizing to splint

D-Elevate the left leg in an attempt to slow the bleeding

47. What former methods used to treat external bleeding have been discontinued in accordance with the 2015 Revised Field Treatment Recommendations?

A - The use of pressure points and elevation

B - stabilizing and splinting open wound injuries

C - For open fractures applying gauze or trauma dressings

D- Use of a sterile gaze to treat external bleeding

MUSCULOSKELETAL INJURIES

Key Terms:

- 1 - Dislocation - Displacement of a bone end from its normal position at a joint
- 2 - Fracture - A break in a bone
- 3 - Joint - A location where two or more bones are joined
- 4 - Ligament - A fibrous band that connects bone to bone
- 5 - Sprain - Excessive stretching and tearing of ligaments, cartilage, and other soft tissue
- 6 - Strain - Excessive stretching and tearing of muscles and tendons
- 7 - Sign - Something that a rescuer sees or feels (cyanosis, deformity of a joint, etc.)
- 8 - Symptom - Something that a patient tells you (my arm hurts, I can't feel my fingers and toes)
- 9 - Tendon - A fibrous band that connects muscle to bone
- 10 - Angulated - Bent at an abnormal or odd angle

MUSCLES:

Muscles are soft tissue that attach to bones which shorten and lengthen that are responsible for bodily movement.

Muscles are anchored to bones by tendons.

Each muscle is controlled by nerves that originate in the brain, travel through the spinal cord and end at each muscle.

NOTE: Injuries to the brain, spinal cord or nerves can affect muscle control.

Paralysis - A loss of muscle control, loss of sensation and ability to feel.

SKELETON:

The skeleton is formed by over 200 bones.

The skeleton gives form and shape to the body and protects vital organs.

The skull protects the brain.

The ribs protect the heart and lungs.

The spinal cord is protected by the bones of the spinal column.

Ligaments - Connect and hold bones together at joints

Bones are hard, dense tissues that support the weight of the body.

Bones store and produce red blood cells.

Bone injuries are painful and do bleed.

JOINTS:

A joint is a location where 2 bones come together.

Ligaments - Strong, tough, fibrous tissue that connect bone to bone at a joint.

Joints are surrounded by ligaments and some joints allow for more movement than others.

TYPES OF MUSCULOSKELETAL INJURIES:

1) Fracture - A break in a bone

Open Fracture - A fracture associated with an open wound

Open fractures are more serious than closed fractures due to external bleeding and infection risks

Closed Fracture - A fracture associated with a closed wound

2) Dislocation - A separation of a bone end from its normal position at a joint

NOTE: Dislocations are extremely painful.

An injured person cannot move a joint that is dislocated because the bone ends are out of place.

3) Sprain - Stretching and tearing of ligaments, cartilage, and other soft tissue. Sprains are associated with a joint injury.

- 4) Strain - Stretching and tearing of muscles and tendons, usually called a “pulled muscle”.
Strains most commonly affect the neck, lower back, and thigh muscles.

SIGNS AND SYMPTOMS OF MUSCULOSKELETAL INJURIES:

NOTE: A rescuer can always compare the injured side or limb to an uninjured side or limb to help evaluate an injury.

NOTE: The cause of an injury (mechanism of the accident) will always help a rescuer identify the area injured and seriousness of the accident.

Common Signs and Symptoms of Musculoskeletal Injuries:

- 1 - Pain
- 2 - Swelling
- 3 - Deformity
- 4 - Discoloration of the skin (caused by blood leaking into tissue)
- 5 - Inability to use the affected part, normally

Pain, swelling and discoloration commonly occur with any significant injury.
Pain is the body’s sign that something is wrong.

DEFORMITY:

Marked deformity is a sign of a fracture or dislocation. Deformity associated with an injury located along the length of a long bone such as the radius (forearm) is usually caused by a fracture.

SIGNS/SYMPTOMS OF A SERIOUS INJURY:

- 1) Significant deformity
- 2) Moderate or severe swelling and discoloration
- 3) Inability to move or use the affected body part
- 4) Bone ends extending through an open wound
- 5) Patient feels bone ends rubbing together (grating) or a patient felt or heard a snap or pop at the time of the injury
- 6) Loss of circulation or feeling in an extremity
- 7) Cause of the injury suggests the injury may be serious

STABILIZE AND TRANSPORT QUICKLY AND SAFELY TO THE HOSPITAL IF THE FOLLOWING ARE PRESENT:

- 1) The injury involves severe bleeding
- 2) The injury involves the head, neck or back
- 3) The injury impairs walking or breathing
- 4) You see or suspect multiple musculoskeletal injuries

GENERAL CARE FOR MUSCULOSKELETAL INJURIES:

- 1) Rest
- 2) Ice
- 3) Elevation

- 1) Rest - Avoid any movements or activities that cause pain (pain causes shock) Help the patient find the most comfortable position and stabilize in that position, if possible.

If you suspect head or spinal injuries, leave the patient lying flat.

- 2) Ice - Applications of cold (ice packs, cold packs, etc.) should be applied to sprains, strains, dislocations, or closed fractures.

NOTE: Always place a layer of gauze or cloth between the skin and source of cold to prevent skin damage.

Never place cold applications directly over or on an open fracture. Cold applications can be placed around an open fracture site

IMMOBILIZATION OF MUSCULOSKELETAL INJURIES:

A rescuer must always immobilize an injured area before giving additional care such as applications of cold or elevation.

IMMOBILIZE - Splinting or securing a patient to prevent movement of injured parts.

PURPOSES OF IMMOBILIZING:

- 1) Reduce pain
- 2) Prevent further damage to soft tissues
(Splinting and securing may help prevent a closed fracture from becoming an open fracture)
- 3) Reduce the risk of serious bleeding
- 4) Reduce the possibility of loss of circulation or loss of feeling to an injured area
- 5) Prevent closed fractures from becoming open fractures

SPLINT - A device that maintains an injured part in place

Follow these 4 basic principles when splinting:

- 1) Splint without causing more pain and discomfort to the patient.
- 2) Splint an injury in the position you find it.
- 3) Splint the injured area and joints above and below the injury site.
- 4) Check for proper circulation and sensation before and after splinting

TYPES OF SPLINTS:

General Types:

- 1) Soft splints - Folded blanket, pillow, towel, folded clothing, sling, swathe, (all are soft material)
- 2) Rigid splints - Spine boards (backboards), wire ladder splints, plastic boards, cardboard, etc. (all are firm, rigid like material)
- 3) Anatomic splint - Using the body to secure another part of the body.
Example: Securing an injured arm to the chest with a sling and swathe. Securing an injured leg with the uninjured leg on a backboard.

HOW TO SPLINT: General Guidelines

- 1) Check the RBB's (Responsiveness, Breathing, Bleeding) and vital signs
- 2) Support the injured part. Have someone support the injured part, both above and below the injured area.
- 3) Cover open wounds with dressings and bandages.
- 4) If an injury involves an extremity, check for circulation and sensation at a site below the injury, both before and after splinting.
- 5) Pad rigid splints for comfort.
- 6) Secure splints with triangular bandages.
- 7) Recheck circulation below the injury site, after splinting, to ensure circulation has not been restricted by applying a splint too tightly
- 8) Recheck the RBB's (Responsiveness, Breathing, Bleeding) and vital signs.
- 9) Treat for shock

GENERAL SPLINTING RULES:

- 1) When in doubt, always splint
- 2) Stabilize and splint in the location found if safe and practical to do so.
- 3) Continue patient care while transporting, if possible.

MUSCULOSKELETAL INJURIES

1. Which is correct as related to musculoskeletal injuries?

- A - Such injuries are usually not painful
- B - Such injuries are rarely life-threatening
- C - Such injuries are associated with diabetes
- D - Such injuries usually cause paralysis

2. What affects the control of muscles?

- A - Injuries of the brain, spinal cord, and nerves
- B - Injuries of the lungs
- C - Injuries of Pelvic area
- D - Injuries of ankle area

3. What are signs and or symptoms of paralysis?

- A - Loss of muscle control, sensation, and movement
- B - Loss of ability to hear high pitched noises
- C - Loss of nails on the right hand
- D - Fractured ribs

4. What type of tissue holds bone ends in place at joints?

- A - Muscle
- B - Tendons
- C - Ligaments
- D - Cartilage

5. What is a fracture?

- A - A break in a bone
- B - Separation of bone ends at a joint
- C - Strain of a muscle
- D - Sprain of an ankle

6. What describes an open fracture?
- A - Open fractures are usually less serious than closed fractures
 - B - Open fractures never involve an open wound
 - C - Open fractures are more serious than closed fractures because of blood loss and risk of infection
 - D - Open fractures never cause deformity of a long bone
7. Which of the following is correct as related to fractures?
- A - Few fractures are life-threatening
 - B - Closed fractures never cause pain
 - C - Open fractures never cause deformity
 - D - Closed fractures never cause shock
8. What is correct as related to fractures?
- A – Fractures will usually cause hearing loss
 - B - Possible open wound
 - C - Will never result in deformity
 - D – Possible chance of tooth loss
9. What is a common characteristic of a fracture?
- A - Bleeding from the ears
 - B - Dislocated joints - both above and below the fracture location
 - C – Pain, open wound, possible deformity, and shock
 - D – An overwhelming urge to urinate

10. Which of the following is a general guideline for splinting suspected fractures?

- A - Straighten all fracture areas and splint
- B - Splint the injured area and immobilize the joints above and below the injury site
- C - Check circulation (capillary refill and sensation) after splinting only for open fractures
- D - Splint fractures only if the patient is in shock

11. Which of the following best describes a dislocation?

- A - A displacement or separation of a bone from its normal position at a joint
- B - A distal pulse that is absent
- C - A muscle cramp
- D - Damage to a nerve

12. Why is a dislocation usually more obvious than other musculoskeletal injuries?

- A - Associated with an open wound
- B - The dislocated joint will look deformed
- C - Large amount of external bleeding
- D - Less pain than any other injuries

13. Why is a patient unable to move a dislocated joint?

- A - Fractured bone
- B - Arthritis due to infection
- C - Muscle cramps
- D - The bone ends are out of place

14. How do you splint suspected dislocations?

- A - Move the limb to a straight position and splint
- B - Move the limb and splint if the patient has feeling in the fingers or toes
- C - Splint in the position found, if possible
- D - Move the limb and splint if such movement does not cause extreme pain

15. What are the reasons for splinting a fracture or dislocation?

- A - To help reduce pain
- B - To prevent damage to soft tissues, including muscle, nerves and blood vessels
- C - To reduce the risk of serious bleeding
- D - To reset the bone ends for dislocations

16. What is identified as stretching or tearing of ligaments and other soft tissues at a joint?

- A - Compound fracture
- B - Cramp
- C - Strain
- D - Sprain

17. Which one may result in deformity?

- A - Back strain
- B - Dislocated elbow
- C - Open femur fracture
- D - Dislocated shoulder

18. What best describes a strain?

- A - Sometimes called a muscle pull
- B - Usually involves impairment to eyes and ears
- C - Usually the result of not getting enough sleep
- D - Usually results in nerve damage

19. When are musculoskeletal injuries splinted?

- A - Splint suspected fractures before performing an initial assessment for all patients
- B - After completing the initial assessment
- C - When all the pain has stopped
- D - Only splint if the patient goes into shock

20. What can a rescuer do to help evaluate and identify an injury?

- A - Compare the injured side or limb to an uninjured side or limb
- B - Straighten all injured areas to evaluate if the pulse disappears
- C - Straighten all injured areas to evaluate if feeling and sensation disappear
- D - Straighten all injured areas to evaluate if muscle movement is lost

21. What is a common sign or symptom of musculoskeletal injuries?

- A - Pain, swelling, deformity of extremity, inability to use extremity
- B - A rash on the mouth and nose
- C - Fluid draining from the ears
- D - Severe pain in the abdominal area

22. What causes swelling?

- A - Bleeding from damaged blood vessels into damaged tissue
- B - Nerve damage
- C - Muscle spasms
- D - Pain

23. Which of the following would result in the most deformity?

- A - Ankle sprain
- B - Back strain
- C - Muscle torn in the thigh
- D - Dislocated elbow

24. When should a rescuer suspect a serious musculoskeletal injury?

- A - When a deformity is present, the patient cannot use or move the affected extremity, when bone ends are protruding from the open wound, and pain
- B - When a patient complains of hearing loss
- C - When the patient complains of pain in the abdomen
- D - When a patient loses
- E - When pain, swelling and signs of shock are not present

25. A rescuer suspects a patient has head, neck, chest, back, spinal Injury. How should you treat and position the patient?

- A - Stabilize semi-sitting on a backboard
- B - Walk the patient around for five minutes to evaluate for possible spine injuries and then stabilize on a backboard
- C - Leave the patient lying flat, log roll onto a backboard, and stabilize as for a spinal injury
- D - Position the patient on one side and stabilize in this position

26. What is the main reason for immobilizing and splinting musculoskeletal injuries?
- A - To prevent closed fractures from becoming open fractures, reduce the possibility of circulation loss, reduce pain, and prevent further damage to tissue
 - B - To help reduce the possibility of getting a urinary infection
 - C - To prevent fractures from becoming dislocations
 - D - To reduce the risk of the patient breaking out in a rash
27. What is the purpose for splinting?
- A - A splint is used to maintain the patient's blood pressure
 - B - A splint is used to immobilize an injured extremity
 - C - A splint is used to allow the patient to use the extremity normally
 - D - A splint is used to help reset dislocations
28. What is a general rule of splinting?
- A - Splint only if the fracture is life-threatening
 - B - Splint injuries (fractures, dislocations, etc.) in the position found, and check for proper circulation both before and after splinting
 - C - Always realign the extremity to make it easier to splint
 - D - Only commercial-made splints should ever be used
29. What should a rescuer do if bandages used for splinting a lower leg causes significant pain and a loss of feeling in the toes?
- A - Loosen the bandages because they are tied too tight
 - B - Remove the splint and see if the patient can walk on the injured leg
 - C - Remove the splint and apply a cold pack to the injured area
 - D - Remove the splint only if circulation and sensation does not reappear in five (5) minutes

30. What is classified as a soft splint?

- A - Folded blanket, pillow, and sling
- B – A steel rod
- C - A piece of PVC conduit
- D - A wooden board

31. What should be done when splinting an injured extremity?

- A - Support the injured part while splinting, check circulation before and after splinting, and cover open wounds to control bleeding and prevent infection
- B -Tie the splint as tight as possible regardless of how much the patient complains
- C – Never apply a splint on a patient who has diabetes
- D - Splint only when the patient thinks that they have a fracture or dislocation

32. A rescuer has applied a splint to the forearm. The patient starts complaining of numbness and tingling in the fingers. What should the rescuer do?

- A - Remove the splint, only if you think that the patient is in shock
- B - Evaluate tightness of bandages; you may need to loosen
- C - Tighten the splint until the fingers turn blue
- D - Do nothing and elevate the forearm

33. What are good general guidelines as related to treating musculoskeletal injuries?

- A – Always treat all musculoskeletal injuries as serious and if any doubt, go ahead and splint
- B - Always treat musculoskeletal injuries first thing before anything else
- C – Always splint anytime the patient complains of chest pain
- D - Splint ONLY fractures of Long Bones and Dislocations of larger joints (hip, knee, shoulder)

34. What is common as related to fractures of long bones?
- A – Bleeding, shock, and severe pain
 - B - Shock
 - C - Severe pain
 - D – No pain is present because nerves are located in the muscles farther away from long bones as compared to short bones
35. Which of the following describes the 2015 first aid update treatment guidelines for splinting fractures of long bones?
- A – Do not attempt to straighten, use only gentle realignment only to the extent necessary to splint, splint in the position found if possible
 - B - Straighten extremities to make it convenient / easier to splint
 - C - Only straighten to the extent that pain is reduced to a tolerable level for the patient
 - D-Give the patient a wooden stick to bite on while realigning
36. Which of the following is the correct treatment of a responsive, breathing patient with a severe extremity injury?
- A – If the patient is responsive, you should immediately straighten all extremities with injuries before you stabilize on a backboard
 - B - Only straighten suspected hip dislocations that are severely angulated away from the body
 - C - Responsive, breathing patients will be holding the injured extremity in the most comfortable position so you will need to stabilize and splint in this position if possible
 - D-Inform the patient to straighten the extremity themselves so you can apply the splint

Injuries to the Head, Neck, and Spine

Head Injuries:

Head Injuries may affect the Brain; the Brain is approx. 2% of the body's weight and uses 20% of the body's oxygen and uses 25% of the body's sugar (Glucose). A continuous, constant supply of oxygen and sugar must be provided.

Head Injuries that damage the brain cause changes in responsiveness, breathing, movement and feeling in extremities.

SPECIAL NOTES:

- The brain is the center of consciousness
- An altered level of consciousness is often the first and most important sign of a serious head injury.
- The brain is the control center for breathing and heartbeat

Spine Injuries:

The spine is a strong column that supports the head and trunk.

The spinal cord and network of nerves leading all parts of the body from the brain extends from the base of the brain through the spinal column.

The spinal column consists of vertebrae with disks between each vertebrae which have a space where nerves branch out to all parts of the body.

The spine is divided into 5 regions:

- Cervical region (neck)
- Thoracic region (chest)
- Lumbar region (lower back)
- Sacrum region (pelvis)
- Coccyx region (tailbone)

Injuries to the spine may fracture vertebrae, sprain ligaments, compress or cut the spinal cord.

Spinal cord damage may cause temporary or permanent paralysis or even death.

Injuries to the Head, Neck, and Spine

SPINAL CORD INJURIES - SCI:

The spine consists of 33 irregular bones called vertebra. The vertebra are stabilized and supported by ligaments and muscle. Injuries of the vertebra with resulting injuries of the spinal cord result in swelling and fluid buildup (Edema) of the spinal cord - this swelling and fluid buildup results in spinal shock.

SPINAL SHOCK - results in disruption of nerve conduction at and below the actual injury location (numbness, tingling, loss of feeling and or movement, paralysis). Spinal Shock - Occurs within the first 30 minutes after injury.

SPINAL CORD INJURIES - SCI:

- 1) Associated mainly with Head and Neck injuries - SCI's; but have occurred with compression injuries of back and or chest
- 2) All trauma patients found unresponsive should be treated as if they have a SCI
- 3) Treat all patients with multiple trauma injuries (head, neck, back, chest, etc.) as if they have a SCI
- 4) All patients with major trauma above the collarbone should be treated as if they have a SCI
- 5) Patients with compression injuries to the chest or back should be treated as if they have a SCI - EXAMPLE: Person pinned and crushed between rib and continuous miner boom
- 6) If in doubt about the accident scene or coworker info, then treat patient as if they have an SCI
- 7) After treating / stabilizing Life-Threats" - Responsiveness, Breathing and Bleeding - begin immediate efforts to:
 - (a) Give oxygen
 - (b) Secure on Backboard
 - (c) Transport ASAP

Injuries to the Head, Neck, and Spine

NEUROGENIC SHOCK IS ASSOCIATED WITH SCI's:

- 1) Neurogenic Shock occurs with Spinal Cord Injuries (SCI)
- 2) Nerves that control Blood Vessel Dilation / Constriction cause the vessels to dilate below the injury location. This dilation causes the blood to pool below the Injury.
- 3) Neurogenic Shock - blood vessel dilation effects on the body:
 - a) Heart Rate Slows
 - b) Heart pumping ability decreases in blood volume and strength
 - c) Blood pressure drops
 - d) Skin - will be warm and dry below the level of injury - because the blood vessels are now dilated

CAUSES OF THE INJURY - MECHANISM OF THE ACCIDENT

SPECIAL NOTE: Always consider the cause of the injury (mechanism of the accident) to help evaluate whether a head or spinal injury is suspected.

Secure the scene and evaluate the forces that caused the injury. Strong forces are likely to cause severe injury to the head and spine.

Example: An unconscious patient that is removed from underneath a roof fall.

SERIOUS HEAD AND/OR SPINE INJURY SITUATIONS:

A fall

A person found unconscious for unknown reasons and all unconscious patients with trauma

Any injury involving severe blunt force to the head and/or trunk

Gunshot wounds

Any accident that involves a lightning strike

SIGNS/SYMPTOMS OF HEAD AND SPINE INJURIES:

These signs and symptoms may be immediately obvious or may develop later:

- Changes in the level of consciousness
- Severe pain or pressure in the head or spine
- Tingling or loss of sensation in the extremities
- Partial or complete loss of movement of any body part
- Unusual bumps or depressions on the head or spine
- Blood or clear, oily looking fluid draining from the ears, nose or head wound)

SIGNS/SYMPTOMS OF HEAD AND SPINE INJURIES:

These signs and symptoms may be immediately obvious or may develop later:

- Profuse external bleeding of the head or spine
- Seizures
- Impaired breathing or vision as a result of injury
- Nausea or vomiting (Head injury patients tend to vomit)
- Persistent headache
- Loss of balance
- Bruising of the head, especially around the eyes and behind the ears

(Raccoon eyes – Bruising around the eyes)

(Battle signs - Bruising of the bone behind the ears)

TREATMENT OF SERIOUS HEAD AND SPINE INJURIES:

Head and spine injuries can become serious, life-threatening emergencies.

Serious head or spine injuries can cause a patient to stop breathing.

The treatment for serious and spine injuries must always include supporting the respiratory, circulatory and nervous systems.

TREATMENT OF HEAD, NECK, AND SPINE INJURIES:

Minimize movement of the head and spine

Maintain an open airway (use the jaw thrust)

Control external bleeding

Monitor vital signs

Maintain normal body temperature (keep the patient warm but do not overheat.

Head injured patients tend to develop an elevated temperature

Control any external bleeding. Monitor breathing very closely - Keep oxygen flowing.

OXYGEN - is the one drug that an injured brain needs most.

