Basic Life Support and First Aid

Version 3.0

BLS

Introduction

- Introductions
  - BLS Instructor & Staff
  - BLS Provider Candidates
- Basic Life Support Provider Registration Form
- Statement of Understanding
- DAN Membership Form
- Other Administrative Procedures
- Course Logistics

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Course Overview

- Course is offered in two sections
  - Section 1: CPR, AED, FBAO
  - Section 2: First Aid and related skills
- Also available to divers as well as non-divers
- Meets ILCOR/AHA *2020 Guidelines* for Resuscitation
- Assumes *injured divers have been removed from the water and all gear removed*
- Requires *retraining every two years* (more often if required by other regulations)

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Course Overview

Section 1: CPR, AED, FBAO

- Basic Life Support
- Respiration and Circulation
- Scene Safety
- Initial Assessment
- Cardiopulmonary Resuscitation (CPR)
- Use of Automatic External Defibrillators, (AEDs)
- Foreign Body Airway Obstruction (FBAO)

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Course Overview

Section 2: First Aid

- Scene Safety
- Bloodborne Pathogens
- Assessments
- Positioning for Care
- Lifting and Moving
- Bleeding Management
- Splinting
- Special Considerations
- Burns
- Temperature Related Injuries
- Medical Emergencies
- Emergency Action Plan

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Section 1: CPR, AED, FBAO

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Basic Life Support

What does BLS mean?

BLS is Basic Life Support

- Providing care for life threatening injuries, including cardiac arrest

BLS Goal – provide & maintain critical blood flow to vital organs

- BLS also ensures that EMS has been activated

4-6 minutes without oxygen, organs (especially the brain) may start dying

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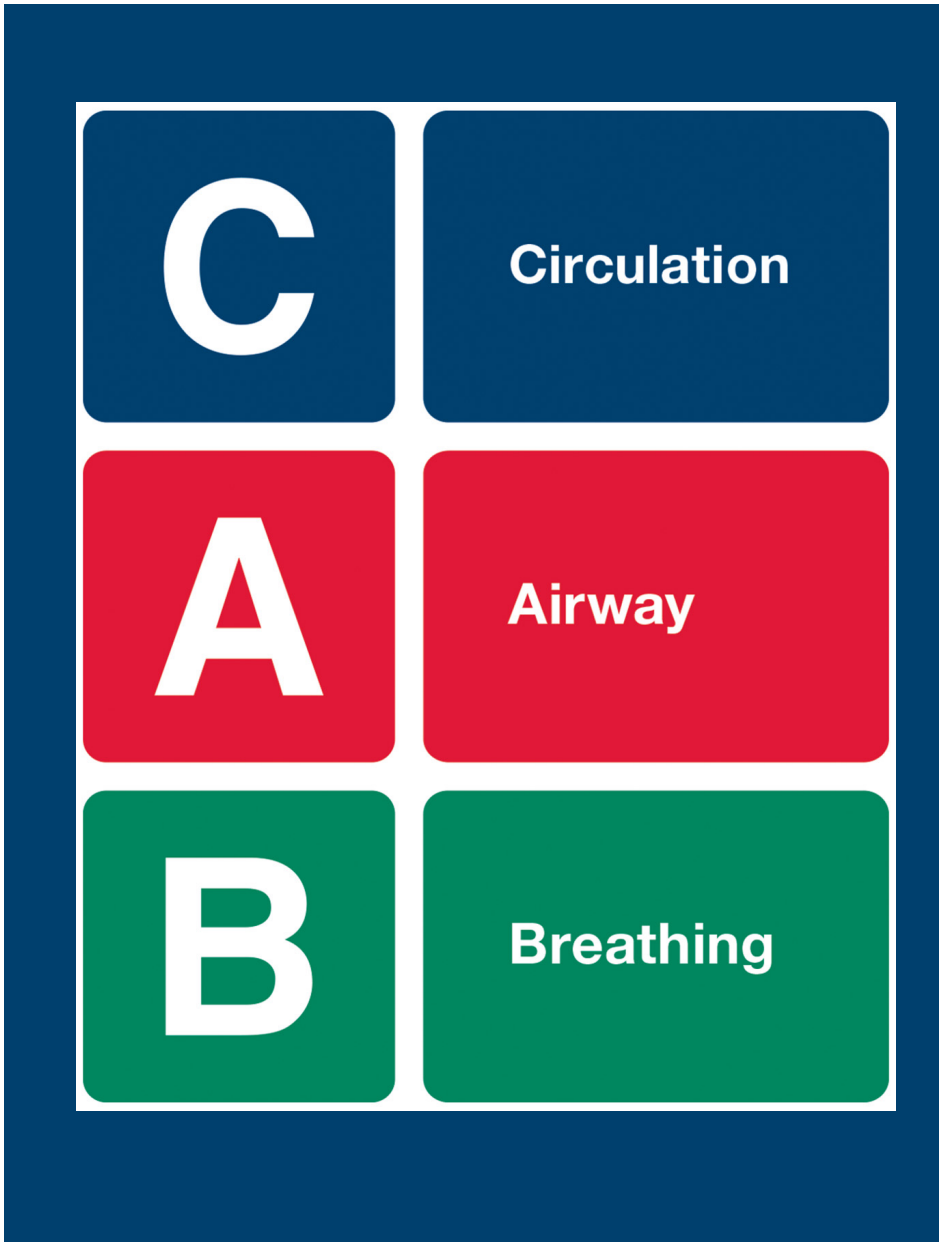

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Basic Life Support

Key Steps during
Cardio-Pulmonary Resuscitation

Check for responsiveness
- activate EMS

Quickly check for normal breathing

Provide chest compressions if not breathing normally

Provide ventilations

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Duty of Care

Duty of Care

No legal obligation to provide care

- May have an obligation to notify authorities that someone is in need of medical care

ALWAYS ask permission before rendering aid of any kind

- State “My name is _____. I am a first-aid provider. May I help you?”