Patients with significant head injuries tend to vomit and or have seizures. This is the reason for getting a head / spinal injured patient secured on a backboard ASAP.

If patient is secured on a backboard, then you can better protect the spinal cord and manage vomiting by turning the backboard up on the side

It helps prevent aspiration of saliva and stomach contents into the lungs, especially if patient vomits

MINIMIZING MOVEMENT OF HEAD, NECK AND SPINE:

- 1) Be Very Careful - Minimize Gross Movement of the head, neck and spine. Movement of an injured head, neck or spine may cause irreversible damage of the spinal cord and or death. Stabilize patient and secure to a backboard at the location found if the scene is safe.
- 2) UPDATE - 2015 - REVISED FIRST AID INFORMATION
 - a) Spinal immobilization is not possible.
 - b) The term spinal motion restriction is used now to describe our efforts to maintain the spine in alignment and to minimize gross movement of head, neck and spine.

STABILIZING PATIENT WITH A SUSPECTED SPINAL INJURY:

- 1) Gently Support the Head / Neck area.
- 2) Secure and immobilize the patient on a backboard. A patient should always be log-rolled toward you for positioning to place on a backboard using at least three, preferably four, people. One to support the head and at least three to roll patient. Secure the patient to the backboard using 15 to 20 triangular bandages. Secure sufficiently enabling the backboard to turn with patient,
- 3) Secure the patient's head to the backboard using a folded or rolled blanket. Secure the forehead with folded triangular bandages
- 4) Monitor patient's responsiveness and breathing. Breathing sounds regardless of injury or illness reveals respiratory distress and indicates a patient with serious life -threats that could cause breathing to stop at any time.

CARE FOR SPECIFIC HEAD INJURIES

I - Concussion

Concussion - a temporary impairment of brain function.

Concussions usually only cause loss of consciousness for a brief period, if unconscious at all

II - Scalp Injury

Scalp bleeding can be minor or severe. Never put direct pressure on a scalp injury if you feel a depression, spongy area or bone fragments

III - Cheek Injury

Control bleeding as other types of bleeding, although you may have to control on the outside as well as the inside of the cheek.

SPECIAL NOTE: Impaled objects in the cheek - Remove only to control bleeding and to maintain an open airway.

Nose Injury

Nose injuries are usually caused by a blow from a blunt object. Treatment for bleeding from the nose:

Have the patient lean forward, pinch the nostrils together and apply cold applications to the bridge of the nose and/or applying pressure on the upper lip just beneath the nose.

NOSE INJURY PRECAUTIONS:

- 1 - After controlling bleeding - Tell the patient to avoid rubbing, blowing or picking the nose.
- 2- Never attempt to completely stop bleeding from the nose if a serious head injury (skull fracture is suspected). Completely stopping the above type bleeding will cause pressure to build up in the brain.

Eye Injury

Eye injuries may involve the eyeball, bone or soft tissue surrounding the eye. Injuries that penetrate the eyeball or cause the eye to be removed from its socket are very serious and can cause blindness.

NOTE: Never put direct pressure on the eyeball

TREATMENT FOR IMPALED OBJECTS OF THE EYE

Place the patient on their back, if they feel comfortable (Remember to make the patient as comfortable as possible)

Never attempt to remove any impaled object (stuck) in the eye

Place a sterile dressing around the object

Stabilize any impaled object in place as best you can. Stabilize with a paper cup to support the object.

Apply a bandage around the cup to stabilize

TREATMENT OF FOREIGN BODIES IN THE EYE

Dirt, sand, metal slivers, etc. on the surface of the eyeball are very irritating. The eye produces tears while attempting to flush out such objects.

Treatment of such objects in the eye - Flushing the eye with water or eye wash solution (away from the bridge of the nose) will usually remove such objects.

If such objects can not be removed by flushing, transport to a medical facility.

Ear Injury

Ear injuries may involve the outer tissue of the ear or the eardrum.

Blood or other oily-like, fluid draining from the ear may be present with a serious head or spine injury.

Never attempt to stop this drainage with direct pressure. Cover the ear lightly with a sterile dressing.

Jaw injuries:

Evaluate whether seriousness may indicate a possible serious head or spine injury.

Maintain an open airway, check the mouth for bleeding, etc.

Minimize movement of the head and neck (possible spine injuries if the situation appears serious).

Neck Injuries

Be cautious - The following critical body parts are located in the neck area:

trachea (windpipe)

carotid arteries

cervical (neck)part of the spine.

Neck injuries may cause severe bleeding and swelling that may obstruct the airway.

Treat all neck injuries as if a serious spine injury is present.

Neck injuries can fracture the trachea, causing airway obstruction. This situation requires immediate stabilization and transportation.

Neck injuries may involve bleeding from the carotid arteries

HEAD, NECK AND SPINE INJURIES

1. What is a correct statement as related to suspected head, neck and spine injuries?

- A – Bruising on the forearm is usually a good sign
- B - It is very easy to determine the extent of damage in Head, Neck and Spine Injuries
- C - A change in the level of responsiveness / consciousness is not an important sign
- D – Always treat all Head, Neck and Suspected Spinal Injuries as very serious

2. A patient has what you suspect to be a serious head injury. What is usually the first and most important sign?

- A - An altered or change in the level of responsiveness / consciousness
- B - normal pupils
- C – Hot flushed skin
- D - Extreme rash on the elbow

3. What would be used to help a rescuer evaluate a patient that has received a serious head, neck and or spine injury?

- A - Evaluate the accident and mechanism of injury
- B - Survey the scene and evaluate the weather conditions at the time
- C - Strong forces are not likely to cause serious injury to the head, neck and or spine
- D - Head, Neck or Spinal Injuries always result in some degree of Total Paralysis

4. A Patient has what appears to be a serious head injury?
What evaluation is critical for this patient?
- A - State of Responsiveness; Breathing; and Bleeding (R - B - B)
 - B – Evaluation for any bruising in the abdomen area
 - C - Evaluation for pain the ring finger on each hand
 - D - Checks for medical alert tags on neck, arms and legs
5. An unresponsive patient was hit in the head when a continuous miner conveyor chain broke under tension. How should a rescuer open the airway for this patient?
- A - Head Tilt - Modified Neck Lift
 - B - Head Tilt - Neck Lift
 - C - Jaw Thrust - First Choice; If Jaw Thrust is not effective, then attempt using Head Tilt - Chin lift
6. Two Shuttle Cars have collided into each other. One operator is complaining of tingling and loss of sensation in the legs. How should this patient be treated?
- A - Walk the patient around to stimulate the nervous system
 - B - Walk the patient around if they do not feel like they have to vomit
 - C - Stabilize for a spinal injury (backboard)
 - D - Massage the legs (treatment for cramps)
7. What are Signs and or Symptoms of a serious head injury?
- A - Blood and or Clear to Pink, watery-like fluid draining from the ears and or nose
 - B - Serious external bleeding and or draining from an open foot wound
 - C - Severe pain or pressure in the middle finger
 - D - Mild pain in the abdomen and pelvis areas

8. What type injury results in bruising and discoloration underneath and around the eyes (Raccoon Eyes) and behind the ears (Battle Signs)?

A - A serious head injury (possible skull fracture)

B - An infected tooth

C - A sinus infection

D - A nasal infection

9. A person has been injured in a roof fall accident and has blood and cerebrospinal fluid draining from the ears and nose.

What is the correct treatment?

A - Pinch the nostrils closed and pack the ears with sterile gauze

B - Pack the ears with sterile gauze and allow the nose to drain

C - Pack the nose with sterile gauze and allow the ears to drain

D - Apply a loose sterile dressing around the head covering the nose and ears; stabilize for a spinal injury; never attempt to stop this bleeding and or fluid from draining from the ears and or nose with associated head injuries

10. A Patient fell 10 feet off the top of a surface building and is complaining of loss of sensation / feeling in the feet and loss of ability to move the legs. What is the correct treatment?

A - Walk the patient around to stimulate the muscles

B - Walk the patient around to stimulate the nervous system

C - Give the patient a stimulant, such as hot coffee, to drink

D - Stabilize on a backboard and monitor responsiveness and breathing

11. A timber, 10 feet in height, fell and struck a person in the head and neck area. The patient does not Move, speak, or blink - but does respond to painful stimulus. How should a rescuer open the airway?

- A - Jaw Thrust - First Choice; If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift
- B - Head Tilt - Modified Neck Lift
- C - Head Tilt - Neck Lift

12. A Patient fell 10 feet while dismounting from a front-end loader and has a suspected spinal injury. The patient does not speak, move or blink but, does respond to verbal stimulus. After ensuring the patient has an open airway and is breathing normal, what should the rescuer do next?

- A - Start CPR
- B - Check feeling, movement and sensation in the arms and legs, scan the body for obvious signs of injury, and check for signs of internal injuries.
- C – Ask the patient to walk around and shake it off
- D - Treat for heat stroke

13. Which is a sign and /or symptom of a head, neck or spine injury?

- A - Pain in the head and or neck
- B – Patient has excessive gas
- C -Throbbing pain in the big toe
- D - Pain in the collarbone areas

14. What should a rescuer do if ever in doubt as to whether a spinal injury may have been caused by the accident forces and or (MOI)?

- A - When in doubt, always stabilize and secure on a backboard
- B - Stabilize only when a patient has partial or complete loss of movement of the arms and or legs
- C - Stabilize only when a patient has tingling or loss of sensation in the arms and or legs
- D - Stabilize / treat only if the patient is unresponsive

15. A Patient has serious head injuries and does not speak, move or blink but respond to painful stimulus. The patient has normal breathing. The external head injuries have been treated. What should the rescuer do next?

- A - Pour small amounts of water into the mouth
- B - Stabilize on a backboard (suspect spinal injuries)
- C - Notify the next of kin, giving the details of the accident and extent of injuries
- D - Elevate the feet 12 inches until stabilized on a backboard

16. What is required for immobilizing a patient with suspected spinal injuries?

- A - The application of constricting bandages to both legs at the thigh to shift blood to vital organs
- B - The application of a blanket roll (horseshoe shape) around the Head and the patient secured to the backboard
- C – Get the patient to walk around to increase circulation
- D – Notify the mine foreman

17. A patient has a scalp wound with external bleeding. Skull bone fragments are visible at the injury site. How should a rescuer treat?

- A - Control bleeding by applying direct pressure with gauze and constricting bandages
- B - Examine the injured area only if the patient has a seizure
- C - Apply slight pressure with a sterile gauze around but not over or on the wound site
- D - Place a constricting bandage in the area near the wound site

18. What are the only two conditions and locations that a rescuer is authorized to remove an impaled object?

- A - In the Lower Leg and Forearm
- B - In the Thigh and Neck
- C - In the Hand and Ankle
- D - In the Cheek if necessary to control bleeding or open the airway and the Chest if it prevents from doing CPR

19. A patient has an impaled object in the cheek. The rescuer attempts to remove the impaled object to keep the airway open but this attempted removal results in extreme pain for the patient. What should the rescuer do?

- A - Remove the impaled object, even if it is very painful for the patient
- B - Leave the impaled object in place and stabilize in place with bulky dressings and bandages
- C - Have a coworker talk to the patient while you remove the impaled object
- D - Remove the impaled object after stabilizing the patient's head

20. What is the proper treatment for a simple nosebleed?
- A - Have the patient sit with the head leaning slightly forward, while pinching the nostrils closed. place a small gauze under upper lip
 - B - Have the patient lie down face-up and pinch the nostrils closed
 - C - Have the patient lie face down and pinch the nostrils closed
 - D - Walk the patient around while pinching the nostrils closed
21. What should be avoided after a simple nosebleed has been treated and bleeding controlled?
- A - Blowing, picking or blowing through the nose
 - B - Talking to and attempting to keep the patient calm
 - C - Contacting advanced medical personnel (EMS) if bleeding starts again and again for no apparent reason
22. What is the proper treatment for a piece of wood impaled in the eye?
- A - Remove the object with a sterile gauze to help prevent infection
 - B - Remove the object with available tools
 - C - Remove the object and apply large amounts of water
 - D - Place a sterile dressing around the object and stabilize as best you can with a paper cup; bandage both eyes to treat sympathetic eye movement (both eyes blinking together)
23. A patient has battery acid splashed in the eyes. How do you treat?
- A - Flush with large amounts of water or eye wash solution for 15 to 20 minutes OR until delivered to EMS personnel.
Contact PCC for other treatment recommendations
 - B - Rub the eyes to increase the flow of tears to neutralize the acid
 - C - Cover both eyes with sterile dressings and transport
 - D - Apply burn ointment to neutralize the chemical, acid, etc.

24. A patient has a small piece of metal lying on the surface of the eyeball. A rescuer attempts to wash out the metal but is unsuccessful. What should the rescuer do now?

- A - Attempt to remove the metal with the corner of a sterile gauze
- B - Attempt to remove the metal with a magnet
- C - Dress both eyes and transport to a medical facility
- D - Apply MSHA Foille burn ointment to prevent infection

25. A patient has injuries to both eyes. How should a rescuer treat?

- A - Cover both eyes with sterile dressings and transport
- B - Use direct pressure to control bleeding from the eyeballs and transport
- C - Place sterile gauze between the upper and lower eyelids so the patient can see and transport
- D - Apply MSHA - Foille burn ointment to both eyes to prevent infection

26. What is the proper treatment for a patient that has dirt in one eye?

- A - Rinse the eye with water away from the nose and unaffected eye and if not removed, transport to a medical facility
- B - Rub the eye to stimulate tear flow
- C - Apply eye burn ointment
- D - Encourage the patient to rub the eye and then flush with water

27. What should be a rescuer's primary concerns when a patient has blunt force trauma injuries to the mouth, jaw or neck?

- A - Missing teeth that may be re-implanted
- B - Responsiveness, breathing, bleeding and has an open airway
- C - Dressing wounds of the lips
- D - The recovery of all teeth knocked out

28. What would be correct as related to blunt force trauma injuries of the front part of the throat and neck?
- A - Suspect a possible injury to the liver
 - B - Suspect fracture or injury to the femur in the left leg
 - C - Suspect bleeding and swelling that may restrict breathing and or obstruct the airway
 - D - Apply pressure to both carotid arteries to control bleeding
29. When should a rescuer suspect a possible spinal injury?
- A - A responsive patient complaining of his arm hurting.
 - B - A strong blunt force that struck the head, neck, back, chest, etc.
 - C - A responsive patient that complains of pain in their foot.
 - D - A patient suspected of having a heart attack or stroke.
30. How should a rescuer give rescue breaths to an unresponsive patient with head injuries that is not breathing and has visible bleeding around the mouth and nose?
- A - Use a resuscitation mask
 - B - Use mouth to mouth
 - C - Use mouth to nose
 - D - Either mouth to mouth OR mouth to nose is acceptable
31. In the 2015 First Aid Treatment Update, what was determined concerning accidents where spinal injuries may be suspected?
- A - No special treatment is necessary - it is best to avoid treatment, load patient, and transport immediately.
 - B - Field rescuers should not attempt treating suspected spinal injuries
 - C - True spinal immobilization is not possible. Field personnel attempts should be to try and maintain the spine in anatomical alignment as much as possible

32. In the 2015 First Aid Treatment Update, what form of treatment for suspected spinal injuries has been discontinued?

- A - The use of cervical collars by all rescuers not possessing an EMT, EMT First Responder or Paramedic certification
- B - Securing patients on backboards
- C - Stabilizing patients with serious head injuries on backboards

33. In the 2015 First Aid Treatment Update, minimizing gross movement of patients with suspected spinal injuries. What did the group recommend?

- A - Move the head/neck area as necessary to apply a rigid cervical collar
- B - Stabilize the patient face-down on the backboard
- C - Minimize movement. Only gently move the head, neck and spine. Move only what is absolutely necessary to stabilize and secure on a backboard

34. While approaching an accident scene, it is critical that rescuers evaluate and recognize the mechanism of injury. Why is this so important?

- A - Only for personal safety
- B - The scene and MOI should provide sufficient evidence for when rescuers should suspect a possible Spinal Injury and to treat accordingly
- C - The scene and MOI should provide sufficient evidence for when rescuers may need multiple ambulances (one patient per ambulance)

35. What are the two key elements for a rescuer attempting to evaluate the seriousness of head/neck/brain/spinal injuries?
- A - Type and strength of force striking the head/neck/brain/spine; or the type / strength of force that the head struck an object
 - B – The patient saying that his big toe was hurting
 - C - Patient saying that they have two teeth knocked loose and that they have a slight headache
36. What are the two key elements that are critical to maintain the function of responsiveness and to keep a person's brain alive every second in life?
- A - Sodium (Salt) and Vitamins
 - B - Potassium and Vitamins
 - C - Glucose (Sugar) and Oxygen

INJURIES TO THE CHEST, ABDOMEN AND PELVIS

The chest, abdomen and pelvis contain important organs and injury to these areas may be fatal.

INJURIES TO THE CHEST

The chest contains the heart, major blood vessels and lungs.

The 12 pairs of ribs help protect the vital organs.

Chest injuries are the second leading cause of trauma deaths each year.

Chest wounds may be open or closed.

SIGNS AND SYMPTOMS OF SERIOUS CHEST INJURIES

- 1) Difficulty breathing
- 2) Pain at the site of injury that increases with deep breathing or movement
- 3) Deformity, such as that caused by a fracture
- 4) Flushed, pale or bluish discoloration of the skin
- 5) Coughing up blood

RIB FRACTURES

A simple rib fracture is rarely life-threatening.

A patient with a rib fracture may have shallow breathing because normal or deep breathing is painful.

A patient with a rib fracture will usually lean toward the side of the fracture and press a hand or arm over the injured area.

Serious rib fractures can be life-threatening.

FLAIL CHEST - Fractured ribs that do not move normally with the rest of the chest during breathing. The flail segment moves in the opposite direction the rest of the chest during breathing.

TREATMENT FOR RIB FRACTURES:

- 1) Have the patient rest in a position that will make breathing easier.
- 2) Binding the patient's arm to the chest on the injured side will help support the injured area and make breathing more comfortable
- 3) A pillow or rolled blanket can be used to help support and immobilize the injured area.

CHEST PUNCTURE INJURIES:

Puncture wounds to the chest may be life-threatening.

A puncture wound that penetrates the lung or chest cavity surrounding the lung may allow air to enter the chest. This prevents the lungs from functioning properly.

TREATMENT FOR CHEST PUNCTURE INJURIES:

Sucking chest wound - A penetrating chest injury that allows air to enter the chest cavity and a sucking sound can be heard coming from the wound each time the patient breathes. This is a very serious injury.

To treat a sucking chest wound – It is acceptable for the first aid provider to leave an open chest wound open and uncovered. If a dressing and direct pressure are required to control the bleeding care should be taken to ensure the dressing does not convert to an occlusive dressing.

INJURIES TO THE ABDOMEN

The abdomen is the area immediately under the chest and above the pelvis.

The abdomen has 4 quadrants with the navel serving as the reference point: Quadrants - Upper left, Upper right,
Lower left, Lower right

NOTE: The liver is located in the upper right quadrant, is rich in blood and injuries to the liver can quickly be fatal.

NOTE: The spleen is located in the upper left quadrant, is easily damaged and bleeds profusely when injured.

NOTE: The stomach, located mostly in the upper left quadrant, can bleed severely when injured.

SIGNS AND SYMPTOMS OF ABDOMINAL INJURIES:

- 1) Severe pain
- 2) Bruising
- 3) External and/or internal bleeding
- 4) Nausea and vomiting (sometimes vomit containing blood)
- 5) Pale, moist skin
- 6) Weakness
- 7) Thirst
- 8) Pain, tenderness, or a tight feeling in the abdomen
- 9) Organs possibly protruding from the abdomen

TREATMENT FOR OPEN ABDOMINAL INJURIES

(Abdominal injuries can cause severe external or internal bleeding and can quickly result in shock.)

- 1) Carefully position the patient on the back
- 2) Do not apply direct pressure if organs are visible
- 3) Do not push organs back in
- 4) Remove clothing from around the wound
- 5) Apply moist, sterile dressings loosely over the wound
- 6) Cover dressings loosely with plastic wrap
- 7) Cover dressings with a folded towel or large trauma dressing to maintain warmth
- 8) Maintain normal body temperature (keep the patient warm)
- 9) Stabilize and secure to a backboard and transport as quickly and safely as possible

TREATMENT FOR CLOSED ABDOMINAL INJURIES

- 1) Carefully position the patient on the back
- 2) Do not apply direct pressure
- 3) Bend the patient's knees slightly. This releases the abdominal muscles to relax. Place rolled-up blanket under the patient's knees. If movement of the patient's legs causes pain, leave the legs straight
- 4) Treat for shock. Maintain normal body temperature by keeping the patient warm
- 5) Stabilize and secure to a backboard and transport as quickly and safely as possible

INJURIES TO THE PELVIS

The pelvis contains the urinary bladder, sex organs, and lower portion of the large intestines.

Arteries and nerves pass through the pelvis.

The organs within the pelvis are well protected on the sides and back but not in the front.

SIGNS AND SYMPTOMS OF PELVIC INJURIES

- 1) Similar to those of abdominal injuries
- 2) Loss of sensation in the legs
- 3) Loss of ability to move the legs

TREATMENT OF PELVIC INJURIES

- 1) Treat for the same way as abdominal injuries
- 2) Never move the victim until stabilized and secured to a backboard, if possible. The situation dictates if you can treat in the location found and if the area is safe
- 3) Keep the patient lying flat on their back
- 4) Keep the patient as comfortable as possible
- 5) Control external bleeding
- 6) Cover any protruding organs
- 7) Maintain normal body temperature (keep the patient warm)
- 8) Stabilize and secure to a backboard and transport as quickly and safely as possible.

GENITAL AREA INJURIES

These injuries are extremely painful.

Treat as for other wounds.

Be careful to avoid embarrassment to the patient.

SUMMARY OF CHEST, ABDOMEN AND PELVIS INJURIES

- 1) These injuries can be serious and life-threatening
- 2) Treat all life-threatening conditions, first, as always, ABC's
- 3) Treat specific injuries
- 4) Stabilize, secure and transport as quickly and safely as possible

CHEST, ABDOMEN, PELVIS INJURIES

1. What are signs or symptoms of serious chest injuries?
 - A - Difficulty breathing, pain at injury site, impaled object in the chest
 - B - Pain in the left ankle
 - C – Patient is complaining of serious headache
 - D - Pain that radiates from the abdomen to the pelvis

2. What are other signs or symptoms of serious chest injuries?
 - A – Patient complains of ringing in their ears
 - B – Normal skin color
 - C – Patient complains of uncontrollable itch on his right elbow
 - D - Pain that increases with normal and or deep breathing

3. What would be associated with rib fractures?
 - A - Shallow breathing, patient leaning forward pressing on the injury site
 - B - Pain in the shoulder area
 - C - Deep breathing
 - D - Patient indicates that he is hurting in his left knee

4. How should rib fractures be treated?
 - A - Triangular bandages tied as tight as possible around the chest, including the injured area
 - B - Occlusive dressing and bandages
 - C - Place a rolled-up blanket or other bulky material against the injured area, secure with two (2) triangular bandages, and bind the patient's arm to the chest with a swathe to help support the injured area
 - D - No treatment is necessary

5. What should be a rescuer's main concern for a responsive, breathing patient that has a serious chest injury?

- A - Control minor bleeding from the mouth
- B - Difficult breathing you need to ensure an open airway
- C - Applying heating pads to the injured area
- D - Insure both feet have good blood flow

6. How should a rescuer treat a sucking chest wound?

- A - Leave the wound open to ambient air except if necessary to control external bleeding. Cover the wound with a loose, dry, sterile dressing. Remove dressing if it becomes soaked or saturated with blood and replace it with a fresh dressing
- B - Stuff sterile gauze into the chest wound to seal the hole
- C - Transport immediately - face down on a backboard
- D - Place the patient on his side on a backboard and transport

7. Where is the liver located in the abdomen?

- A - Upper right quadrant
- B - Upper left quadrant
- C - Lower right quadrant
- D - Lower left quadrant

8. Where is the spleen located in the abdomen?

- A - Upper right quadrant
- B - Upper left quadrant
- C - Lower right quadrant
- D - Lower left quadrant

9. In reference to abdominal Injuries, what does the liver, spleen and kidneys have in common?

- A - All three are solid organs and are rich in blood and may bleed profusely when injured
- B - All three organs store bile and have few blood vessels
- C - All three organs are part of the circulatory system
- D - All three organs are seldom injured due to their locations

10. Which is a sign or symptom of abdominal injuries?

- A – Patient states he is feeling no pain in the abdominal area
- B – The skin will look discolored and show signs of bruising
- C - External bleeding on the right hand
- D - Red, hot dry skin

11. Which one is a sign or symptom of abdominal injuries?

- A - Nausea and vomiting, pale moist skin, and thirst
- B - Hunger
- C – Patient complains of right forearm hurting
- D – Patient has a twitch in his left eye

12. What is another sign or symptom of abdominal injuries?

- A - Pain, tenderness, or a tight feeling in the abdomen even possibly organs may be protruding from the abdomen
- B -The patient complains that the ring finger on his left-hand hurts
- C – The patient states they are feeling no pain
- D – The Patient complains of numbness in the left foot

13. A Patient has an open abdominal injury with protruding organs. What is the proper treatment?

- A - Push the organs back in and apply dry, sterile dressings
- B - Carefully position the patient on their stomach
- C – Tie a rubber band around the organ to hold it secure
- D – Lay the patient on their back, remove clothing from around the wound Area, then apply moist or wet sterile dressings loosely over the wound and organs

14. A Patient has an open abdominal injury with protruding organs. What is the recommended treatment?

- A - Cover with loose, moist, sterile dressing and try to keep patient warm to maintain normal body temperature
- B -Tie a rubber band around the moist dressings to keep them in place
- C - Apply direct pressure to the protruding organs to control bleeding
- D – Place ice packs under the arm pits to help keep patient cool.

15. A Responsive talking patient has severe abdominal pain and has signs and symptoms of closed abdominal injuries. What is the proper treatment?

- A - Apply direct pressure immediately to the injured area to help control bleeding
- B - Carefully position the patient on their back, bend the patient's knees slightly and place a rolled blanket under them if it helps reduce pain, and treat for shock.
- C -Have the patient sit up and move around to prevent stiffness
- D – Give the patient plenty of water to keep the injured site hydrated

16. A responsive patient has an impaled object in the abdomen. What is the correct treatment?

- A - Remove the impaled object immediately to reduce the risk of infection
- B - Remove the impaled object immediately if the patient becomes angry or irritable
- C - Remove the impaled object immediately if the patient vomits or has a breathing problem
- D - Stabilize the impaled object in place with bulky dressing, bandages, thick padding, etc. Only time you would remove the impaled object is if the patient became unresponsive, and it interferes with giving chest compressions

17. How should a patient with a suspected serious pelvis injury be stabilized and treated?

- A - On a backboard (suspect spinal injury)
- B - Long leg air splint on the injured leg side
- C - Stabilizing is not necessary
- D - Apply large trauma dressings on the left shoulder

18. A Patient was hit in the pelvis when a steel belt rope broke, and whip lashed toward the patient. The responsive, patient has lost feeling and sensation in the legs and cannot move their legs. What is the proper treatment?

- A - Apply rigid board splints to both arms
- B - Walk the patient around to stimulate the nerves and blood vessels
- C - Apply long leg air splints to both legs
- D - Stabilize and secure on a backboard at location found if the scene is safe

19. What should a rescuer also suspect if a patient has a serious pelvis injury?

- A - Possible injury to the lower spine
- B - Ruptured spleen
- C - Ruptured liver
- D - Stomach injury

20. When you approach an accident scene, an eyewitness tells you that a coal rib rolled off and struck the patient in the chest and abdomen. Since the accident occurred, the patient has not spoken to anyone and appears to be unresponsive when you arrive. What are your first priorities of treatment as you conduct an initial assessment?

- A - Extent of injuries of the abdomen and pelvis
- B - Evidence of fractured ribs and pelvis
- C - Level of responsiveness / consciousness, status of breathing and external bleeding (R - B - B)
- D - Distention of the stomach and kidneys

21. What does the liver, spleen, and kidneys have in common?

- A - All are solid organs and may bleed profusely.
- B - All are classified as hollow organs that bleed very little, if injured
- C - All these organs produce and store bile
- D - All these organs produce some form of sugar

22. A Miner Operator is pinned between the machine cutterhead and rib. When you arrive, coworkers are hollering at the operator who is still pinned. The operator appears to be unresponsive as you observe from a distance. You shout to the patient from a distance but get no response. The patient has blood draining from his nose and mouth. What should be your first course of action in this entrapment situation and what types of suspected injuries would you expect to have to treat?

- A - First course of action is to insure a competent, confident, qualified person is available to move the machine in the correct direction to prevent further injuries to the operator. Once removed, check RBB's. Suspect and treat for possible spinal injuries, severe chest injuries, lung injuries, rib injuries, severe breathing problems, or respiratory distress.
- B – Don't waste time trying to treat the patient, just get him outside
- C - Notify the entrapped miner's next-of-kin and inform them that their family member is most likely dead
- D-Call outside and see if they can get a doctor up to the section

23. When is the only time that a rescuer is authorized to remove an impaled object from the chest?

- A - Only if the object interferes with performing CPR chest compressions
- B - Only if you think that the object has punctured a lung
- C - Only if you think that the object has punctured the heart
- D - Only if you think that the object has punctured an artery

INJURIES TO THE EXTREMITIES

Injuries to the extremities are very common. Prompt treatment can help prevent further damage and pain.

GENERAL TREATMENT:

- 1) Insure adequate breathing and RBB's
- 2) Control bleeding
- 3) Support and immobilize the injured extremity
- 4) Elevate, if practicable, after splinting if such elevation does not cause pain
- 5) Monitor vital signs
- 6) Treat for shock - Maintain normal body temperature by keeping patient warm. Help make the patient as comfortable as possible.
- 7) Transport in a safe manner

SIGNS AND SYMPTOMS OF SERIOUS EXTREMITY INJURIES:

- 1) Pain
- 2) Tenderness
- 3) Moderate or severe swelling
- 4) Discoloration
- 5) Significant deformity of a limb
- 6) Inability to move or use an injured limb
- 7) Severe external bleeding

UPPER EXTREMITY INJURIES

The upper extremities include the arms, hands, collarbone, shoulder blade and shoulder. The upper extremities are the most injured areas of the body. Minimize movement of any seriously injured upper extremity.

NOTE: Never change the position if a patient is holding an injured arm against the chest. Holding the arm in this position is an effective immobilization.

SHOULDER INJURIES

The shoulder consists of the collarbone, shoulder blade and upper arm, and shoulder joint.

Collarbone

The most common injured bone of the shoulder is the collarbone, usually the result of a fall.

A patient with a fractured collarbone will usually hold the arm against the chest.

A sling and swathe on the injured side can be used to splint a collarbone injury.

Shoulder blade

Shoulder blade injuries are not common.

The patient may have extreme pain and may not be able to move the arm.

Splint the arm in position found, usually with a sling and swathe on the injured side.

Shoulder joint

Dislocations are common shoulder injuries.

Shoulder dislocations are painful and can be identified by the deformity present. These patients will try to minimize the pain by holding the arm in the most comfortable position.

TREATMENT FOR SHOULDER INJURIES:

- 1) Check and treat RBB's
- 2) Control external bleeding
- 3) Check for circulation and sensation in the hands and fingers.
- 4) Splint in the position found
- 5) Splint with a sling and swathe.
- 6) Recheck for circulation and sensation
- 7) Apply cold applications to help reduce swelling and pain.
- 8) Treat for shock
- 9) Monitor RBB's.

UPPER ARM INJURIES

The upper arm contains the bone that extends from the elbow to the shoulder.

A fracture of the upper arm may damage blood vessels and/or nerves.

Upper arm fractures are very painful, and a patient usually cannot use that arm.

TREATMENT FOR UPPER ARM INJURIES

- 1) Check and treat RBB's
- 2) Control external bleeding (direct pressure, etc.)
- 3) Check for circulation and sensation in the hand and fingers
- 4) Immobilize the upper arm from the shoulder to the elbow
- 5) Splint with a sling and swathe
- 6) Recheck for circulation and sensation
- 7) Apply cold applications
- 8) Treat for shock (keep the patient warm)
- 9) Monitor RBB's

ELBOW INJURIES

The elbow can be sprained, fractured, or dislocated.

Injuries to the elbow can cause permanent disability because nerves and blood vessels go through the elbow.

Treat all elbow injuries as very serious. Elbow injuries can be made worse by movement.

TREATMENT FOR ELBOW INJURIES

- 1) Check and treat RBB's
- 2) Control external bleeding (direct pressure, etc.)
- 3) Check for circulation and sensation in the hand and fingers
- 4) Immobilize the arm from the shoulder to the wrist
- 5) Splint in the position found
- 6) Recheck for circulation and sensation

FOREARM, WRIST, AND HAND INJURIES

The forearm is the area from the elbow to the wrist and contains 2 forearm bones.

A forearm fracture may cause severe bleeding and/or loss of movement in the wrist and hand.

The hands are commonly injured because of everyday use.

Serious injuries may damage nerves, blood vessels and bones.

TREATMENT OF FOREARM, WRIST AND HAND INJURIES

- 1) Check and treat RBB's
- 2) Control external bleeding
- 3) Check for circulation and sensation in the hand and fingers

AIR SPLINTS

Air splints are also an effective way to immobilize the hand and forearm. Be very careful when applying an air splint so as not to increase pain for the patient.

SPECIAL NOTE: Be careful not to over inflate an air splint. Over inflation may cut off circulation and serve as a tourniquet.

PROPER INFLATION OF AN AIR SPLINT

A rescuer should be able to make a slight dent in the splint surface with your thumb.

A change in air temperature affects the air and splint tightness of an air splint. Moving from a cold area to a warm area will cause an air splint to expand and get tighter.

Moving from a warm area to a cold area will cause an air splint to loosen.

Continuously check inflation of an air splint.

Continuously check circulation and sensation in the fingers if you apply an air splint

FOREARM INJURY TREATMENT

- 1) Check and treat RBB's
- 2) Control external bleeding
- 3) Check for circulation and sensation in the hands and fingers
- 4) Place a rigid splint underneath the forearm, extending beyond the hand and elbow.
- 5) Place a roll of gauze or similar material in the palm of the hand to maintain fingers in a normal position.
- 6) Apply a triangular bandage both above and below the injury site.
- 7) Recheck circulation and sensation.
- 8) Apply a sling and swathe.
- 9) Elevate the injured area if possible
- 10) Apply cold applications
- 11) Treat for shock
- 12) Monitor RBB's

WRIST, HAND, AND FINGER INJURIES TREATMENT

- 1) Check and treat RBB's
- 2) Control external bleeding
- 3) Check for circulation and sensation in the hands and fingers
- 4) Immobilize wrist, hand, and finger injuries with a soft splint
- 5) Splint injured fingers to an adjacent finger with tape
- 6) Recheck circulation and sensation
- 7) Apply a sling and swathe to the injured hand side
- 8) Elevate the injured area if possible
- 9) Apply cold applications
- 10) Treat for shock
- 11) Monitor RBB's

UPPER EXTREMITY INJURIES

1. What is correct as related to splinting upper and lower extremity injuries?
 - A - Splint in the position found, if possible
 - B - Injuries may damage the patient's ability to hear well
 - C - Always move injured extremities to the position that allows for convenient, easy splinting
 - D - Injuries may cause the patient to break out in a rash

2. How can a rescuer splint a suspected collarbone injury?
 - A - No treatment or splinting is necessary
 - B - Apply a sling and swathe on the injured arm side to support the arm and hold it against the chest
 - C - Apply a long-arm air splint to the injured arm side
 - D - Apply rigid wooden splints to both sides of the arm on the injured arm side

3. A patient has a suspected dislocated shoulder, and the arm is being held away from the chest. How should a rescuer stabilize and splint?
 - A - No treatment is necessary because shoulder dislocations are not required to be stabilized
 - B - Wrap a blanket around the entire chest and arms and secure with three (3) triangle bandages
 - C - Splint in the position found, if possible; place a rolled blanket or other bulky material in the space between the arm and chest; and apply a sling and swathe on injured arm side
 - D - Cross both arms across the chest and secure with triangular Bandages

4. A patient has a shoulder injury. When should the circulation be evaluated in the hand and fingers?

- A - After splinting has been completed when severe bleeding is present
- B - Before splinting if severe bleeding is not present
- C - No checks are necessary
- D - Before and after splinting

5. What is correct as related to elbow injuries?

- A - Injuries to the elbow can cause the eyes to get infected
- B - All nerves in the toes usually tingle with an elbow injury
- C - Injuries to the elbow can be made worse by movement
- D - Elbow injuries are never serious

6. Which is correct as related to elbow injuries?

- A - When a patient says that they cannot move their elbow, always attempt to move it so it will be easier to splint
- B - Splint in the position found, if possible
- C - Check for circulation and sensation in the hand and fingers after splinting only
- D - Move the arm and elbow to a straight position where a long arm, air splint can be applied

7. Which is correct as related to a suspected fracture of the forearm?

- A - Check for circulation and sensation in the fingers after splinting
- B - Apply a rigid, wooden board splint and cover the fingers
- C - Apply a sling and swathe after applying a wooden, padded board splint
- D - Move around and attempt to straighten the arm before splinting to determine which bone is broken

8. What is the correct treatment for a suspected finger dislocation or fracture?
- A - Apply an air splint
 - B - Reset the bones and apply moist, sterile dressings
 - C - Splint to an adjacent finger; avoid movement while stabilizing
 - D - Finger injuries cannot be treated
9. If applied, how much air is required to properly inflate an air splint?
- A - Inflate until the fingers or toes turn blue
 - B - Inflate until the feeling and sensation are absent in the fingers or toes
 - C - Inflate until you can make a slight dent in the surface of the splint with your thumb
 - D - Inflate the splint until is extremely hard to the touch
10. In July, an air splint has been applied to a patient's forearm while underground. After arriving on the Surface, the patient starts complaining that they have no feeling in their fingers. What action should be taken by the rescuer?
- A - Nothing because this is normal
 - B - Release part of the air in the splint because the air has expanded in the splint due to moving from a cold temperature area to a hot temperature area
 - C - Recheck sensation in the hand and adjust the air only after the fingers have turned blue, or the patient starts complaining of pain

11. Why are air splints not appropriate or recommended for splinting open wounds with serious bleeding?

- A - Because air splints do not control or affect arterial bleeding until a Patient's systolic blood pressure drops to 50 mm Mercury (Hg) or less which at that point is a very life threatening condition.
- B - Because air splints will put too much pressure on the wound causing the fingers to turn blue
- C - Because most air splints leak air around or through the inflation valve
- D-Because it causes the patient to have a headache from the splint pressure

LOWER EXTREMITY INJURIES

The lower extremities consist of the thigh, knee, lower leg, and foot.

Damage to the femoral artery, which can occur with a fracture of the bone in the thigh, can be life-threatening due to severe blood loss.

THIGH, KNEE, AND LOWER LEG INJURIES

Thigh Injuries

The bone in the thigh (femur) is the largest bone in the body. A femur fracture usually produces a deformity.

TREATMENT OF A THIGH INJURY

- 1) Check and treat RBB's
- 2) Control external bleeding (direct pressure, etc.)
- 3) Check for circulation and sensation in the foot and toes.
- 4) Immobilize in the position found
- 5) Splints:
 - a) Tie legs together, pad with blanket or other bulky material between legs.
 - b) Secure injured leg with a padded board on the outside and inside of the leg (Outside - Splint beyond foot and thigh. Inside - Crotch to beyond foot.)
 - c) Secure to a backboard after stabilizing using a or b, above
- 6) Recheck for circulation and sensation
- 7) Apply cold applications (cold pack, etc.) to help reduce swelling and pain.
- 8) Treat for shock (keep the patient warm).
- 9) Continue to monitor RBB's.

KNEE INJURIES

The knee joint is very vulnerable to injury and consists of the lower end of the thigh (bone), upper ends of the lower leg bones, and the kneecap.

Knee injuries range from cuts, bruises, sprains, fractures, and dislocations.

TREATMENT FOR KNEE INJURIES

- 1) Check and treat RBB's
- 2) Control external bleeding (direct pressure, etc.)
- 3) Immobilize with the following considerations:
 - a - If the knee is bent and cannot be straightened without pain, splint as found.
 - b - If the knee is straight or can be straightened without pain, splint as found with available material.
- 4) Splint with long leg rigid splinting material. (Long wooden board on outside - short wooden board on inside)
Secure on a backboard. A long leg air splint or blanket (pillow) material can be used to stabilize an injured knee depending on position of the leg, knee, and patient position.
- 5) Recheck for circulation and sensation.
- 6) Apply cold applications (cold pack, etc.)
- 7) Treat for shock (keep the patient warm)
- 8) Continue to monitor RBB's

ANKLE AND FOOT INJURIES

Ankle and foot injuries are common and range from sprains and dislocations. Treat all ankle and foot injuries as serious.

TREATMENT FOR ANKLE AND FOOT INJURIES

- 1) Check and treat RBB's
- 2) Control external bleeding
- 3) Check for circulation and sensation
- 4) Immobilize with available splints
- 5) Splint, using a soft splint such as a folded blanket secured to the foot, use an air splint, and stabilize on a backboard
- 6) Recheck for circulation and sensation
- 7) Apply cold applications (cold pack, etc.) to help reduce swelling and pain.
- 8) Treat for shock (keep the patient warm)
- 9) Continue to monitor RBB's

LOWER EXTREMITY INJURIES

1. What would you expect to see for a patient with a suspected fractured thigh bone?
 - A - The leg will usually be turned outward
 - B - The injured leg may be noticeably shorter than the other leg
 - C - The patient may not be able to move the injured leg and severe pain and swelling will be present
 - D - The injured leg will appear to be longer than the uninjured leg

2. Which is correct as related to an injury of the femur or thigh bone?
 - A - Check circulation and sensation in the foot after splinting
 - B - Have the patient walk around or move the injured leg around to evaluate the extent of the injury
 - C - If long leg wooden splints are used to stabilize, place one on the outside of the leg and one on the inside of the leg
 - D - Treat for shock by keeping the patient cooled down with ice

3. Which is a general rule for splinting knee injuries?
 - A - Splint in the position found, if possible
 - B - Move the leg to apply an air splint, regardless of the amount of pain that it causes
 - C - Move the leg to apply wooden board splints, regardless of the amount of pain that it causes
 - D - A rescuer can always straighten a knee and leg to splint except when a dislocation is suspected

4. Which is correct as related to splinting a knee injury?
- A - A pillow splint should be used to splint
 - B - A blanket splint cannot be used if a pillow is unavailable
 - C - Rigid wooden board splints should never be used for this application
 - D - Move the knee to a straight position and splint even if this movement causes very severe pain
5. Which of the following will usually cause a deformity?
- A - Chest injury
 - B - Injuries of the abdomen
 - C - Dislocations of the hip, knee, shoulder, elbow
 - D - Ankle sprain
6. A patient has an injury to the knee, and you cannot determine if the injury caused a fracture or dislocation. How should you treat?
- A - Move the knee and leg to a straight position even if the patient displays the most severe pain that you have ever seen
 - B - Move the knee and leg to a straight position and apply an air splint, even if severe pain is created by such movement
 - C - Splint in the position found, if possible
 - D - Splinting is required only if sensation and feeling are absent in the foot
7. What is the main concern that a rescuer should have while treating a knee injury?
- A - Treat and stabilize to reduce the risk of loss of sensation and circulation below the knee. splint in position found if possible
 - B - The amount of pain that the patient displays
 - C - Identifying the bones that may be broken or injured
 - D - Reducing the risk of infection

8. Which is correct as related to ankle and foot injuries?

- A - Such injuries are commonly caused by twisting forces
- B - You should care for such injuries as if they are serious
- C - A rescuer can usually tell if the injury is serious enough to treat
- D - Such injuries are never required to be treated as serious. Walk the patient around or have the patient move the foot to stimulate circulation and to relieve the pain.