Responsive person should give permission

- Permission is assumed for unresponsive person

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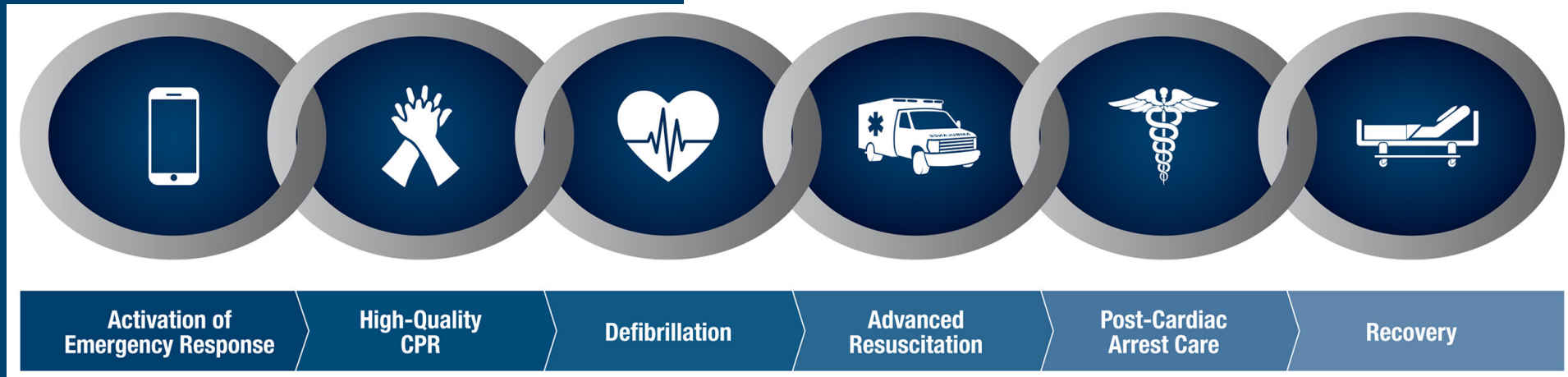
Chain of Survival

Six Links in
The Chain of Survival



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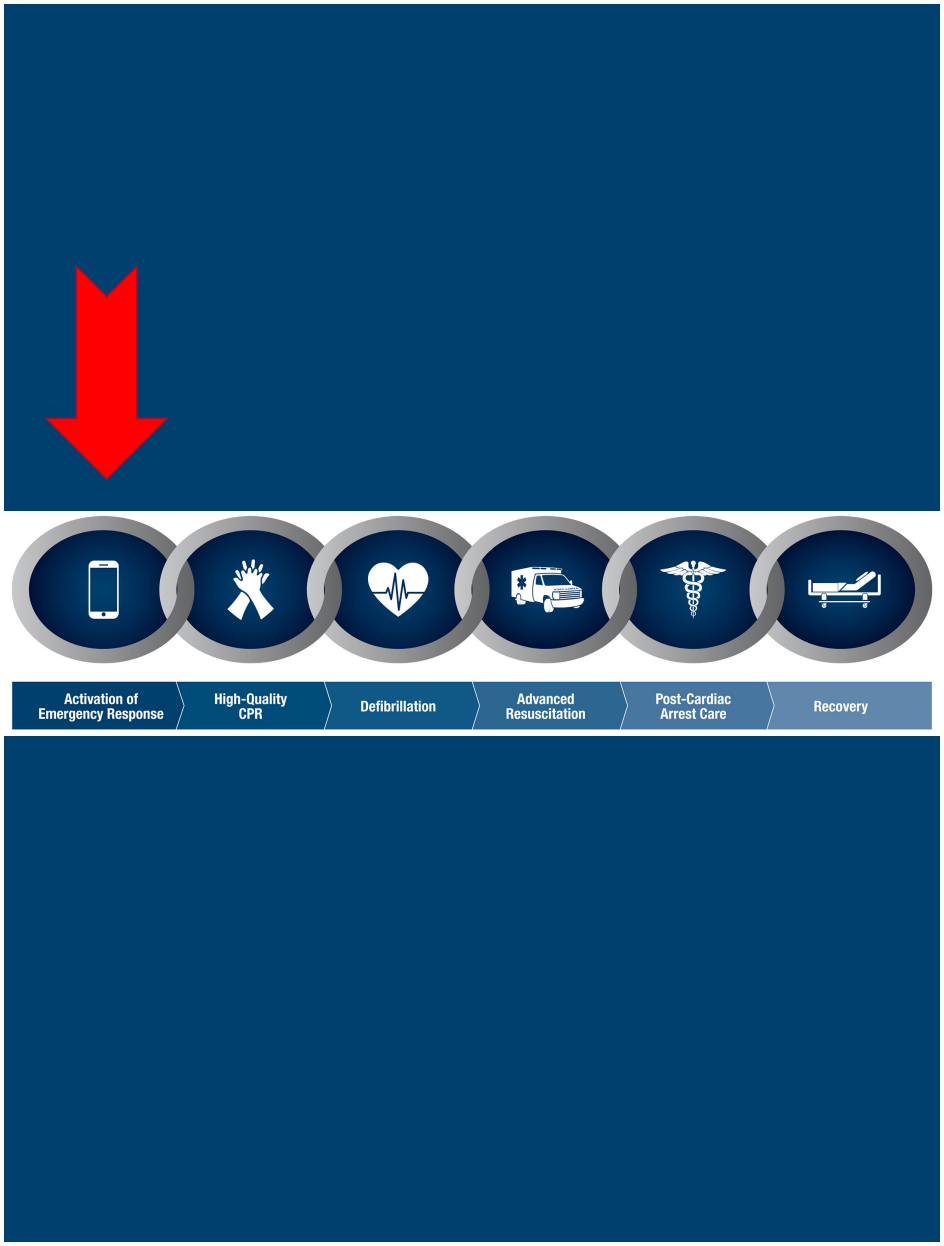

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Cardiopulmonary Resuscitation (CPR)

Early Access

Recognition of a problem should be followed by rapid action

Call for help ***immediately*** after determining an adult is unresponsive

- For children, infants and drowning victims provide two minutes of CPR first - if alone

The sooner EMS is called, the sooner advanced medical care is available

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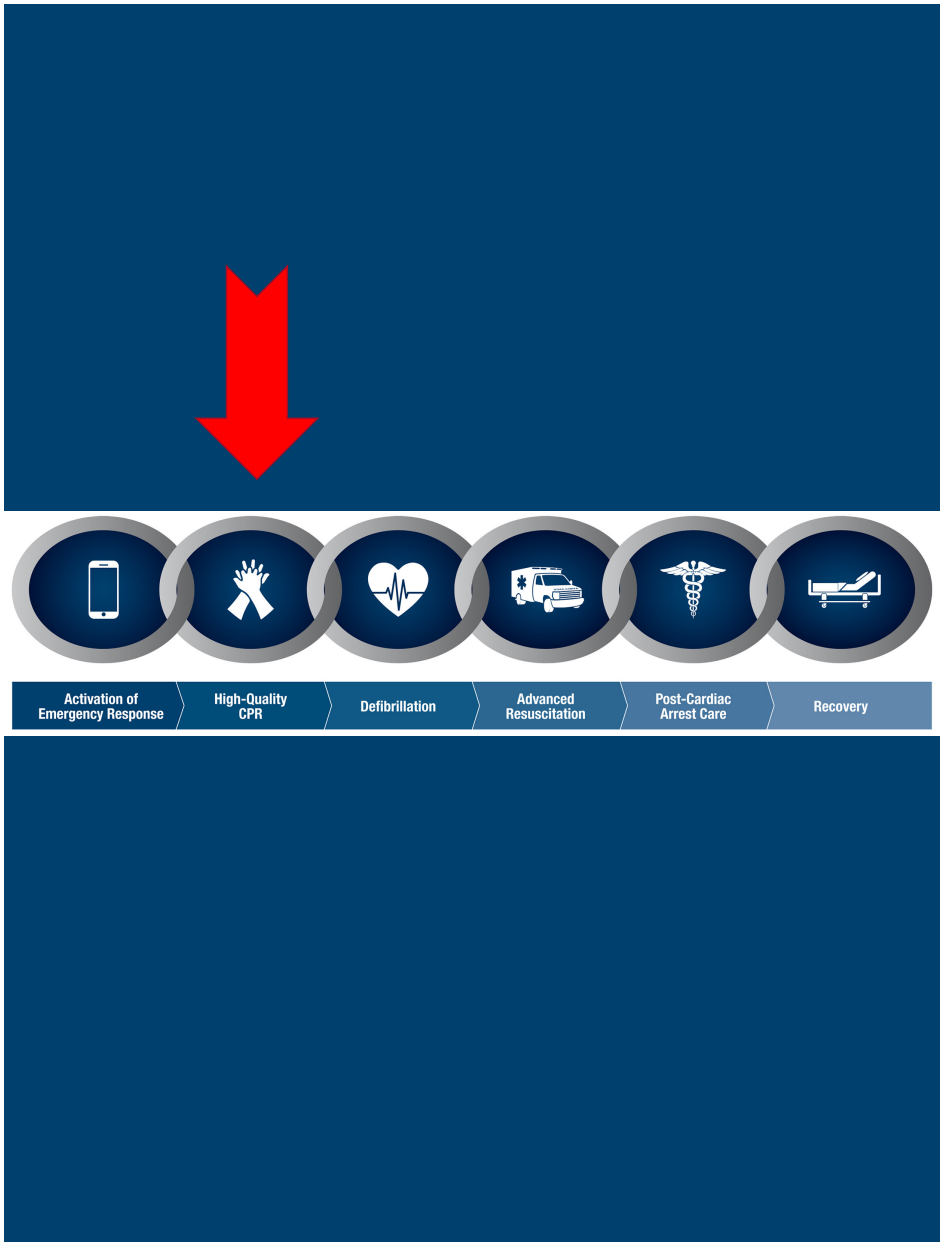

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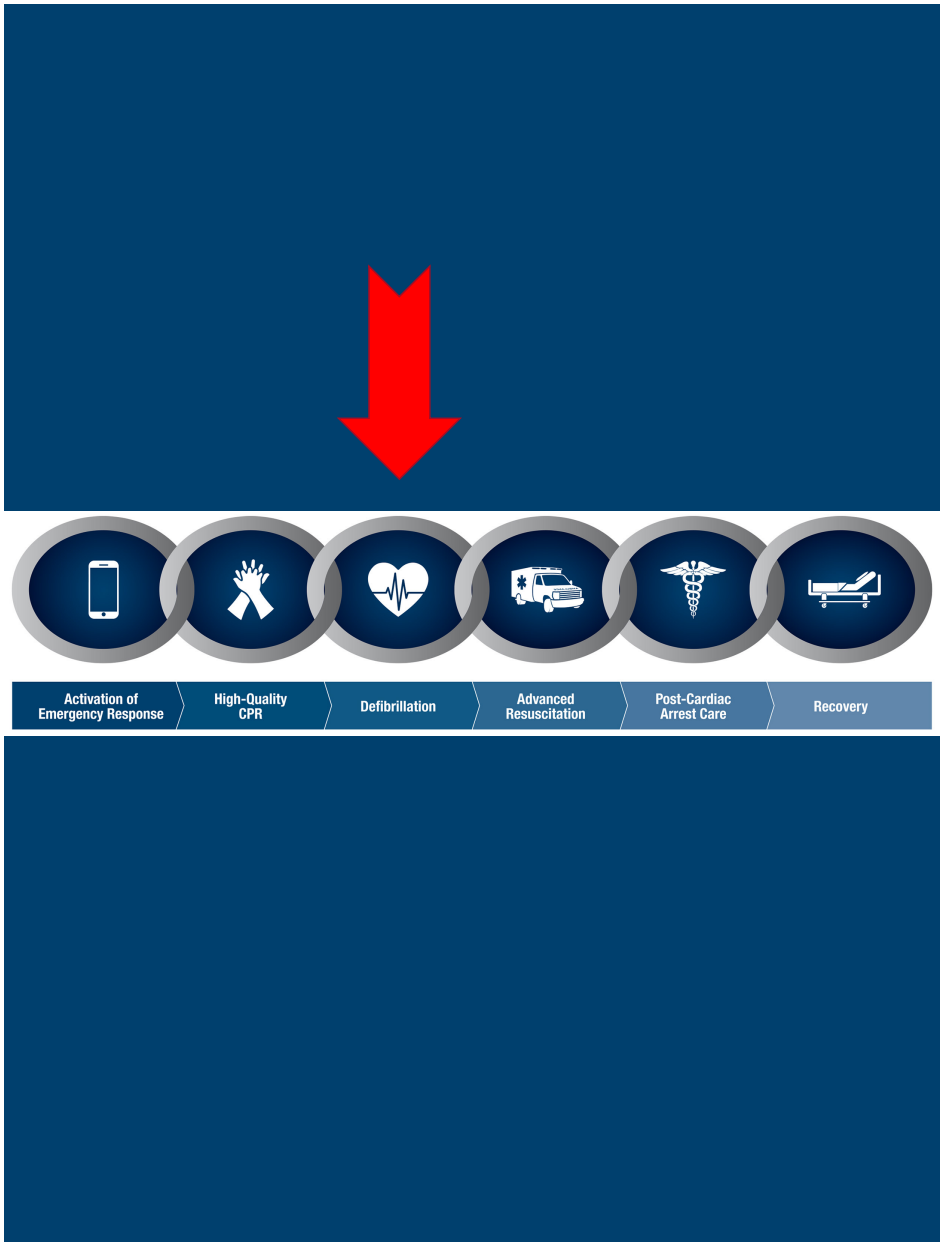
Cardiopulmonary Resuscitation (CPR)