9. What is correct as related to splinting an ankle or foot injury?

- A – Have the patient move the foot around in circles to verify severity of the injury
- B - Walk the patient around or have the patient move the foot to evaluate pain before applying rigid wooden board splints
- C - A rolled blanket or pillow splint can be used; usually most preferable and will cause the least amount of pain for patient
- D-Tie a constricting bandage at the knee to help with pain

10. A person became off balance and fell 10 feet off a ladder and landed on both feet. The patient is complaining of pain in both ankles and back. What should a rescuer treat in addition to injuries of both ankles?

- A - Rib fractures
- B - Dislocated shoulder
- C - Ruptured liver
- D - Suspect a spine injury and stabilize on a backboard

11. A patient has been injured in a roof fall accident. The patient only responds to painful stimuli. The patient is breathing normal and has injuries of the head, chest, both legs and the knees. How would you splint the legs and knees?

- A - Secure both legs to the backboard; patient is only responding to painful stimuli and requires immediate transportation
- B - Apply full leg air splints
- C - Apply long, padded board splints
- D-Apply a constricting bandage at the ankles to control pain

12. A patient has an open leg fracture with life threatening external bleeding, A visual, close - up examination / evaluation of the scene and patient reveals patient has already lost a substantial amount of blood. How should you treat?

- A - Apply a tourniquet because patient has already lost a substantial amount of blood
- B - Apply pressure on the Arterial Pressure Point located behind the Knee
- C - Splint the leg immediately; secure on a backboard and elevate the Feet-End of the backboard
- D-Apply a large trauma dressing to the area hope it will stop bleeding

TRANSPORTATION AND PATIENT ASSESSMENT

STABILIZING FOR TRANSPORTATION

SPECIAL NOTE: Stabilize patients before moving unless necessary to move for you or the patient's safety. When in doubt, always splint before moving.

Always evaluate the cause of the accident and determine if a patient may have a suspected neck or spinal injury. Always treat patients with serious head injuries as though they have a neck (spinal) injury.

Open and maintain the airway in these patients using the jaw thrust. Always apply a blanket-roll around the head for patients with a suspected spinal injury.

Patients with any type of serious head, chest, abdomen, pelvis, or leg injuries should be secured on a backboard.

Other patients that have signs and symptoms of shock should also be secured to a backboard.

Always secure a patient to a backboard with enough triangular bandages (usually 12 to 15) such that the backboard and patient can be turned on its side to allow for drainage if a patient vomits.

PREVENTING INJURY DURING TRANSPORTATION

Be sure you have adequately secured and stabilized a patient before you begin transportation.

Never get in too big a hurry while transporting a patient.

Your objective is to safely transport a patient without causing further injuries. The worst thing that can happen is to cause more patient injuries.

PATIENT ASSESSMENT-PRIMARY AND SECONDARY SURVEY

Must be conducted in the following order to ensure your safety, patient safety and the safety of others who may be assisting you:

SURVEY THE SCENE

Take adequate time to evaluate the scene to ensure the area is safe to enter.

You must always be able to answer these questions:

- A - Is the scene safe?
- B - What happened?
- C - How many patients are there?
- D - Are other people available to help you?

As a rule, never move a patient until treated and stabilized unless there is an immediate danger to you or the patient

PRIMARY SURVEY

A primary survey is used to evaluate and determine if a patient has any life-threatening conditions.

The following must be checked during a primary survey:

- A - Is the patient responsive or unresponsive (Use AVPU method to determine unresponsiveness)
- B - Is the person breathing? Check the breathing by placing your ear close to their mouth and place your hand on their chest. You will feel for exhaled air from their mouth while watching for the rise and fall of the chest.
- C - Bleeding. If you observe severe life-threatening bleeding, then it must be controlled at this time

SECONDARY SURVEY

A secondary survey is started only after all life-threatening conditions as evaluated in the primary survey have been treated

Interview the patient and witnesses, if available

- 1 - If Responsive - ask 3 W's - who, where, what (Does the patient know who they are, where they are, what they were doing when the accident occurred?) Interview witnesses, if applicable
The scene will usually provide evidence indicating what has happened.
- 2 - Determine if the patient's condition is due to trauma or circumstances from the accident, medical condition, or allergic reaction

Check vital signs

Vital signs include level of responsiveness, breathing and skin characteristics

If Responsive, tell patient what you are going to do

Avoid touching painful area and do not have a patient move any area in which there is pain.

Look for medical alert tags or bracelets, necklace, etc.

HEAD TO TOE SURVEY

Examine the entire body, starting at the head.

If any life-threatening problems develop, stop whatever you are doing and treat immediately.

A good tool to use during the survey is the SAMPLE method:

S-Signs and Symptoms

A-Allergies

M-Medical conditions

P-Pertinent medical history

L-Last food or drink

E-Events leading up to the incident

Check the head.

Check for blood or clear fluid in or around the ears, nose, and mouth. These indicate a serious head injury.

Check for bruising around the eyes and behind the ears. This indicates a serious head injury.

Check the pupils. Pupils that are unequal, fully dilated or fully constricted and unresponsive to light indicate a serious injury or illness

Check the neck.

Check for medic-alert necklace.

Look and feel for any neck abnormality. When head or neck injuries are present or patient has pain of the head, neck or back - manage as if a spinal injury is present.

Be cautious of all accidents when the mechanism of the accident could have caused a spinal cord injury.

Check the shoulders.

Check the shoulders and collarbone by feeling for deformity.

Check the chest.

Feel the ribs for deformity and ask the patient to take a deep breath and exhale.

Look and feel for equal movement of both sides of the rib cage. Look and listen for signs of breathing difficulty.

Check the abdomen.

Feel and apply slight pressure on each side of the abdomen, high and low (all 4 quadrants of the abdomen). A normal abdomen is soft, and a rigid abdomen indicates a problem.

Check the hips.

Examine the hips and ask the patient if they have pain in this area. Place your hands on both sides of the pelvis and push down and in. When pushing down and in, ask conscious patients if they feel any pain. If unconscious, observe for nervous system reaction such as flinching, etc.

Check the arms.

Check one arm at a time.

Check each wrist for medic-alert bracelet.

Feel the arms for any deformity.

Check for adequate circulation

Check the back.

Feel the back by reaching under the patient.

Check the legs.

Check one leg at a time.

Check each ankle for medic-alert tag.

Feel the legs for any deformity.

Check for adequate circulation

Ask the patient to move the foot and toes on each leg

PATIENT ASSESSMENT

1. What conditions are evaluated and treated during an initial assessment of a patient?
 - A - Splinting fractures
 - B - Splinting dislocations
 - C - Stabilizing an impaled object
 - D - Level of responsiveness, breathing status, and bleeding and heart status (life - threatening conditions)

2. What is checked during a patient initial assessment?
 - A – Responsiveness, breathing, and bleeding
 - B – Look for bruises and cuts on the body
 - C – Check to make sure the patient can move his feet ok
 - D - Check for paralysis

3. During an initial assessment, which of the following is evaluated and treated first? The scene has been determined to be safe.
 - A - Check responsiveness, evaluate breathing and, check for external Bleeding (R - B - B)
 - B - Suspected fractures
 - C - Evaluation of injuries on extremities
 - D - Possible abdominal injuries

4. What is the first course of action that is performed when a rescuer arrives at any accident scene?
 - A - Ensure the scene is safe for the rescuer(s) and patient(s)
 - B - Go directly to the patient(s) and check for paralysis
 - C - Prepare your splinting equipment; open fractures must be stabilized and splinted immediately
 - D - Evaluate patient immediately for injuries of extremities

5. What may block the airway if a patient becomes unresponsive and is lying on their back, face-up?

- A - Voice box
- B - Tongue
- C - Black lung disease
- D - Lung infection

6. How do you open the airway in a patient that does not have a suspected spinal injury?

- A - Head Tilt - Neck lift
- B - Head Tilt - Chin lift
- C - Modified Chin Lift
- D-Modified Head Tilt

7. How do you open the airway in a patient that has a suspected spinal injury?

- A - Head Tilt - Modified Neck Lift
- B - Head Tilt - Neck Lift
- C - Jaw Thrust If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift
- D-Modified Head Tilt

8. How does a rescuer ensure that a patient's airway is open whether using the Head Tilt - Chin Lift or Jaw Thrust methods?

- A - By proper positioning of the head and lower jaw
- B - By testing for a gag reflex of the throat
- C - By checking for cyanosis
- D-By pinching the forehead and checking for a response

9. How do you evaluate breathing in a patient?

- A - Put your hand on the chest and your ear over their mouth. You will look for the rise and fall of the chest as well as listen and feel for air exchange at the patient's nose and mouth
- B - Check for cyanosis
- C - Move the patient's head from side to side
- D - Look to see if there are any bleeding from the ears

10. How long should a rescuer take to evaluate breathing?

- A - About one (1) second
- B - No less than 5 seconds and no more than 10 seconds
- C - About thirty (30) seconds
- D - About sixty (60) seconds

11. Which of the following will be present if a patient is breathing?

- A - Cyanosis
- B - Obstructed airway
- C - Heart problem
- D - Chest will rise and fall as patient inhales and exhales

12. As a rescuer, you may have to triage or sort patients based on the seriousness of their injuries in a multiple patient accident. Which patient described below would be evaluated and treated first?

- A - A patient that does not respond to any stimuli and appears to be unresponsive
- B - A patient telling you that they cannot feel their legs
- C - A patient shouting, is sweating profusely, and says they feel nauseated
- D - A patient telling rescuers to notify his/her family and tell them that he/she is O.K.

13. A rescuer must leave a patient that is responsive to painful stimuli to call for assistance with no one else present at the scene. What should the rescuer do?
- A - Position patient flat on their back
 - B - Position patient flat on their stomach
 - C - Place the patient in the recovery position if they do not have suspected hip, pelvis, or spinal injuries
 - D - Position patient on their back with their hands over the chest
14. What describes an unresponsive patient?
- A - A patient that does not move, speak, blink, or otherwise react to the voice or touch of a coworker or rescuer
 - B - A patient with obvious, serious lower extremity injuries
 - C - A patient that is coughing loudly and forcefully
 - D - A patient that has severe pain in both arms
15. What describes a responsive patient?
- A - A patient lying face-down and not breathing
 - B - A patient who has no heartbeat
 - C - A patient that does not respond to any form of stimuli
 - D - A patient that can move, speak, blink, or react to the voice or touch of a coworker and or rescuer
16. What should a rescuer do if severe life-threatening bleeding is observed while conducting a patient initial assessment?
- A - Continue with the physical head-to-toe survey
 - B - Continue with a physical head-to-toe survey if no signs of shock are present
 - C - Treat and control the bleeding
 - D - Begin splinting suspected fractures immediately

17. In what position should a rescuer place a responsive patient?
- A - Sitting up
 - B - Lying face down
 - C - Semi-sitting
 - D - The position most comfortable for the patient
18. How do you treat and move a patient when the accident scene and mechanism of injury direct you to suspect that a patient may have a spinal injury?
- A - Treat, stabilize, move, and secure, as if a spinal injury is present
 - B - Open airway using two fingers to open the mouth
 - C - Turn the patient to a face down position to stabilize/secure on a backboard
 - D - Treat for abdomen and pelvis injuries
19. What is correct as related to a patient's level of responsiveness?
- A - An unresponsive patient responds to any stimulus
 - B - A patient that responds when you pinch the skin is responsive to verbal stimulus
 - C - A patient that Responds when you speak to them is Responsive to painful stimulus
 - D - A patient that is unresponsive to any stimulus is classified as unresponsive
20. What level of AVPU responsiveness does a patient have if they react when you speak to them?
- A - Seizure stimulus
 - B - Verbal stimulus
 - C - Painful stimulus
 - D - Unresponsive

21. If a patient reacts when the skin is pinched, then what level of AVPU responsiveness do they have?

- A - Alert
- B - Verbal stimulus
- C - Painful stimulus
- D - Unresponsive

22. What level of AVPU responsiveness does a patient have if they do not react to any form of stimuli?

- A - Alert
- B - Verbal stimulus
- C - Painful stimulus
- D - Patient is Unresponsive

23. What are signs and or symptoms of abnormal breathing?

- A -Breathing rate is 20 times per minute
- B - Breathing rate is 15 times per minute
- C - Noisy breathing (snoring, crowing, gurgling, wheezing, etc.)
- D - Normal deep breathing

24. Which of the following is evaluated when checking a patient's breathing while looking, listening, and feeling?

- A - Suspected Lung Collapse (One Lung)
- B - Presence or Absence of Breathing
- C - Suspected Lung Collapse (Both Lungs)
- D - Sucking Chest Wound effect of One Lung

25. Which organ controls breathing?

- A - Brain
- B - Heart
- C - Lungs
- D - Liver

26. Which of the following can be used to evaluate if blood is circulating effectively in the arms and legs?
- A - Amount of external bleeding
 - B - Signs of a bruise
 - C - Signs of internal bleeding
 - D - Capillary refill
27. What period of time should be used to evaluate capillary refill?
- A - Two (2) seconds
 - B - Five (5) seconds
 - C - 10 seconds
 - D - 60 seconds
28. What is the problem if a rescuer does not get a return of blood when checking capillary refill of an injured arm or leg?
- A - Damaged muscle
 - B - Damaged tendons
 - C - Insufficient circulation in the arm or leg
 - D - Damaged ligaments
29. While conducting a head-to-toe survey on a patient that is breathing normal and responding to verbal stimuli, what should a rescuer look for at the neck, ankles and at wrists?
- A - Needle marks that verify the abuse of drugs
 - B - Medical Alert Tags (Necklace, Bracelet, etc.)
 - C - Bruises that may indicate spousal abuse
 - D - Burn marks that verify the use of marijuana

30. A Rescuer is conducting a head-to-toe survey on patient that has serious head injuries. The patient does respond to painful stimuli. What should be checked while examining the head?

- A - Presence of blood and clear to pink watery-looking fluid (CSF) draining from the nose, ears, or open head wound (signs of skull fracture)
- B - Alignment of the cheek bones
- C - Check for a possible nose fracture
- D - Check for a possible jaw fracture

31. A patient experienced a compression injury to the abdomen and has a rigid, firm, hard-Like abdomen. What does this indicate?

- A - Nothing, a rigid, firm abdomen is normal
- B - An injury or problem in the abdomen
- C - An injured lung
- D - Kidney failure

32. When conducting a head-to-toe survey on a patient, how would you check the chest?

- A - Apply extreme downward pressure to all points along the head and neck.
- B - Gently squeeze the arms from each side and watch for a chest reflex
- C - Feel the ribs for deformity and feel / observe for equal breathing movement and rib abnormalities on both sides of the rib cage
- D - Cross the patient's arms across the chest and apply downward pressure while watching for a reflex

33. When conducting a head-to-toe survey on a patient, what is the procedure for checking the abdomen?
- A - Ask the patient if they feel hungry
 - B - Apply very slight pressure to each side of the abdomen - high and low- all four (4) quadrants to evaluate if the abdomen is soft and normal
 - C - Move the patient to a semi-sitting position to evaluate if pain is present
 - D - Ask the patient to move their head up and down to evaluate if an increase in abdominal pain results
34. When conducting a head-to-toe survey on a patient, what is the procedure for checking the hips and pelvis?
- A - Ask the patient to raise each leg, one at a time
 - B - Ask the patient to roll over to evaluate extent of patient's pain
 - C - The rescuer should lift each leg and observe for a painful reflex
 - D - Push gently, down and in, on both sides of the pelvis and evaluate / observe for a reaction
35. Why is an unresponsive patient usually in worse condition than a responsive patient?
- A - Because the liver has started over-producing bile
 - B - Because the kidneys stop processing urine, causing a severe metabolic fluid condition
 - C - Because the brain is no longer in control of all the major body functions, including the vital organs (Brain, Heart, Lungs)
 - D - Because the lungs have collapsed

36. Which is correct as related to patient monitoring after life-threatening Injuries have been evaluated, stabilized, and treated? The patient is breathing normal and is responding to verbal stimuli.

- A - Emergency care ends once you get patient stabilized at the accident scene and patient ready to be transported
- B - Patient monitoring is required to ensure patient's injuries do not progress to life – threatening conditions such as patient becoming unresponsive.
- C - Patient monitoring is not required because EMS personnel are waiting on the surface
- D - Patient monitoring is not required because the foreman will be taking the patient outside

37. You are the certified and designated ADFA person on your shift that provided emergency care to an injured person on the section. Who can you transfer patient care to for care and transportation from underground to the surface?

- A - Superintendent
- B - Electrical repairman
- C - Any person whose annual retraining is up to date because the patient is breathing normal
- D - Another person certified in ADFA, EMT, or higher level of First Aid training

38. If you are a certified and designated ADFFA person on your shift and you transfer care of an injured patient to a person who does not have equal or higher training than you, what legal standard are you liable for if the patient's condition becomes worse, and he suffers damages?

- A - Breach of first aid care
- B - Illegal consent
- C - Wrongful negligence
- D - Abandonment

39. Which of the following must be considered for patient care when the accident scene reveals to you that a patient may have a spinal injury?

- A - Clothes drag for an emergency move; Jaw Thrust - First Choice for opening the airway; log-roll to get patient on a backboard
- B - Head tilt-chin lift for opening the airway if patient does not have any open head wounds
- C - Log-roll is only necessary if patient has blood and or clear to pink, watery-looking fluid (CSF) draining from the nose, ears or open head wound
- D - Have the patient move around to get blood circulating

40. What best describes Agonal Gasps?

- A - Occurs when a patient has a partial airway obstruction
- B - Is initiated when the brain senses too much sugar in the body
- C - Are stray neurological impulses that occur within the first few minutes following Cardiac Arrest; patient may look and make Sounds like they are trying to breathe
- D - Patient will complain of chapped lips and dry mouth

COLD EXPOSURE AND FROSTBITE

BODY TEMPERATURE

The body temperature must remain constant for the body to work efficiently.

Normal body temperature is 98.6 degrees Fahrenheit.

Body heat is generated primarily through the conversion of food to energy.

Body heat is also produced by muscle contractions such as exercise, shaking and shivering.

Heat always moves from warm areas to cooler area

The body removes heat from the body through the skin. Blood vessels near the skin dilate (get larger) to bring more blood near the surface. Heat escapes through the skin and through sweating.

The body reacts to a cold environment by constricting (get smaller) blood vessels near the skin to avoid losing body heat.

Air temperature, humidity and wind are 3 external factors that affect how the body maintains its temperature.

The clothing you wear also affects how well the body manages extreme temperatures, both hot and cold.

COLD EMERGENCIES

Cold emergencies are divided into 2 types:

- 1) Frostbite
- 2) Hypothermia

Frostbite occurs when the body is exposed to cold.

Hypothermia occurs when the body can no longer generate sufficient heat to maintain normal body temperature.

FROSTBITE

Frostbite is the freezing of body tissues.

Frostbite can affect the skin or deep tissues.

NOTE: In frostbite, the water between and in the cells freeze and swell, causing damage or destruction of the cells.

SIGNS AND SYMPTOMS OF FROSTBITE

- 1) Lack of feeling in the affected area.
- 2) Skin that appears waxy.
- 3) Skin that is cold to the touch.
- 4) Skin that is discolored (flushed, white, yellow, or blue)

TREATMENT FOR FROSTBITE

- 1) Check and treat RBB's
- 2) Handle the area gently and cover the affected area to rewarm if you don't have warm water immediately available to rewarm the body part.
- 3) If available, place the frostbitten part in warm water that is 98.6 to 104 degrees Fahrenheit. Test the water to make sure the water is comfortable. If the water temperature is uncomfortable for you, it is too hot.
- 4) Keep the frostbitten body part in the warm water until it appears red (normal) and feels warm.
- 5) After rewarming, bandage the area with a dry, sterile dressing.
- 6) Avoid breaking any blisters
- 7) Recheck and monitor RBB's
- 8) Transport to the hospital safely

Note: Do not try to rewarm the frostbite if there is any chance that it might refreeze or if you are close to a medical facility.

HYPOTHERMIA

Hypothermia occurs when the entire body cools after the warming mechanisms have failed.

Hypothermia patients will die if not treated.

In hypothermia, the body temperature drops below 95 degrees Fahrenheit.

The heart begins to beat irregular and eventually will stop as the body temperature cools in this situation. Death will then occur.

SIGNS AND SYMPTOMS OF HYPOTHERMIA

- 1) Shivering
- 2) Slow, irregular pulse
- 3) Numbness
- 4) Glassy stare
- 5) Apathy and decreasing levels of consciousness

TREATMENT FOR HYPOTHERMIA

- (1) Check and treat the RBB's. Treat life threatening problems immediately.
- (2) Notify and arrange to transport to a medical facility (hospital) as quickly and safely as possible.
- (3) Remove any wet or damp clothing.
- (4) Dry the patient, if wet.
- (5) Wrap the patient in blankets, put on dry clothing, etc.
- (6) Move the patient to a warm area.
- (7) If available, hot water bottles, heating pads, etc. can be applied to help rewarming the body.
- (8) Give patient warm liquids to drink if conscious and fully alert
- (9) Never rewarm the patient too quickly because too rapid rewarming can cause dangerous heart rhythms.
- (10) Handle the patient very gently.
- (11) Recheck and monitor RBB's
- (12) Transport the patient to the hospital as quickly and safely as possible.