Early CPR

Early and aggressive CPR supports life until advanced care is available

CPR keeps oxygenated blood circulating to the brain and heart



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Cardiopulmonary Resuscitation (CPR)

Rapid Defibrillation

Sudden Cardiac Arrest (SCA) is a leading killer of adults

SCA often results from abnormal heart rhythm called **Ventricular Fibrillation,** where the heart muscle quivers ineffectively

Defibrillation is the ***single*** most important intervention in cardiac arrest

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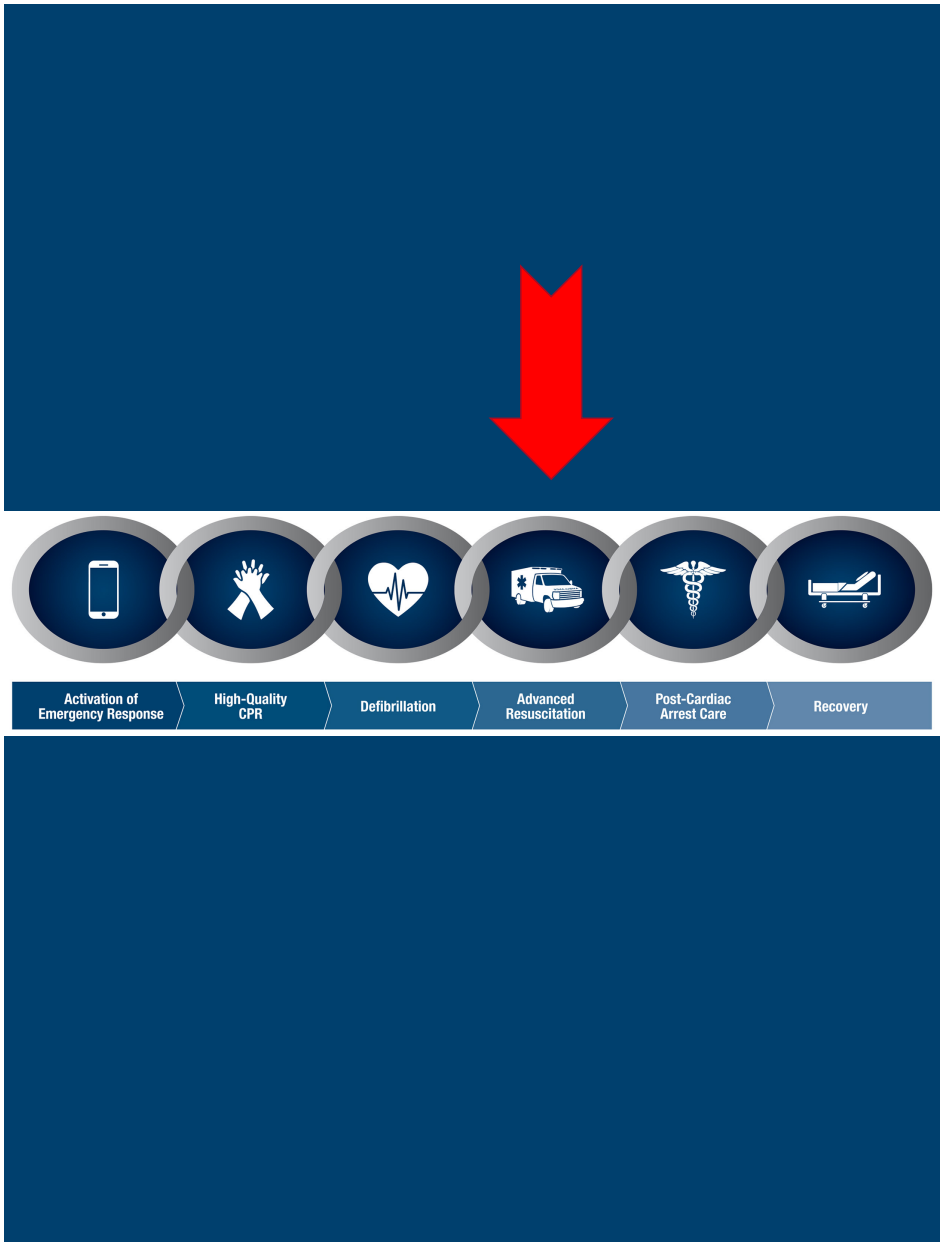

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Cardiopulmonary Resuscitation (CPR)

Advanced Life Support

Includes:

Advanced Airways

IV Medications

Advanced Heart Monitoring

Stabilizes patient for transport to hospital

Good ALS care revolves around good BLS care!

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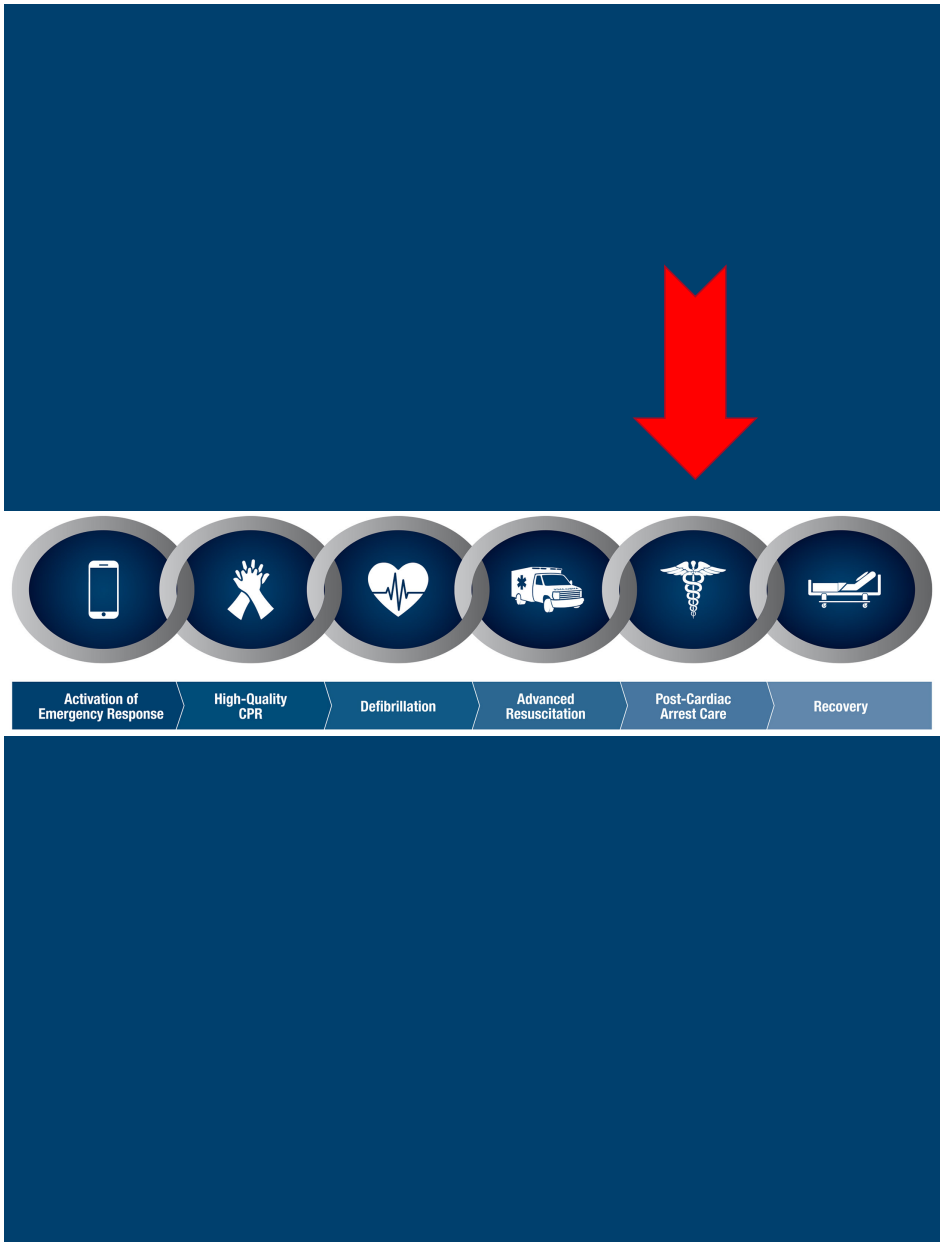

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Cardiopulmonary Resuscitation (CPR)

Post Cardiac-Arrest Care

Involves:

- **Maintaining airway**
- **Heart Monitoring**
- **Hospital interventions** to treat the underlying cause of the cardiac arrest

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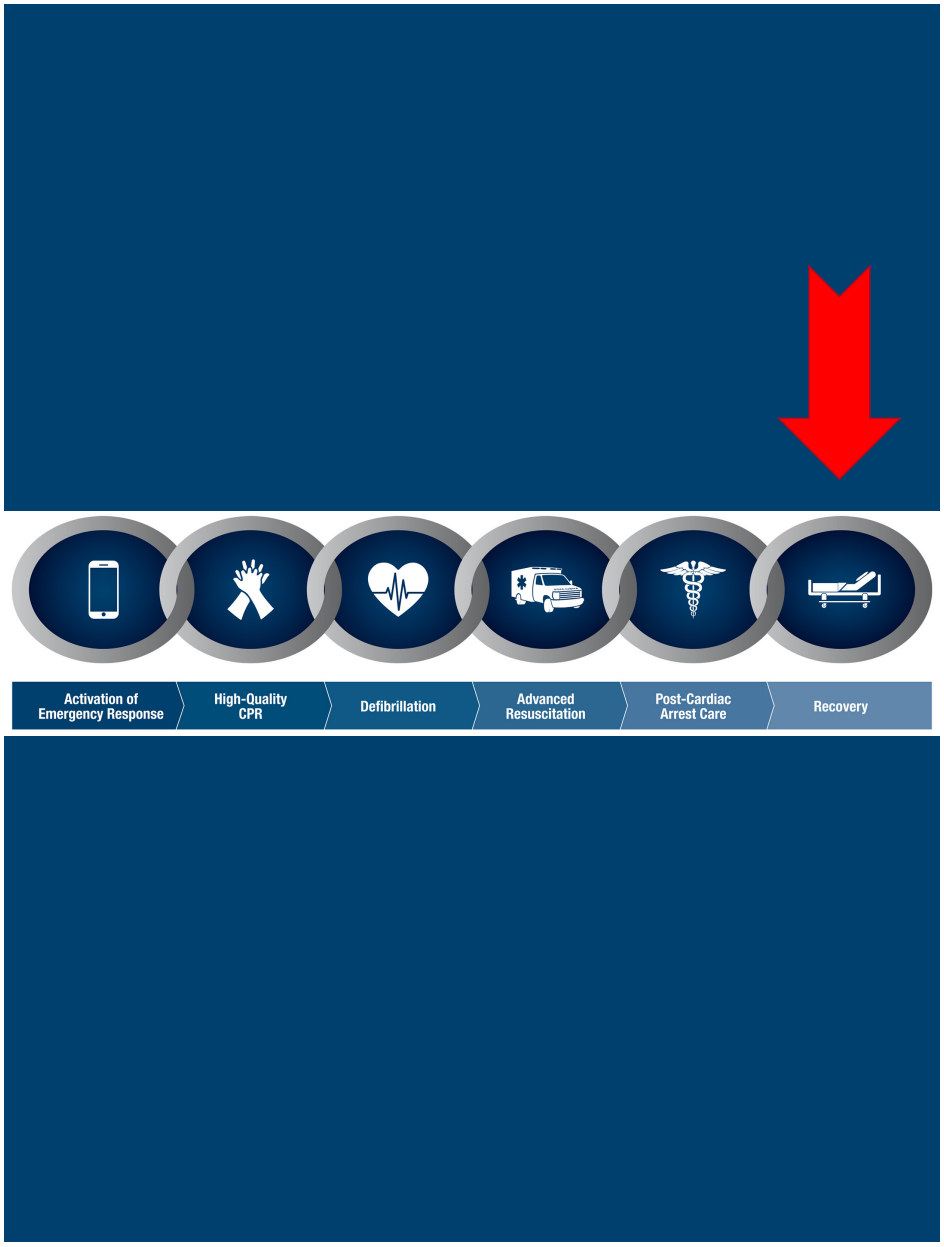