HEAT EXPOSURE

Illnesses caused by exposure to extreme temperatures are progressive and can become life-threatening.

When symptoms of a heat-related illness begin to appear, a patient's condition can get worse and can lead to death.

Immediate treatment can prevent the illness from becoming life-threatening.

The body releases heat through the skin and by sweating. Blood vessels near the skin dilate (get larger) and help bring excessive heat to the surface of the skin.

HIGH RISK PEOPLE FOR HEAT RELATED ILLNESSES

- 1) Those who work strenuously outdoors
- 2) Elderly people
- 3) Those with health problems
- 4) Those who have had a heat-related illness in the past
- 5) Those who have a respiratory or cardiovascular disease (heart problem) or other conditions that cause poor circulation (diabetes)
- 6) Those who take medications to eliminate water from the body

HEAT - RELATED EMERGENCIES

- 1) Heat cramps
- 2) Heat exhaustion
- 3) Heat stroke

HEAT CRAMPS

Heat cramps are painful spasms of muscles.

Believed to be caused by a combination of fluid and salt loss caused by heavy sweating.

Heat cramps develop rapidly and usually occur after heavy exercise or work outdoors in warm temperatures.

Heat cramps usually affect the leg or abdomen muscles

TREATMENT FOR HEAT CRAMPS

- 1) Have the patient move to a cool place and rest comfortably.
- 2) Provide cool water or a commercial sports drink (Gatorade)
Usually rest and fluids are all that the body needs.
- 3) The patient should not resume any activity until the cramps stop.
- 4) Inform the patient to drink plenty of fluids during physical activities.

HEAT EXHAUSTION

Heat exhaustion is the most common form of heat-related illness. Heat exhaustion occurs after long periods of strenuous exercise or work in a hot environment.

Heat exhaustion is an early sign that the body's temperature - regulating mechanism is becoming overwhelmed. The patient loses fluid through sweating which decreases the blood volume. Blood flow to the skin increases, which reduces blood flow to the vital organs. The patient goes into mild shock because the circulatory system is affected.

SIGNS AND SYMPTOMS OF HEAT EXHAUSTION

- 1) Normal or below-normal body temperature
- 2) Cool, moist, pale skin
- 3) Headache
- 4) Nausea and/or vomiting
- 5) Dizziness and weakness
- 6) Exhaustion
- 7) Possible change in the level of consciousness
- 8) Increasing level of body temperature, if not treated promptly

TREATMENT FOR HEAT EXHAUSTION

- 1) Have the patient move to a cool place and provide comfortable patient rest.
- 2) Provide cool water to drink if the patient is conscious and fully alert.

HEAT STROKE

Heat stroke is the most serious heat-related illness but is the least common. Heat stroke usually occurs when patients ignore the signs and symptoms of heat exhaustion.

Heat stroke develops when the body heat regulating mechanism begins to stop functioning.

Heat stroke causes the body to stop sweating because the body fluids have become low.

When sweating stops, the body cannot cool itself effectively and the body temperature rises rapidly.

The body temperature will rise to such a high level that the brain, heart and kidneys will begin to fail.

If the body is not cooled, convulsions, coma and death will result.

NOTE: HEAT STROKE IS A SERIOUS MEDICAL EMERGENCY

SIGNS OF A HEAT STROKE

- 1) High body temperature (may go as high as 106 degrees Fahrenheit)
- 2) Red, hot, dry skin
- 3) Rapid, weak, or irregular pulse
- 4) Rapid, shallow breathing
- 5) Progressive loss of consciousness

TREATMENT OF A HEAT STROKE

- 1) Move the patient to a cool place and provide comfortable patient rest.
- 2) Evaluate and treat RBB
- 3) Remove any tight or heavy clothing
- 4) Cool the body by applying cool, wet cloths, towels, sheets, etc. to the skin (If ice packs are available, place on the neck, armpits, ankles, wrists, etc. to cool large blood vessels, preferably immersing the victim in cold water.
- 5) Do not try to force the victim to drink liquids. Heat stroke requires emergency treatment with intravenous fluids.
- 6) Monitor the patient closely and watch for changes in their condition.
- 7) Keep the patient lying down and continue to cool the body.
- 8) Recheck and treat RBB

HEAT AND COLD EMERGENCIES

1. Which statement is correct as related to body temperature heat?
 - A - Heat is generated primarily through the conversion of food to energy
 - B - Heat is also produced by the liver secreting insulin
 - C - Heat always moves from cool areas to warm areas
 - D - An increase in body temperature has no effect on the body's systems

2. Which statement is correct as related to body temperature?
 - A - When body heat increases, the body removes heat through the liver
 - B - Blood vessels near the skin dilate (widen) to bring more blood and heat near the surface to escape when hot and when reacting to cold the blood vessels constrict near the skin to conserve the heat
 - C - The body reacts to cold by producing more bile in the gall bladder
 - D - Shivering results when the body gets overheated

3. Who would be classified as a person at risk for a heat or cold related illness?
 - A - Those who work or exercise strenuously outdoors or in unheated or poorly cooled areas
 - B - Those with health problems such as heart problems, diabetes, etc.
 - C - Those who have a respiratory or cardiovascular disease or other poor circulation illness (diabetes)
 - D - All the above would be classified as a person at risk

4. What should be done to treat heat cramps?
 - A - Give salt tablets or salt water
 - B - Have the patient move around in the heat to get acclimated
 - C - Provide cool water or commercial sports drink (Gatorade, etc.) to drink
 - D - Gently massage the head and neck area

5. Which of the following is the most common heat related illness?

- A - Heat cramps
- B - Heat exhaustion
- C - Heat stroke
- D - Heat virus

6. Which is a sign and or symptom of heat stroke?

- A - Nausea and vomiting
- B - Red, hot dry skin from onset until the heart stops beating
- C - Headache and dizziness
- D - All the above would be correct

7. Which is correct as related to the treatment of heat exhaustion?

- A - Can usually be reversed by drinking hot coffee
- B - Have the patient rest in the hot sun as much as possible
- C - Give the patient cool water to drink when responsive, alert, and is not vomiting
- D - Keep the patient hot and physically active to allow the nervous system to adjust to the heat

8. What is the least common but most serious heat related illness?

- A - Heat cramps
- B - Heat exhaustion
- C - Heat stroke
- D - Heat virus

9. Which is correct as related to heat stroke?

- A - Occurs often when a patient ignores the signs and symptoms of heat exhaustion. The body temperature will rise rapidly
- B - Develops when body systems are overcome by the effects of heat and begin to stop functioning
- C - Sweating stops because body fluids are low
- D – All the above are correct

10. Which is a sign of heat stroke?

- A - Cool, moist skin
- B – Pain and swelling in the liver
- C - High body temperature
- D – The patient will complain of numbness in their toes

11. What is correct as related to the treatment of a heat related illness?

- A -Apply rubbing alcohol to the skin in generous amounts
- B - Have the patient drink cool water or Gatorade slowly if responsive, alert and is not vomiting
- C - If unresponsive pour small amounts of water (two ounces at a time) into the corner of the mouth
- D - Have the patient resume normal activities immediately to shake off the effects

12. A patient is showing signs and symptoms of a heat related illness. What is an indication that the patient's condition is getting worse?

- A - The patient refuses to drink water
- B - The patient starts vomiting
- C - The patient's level of Responsiveness / Consciousness starts declining
- D – All the above would be correct

13. A Patient is suffering a heat related illness. The rescuer is giving the patient water to drink and the patient starts vomiting. How should the rescuer treat?
- A - Continue to give water to drink
 - B - Give more water at a faster rate - one glass every five (5) minutes
 - C - Stop giving water to drink
 - D - Keep patient lying down and elevate the feet
14. Which is a correct statement as related to cold and frostbite emergencies?
- A - Frostbite is the freezing of body tissues
 - B - Frostbite usually occurs in exposed areas of the body (face, hands ears and fingers)
 - C - Frostbite causes water in and between body cells to freeze and swell
 - D - All the above would be a correct statement
15. Which is a factor that directly affect cold emergencies?
- A - The wind
 - B - Air temperature
 - C - Length of exposure
 - D - All the above affect cold emergencies
16. What should be the rewarming temperature of water applied to frostbitten body parts according to the 2015 ILCOR revised treatment recommendation?
- A - 98.6 to 104 degrees Fahrenheit for 20 to 30 minutes until the skin and temperature appears normal
 - B - 110 to 120 degrees Fahrenheit - for not less than 30 minutes
 - C - 120 to 130 degrees Fahrenheit - for not less than 45 minutes
 - D - 150 to 180 degrees Fahrenheit - for not less than 60 minutes

17. Which is a correct statement as related to the treatment for frostbite?

- A – Never rub the affected area
- B - Handle the affected area very gently
- C - Cover the affected area before and after re-warming in water
- D -All the above would be correct

18. How long should a frostbitten area remain in water used for rewarming”?

- A - At least 4 minutes
- B - At least 6 minutes
- C - Until the area appears white and the skin looks wrinkled
- D - Until the area appears normal and feels warm or until delivered to EMS personnel

19. Which is a sign or symptom of hypothermia?

- A - Decreasing level of consciousness
- B - Numbness
- C - Glassy stare
- D – All the above would be correct

20. Which is a correct statement as related to treating hypothermia?

- A – Have the patient take off their coat to acclimate to the cold
- B - If the patient is alert, give plenty of cold water to drink (1 glass every 15 minutes)
- C - Contact the patient’s next of kin
- D - Remove wet clothing, keep the patient dry, and cover the body with blankets to keep them warm

21. Which is a sign and or symptom of frostbite?

- A - Lack of feeling in the affected area
- B - Skin that is cold to the touch
- C - Skin that is discolored (flushed, white, yellow, blue)
- D – All the above are correct

SUDDEN ILLNESS

Sudden illnesses have a variety of signs and symptoms.

A patient's level of consciousness may change.

A patient may complain of feeling lightheaded, dizzy, weak, nauseated and/or vomit.

Breathing, pulse and skin characteristics may change.

Sudden illnesses such as fainting, diabetes, epilepsy, stroke, and shock can cause a change in consciousness.

FAINTING

Fainting is the most common sudden illness.

Fainting is a partial or complete loss of consciousness.

Fainting is caused by a temporary reduction of blood flow to the brain as blood pools in the legs and lower body.

Fainting can be triggered by an emotional shock such as the sight of blood, pain, medical conditions, standing for a long time, overexertion, etc.

SIGNS AND SYMPTOMS OF FAINTING

- 1) Lightheaded or dizzy feeling
- 2) Signs of shock, including pale, cool, moist skin
- 3) Nausea feeling
- 4) Numbness and tingling of the fingers or toes
- 5) Increase in breathing and/or pulse rate

TREATMENT FOR FAINTING

Fainting usually resolves itself.

When a patient is moved from an upright position to horizontal position, normal circulation is restored to the brain.

The patient usually regains consciousness within a couple of minutes.

TREATMENT:

- 1) Evaluate and treat RBB's
- 2) Lower the patient to the ground or a flat surface
- 3) Elevate the patient's feet 8 to 12 inches
- 4) Loosen any tight clothing
- 5) Recheck the RBB's

DIABETIC EMERGENCIES

Body cells need sugar as a source of energy.

The body breaks down food into sugar.

Sugars cannot pass freely into the body cells.

Insulin is necessary to help sugars pass into the body cells.

Insulin is produced by the pancreas.

A condition in which the body does not produce enough insulin is called sugar diabetes. A person who has this condition is called a diabetic.

Any person who is a diabetic must carefully monitor their diet and exercise. When a diabetic fails to control these factors, either of two problems can occur - too much or too little sugar in the blood. Either imbalance can become a diabetic emergency.

HYPERGLYCEMIA (Hyper-High Sugar Level)

- The sugar level in the blood is high
- The insulin level in the blood is low
- Sugar is present in the blood but cannot be transported into cells due to low insulin
- Diabetic coma results if the hyperglycemia condition is not treated promptly

HYPOGLYCEMIA (Hypo-low Sugar Level)

- The insulin level in the blood is too high
- The sugar level in the blood is low
- The sugar level can become too low if the diabetic:
 - 1) Takes too much insulin
 - 2) Fails to eat adequately
 - 3) Over-exercises and burns off sugar faster than normal
 - 4) Experiences great emotional stress
- An insulin reaction - insulin shock results if the hypoglycemia condition is not treated promptly

SIGNS AND SYMPTOMS OF DIABETIC EMERGENCIES

- 1) Changes in the level of consciousness, including dizziness, drowsiness, and confusion
- 2) Rapid breathing
- 3) Rapid pulse
- 4) Feeling and looking ill

TREATMENT FOR DIABETIC EMERGENCIES

Conduct primary survey

Evaluate and treat RBB's

Conduct a second survey

If conscious, ask the patient if they are diabetic

If unconscious, look for a medic-alert tag on the neck, wrists, and ankles

If conscious, give sugar in some form, such as candy, fruit juices, non-diet soft drinks. Common table sugar, either dry or dissolved in a glass of water can be given.

If the patient's problem is low blood sugar (hypoglycemia), the sugar will help the patient quickly. If the patient's problem is high blood sugar (hyperglycemia), the excess sugar will not harm the patient.

Maintain normal body temperature (keep the patient warm)

Recheck and treat RBB's

Transport to the hospital if the patient does not feel better within 5 minutes after taking sugar.

EPILEPSY

An acute or chronic condition that may cause seizures.

A seizure is a loss of body control caused by an electrical irregularity of the brain.

The electrical activity of the brain becomes irregular when normal functions of the brain are disrupted by injury, disease, fever, infection, or epilepsy.

SIGNS AND SYMPTOMS OF A SEIZURE

- 1) Patient may have an unusual sensation or feeling such as a visual hallucination, a strange sound, taste, smell or urgent need to get to safety
- 2) Uncontrolled muscular contractions (convulsions)
- 3) Irregular or possibly stoppage of breathing

TREATMENT FOR A SEIZURE

- 1) Check and manage the airway
- 2) Protect the patient from injury
- 3) Position the patient on one side for drainage, if saliva or vomitus is present in the mouth
- 4) Never place anything in the patient's mouth, including your fingers
- 5) Perform a secondary after the seizure has run its course, Treat any injuries that may have occurred during the seizure. Offer comfort and reassure the patient. Ask bystanders not to crowd around the patient
- 6) Stay with the patient until they are fully conscious and aware of their surroundings. Seizure patients usually recover in a few minutes.

TRANSPORT THE FOLLOWING SEIZURE PATIENTS TO THE HOSPITAL

- 1) If the seizure lasts more than a few minutes
- 2) If the patient has repeated seizures
- 3) If the patient appears to be injured
- 4) If you are uncertain about the cause of the seizure
- 5) If the patient is a known diabetic
- 6) If the seizure takes place in water
- 7) If the patient fails to regain consciousness after the seizure

STROKE

A stroke is caused by a disruption of blood to the brain, serious enough to damage brain tissue. A stroke is caused by one of the following:

- 1) A clot that forms in the brain and restricts or stops blood flow
- 2) A clot that forms elsewhere in the body, travels to the brain and restricts or stops blood flow
- 3) A blood vessel that bursts in the brain

A head injury, high blood pressure, a weak area in a blood vessel, fat deposits in a blood vessel or a tumor may cause a stroke.

SIGNS AND SYMPTOMS OF A STROKE

- 1) A patient looking or feeling ill
- 2) Changes in consciousness or abnormal behavior
- 3) Weakness and numbness of the face, arm, or legs usually on one side of the body
- 4) Difficulty in talking or understanding verbal communications
- 5) Blurred or dimmed vision
- 6) Unequal pupils
- 7) Sudden, severe headache
- 8) Dizziness, confusion, changes in behavior/mood
- 9) Ringing in ears
- 10) Loss of bladder or bowel control

TREATMENT FOR A STROKE

- 1) Check and treat RBB's (Treat all life-threatening conditions)
- 2) Position the patient on one side if fluid or vomitus is present in the mouth.
- 3) Secure to a backboard and transport quickly and safely to the hospital
If the patient is conscious:
 - A - Conduct a secondary survey
 - B - Comfort and reassure the patient
 - C - Never give anything to eat or drink
 - D - Place the patient on one side if any type of material is present in the mouth
- 4) Recheck RBB's while transporting

ANAPHYLAXIS - ANAPHYLACTIC SHOCK - SEVERE ALLERGIC REACTION

Severe allergic reactions are rare but are life-threatening if they occur.

Anaphylaxis is a form of shock.

Anaphylaxis (severe allergic reaction) can be caused by an insect bite, sting or by contact with drugs (penicillin), medications, food, chemicals, etc.

SIGNS AND SYMPTOMS OF ANAPHYLAXIS

- 1) Usually occurs suddenly
- 2) Skin or area of the body affected usually turns red and swells
- 3) Hives, rash, and itching
- 4) Weakness
- 5) Nausea and vomiting
- 6) Dizziness
- 7) Breathing difficulty, including coughing and wheezing

TREATMENT OF ANAPHYLAXIS

- 1) Check and treat the RBB's
- 2) Assist the patient to make as comfortable as possible.
- 3) Keep the patient as calm as possible.
- 4) Monitor and treat the RBB's

NOTE: If a patient is known to have severe allergic reactions and carries an anaphylaxis kit, you can assist the patient with the injection of epinephrine.

Sudden Illness

DIABETES, EPILEPSY, STROKE, ANAPHYLAXIS, and FAINTING

1. Which hormone must be present in the body in a sufficient amount necessary for the body to break down and use sugar?
 - A - Insulin
 - B - Bile
 - C - Kidney fluids
 - D - Spleen fluids

2. Which is correct as related to diabetic emergencies?
 - A - When the insulin in the body is too low, the sugar level in the blood is high
 - B - When the insulin in the body is too high, the sugar level is low
 - C - Sugar given in various forms can restore a diabetic patient's condition to normal
 - D - All the above would be correct

3. What illness results when too much or too little sugar is present in the body?
 - A - Liver disease
 - B - kidney disease
 - C - Diabetic emergency (Hyperglycemia and Hypoglycemia)
 - D - Spleen disease

4. A known diabetic patient becomes dizzy and feels ill. How should a rescuer treat?

- A - If responsive and talking, give sugar in some form.
If ever in doubt, then always give sugar in some form
- B - Walk the patient around to see if the patient gets worse before giving any form of sugar
- C - Do nothing, the patient is probably coming down with the flu
- D - Give the patient nothing but stimulants to drink, such as hot coffee with no sugar

5. Which statement is correct as related to diabetic emergencies?

- A - Never give anything by mouth unless the patient is fully responsive, talking and alert
- B - Sugar given in some form to a patient that has low blood sugar (Hypoglycemia) will help the patient quickly and may save their life
- C - Sugar given in some form to a patient that has high blood sugar (Hyperglycemia) will not cause any more significant problems than what already exists during an emergency
- D - All the above would be correct

6. What may cause a seizure to occur?

- A - Disease, epilepsy, and high fever
- B - Sunburn
- C - Injuries to the feet and ankles
- D - Injuries to arms and hands

7. What is a correct statement as related to seizures?
- A - A seizure is a loss of body control due to irregular electrical activity in the brain
 - B - Place a piece of wood, bite stick, etc. in the patient's mouth to prevent the patient from biting their tongue
 - C - A rescuer's main objective in treating a patient having seizures is hold them down to prevent them from moving
 - D - Place your fingers in the patient's mouth to keep the airway open
8. What types of patients having a seizure should seek medical help?
- A - The patient fails to regain consciousness after the seizure
 - B - The patient has repeated seizures
 - C - The patient is a known diabetic
 - D - All the above would be correct
9. Which statement is correct as related to causes and effects of a stroke?
- A - A blood clot may form on the brain and block the supply of blood to a particular part of the brain
 - B - A blood clot may form elsewhere in the body, travel to the brain and block a blood vessel in the brain
 - C - A blood vessel may rupture in the brain
 - D - All the above are causes and effects of a stroke
10. Which is a sign or symptom of a stroke?
- A - Difficulty with talking or understanding speech
 - B - changes in responsiveness and or behavior
 - C - Weakness and numbness of the face, arm, or leg that usually only affect one side of the body
 - D - All the above are correct

11. Which is a sign or symptom of a stroke?

- A - Pain in the left upper quadrant
- B - Blurred or dimmed vision, confusion, or sudden change in mood, the patient may become unresponsive, or lose bowel or bladder control
- C – Sudden onset of the patient getting hungry
- D - The patient will complain of throbbing pain in his feet and ankles

12. When treating a suspected stroke patient, what is the main concerns that a rescuer should have?

- A - Evaluate responsiveness, monitor breathing, treat life - threatening conditions and any injuries
- B - Immediately check their toes for any signs of swelling
- C – Ask the patient to do 20 sit-ups to evaluate their brain activity
- D - Give the patient plenty of water to drink to help thin the blood

13. What may occur during or after a seizure?

- A - Breathing may become irregular and even stop temporarily
- B - A fever may result
- C - The patient will complain of his right leg being numb
- D – The patient will be hyperactive after the seizure

14. Which is correct as related to mini strokes?

- A - Signs and symptoms usually appear when patient has the flu
- B - Mini-strokes are caused by reduced blood flow to part of the brain
- C - Mini-strokes are temporary episodes similar to having shingles
- D - Mini-strokes are caused by lung disease

15. What is used to help a rescuer recognize the warning signs and treatment for a patient suspected of having a stroke?
- A - The FAST Method: F for Face Drooping, A - for Arm Weakness, S - for Speech Difficulty, T for Time to contact EMS and Transport immediately
 - B - AVPU Evaluation
 - C - Check / evaluate capillary refill
 - D-The Check, Call, and Care Method
16. A surface person had been looking for a scoop universal joint in the hydraulic parts trailer. He suddenly comes running into the mine Office coughing severely and complains of breathing difficulty. What has most likely happened and what would you treat for?
- A - Bee sting or spider bite; treat for Anaphylactic Shock
 - B - Heart attack; treat for heart attack
 - C - Stroke; treat for a stroke
 - D-Angina: treat for angina pain
17. A patient gets stung by a honeybee and very quickly begins having breathing difficulty and starts wheezing. The face and lips begin to swell which indicate that the patient is going into Anaphylactic Shock. What is the 2015 Revised recommendation for treating a responsive talking patient suspected of experiencing Anaphylactic Shock?
- A - Assist patient with an Injection of Epi-pen in the Mid - Thigh
If patient's condition does not improve in five (5) to ten (10) minutes, then assist patient with a second dose.
Notify EMS Personnel Immediately
 - B - Treat patient for a Severe - Complete Airway Obstruction
 - C - Give patient two (2) Adult Aspirins (325 mg)
 - D-Call their next of kin to report the bee sting

18. You respond to an emergency where a known diabetic patient is complaining that they have been feeling sick for the past 10 hours. The patient has red, dry skin and their speech is slurred. You think the patient is in a state of Hyperglycemia but are unsure. What should you do?