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Cardiopulmonary Resuscitation (CPR)

Recovery

- Recovering from a cardiac arrest is a long-term process.
- Includes mental and emotional well-being as well as support for the physical healing processes.
- This support begins while the survivor is still hospitalized but needs to continue after discharge to assure a return to normal social functioning.

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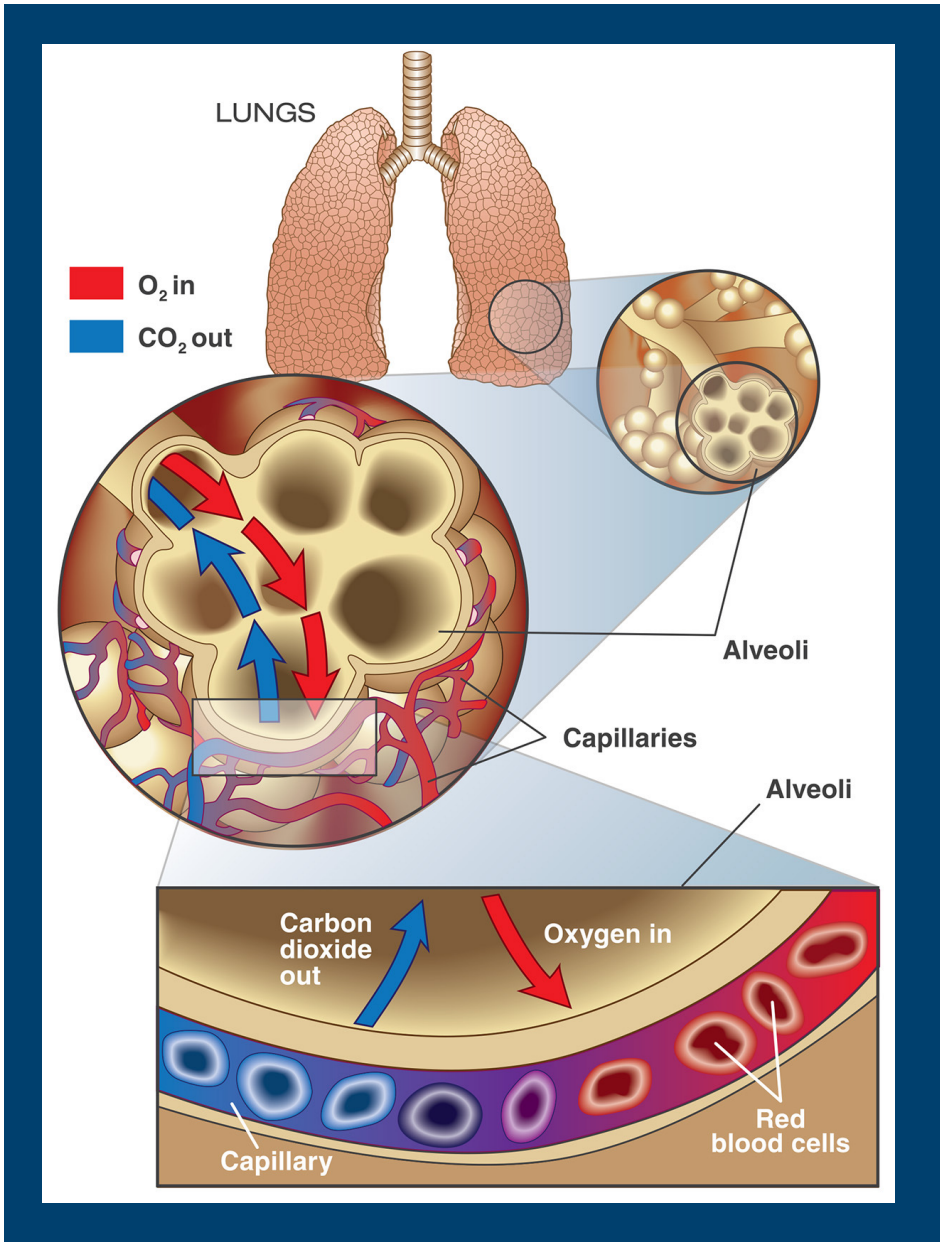

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Respiration and Circulation

Oxygen is essential for life and required for cellular function

- Hypoxia is oxygen deficiency
- Anoxia is the absence of oxygen

Respiratory system provides the interface between the atmosphere and the bloodstream for gas exchange

- Intake of oxygen
- Removal of CO_2

Respiratory system is comprised of the upper airway (mouth, nose, pharynx), the trachea, and the lungs

- The smallest structures are the alveoli

Pulmonary gas exchange takes place at the alveolar-capillary membrane

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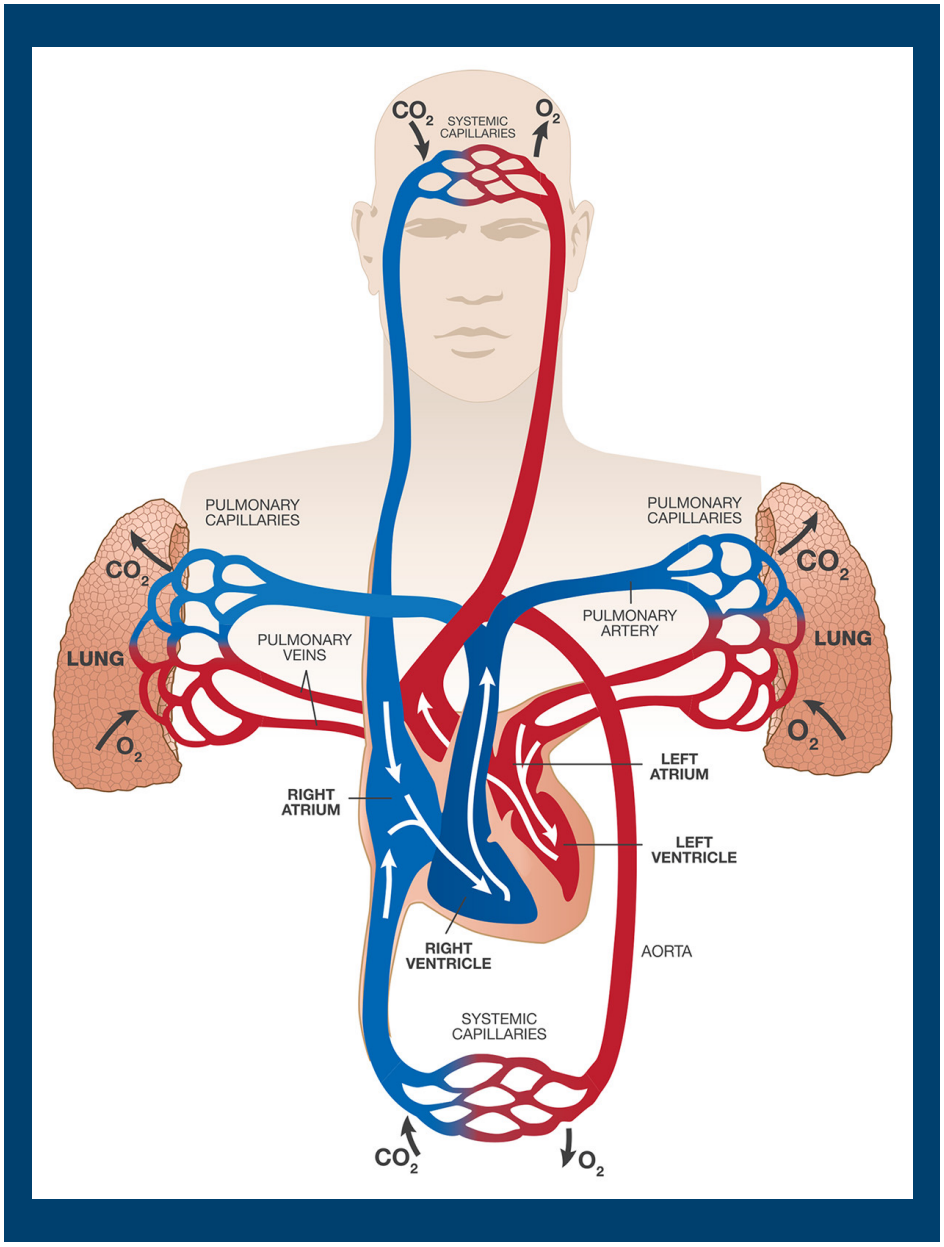

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Respiration and Circulation

Circulatory System includes the heart and blood vessels

Primary function is pumping blood, transporting oxygen and nutrients to tissues and
removing waste products

Arteries
carry blood from the heart
to the body tissues

Veins
carry blood from the body tissues back to the heart

Capillaries
the smallest blood vessels where nutrients and waste products are exchanged at the tissue cellular level

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Scene Safety

Avoid becoming injured person

Think S A F E

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Scene Safety

Infection Risk

Minimal, but present

Infection may happen via contact with infected blood and other body tissues

- ***Not* transmitted through casual contact**
- ***Not* transmitted through intact skin**

Use barriers to further minimize risk

If you believe you have been exposed to a bloodborne pathogen immediately seek medical evaluation

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Blood Borne Pathogens

Occupational Safety and Health Administration (OSHA)

- Created 1970 to assure safe, healthful working environment
- Provides training, outreach, assistance

Blood Borne Pathogen Standard (BBP)

- Applies to employees who may come into contact with human blood, body fluids, body tissues or organs
- Requires training to assist in
  - understanding the need for protection
  - options to meet that need
  - what to do if exposed