- A - This patient is in a state of Hyperglycemia. If you are in doubt as to whether to give sugar, then always give sugar even if the patient doesn't need the additional sugar. This extra Sugar will not harm a patient having Hyperglycemia
- B - Treat for Infected Kidneys because they are not filtering the acid waste product created by the imbalance of sugar and insulin
- C - Treat for infected Liver because the Liver is not storing enough Insulin for the body.
- D-Treat for gall bladder infection caused by lack of insulin

EMERGENCY UNDERGROUND RESCUE AND TRANSFER

ROOF-RIB FALL ENTRAPMENT

PERSONAL SAFETY

Roof and rib fall accidents account for many mining injuries each year. Roof fall entrapments are one of the most serious and most dangerous situations that a rescuer may have to manage.

The first consideration that must be analyzed at the scene of any emergency is the safety of the rescuer and others assisting in rescue efforts. Many rescuers and bystanders have been injured at accident scenes because they failed to evaluate the situation for personal safety hazards. Even though rescuers are oriented in rapid response, a rescuer absolutely cannot overlook adequate safety for yourself and others. Always approach any emergency scene very cautiously. Never rush into a roof fall or any other accident area prior to conducting proper roof evaluations for personal safety hazards. If a rescuer has any doubt about the safety of an emergency scene, he should request assistance from the mine foreman designated by the operator.

SECURING THE SCENE

Securing the scene is the second course of action that should be taken at the scene of a roof-rib fall entrapment. Making the scene safe helps ensure the safety of the rescuer and to every extent possible, the patient and others at the scene. Temporary roof support may have to be installed to make the accident area safer to enter. A rescuer must always remember that some adverse condition was present for this type of accident to occur. A rescuer may have to solicit the help of other personnel to make the area safe to enter. As soon as possible, a rescuer should evaluate measures that may be required to secure the scene to help prevent further injury to the patient. From second to second, no one knows when more roof or rib material may become adverse that could cause more injuries to the patient or personnel attempting to rescue a patient.

The roof and/or rib fall areas must be secured as soon as possible to help preserve the safety of the patient and everyone working to help the patient. Once again, a rescuer should request guidance and assistance from the designated mine foreman while attempting to secure the scene

GAINING ACCESS

Gaining access is the third course of action that should be taken at the scene of a roof-rib fall entrapment. The initial evaluation of the scene should include the safest direction from which to approach and attempt to gain access to the patient. A rescuer should always be assisted by the designated mine foreman in determining the safest approach to gain access to an injured person. Access at this type of situation may vary from minor work to major work that may require installing several timbers, cribs, safety jacks, etc. to maintain a safe work area while approaching a patient. A rescuer must remember though that roof-rib conditions may deteriorate as you gain access and will require you to take time to re-evaluate the accident area. Additional roof support may have to be installed to maintain the scene as safely as possible for the rescuer and the patient.

The patient's location, types of injuries and severity of injuries should be evaluated while determining the safest direction from which to gain access. A rescuer may have to alter the access plan or direction of access if roof-rib conditions deteriorate that could jeopardize the safety of the rescuer or the patient.

EXTRICATION

Extrication or removing a patient from an accident scene occurs after a rescuer can safely gain access. Patients should be treated and stabilized at the scene of an accident but situations that may endanger the rescuer or patient will require the patient to be moved. A rescuer may have to move a patient before administering any type of first aid treatment. To the extent that the area is safe, patients should be treated and stabilized at the accident scene, but if the safety of the rescuer or patient is jeopardized, then the patient may have to be moved to a safe area for treatment. Periodic roof-rib evaluations should be conducted to ensure the area remains safe to work in.

Two key elements to consider as related to emergency extrication are: The rescuer should coordinate the handling of extrication activities and adequate support personnel should be available to stabilize all the patient's injuries to the extent possible.

Even though suspected neck-spinal injuries are treated during stabilization/transportation, the spinal cord must be protected in all accidents where the mechanism of the accident could have caused a spinal injury. As related to a roof-rib fall accident, the patient should be handled as if they have a spinal injury, until proven otherwise.

If emergency movement is necessary prior to stabilizing a patient, then the head should be maintained in a neutral, in line position. With the head maintained in this neutral-in-line position, the body should be rolled or moved as a unit if such movement is necessary. Clothes drag is usually the quickest and probably the most effective emergency move that a rescuer can use on a patient with suspected spinal injuries that is lying down.

STABILIZATION AND TRANSPORTATION

As a rule, patients should be treated and stabilized at the scene if the area remains safe. Certain roof-rib entrapment situations could possibly require emergency movement of a patient to a safe work area after freed from the entrapment. A rescuer must always remember that a roof-rib situation could become worse at any minute and may require alternative first aid action.

The first aid treatment for a roof-rib fall entrapment patient is generally the same as other types of accidents. The RBB's of first aid (responsiveness, breathing, bleeding) should be followed.

One of the most important areas that must be remembered is that the airway, breathing and other body movements should be managed as if a spinal injury is present. In these types of accidents with suspected spinal injuries, the modified jaw thrust should be used to open and maintain the airway. Other injuries should be treated and stabilized, and the patient transported to a medical facility.

A rescuer should consider the safest type of transportation, extent of injuries and severity of injuries while planning patient transportation. In some situations, a choice of transportation may not be an option.

EMERGENCY UNDERGROUND ROOF/RIB FALL ACCIDENTS RESCUE

1. What is the first consideration that a rescuer must always evaluate at the scene of an emergency that involves a roof or rib fall?
 - A - Whether the patient can feel and move all four extremities
 - B - Personal safety, safety of assisting rescuers, and the patient to the extent safety will allow
 - C - Whether the patient is responsive / conscious
 - D - Whether the patient is trapped

2. A rescuer has arrived at the Scene of an accident where a person is entrapped underneath a roof/rib fall. The entrapped person has not responded to verbal communications from coworkers. The rescuer is not exactly sure of how to support the area and the safest direction from which to approach the patient. Who should the rescuer seek assistance from?
 - A - The mine engineer
 - B - Local fire department personnel trained in “cave rescue”
 - C - The mine / section foreman designated by the mine operator
 - D - Local rescue squad personnel

3. What should a rescuer do next at the scene of a roof/rib fall accident after the area is evaluated to be safe to enter? (Refer to Question No.2)
 - A - Secure the scene as necessary; closely monitor the area to ensure more material does not fall on the rescue personnel or patient
 - B - Go directly to the patient and check for head and chest injuries
 - C - Go directly to the patient and check for bleeding
 - D - Go directly to the patient and conduct a physical head-to-toe survey to determine the extent of injuries

4. What would ordinarily be used as support material to secure the roof/rib, to gain safe access to a roof/rib fall patient?
 - A – Timbers, crib blocks, or safety jacks
 - B -Rock dust
 - C -PVC pipe
 - D - Brattice material, curtain, etc.

5. If safe to do so, where should an unresponsive patient injured in a roof/rib fall accident be stabilized and treated?

- A - At the scene where the accident occurred, if possible and safe
- B - Move the patient to the loading point, treat and stabilize
- C - Move the patient to the section power center where the first aid equipment is normally located
- D - Move the patient to a location that makes it easier to treat and stabilize

6. How should the airway be opened in a suspected unresponsive patient injured in a roof/rib fall accident?

- A - Jaw Thrust - First Choice; If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift
- B - Head Tilt - Neck Lift
- C - Head Tilt - Modified Neck Lift
- D-Head Thrust—Chin Tilt

7. Which would be the most critical while treating a suspected unresponsive patient injured in a roof /rib fall accident?

- A - How to treat and stabilize a dislocated thumb
- B - How to treat and stabilize a suspected elbow injury
- C - How to treat and stabilize a suspected ankle injury
- D - How to treat and stabilize for spinal injuries that should be suspected in all roof/rib fall accidents

8. An Unresponsive patient found at the scene of a roof/rib fall accident requires moving to a safe location to stabilize and treat. In what position should the patient's head be maintained while moving?
- A - The head should be turned over the left shoulder to allow unrestricted circulation through the right carotid artery
 - B - The head should be turned over the right shoulder to allow unrestricted circulation through the right jugular vein
 - C - The head should be maintained in a neutral-in-line position with the body, if possible; use (clothes drag) one - man, emergency move as is necessary.
 - D - Bend the head down with the chin against the chest before dragging to a safe location
9. A responsive patient has been injured in a roof/rib fall accident. The patient has serious head injuries and is complaining of numbness and tingling in the arms and legs. What type of treatment should this patient receive?
- A - Treat for stroke since the patient is responsive and no stabilization is necessary
 - B - Treat for head, neck, and spinal injuries. stabilize on a backboard
 - C – Treat only for a head injury and give aspirins for the headache
 - D - Have the patient crawl or walk to stimulate blood flow to the brain to relieve the headache

MACHINERY AND EQUIPMENT ENTRAPMENT

PERSONAL SAFETY

Machinery accidents are usually the second or third leading cause of fatalities across the nation. Machinery entrapment could present many dangers to a rescuer.

The first consideration that must be analyzed at the scene of any emergency is the safety of the rescuer and other assisting personnel. A rescuer must always remember that their personal safety and the safety of bystanders should be considered first. It's bad enough that one person has been injured, but the situation gets even worse when a rescuer or bystander becomes the second patient. Always size up the scene and evaluate any hazards that may exist while patient rescue attempts are being made.

Machinery entrapment/accidents could present multiple dangers for rescue personnel including electrical hazards, unintentional movement or falling of machinery, and possibly roof fall hazards.

A rescuer must always take the time to recognize apparent dangers and take the necessary safety precautions to prevent injury to himself or others at the scene.

SECURING THE SCENE

Securing the scene is the second course of action that should be taken at the scene of a machinery entrapment. Making the scene safe helps ensure the safety of the rescuer and to every extent possible, the patient and others at the scene.

To the extent possible, electrical power should be de-energized on machinery involved with an entrapment accident. Even though electrical power may be needed to help remove a patient, a rescuer should get assistance from an electrician and a mine foreman to help determine if the scene is safe with electrical power on the machinery.

Machinery wheels should be blocked to prevent accidental movement and machinery raised to extricate a patient should always be securely blocked to help secure the scene. In addition to blocking machinery, roof support may also be necessary to secure the scene in certain situations.

GAINING ACCESS

Gaining access is the third course of action that should be taken at the scene of a machinery entrapment. A patient may be entrapped underneath machinery or entangled in some machinery component. A rescuer should remember though, to the extent possible electrical power should be removed unless evaluated by a mine foreman and electrician and determined to be safe.

Even though electrical power on the machine may be necessary to help gain access to the patient, electrical power should be removed to the extent possible. Additional dangers such as shock hazards may be present if electrical power is left on.

The patient's location, types of injuries and severity of injuries should be evaluated while determining the safest means of gaining access to the patient.

If determined to be safe, a machine or machine component may have to be moved to gain access to the patient. Anytime a machine or machine component is raised, blocking material should be immediately available to secure the machine, if deemed necessary. Always be sure to have a qualified person move the machinery to prevent accidental movement in the wrong direction. A patient could be more seriously injured or killed if the machine is moved in the wrong direction.

A machine or machine component may have to be lifted or jacked up to gain access. Always remember though that if a machine must be raised or lifted, secure blocking must be installed as the machine is lifted to prevent accidental falling on the patient or rescue personnel.

EXTRICATION

Extrication or removing a patient from entrapment occurs after a rescuer can safely gain access. Machinery entrapment accidents will require extrication before extensive first aid can be provided. To the extent possible, life-threatening injuries (RBB's) may be treated as soon as safely gaining access to a patient.

The type and severity of injuries must be evaluated to safely extricate or move an injured person. Two key elements to consider as related to emergency extrication are: The rescuer should coordinate the handling/extrication activities and adequate

support personnel should be available to stabilize all the patient's injuries to the extent possible.

Even though suspected neck-spinal injuries are treated during stabilization/transportation, the spinal cord must be protected while moving or handling any patient where the "mechanism" of the accident could have caused a spinal injury. The rescuer should protect the spine while extricating a patient if the accident could have caused a spinal injury. If a spinal injury is suspected, the head should be maintained in a neutral, in line position if moving the patient is necessary prior to stabilizing. Regardless of the situation, a rescuer must remember to support the head and protect the spinal cord as soon as possible if the accident could have caused a possible spinal injury. A clothes-drag is usually the quickest and most effective one person emergency move that a rescuer can use on a patient with suspected spinal injuries that is lying down.

STABILIZATION AND TRANSPORTATION

As a rule, patients should be treated and stabilized at the scene, if possible, if the area remains safe. Machinery entrapment situations will most likely require moving a patient to an area where they can be treated and stabilized. If movement of a patient is necessary, safety precautions should be taken to protect the spinal cord if spinal injuries are suspected.

The first aid treatment for a machinery accident patient is generally the same as other types of accidents. The RBB's of first aid (Responsiveness, breathing, bleeding) should be followed. If a spinal injury is suspected, the airway, breathing and any other body movements must be managed properly to prevent further injury to the patient. The modified jaw thrust should be used to open and maintain the airway in a patient with a suspected spinal injury. Other injuries should be treated and stabilized, and the patient transported to a medical facility.

A rescuer should consider the safest type of transportation, extent of injuries and severity of injuries while planning patient transportation. In some situations, a choice of transportation may not be an option.

Patients that have a suspected spinal injury should be stabilized and transported on a full spine board. All unconscious patients, patients with head injuries, patients complaining of numbness, tingling in the arms and/or legs and other patients that you think may have a spinal injury should always be stabilized and transported on a spine board.

UNDERGROUND MACHINERY AND EQUIPMENT RESCUE ACCIDENTS

1. What is the first consideration that a rescuer should always evaluate at the scene of an emergency that involves machinery or equipment?
 - A - Whether the patient is breathing
 - B - Whether the patient has extremity injuries
 - C - Whether the patient has bleeding
 - D - Personal safety, safety of assisting rescuers and the patient to the extent safety will allow

2. A Patient was run over by a battery scoop and is trapped underneath the scoop out of reach of rescuers. What should a rescuer do?
 - A - Lift the scoop with available means and block the scoop as raised, to prevent it from accidentally falling back down on the patient or the rescuers while extricating the patient
 - B - Start digging the mine floor to gain access to the patient to check breathing
 - C - Start digging the mine floor to gain access to the patient to check bleeding
 - D - Have a properly trained operator tram the scoop clear of the patient

3. An unresponsive patient is found entangled in the pick breaker of a feeder. What should a rescuer do first?
 - A - Go directly to the patient and attempt to free the patient
 - B - Go directly to the patient and check for breathing
 - C - Go directly to the patient and check bleeding
 - D - Make sure the conveyor feeder is de-energized with assistance from the repairman and foreman before approaching the patient

4. An unresponsive patient is trapped between a scoop bucket and the rib. The scoop operator has panicked, started crying and has gone to the surface. The scoop must be moved to extricate the patient. What should a rescuer do?
- A - Check with the foreman and electrician and confirm that a competent person can move the scoop in the correct direction to prevent further injury to the patient
 - B - Move the scoop immediately even if you are not sure of how to operate properly because it is critical to get the patient out quickly
 - C - Go directly to the patient and check for bleeding
 - D - Go directly to the patient and check for feeling/sensation in all four extremities
5. A person was operating a shuttle car and was rammed by another shuttle car that hung on point. The patient is responsive and complaining of neck pain and numbness/tingling in the arms and legs. What should a rescuer treat and stabilize for?
- A - Pulled muscle in the neck
 - B - Leg cramps
 - C - Spinal injury
 - D - Muscle spasms of the neck
6. An unresponsive patient was hit in the head with a trailing cable as the shuttle car cable reel was taking up cable. The patient has blood and clear to pink watery fluid draining from the nose and ears. How should a rescuer open the airway?
- A - Head Tilt - Modified Neck Lift
 - B - Head Tilt - Neck Lift
 - C - Jaw Thrust would be the first choice. If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift
 - D - Head Turn - Finger Lift

7. A slightly responsive patient was hit in the head with a miner conveyor boom. The patient is breathing normal and has bleeding from a laceration across the forehead. What type injuries do you suspect and how should the patient be treated, stabilized, and transported?
- A - Suspect head and spinal injuries; secure and transport on a backboard
 - B - Suspect a heart attack; transport in a semi-sitting position to help monitor breathing
 - C - Suspect a stroke and transport in a scoop bucket with the feet elevated
 - D - Suspect an epileptic seizure and transport on top of the man-trip to ensure patient can be monitored during transportation
8. Which is a critical factor while determining the safest means of gaining access to an unresponsive patient entrapped between a shuttle car and the rib?
- A - Patient's location, type and severity of injuries, and a competent person is available to move the shuttle car if needed
 - B - There is ample amount of water on the section
 - C - The patient's next of kin is notified
 - D - Whether the shuttle car is powered by direct current or alternating current

UNUSUAL RESCUE SITUATIONS RELATED TO MINING

Contact With Electrical Circuit

PERSONAL SAFETY

A patient in contact with an energized electrical circuit is one of the most dangerous situations that a rescuer may be confronted with. This emergency may be life-threatening to the rescuer and other would-be rescuers if not managed properly. A rescuer that comes in contact with an energized circuit whether it be direct contact with the energized object or a patient in contact with the energized circuit, may be seriously injured or killed.

As in all emergency situations, personal safety of the rescuer and others assisting in rescue efforts is the first consideration that must be analyzed. Reacting too quickly without properly evaluating the situation could result in serious injury or death to the rescuer or any other person that comes in contact with an energized circuit. Many coal miners commonly talk about receiving some type of electrical shock every day, but they never know when the next shock felt could cause an electrocution. Everyone must realize that any time that a shock is felt, enough current has passed through the body to cause death. The reason that all electrical shocks felt do not result in death is that the four major factors that could cause death are not present in the right combination. These four major factors are:

- (1) the amount and duration of current traveling through the body
- (2) the direction of current passing through the body (current passing through the heart is the most dangerous)
- (3) the body resistance and resistance to ground
- (4) electrical cycle of the heart when current passes through it.

If a rescuer has any doubt about the safety of an electrical emergency scene, they should get assistance from a mine foreman and a certified electrician.

SECURING THE SCENE

Securing the scene is the second course of action that should be taken at the scene of an electrical accident. Making the scene safe helps ensure the safety of the rescuer and to every extent possible, the patient and other personnel at the scene.

De-energizing the electrical power or having an electrician verify that a shock hazard does not exist is the most important element in securing this type of accident. Any person that touches a patient that is in contact with an energized circuit will be seriously injured or electrocuted. Therefore, it could save another person's life if it is verified by an electrician that a shock hazard is not present at the scene. As with other emergency scenes, rushing into an accident scene without making an accurate evaluation of the situation could cost you your life.

Always be cautious of a scene where a patient is in water that has an electrical circuit in the water such as a cable, pump, etc. The water may be energized and any contact with the water, pump, patient, etc. could result in electrocution.

While attempting to de-energize an electrical circuit, make certain that you have de-energized the correct circuit. Many mining personnel have been seriously injured and or electrocuted when they mistakenly disconnected an incorrect circuit.

EXTRICATION

Extrication of a patient from an electrical accident scene does not involve anything other than standard emergency care except for de-energizing the correct circuit. De-energizing the correct electrical circuit cannot be overemphasized as this type of accident could be life-threatening to all personnel attempting to provide emergency care to a patient.

STABILIZATION AND TRANSPORTATION

All patients should be treated and stabilized at the scene if the area remains safe to do so.

The first aid treatment for a patient involved in an electrical accident is generally the same as other accidents except that rescuers must be aware of certain injuries that could occur because of contact with an electrical circuit.

The RBB's of first aid (responsiveness, breathing, bleeding) should be followed.

Specific injuries that could occur that a rescuer must be conscious of are:

- (1) cardiac arrest and/or heart abnormalities - could occur immediately or at any time
- (2) shock
- (3) muscle contractions
- (4) trauma, fractures and/or burns at entry and exit points
- (5) tissue injury far more serious than the surface appearance indicates.

A rescuer must also be conscious of the fact that an electrical shock could have caused a patient to fall and possibly caused a spinal injury. If the mechanism of the accident and evidence at the scene indicate possible spinal injury, then the modified jaw thrust must be used to open and maintain the airway. In addition, if a spinal injury is suspected, the patient must always be moved, rolled, or lifted as a unit to prevent further injury.

The patient should be secured and transported on a spine board, anticipating that a patient's condition could worsen at any time.

Monitor and treat the RBB's during transportation. Always be prepared to perform CPR and always have an AED available on this type of patient because cardiac arrest could occur at any time.

Irrespirable Atmosphere

PERSONAL SAFETY

As with all emergency situations, the first consideration that must be evaluated at the scene of any emergency is the safety of the rescuer and bystanders. Miners have been killed and others have been disabled in Virginia when they entered an irrespirable atmosphere while attempting to rescue miners injured by an irrespirable atmosphere.

This situation is certainly life-threatening for would-be rescuers if proper gas and oxygen tests are not taken. This atmosphere should always be tested by a mine foreman with the proper gas and oxygen detection equipment before anyone enters such area to administer treatment to an injured person.

An irrespirable atmosphere is defined as an area with insufficient oxygen necessary to sustain life. Some miners refer to irrespirable air as blackdamp. What happens to a normal atmosphere to change it to an irrespirable atmosphere is that carbon dioxide and sometimes methane will displace the oxygen content. Normal air contains approximately 21% oxygen and as the oxygen concentration starts decreasing below 19.5%, various health effects occur to the body when breathed.

An irrespirable atmosphere is usually found in poorly ventilated areas, behind seals, old works, or old abandoned mines, and after a mine fire or explosion.

In the case of a mine fire or explosion, the oxygen is consumed by the fire or explosion, and, in addition, oxygen is displaced by the formation of carbon dioxide, carbon monoxide, nitrogen, etc. Some coal miners refer to the atmosphere following a mine fire or explosion as afterdamp, but for rescuer purposes, it is important to remember that the reduced oxygen concentration creates a life-threatening situation to any person who enters such area. In these type situations, the first reaction should be immediate evacuation using the emergency evacuation procedures.

Irrespirable atmospheres are most commonly encountered in the mining industry when a mine cuts into its own old works, old works of another mine, usually abandoned and behind mine seals. The effects that an irrespirable atmosphere have on the body as the oxygen content decreases below 19.5% include labored breathing, faster breathing rate and a severe headache. All mining personnel should be aware and alert when mining near old works, old mines, sealed areas, etc. Mines in Virginia have cut into such areas even though the mine map showed such areas to be as much as 1500 feet away. A rescuer should be suspicious of a situation when coal miners are seen lying on the mine floor for no obvious reason especially when mining near areas where low oxygen or an irrespirable atmosphere could be encountered.

A rescuer must be conscious of the hazards of these mining situations when called upon to administer treatment to an injured person.

A rescuer should never enter such areas to administer emergency treatment to injured miners until such area has been evaluated, gas and oxygen tests made, and determined to be safe by a mine foreman designated by the mine operator.

A rescuer must always remember that even though the area has initially been determined to be safe, it could change from second to second. It could be life-saving important that continuous monitoring of such area be conducted to ensure the area remains safe while administering care to an injured person. This monitoring of oxygen and mine gases should be conducted by a mine foreman designated by the operator while using the proper instruments.

Remember, never enter such area until evaluated and determined to be safe by a mine foreman designated by the operator and always keep in mind that this situation could change from second to second.

It is important to be able to respond and treat an injured person, but a bad situation can become much worse if a rescuer or bystander becomes a second or third patient, etc.

GAINING ACCESS

While attempting to gain access to the area to help an injured person, a rescuer must be accompanied by a designated mine foreman who has the proper instrumentation to conduct proper oxygen and gas tests. A rescuer should never enter such area until such mine foreman evaluates the area to be safe and is directed by such foreman to render emergency care to an injured person. Remember that these type situations most commonly occur when one mine cuts into old works of the same or another mine or when a mine cuts into a sealed area. Even though irrespirable atmospheres have been encountered in other situations, these are the most common, especially in small, drift mines.

Gaining access to a patient in this type of situation is usually not hindered by physical obstructions.

Always remember that the main consideration to evaluate before attempting to gain access in this situation is the safety of the atmosphere.

STABILIZATION AND TRANSPORTATION

A rescuer must always remember that to treat, stabilize and prepare a patient for transportation may take a few minutes and that the mine atmosphere in this situation could change from second to second. For this reason, a designated mine foreman should continuously monitor the atmosphere while a patient is being treated and prepared for transportation.

Serious trauma such as fractures, etc. usually is not present in this situation. A rescuer could expect to encounter unconscious patients, patients with breathing problems and cardiac arrest due to the low oxygen content in this type of atmosphere. A rescuer should be prepared to open and maintain open airways, give artificial respiration and CPR.

Unconscious patients recovered from this type of atmosphere must be secured and transported on a full spine board. As with all types of unconscious patients, transportation should be expedited as quickly as possible in a safe manner while continuing to monitor and treat the patient as their condition may require.

UNUSUAL RESCUE SITUATIONS

ELECTRICAL CIRCUITS IRRESPIRABLE ATMOSPHERE

1. What is the first consideration that a rescuer must always evaluate at the scene of an emergency that involves suspected contact with an electrical circuit?
 - A - Whether the patient is in cardiac arrest
 - B – Whether the patient is in respiratory arrest
 - C - Personal safety, safety of assisting rescuers and the patient to the extent that safety will allow
 - D -Whether the patient has severe electrical burns

2. What is a major factor that determine whether an electrical shock results in an electrocution?
 - A - The type of grounding / ground monitoring circuit associated with the involved electrical equipment / circuit
 - B - The amount and duration of current traveling through the body, the direction of current passing through the body, the body resistance and resistance to ground, and the electrical cycle of the heart when current passes through it
 - C – If the voltage was AC or DC voltage
 - D – If the patient is a known diabetic

3. An unresponsive patient was attempting to make a splice on a shuttle car trailing cable. This section has four shuttle cars operating. The Rescuer is not sure about which circuit breaker to de-energize. Who should a rescuer get assistance from to confirm the correct circuit is de-energized prior to touching the patient and or equipment or circuit?
 - A - The equipment manufacturer
 - B - The repairman (electrician)
 - C - The continuous miner operator who is not a certified electrician
 - D - The company that rebuilt the shuttle car

4. An unresponsive patient is found lying in a water hole at a belt drive that has the belt drive cable lying in the water. What should a rescuer do?
- A - Go immediately to the patient to evaluate breathing
 - B - Go immediately to the patient and use a clothes drag to remove the patient from the water area
 - C - Get assistance from the repairman (electrician) and mine foreman to verify the power is de-energized on the belt drive cable before you or anyone else contacts the patient and or the water area
 - D - Go directly to the patient and treat for a heart attack because Alternating Current (AC) belt drives have the safest grounding system available which minimizes electrical shock hazards
5. An electrician was working on top of the high voltage substation building located on the surface. The building is eight (8) feet high. When you arrive, the patient is lying on the ground and appears to be unresponsive. How would you open the airway for this patient?
- A - Jaw Thrust would be the first choice. If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift
 - B - Head Tilt - Neck Lift
 - C - Head Tilt - Modified Neck Lift
 - D-Head Turn-Finger Probe
6. After checking responsiveness and evaluating breathing, what is the treatment required for the patient in question No. 5?
- A - Treat and stabilize for ankle sprains
 - B - Treat and stabilize for knee strain
 - C - Treat and stabilize for abdomen injuries
 - D - Treat and stabilize for spinal injuries

7. A patient received a suspected electrical shock. What serious conditions should a rescuer recognize and be prepared to treat?
- A - Muscle spasms in the legs if electrical current traveled through the legs
 - B - Muscle spasms in the arms if electrical current traveled through the arms
 - C - Cardiac arrest, respiratory arrest, possibly serious breathing problems, and injuries associated with entrance and exit wounds
 - D - Cramps of the abdominal muscles
8. What safety precautions should a rescuer consider if a person has come in contact with an electrical circuit?
- A - A patient in contact with a suspected energized electrical circuit is a very dangerous situation. Reacting too quickly could also put the rescuer in a dangerous situation also.
 - B - An electrical accident is dangerous only when an AC circuit is involved. DC circuits are not dangerous
 - C - Pull the patient out of the power immediately
 - D - The situation is dangerous if the patient is not wearing safety glasses
9. What is your first consideration when a situation involves a suspected irrespirable atmosphere?
- A - Contact the next-of-kin of all the unaccounted miners
 - B - Personal safety, safety of assisting rescuers and the patient(s) to the extent that safety will allow
 - C - Verify the extent of injuries of the involved patient(s) immediately
 - D - Verify the location of suspected injuries immediately

10. What safety precaution should always be taken before a rescuer enters a suspected irrespirable atmosphere where a patient is located?
- A - Donn their SCSR
 - B - A Mine Foreman must ensure the proper gas and oxygen tests have been made and that the area evaluated is safe to enter
 - C - A rescuer should hold their breath in such area until they need to ventilate a patient
 - D - Hold a sterile gauze over their mouth and nose while in such area
11. In what areas would a rescuer suspect to contain an irrespirable atmosphere?
- A - In old works or old abandoned mines, behind mine seals, In poorly ventilated areas, and after a mine fire or explosion
 - B – Near the loading point on the section
 - C – Any area where a belt drive is located
 - D - In the Section, Smoke-Free, Intake Air - Entries
12. What effects does an irrespirable atmosphere have on mining personnel?
- A - Labored breathing, faster breathing rate, and headache.
 - B – Sharp pain in the groin area
 - C -Radiating pain in one or both legs
 - D - Kidney failure
13. What is correct as related to a suspected irrespirable atmosphere area?
- A - A rescuer should be suspicious of a situation when miners are seen lying on the mine floor unresponsive for no reason, especially if mining near old works, old mines, or seals
 - B - A rescuer must always remember that even though the area has been determined to be safe, it could change quickly and should be monitored continuously for deadly mine gases by a Mine Foreman while rescuers are working in the area
 - C - An irrespirable atmosphere is an area that does not contains sufficient oxygen to support life
 - D – All the above are correct statements

14. What treatment should a rescuer anticipate when a patient is found in a suspected irrespirable atmosphere area?

A - Unresponsive patient(s)

B - Patients with breathing problems; respiratory distress

C - Patients in cardiac arrest

D - All the above are correct

POISONING

A Poison is any substance that causes injury or illness when introduced into or on the body. Poisons include solids, liquids, fumes, gases, and vapors.

Poisons can enter the body in four (4) ways:

- 1) Ingestion
- 2) Inhalation
- 3) Absorption
- 4) Injection

- 1) **INGESTION** - Swallowing a poison (alcohol, medications, spoiled food, drinking unidentified liquids, etc.)
- 2) **INHALATION** - A patient inhales toxic fumes (gases such as carbon monoxide, carbon dioxide, glues, paints, etc.)
- 3) **ABSORPTION** - A poison enters the body after coming in contact with the skin (poison ivy, poison oak, fertilizers, pesticides, drugs, etc.)
- 4) **INJECTION** - Poisons that enter the body through bites or stings of insects, spiders, ticks, animals, snakes, drugs, etc.

The Most Important Thing to remember about a possible poison situation is to recognize that a poisoning may have occurred and regard all poison situations as serious

Contact the PCC and seek medical help immediately, even if you have a slight suspicion that a patient has been poisoned

SIGNS AND SYMPTOMS OF POISONING:

- 1) Burn Injuries Around the Mouth and Nose.
- 2) Nausea and Vomiting.
- 3) Diarrhea.
- 4) Chest or Abdominal Pain.
- 5) Breathing Difficulty.
- 6) Sweating.
- 7) Altered Level of Responsiveness.
- 8) Seizures.

Try to get the following information if you suspect a poisoning incident has occurred:

- 1) What was taken or involved?
- 2) How much was taken, or area of body involved?
- 3) When was it taken or came in contact with the patient?

POISON CONTROL CENTER - CALL 1-800-222-1222

The Severity of Poisoning Depends on:

- (1) The type and amount of the substance.
- (2) How it entered or contacted the body
- (3) the Patient's Size, Weight, and Age

Some poisons act fast, some may be slow acting, and sometimes you may not be able to identify the poison.

POISON CONTROL CENTERS are agencies that you can call, to get treatment information on Poisonings.

Call EMS and a Poison Control Center (PCC immediately for suspected poisoning accidents. PCC and EMS will tell you what treatment to give and if patient should be transported to a hospital

When calling a PCC, provide if you can:

- (1) Name of poison product
- (2) Nature - Means of Poisoning and
- (3) Time of Exposure

Transport Immediately to the Hospital if a suspected poisoned patient is unresponsive

GENERAL TREATMENT FOR POISONING:

- 1) Notify EMS / MED-VAC and PCC immediately
- 2) Survey the Scene, to make sure it is safe to enter
- 3) Remove the patient from the source of the poison, remove patient's contaminated clothing (if applicable), and do not contaminate yourself
- 4) Check responsiveness and evaluate breathing.
- 5) Treat all life-threatening conditions.

Never give the patient anything by mouth unless directed by the PCC and or EMS Personnel.

If an ingested poison is unknown and the patient vomits, then save some of the vomitus it help to identify the poison

2015 ILCOR update - Physicians are now recommending the following as related for the treatment of poison

- 1) Do not give anything by mouth.
- 2) Do not dilute with milk or water.
- 3) Do not give activated charcoal to absorb poison.
- 4) Do not give syrup of IPECAC to induce vomiting.

TREATMENT FOR INGESTED POISONING:

- 1) Notify EMS / MED-VAC immediately
- 2) Check responsiveness and evaluate breathing.
- 3) Do not give anything by mouth, do not dilute with water or milk, do not give activated charcoal, or do not administer syrup of IPECAC
- 4) Always follow recommendations from the PCC and EMS
- 5) Monitor responsiveness and breathing.
- 6) Save any Vomitus for later identification of poison.

INHALED POISONS:

Toxic fumes come from a variety of sources. Toxic Fumes may or may not have an odor. Gases like Carbon Dioxide, Carbon Monoxide and Methane do not have an odor.

SPECIAL NOTE: A Pale or Bluish Skin Color indicates a lack of Oxygen and may alert you to Carbon Monoxide Poisoning; the skin may later turn a Cherry Red Color after death in cases of Carbon Monoxide Poisoning.

TREATMENT FOR INHALED POISONING:

- 1) Notify EMS / MED - VAC/ PCC Immediately.
- 2) Survey the scene, to make sure it is safe to enter.
- 3) If possible and safe to do, remove the patient from the poison area.
- 4) Check responsiveness and evaluate breathing.
- 5) Give oxygen if it is needed.
- 6) Stabilize and if required, secure the patient to a backboard.
- 7) Monitor responsiveness and breathing.
- 8) Transport to a Medical Facility - ASAP.

TREATMENT FOR ABSORBED POISONS:

- 1) Flush the affected area with large amounts of water
- 2) Check responsiveness and evaluate breathing.
- 3) Notify EMS / MED – VAC / PCC personnel, immediately.
- 4) Continue to flush while transporting and while waiting for EMS.
- 5) Monitor responsiveness and breathing.
- 6) Transport to a Medical Facility – ASAP.

Many different types of poisons are absorbed through the skin including poison ivy, chemicals, powders, liquids, etc.

TREATMENT FOR INJECTED POISONS:

The most common sources of injected poisons are caused by Insect Stings, Spider Bites, Snakebites, Animal Bites, etc.

TREATMENT FOR INSECT STINGS:

- 1) Check responsiveness and evaluate breathing.
Be Cautious of a Severe Allergic Reaction - Anaphylaxis
- 2) Examine sting area to see if the stinger and venom sac are still present. Remove stinger by scraping from the skin with a fingernail or plastic card.
- 3) Wash the sting site with water.
- 4) Apply cold applications to the sting area to help reduce pain and Swelling.
- 5) Monitor responsiveness and breathing.
- 6) Transport to Medical Facility - ASAP, especially if the patient shows signs of anaphylaxis shock

SPIDER BITES:

Two Types of Spiders, Black Widow and Brown Recluse have venom whose bites are serious and can be fatal. Both spiders prefer dark places such as wood, rock, or brush piles and in dark storage areas. A patient may not know they have been bitten until signs and symptoms develop later. A patient bitten by either type should be transported to the hospital immediately.

SIGNS AND SYMPTOMS OF SPIDER BITES:

- 1) Nausea and or vomiting.
- 2) Difficulty breathing or swallowing.
- 3) Sweating and profuse saliva in the mouth.
- 4) Irregular heart rhythms that may lead to Cardiac Arrest.
- 5) Severe pain in the bite area.
- 6) Swelling on or around the site.
- 7) A mark indicating a bite area.

TREATMENT OF SPIDER BITES:

- 1) Check responsiveness and evaluate breathing.
- 2) Arrange for immediate transportation to a medical facility.

SNAKEBITE

Approximately 8,000 people are bitten each year and less than 12 die. Most deaths from snake bites occur because the patient has an allergic reaction, weak body immune system, or a long delay before reaching the hospital. Most snake bitten patients can get to a hospital within 30 minutes.

SNAKEBITE TREATMENT

- 1) Do not apply suction to the bite including a commercial snakebite kit. Suctioning has no medical benefit and possibly make the injury worse
- 2) If the bite is on an extremity, apply a constricting bandage around the arms or legs to slow the spread of venom

TREATMENT OF SNAKE BITES:

- 1) Check Responsiveness and evaluate breathing.
- 2) Wash the wound in water if available.
- 3) Immobilize the affected area. If the bite is on an extremity, then use a constricting bandage tied above the bite area
- 4) Keep the affected part lower than the heart if possible.
- 5) Transport to the hospital immediately.
- 6) Do not apply ice.
- 7) Monitor responsiveness and breathing.

ANIMAL BITES:

An animal bite carries a risk of Infection. The most serious is rabies. Rabies is transmitted through the saliva of diseased animals such as dogs, cats, skunks, raccoons, bats, and foxes. Rabid animals may foam at the mouth, appear partially paralyzed, act aggressive, irritable, or act abnormal.

If not treated rabies can become fatal. A patient bitten by a rabid animal must receive medical attention.

TREATMENT OF ANIMAL BITES:

- 1) Try to get the Patient away from the animal without endangering yourself. Get a description of the animal and where it was last seen. Do not try to restrain the animal.
- 2) Check responsiveness and evaluate breathing.
- 3) Control any bleeding.
- 4) Wash the wound with water and control bleeding
- 5) Transport to a Medical Facility.

TREATMENT OF A HUMAN BITE:

- 1) Wash with large amounts of water
- 2) Control bleeding by applying a sterile dressing and direct pressure
- 3) Transport to a Medical Facility.

TICK BITES:

Ticks can carry and transmit Rocky Mountain spotted fever and Lyme Disease. The first sign of infection from a tick bite may appear a few days or a few weeks after the bite. A rash starts as a small red area and may spread five (5) to seven (7) Inches.

SIGNS AND SYMPTOMS OF A TICK BITE:

- 1) Rash
- 2) Fever
- 3) Headache
- 4) Weakness
- 5) Flu like pain in the joints and muscles

Signs and symptoms of advance stages if not treated:

- 6) Arthritis
- 7) Numbness
- 8) Memory loss
- 9) Problems in seeing and or hearing
- 10) High fever
- 11) Stiff neck
- 12) Irregular and or rapid heartbeat

REMOVING A TICK:

Remove by pulling steadily and firmly. Grasp the tick with fine-tipped tweezers as close to the skin as possible and pull slowly. If you do not have tweezers, you can use your fingers. Wear gloves to protect yourself.

SPECIAL NOTES ON TICK BITES

- 1) Never try to burn a tick off with a hot match or cigarette.
- 2) Don't use home remedies like coating with nail polish or Vaseline.
- 3) Wash the bite area.
- 4) Apply antibiotic ointment, if available.
- 5) Inform the patient to observe the bite area and to see a doctor if a rash or if flu-like symptoms develop.

POISONING

1. What are the ways in which poison can enter the body?
 - A – Ingestion, inhalation, injection, and absorption
 - B – When the gall bladder makes too much fluid
 - C – Usually when the pancreas is damaged
 - D - Kidneys (urinary tract)

2. What is the key thing to remember about a suspected poisoning incident?
 - A - Recognize that a poisoning may have occurred and acting on it
 - B - Remember that poisonings are never serious unless the patient is unresponsive
 - C – Recognize that no treatment is required
 - D - Remember that most poisonings result from overdose of drugs

3. Which is a common sign and or symptom of poisoning?
 - A - Chest and or abdominal pain, nausea, vomiting and diarrhea,
 - B - Sweating and difficult breathing
 - C - Altered level of responsiveness and /or seizures
 - D – All the above are correct

4. What is important information that a rescuer should try to obtain in a suspected poisoning incident?
 - A - If the patient has a previous drug abuse - related history
 - B - What type of poison was taken, how much poison was taken, and when the poison was taken
 - C – Does the patient have a next to kin contact on them
 - D – When was the last time the patient went to the bathroom

5. Which is a critical factor in determining the severity of a suspected poisoning incident?
- A - Type and amount of poison taken (involved)
 - B - How the poison entered the body
 - C - The patient's age and weight
 - D - All the above would be correct
6. What is the first thing that a rescuer should do at the scene of a suspected poisoning incident?
- A - Survey the scene to make sure it is safe to approach the patient
 - B - Quickly remove the patient from the source of poison; may require Rescuer taking extraordinary risks of personal safety to extricate the patient
 - C - Perform a physical head-to-toe survey
 - D - Approach the patient and seek to identify the source of the poison
7. After securing the scene at a poisoning incident or moving the patient to a safe location, what should a rescuer do next?
- A - Perform a physical head-to-toe survey to look for snake bites, etc.
 - B - Check the toes for capillary refill
 - C - Look for and identify the source of the poison, if possible
 - D - Notify the patient's next of kin
8. Which is a correct action as related to a suspected poisoning incident?
- A - Contact the Poison Control Center (PCC), immediately
 - B - Contact EMS, immediately
 - C - Always survey the scene to make sure that it is safe to approach the patient.
 - D - All the above are correct.

9. Which of the following is correct as related to a rescuer inducing vomiting during an ingested poisoning incident?
- A - Induce vomiting if responsive patient is complaining of abdominal pain
 - B - Induce vomiting if patient is not having a seizure
 - C - Induce vomiting if patient has swallowed a corrosive substance such as an acid, alkali, or a petroleum product such as gasoline, kerosene, etc.
 - D - Do not give anything by mouth and never induce vomiting unless authorized and directed by the Poison Control Center
10. Which is correct as related to a honeybee sting?
- A - Remove the stinger with tweezers, pliers, etc. to compress the venom sac
 - B - Scrape the stinger away from the skin with your fingernail, plastic card, etc.
 - C - Apply large amounts of cola products to the sting area
 - D - Examine the toes and check capillary refill
11. A rescuer arrives at the scene of a suspected inhalation poisoning incident. After surveying the scene to ensure the area is safe to enter, what should a rescuer do next?
- A - Check the patient for paralysis in all extremities
 - B - Conduct a physical head-to-toe survey to evaluate other injuries
 - C - Ensure patient location is safe to enter and remove the patient from the poison area as soon as possible, if required
 - D - Check the patient's mouth, nose, and ears for bleeding

12. A patient has a chemical spilled on their skin. What is the correct treatment?
- A - Flush the affected area with large amounts of water until Patient is delivered to EMS Personnel
 - B - Give the patient plenty of water to drink
 - C - Apply an oil-based product to neutralize the poisonous chemical
 - D - Cleanse the affected area with brake fluid
13. Which of the following is correct as related to treatment of a snake bite?
- A - Apply a generous supply of grease to the wound to reduce swelling
 - B - Cut each fang bite area one-half inch and suction with your mouth
 - C - Apply a tourniquet (TK) between the bite area and the heart
 - D - Never perform any type of suction for a snake bite area, including with a commercial, snakebite kit, suction device
14. A patient was bitten by an animal. What is correct as related to treatment for animal bites?
- A – Do not try to restrain or capture the animal
 - B - Try to get the patient away from the animal without endangering the patient or yourself
 - C - Try to get a good description of the animal and the location where it was last seen
 - D – All the above would be correct
15. Which is a sign and or symptom of tick bites?
- A - Joint and muscle pain, similar to the flu
 - B - Fever and headache
 - C - A rash at the bite area
 - D – All the above are signs and symptoms of tick bites

16. What may cause a severe allergic reaction in a patient (Anaphylaxis)?
- A - Insect bite or sting
 - B - Medications and chemicals
 - C - Food
 - D - All the above are correct
17. Which is the most important to always be aware of when managing a suspected allergic reaction patient?
- A - Breathing difficulty that may result and progress to an obstructed airway as the tongue and throat (airway) may swell
 - B - Irritating rash
 - C - Red skin color at the contact area of the body
 - D - Itching at the contact area of the body
18. A Patient is having a suspected severe allergic reaction. Which of the following would most likely cause death in a patient if left untreated?
- A - Dizziness
 - B - Itching and swelling of the contact area
 - C - Coughing
 - D - The tongue and airway may swell; breathing is severely impaired as the airway may swell and may become completely obstructed
19. What should a rescuer do when the Poison Control Center (PCC) and or EMS personnel give you specific instructions concerning a poisoning incident?
- A - Follow the directions, only if you agree
 - B - Always follow the explicit directions from the PCC and or EMS personnel.
 - C - Follow the directions only if the patient is responsive.
 - D - Follow the directions only if the patient is unresponsive

20. What is correct as related to poisoning treatment?

- A - Survey the scene, make sure area is safe to enter
- B - Conduct an initial assessment - Check for responsiveness
- C - Contact the Poison Control Center (PCC) and EMS personnel
- D – All the above would be correct

21. What is the recommendations for the field treatment of snakebites?

- A - Make one - half inch incisions in each fang wound to allow venom to drain out and apply a Tourniquet (TK) above the bite location
- B - Make one - fourth inch incisions in each fang wound and Suction Only with a Commercial, Snakebite Kit, Suction Device
- C - Apply a pressure / constricting bandage above the bite location to slow venom absorption from spreading. Transport as soon as possible

POISONOUS, TOXIC, AND HAZARDOUS MATERIALS

Poisonous, toxic, and hazardous materials are not uncommon and may be of many different types, including chemicals, solids, liquids, or gas.

WHAT IS A HAZARDOUS MATERIAL?

A material is considered hazardous if it is

- A - Specifically listed in the law 29-Code of Federal Regulations Part 1910, Subpart 2, Toxic and Hazardous Substances
- B - Assigned a threshold limit value (TLV) by the American Conference of Governmental Industrial Hygienists
- C - Determined to be cancer causing, corrosive, toxic, an irritant, a sensitizer, or has damaging effects on specific body organs

These materials are appropriately named because they represent a hazard to everyone exposed - rescue personnel as well as the injured persons.

Personal safety is the first consideration for any person trained to provide emergency first aid. The worst thing that can happen at the scene of an accident with injured people is for the would-be-rescuer to become a victim. A patient certainly needs help but if a hazardous materials accident is not handled carefully, the would-be-rescuer and other involved personnel can become casualties.

Never attempt to take any action beyond your level of training. Know and respect what you are capable of safely doing and never hesitate to call for help. To wait for properly trained assistance is most often the correct course of action when hazardous materials are involved.

Always remember - be a part of the solution, not a part of the problem.

When responding to a hazardous materials incident, a rescuer cannot follow those move fast, take action, and save lives instincts. Adequate time must be taken to assess the scene prior to entering any area where injured persons are located. This means identifying the hazardous material, total hazard area, finding a safe location for other personnel and taking self-protective measures against contamination.

The Chemical Transportation Emergency Center better known as CHEMTREC is the nationally known agency responsible for providing information on chemicals and hazardous materials. CHEMTREC provides information warnings and guidance for safe emergency management of hazardous materials if the Department of Transportation (DOT) identification number, chemical name or product name, to provide assistance. The information must be accurate.

CHEMTREC operates 24 hours a day, seven days a week and can be contacted by calling 1-800-424-9300.

The following information should be provided to CHEMTREC when hazardous materials are involved in an accident:

- (1) Your name and return telephone number
- (2) Location and nature of accident
- (3) Identification number, chemical name, or product name of material (all of this data should be provided if available)
- (4) Container type, size, quantities, etc.
- (5) local conditions surrounding the incident, such as fire, spillage, etc.



FOR CHEMICAL EMERGENCY
Spill, Leak, Fire, Exposure or Accident
CALL CHEMTREC® - Day or Night
800-424-9300
Outside the United States Call Collect 703-527-3887

In Canada CANUTEC Call Collect 613-996-6666

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This training information is divided into the following three major areas:

- (I) On-scene assessment
- (II) Identifying hazardous materials
- (III) Securing the scene/establishing a hazard zone.

ON-SCENE ASSESSMENT

When dealing with hazardous materials, hazards may not be obvious. Approach the scene very cautiously. Resist the urge to rush in; you cannot help others until you know what you are faced with. Observe the incident scene very carefully while approaching. Be alert to signs of leakage such as sounds of escaping gas, evidence of liquid leaks, odd smells, vapor clouds and any evidence of fire. Fires can intensify the effect of some hazardous materials and may even cause some to explode. Sometimes the dangerous nature of the situation is not recognized until rescuers and other people have been injured while attempting to provide first aid or extricate injured persons from an emergency scene. Never attempt to rescue an injured person or retrieve documentation from a scene, building, etc. until the situation is assessed by a specifically trained person and evaluated to be safe.

Upon arrival at the scene, recognize the presence of toxic, poisonous, or hazardous materials, protect yourself and others, secure the area and call for assistance of properly trained personnel as soon as possible. Rescuers and others have lost their lives or become permanently disabled because of a lack of understanding of potential dangers associated with hazardous materials. Bystanders should be kept away. Very often, well-meaning people may try to help and become victims.

Even though rescuers and others trained to administer emergency first aid are oriented in rapid response at the scene of an accident, the first step in a toxic, poisonous, or hazardous materials incident is to make an accurate assessment of the situation. Safety of the would-be-rescuer and others around the scene is the primary concern. Rescuers and others at the scene should not become casualties.

Only those people with specialized training should enter a hazardous environment. Some hazardous material incidents may involve small quantities of toxic materials whereas other situations may involve barrels, boxes, or tanks of such chemicals.

The following safety precautions should be followed when approaching a hazardous environment:

- (1) Test the wind and approach the scene from the upwind direction.
- (2) Never drive or travel into vapor clouds or smoke from the scene (vehicles are an ignition source).
- (3) Isolate the accident scene for at least 250 feet in all directions and even greater distances if large quantities of materials are involved.
- (4) Do not allow other personnel to gather around the incident scene (when isolating an incident area, remove all persons in areas of oncoming smoke or vapor clouds).
- (5) Avoid contact with all chemicals and materials.
- (6) Never enter a building or other area containing hazardous materials where an incident has occurred prior to evaluation by a Hazardous Materials Coordinator.
- (7) Never walk into or touch spilled material.
- (8) Avoid inhalation of fumes, smoke, and vapors, even if no hazardous materials are known to be involved.
- (9) Never assume that smoke, gases, or vapors are harmless because of a lack of smell because odorless gases or vapors may be harmful.

Also, upon arrival at the scene of a poisonous, toxic, or hazardous material incident and after verifying that such materials are involved, immediately notify the appropriate county sheriff's dispatcher that is located at the local sheriff's office. The county dispatcher will notify the applicable county Hazardous Materials Coordinator.

If available, the following information should be provided to the county dispatcher:

- (1) Exact location of the incident - town, road number, etc.
- (2) Type of situation involved
- (3) Known or suspected injuries and number of unaccounted for people
- (4) Presence of fire or suspected fire, spilled liquids, vapor leaks, etc.

These HAZ-MAT Coordinators have specialized training in the management of hazardous materials and can determine when a scene is safe to enter. Upon arrival of a HAZ-MAT Coordinator, brief such person with all known information about the incident.

IDENTIFYING TOXIC, POISONOUS OR HAZARDOUS MATERIALS

It is very important to identify the substance (s) involved in any incident. Accurate identification of the materials is critical. Placards, container labels, MSDS information and/or knowledgeable persons on the scene are valuable information sources. Note the information on the labels, placards, and numbers present, if possible. This information will assist in identification of the material and necessary safety precautions that must be taken. Evaluate all possible sources of information before you place yourself at risk or allow others to be at risk.

Material safety data sheets, currently known as SDS (Safety Data Sheets), are information sheets designed to inform you about the hazards of materials that you work with so that you can protect yourself and others. The Federal law requires SDS's for all hazardous materials and that they must be accessible for those personnel who may need such information.

The purpose of an MSDS is to tell you:

- A - The material's physical properties or fast acting health effects that make it dangerous to handle
- B - The level of protective gear needed to enter such are
- C - The first aid treatment to be provided when exposed to this material
- D - The preplanning needed for safely handling spills, fires, etc.
- E - How to respond to such incidents

MSDS information from various manufacturers may look different but all must contain the following information:

- A - The material's identity, including its chemical and common names (for example, brand name: Clorox; chemical name: sodium hypochlorite. common name: bleach)
- B - Hazardous ingredients (even in parts as little as 1%)
- C - Cancer-causing ingredients (even in parts as small as 0.1%)
- D - List of physical and chemical hazards and characteristics (Flammable, explosive, corrosive, etc.)
- E - List of health hazards, including acute effects such as burns or unconsciousness and chronic effects such as allergic sensitization, skin problems, or respiratory disease, which build up over a period.
- F - Limits to which a worker can be exposed, the primary entry routes into the body, specific organs likely to sustain damage, and medical problems that exposure can worsen
- G - Precautions and safety equipment
- H - Emergency and first aid procedures
- I - Identity of the organization responsible for creating the sheet and date of issue

An understanding of how to interpret the data on the MSDS is your best defense against accidents and injury. Knowing which data a proper MSDS should include will help you find it more quickly. The law states very clearly that the supplier must include complete data on the MSDS.

Hazardous materials must be identified with a warning label. Some occupational poisons or toxic materials may not be labeled with a hazardous material placard but must have a label that identifies such material as poisonous or toxic. A HAZ-MAT Coordinator may also be able to provide information on poisons and toxic materials, so if in doubt, contact the HAZ- MAT Coordinator through the applicable county sheriff's dispatcher.

All hazardous materials must be identified with a warning label that identifies the substance or material. This label may contain a picture, information or a four-digit identification number. The information displayed on the label is critically important in evaluating hazards associated with the material.

If possible, without jeopardizing personal safety, obtain this information and communicate to CHEMTREC and the HAZ-MAT Coordinator. MSDS information can also be used to gather this data.

Never risk personal exposure to poisonous, toxic, or hazardous materials while attempting to identify a placard, label, etc. Use available information from labels, placards, MSDS's or knowledgeable mining personnel familiar with the presence of such materials. Each county has an Emergency Response Plan designed to help a HAZ-MAT Coordinator identify and manage hazardous material incidents in their respective county.

SECURING THE SCENE/ESTABLISHING A HAZARD ZONE

Without entering the immediate hazard area, do what you can to isolate the area to assure the safety of rescuers, and other people. It's bad enough that a person has been injured in a poisonous, toxic, or hazardous material incident but it's even worse for a rescuer or other person to become a victim of such situation. Always remember, it's important to rescue an injured person but don't complicate the situation by having more victims. Ensure the area remains isolated to prevent unauthorized entry. Keep all non-involved personnel away from the scene at a safe distance.

Assist other emergency personnel, if available, in establishing a hazard zone to prevent vehicles and unauthorized personnel from entering the danger area. Be cautious of vapor clouds, smoke clouds, and especially wind direction. While establishing a hazard zone, maintain a safe distance such that if the wind direction changes, rescuers and other personnel will not be endangered by vapor clouds, smoke clouds, etc. Be cautious and avoid low lying areas around a hazardous material accident because toxic fumes could settle in such areas.

POISONOUS, TOXIC AND HAZARDOUS MATERIALS (PTH)

1. What is the first consideration that a rescuer must always evaluate at the scene of an emergency that involves a suspected poisonous, toxic, or hazardous material?
 - A - Whether the material causes cancer
 - B - Whether the patient is breathing
 - C - Whether the patient is in cardiac arrest
 - D - Personal safety, safety of assisting rescuers, and the patient's safety
2. Which is correct as related to a suspected hazardous materials incident?
 - A - USE your instincts and attempt to help the patient immediately even if you must take serious risks
 - B - Do not attempt to take any action beyond your level of training
 - C - Do not hesitate to rush on in and get the patient out.
 - D - Never wait for properly trained people to arrive. Take charge
3. Which agency provides information, warnings, and guidance on how to manage a hazardous materials incident?
 - A - National Chemical Company of America (NCCA)
 - B - Federal Bureau of Toxic Materials (FBTM)
 - C - National Society of Poisonous Materials (NSPM)
 - D - Chemical Transportation Emergency Center (CHEMTREC)
4. What information is necessary to report to CHEMTREC when reporting a hazardous materials incident?
 - A - Your name and telephone number
 - B - Container type, size quantity, etc.
 - C - Location and nature of the incident
 - D - All the above would be correct

5. What information would you need to manage a hazardous materials incident?
- A – Medical conditions for unaccounted personnel
 - B – The location of the employee next to kin list
 - C - MSDS (Material Safety Data Sheet)
 - D – People on the scene knowledgeable in good places to eat
6. What information is provided on Material Safety Data Sheets?
- A - The material's physical properties and fast acting health effects
 - B - The level of protective gear needed to enter an affected area
 - C - The first aid treatment to be provided when exposed to this material
 - D – All the above would be correct
7. What additional information would be provided on Material Safety Data Sheets?
- A - The material's identity, including chemical and common name, hazardous ingredients, cancer causing ingredients, list of physical and chemical hazards, and list of health hazards.
 - B – How long you can live if contaminated by the material
 - C – Advice on how to manage your financial losses due to the incident
 - D – All the above are correct
8. What information may be identified on a hazardous materials warning label?
- A - A picture showing how to lift the container safely
 - B - Information on the material
 - C - Maximum breathing exposure time
 - D - Four - digit identification number

9. Which is information you may need in a hazardous materials incident.

- A - Hazardous materials are not dangerous unless they have a picture of skull and crossbones on the container
- B - Hazardous materials does not need to be identified with a warning label
- C – Don't worry about identifying the material as it is not important
- D - Use available information from labels, placards, MSDS's and knowledgeable emergency personnel to help manage the incident

Appendix A—Question Answer Sheets

Managing an Emergency Scene Body Systems Legal Considerations Disease Transmissions Substance Abuse					
1. A	12. B	23. A	34. C	45. A	56. D
2. A	13. C	24. B	35. A	46. D	57. A
3. B	14. B	25. B	36. B	47. C	58. C
4. A	15. B	26. B	37. C	48. A	59. B
5. B	16. D	27. B	38. D	49. B	60. A
6. A	17. C	28. A	39. A	50. B	61. C
7. C	18. B	29. D	40. B	51. D	62. B
8. D	19. B	30. B	41. D	52. A	63. C
9. C	20. A	31. A	42. D	53. B	64. A
10. D	21. B	32. B	43. D	54. D	
11. A	22. B	33. A	44. D	55. D	

Respiratory Emergencies Breathing Devices			
1. B	11. D	21. C	31. B
2. A	12. C	22. C	32. A
3. D	13. D	23. A	33. B
4. A	14. C	24. B	34. A
5. C	15. C	25. C	35. A
6. A	16. B	26. D	
7. B	17. D	27. C	
8. B	18. D	28. A	
9. B	19. D	29. C	
10. B	20. A	30. C	

Wounds Soft Tissue Injuries					
1. A	8. B	15. C	22. A	29. B	36. C
2. D	9. C	16. B	23. D	30. D	37. C
3. C	10. D	17. D	24. B	31. C	38. A
4. B	11. A	18. A	25. C	32. B	39. A
5. C	12. B	19. C	26. B	33. A	40. B
6. B	13. D	20. A	27. A	34. B	41. A
7. D	14. B	21. C	28. A	35. C	42. D

Cardiac Emergencies Heart Attack		
1. B	8. A	
2. A	9. B	
3. B	10. D	
4. C	11. A	
5. C	12. B	
6. A	13. B	
7. D	14. B	

Bleeding					
Shock					
1. A	10. D	19. B	28. A	36. B	43. A
2. C	11. C	20. B	29. A	37. C	44. A
3. B	12. B	21. B	30. A	38. A	45. C
4. D	13. A	22. A	31. A	39. D	46. B
5. B	14. B	23. D	32. A	40. C	47. A
6. B	15. C	24. B	33. A	41. A	
7. D	16. A	25. C	34. D	42. D	
8. D	17. B	26. D	35. D		
9. D	18. C	27. A			

Muscoskeletal			
Injuries			
1. B	11. A	21. A	31. A
2. A	12. B	22. A	32. B
3. A	13. D	23. D	33. A
4. C	14. C	24. A	34. A
5. A	15. B	25. C	35. A
6. C	16. D	26. A	36. C
7. A	17. B	27. B	
8. B	18. A	28. B	
9. C	19. B	29. A	
10. B	20. A	30. A	

Chest Abdomen And Pelvis			Upper and Lower Extremity Injuries		
			Upper		
1. A	11. A	21. A	1. A	6. B	11. A
2. D	12. A	22. A	2. B	7. C	
3. A	13. D	23. A	3. C	8. C	
4. C	14. A		4. D	9. C	
5. B	15. B		5. C	10. B	
			Lower		
6. A	16. D		1. C	5. C	9. C
7. A	17. A		2. C	6. C	10. D.
8. B	18. D		3. A	7. A	11. A
9. A	19. A		4. A	8. B	12. A
10. B	20. C				

Injuries to the Head, Neck, and Spine			
1. D	11. A	21. A	31. C
2. A	12. B	22. D	32. A
3. A	13. A	23. A	34. B
4. A	14. A	24. C	35. A
5. C	15. B	25. A	36. C
6. C	16. B	26. A	
7. A	17. C	27. B	
8. A	18. D	28. C	
9. D	19. B	29. B	
10. D	20. A	30. A	

Heat Cold Emergencies			Sudden Illness		
1. A	11. B	21. D	1. A	11. B	
2. B	12. D		2. D	12. A	
3. D	13. C		3. C	13. A	
4. C	14. D		4. A	14. B	
5. B	15. D		5. D	15. A	
6. D	16. A		6. A	16. A	
7. C	17. D		7. A	17. A	
8. C	18. D		8. D	18. A	
9. D	19. D		9. D		
10. C	20. D		10. D		

Patient Assessment			
1. D	11. D	21. C	31. B
2. A	12. A	22. D	32. C
3. A	13. C	23. C	33. B
4. A	14. A	24. B	34. D
5. B	15. D	25. A	35. C
6. B	16. C	26. D	36. B
7. C	17. D	27. B	37. D
8. A	18. A	28. C	38. D
9. A	19. D	29. B	39. A
10. B	20. B	30. A	40. C

Poisoning			Hazardous Materials	
1. A	11. C	21. C	1. D	
2. A	12. A		2. B	
3. D	13. D		3. D	
4. B	14. D		4. D	
5. D	15. D		5. C	
6. A	16. D		6. D	
7. C	17. A		7. A	
8. D	18. D		8. D	
9. D	19. B		9. D	
10. B	20. D			

Roof Falls	Mach. and Equip.	Electrical Irrespirable Atmosphere	
1. B	1. D	1. C	11. A
2. C	2. A	2. B	12. A
3. A	3. D	3. B	13. D
4. A	4. A	4. C	14. D
5. A	5. C	5. A	
6. A	6. C	6. D	
7. D	7. A	7. C	
8. C	8. A	8. A	
9. B		9. B	
		10. B	

Appendix B—Reference Material

International Liaison Committee on Resuscitation (ILCOR)—2015 and 2021 recommendations for First Aid lay responders

American Red Cross First Aid/ CPR/ AED course of instruction 2021 edition

American Red Cross Responding to Emergencies 2021 edition

Mine Safety and Health Administration publication First Aid for Miner



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