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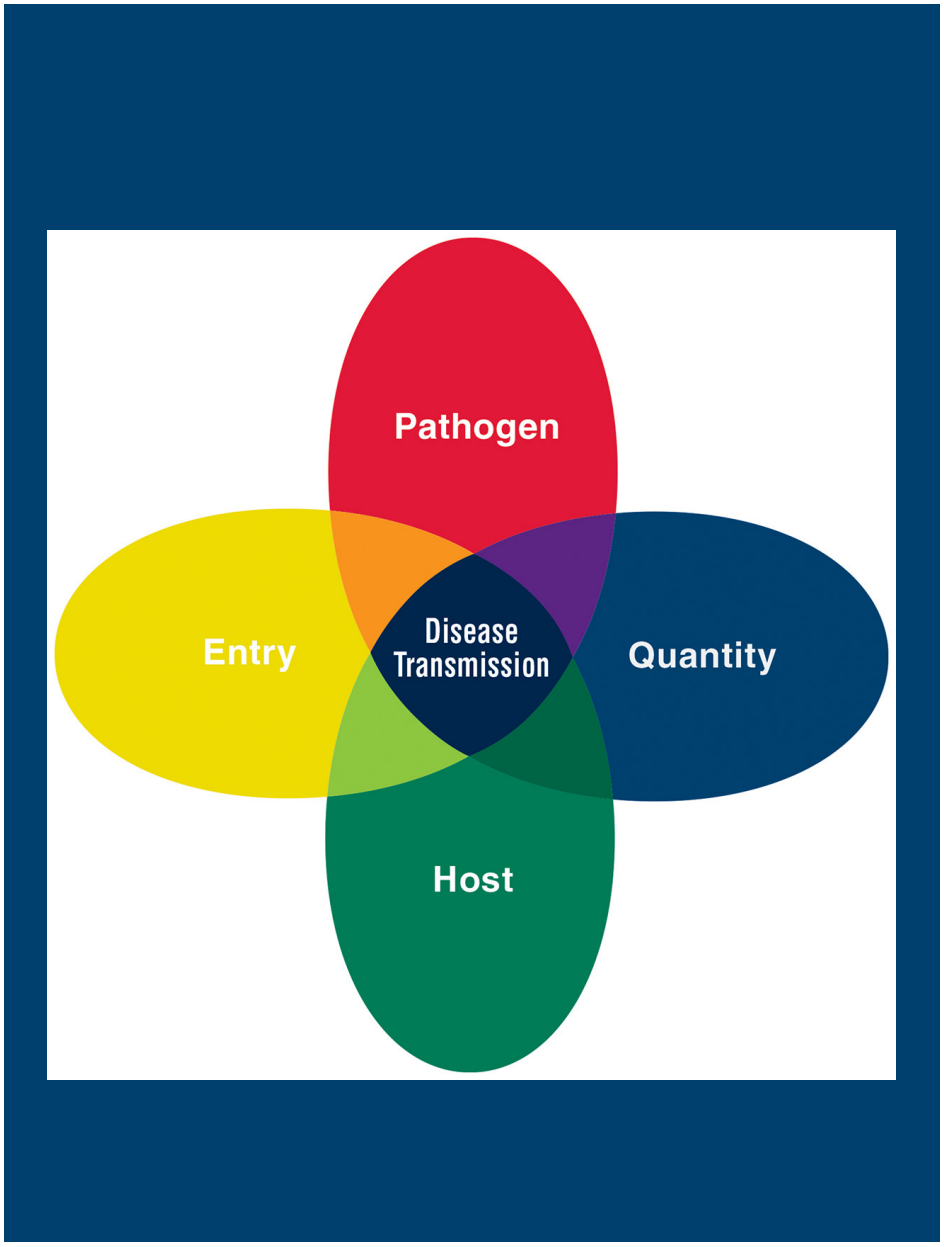

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Blood Borne Pathogens

Disease Transmission

Four things must meet:

- Infectious pathogen present
- Sufficient quantity of the pathogen must be present
- Exposure to a susceptible host
- Site of entry/Mechanism of transmission

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Blood Borne Pathogens

Mechanisms of Transmission

- Direct – person to person
  - touching, biting, kissing, open wound
- Indirect – transfer by an inanimate object
  - clothing, utensils, furniture, doorknobs
- Airborne – aerosol droplets inhaled by another person
  - sneezing, coughing
- Vector – transfer by an insect bite
  - mosquitoes, ticks

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Blood Borne Pathogens

Prevention

- **Prevention** is the best protection
- **Personal protective equipment (PPE)** a focus of first-aid courses
  - Gloves, eye shields, masks, clothing (scrubs)
- **Hand washing**
- **Avoid** eating, drinking, handling contact lenses in potential exposure areas
- **Engineering controls**
  - Hand washing stations, eye flush stations, sharps disposal

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Blood Borne Pathogens

Exposure Control Plan

- Required where OSHA regulations apply
- Tailored to specific facility
- Designated safety officer to monitor
- Addresses
  - Use of PPE
  - Disposal of sharps
  - Vaccinations
- Annual review required

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Blood Borne Pathogens

Hepatitis B (HBV)

- **Affects the liver**
- 50-100 x **more infectious than HIV**
- Effective **vaccination is available**

- Symptoms.
- Most people do not experience symptoms when newly infected. Acute symptoms can last for several weeks. Symptoms may include:
  - Yellowing of the skin and eyes (jaundice)
  - Extreme fatigue
  - Dark urine
  - Nausea and vomiting
  - Abdominal pain
- For some people, symptoms may persist for several months or up to a year.

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Blood Borne Pathogens

Hepatitis C

- **Affects the liver**
- **About 40%** of infected people recover fully
- **Symptoms** may take many years to develop
- **Many infected people become chronic carriers** and may not realize they are infected.
- **Less contagious** than Hepatitis B
- **No immunization** available

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Blood Borne Pathogens

Human Immunodeficiency Virus (HIV)

Affects the immune system, causes AIDS

- ***HIV*** *is the* ***virus***
- ***AIDS*** *is the* ***disease*** *caused by the virus*

Symptoms may take years to develop

Least infectious of the 3 major pathogens

No immunization available

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Blood Borne Pathogens

If you believe you have been exposed:

- Milk the wound, encourage bleeding
- Wash with soap and water
  - Flush eyes, nose, mouth with running water
- Report injury per your company protocols
- Seek medical evaluation and counseling

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Initial Assessment

Assessing Responsiveness

Tap firmly on collar bone and shout "are you OK?"

State your name and ask permission to help

If the injured diver responds, continue with secondary assessment

If the injured diver does not respond, scan quickly to determine if he is breathing normally

- **Call or send someone to call EMS immediately**

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Initial Assessment

Recovery Position

Good positioning to **help protect the airway**

Continually **check** to ensure that his condition does not deteriorate

Do not use for individuals with suspected spinal injury

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Initial Assessment

Log Roll

Used to move the individual onto their back

Protect neck and spine

If the person is unresponsive
and not breathing normally, call for EMS & initiate CPR

Nothing is more important than compressions (after calling for help)

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Starting CPR

Starting CPR

Call for help

Begin with *compressions* at a rate of **100-120 compressions per minute**

Compress to a depth of **2-2 ½ inches/5-6 cm Push HARD**

30 compressions, then 2 ventilations

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Starting CPR

Critical Steps for Compressions

Maximize compression quality -- hard with controlled speed

Release pressure

- without losing contact with chest wall

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Starting CPR

Critical Steps for Compressions

Maximize compression quality -- hard with controlled speed

Release pressure

- without losing contact with chest wall

BLS

Starting CPR

Critical Steps for Ventilations

Use head-tilt-chin-lift to open airway

Create seal with barrier device or directly on person's mouth

Ventilations should be sufficient for chest rise-and-fall, no more

- **1 second for first breath**
- **1 second for exhale**
- **1 second for next breath**

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Starting CPR

Critical Steps for Ventilations

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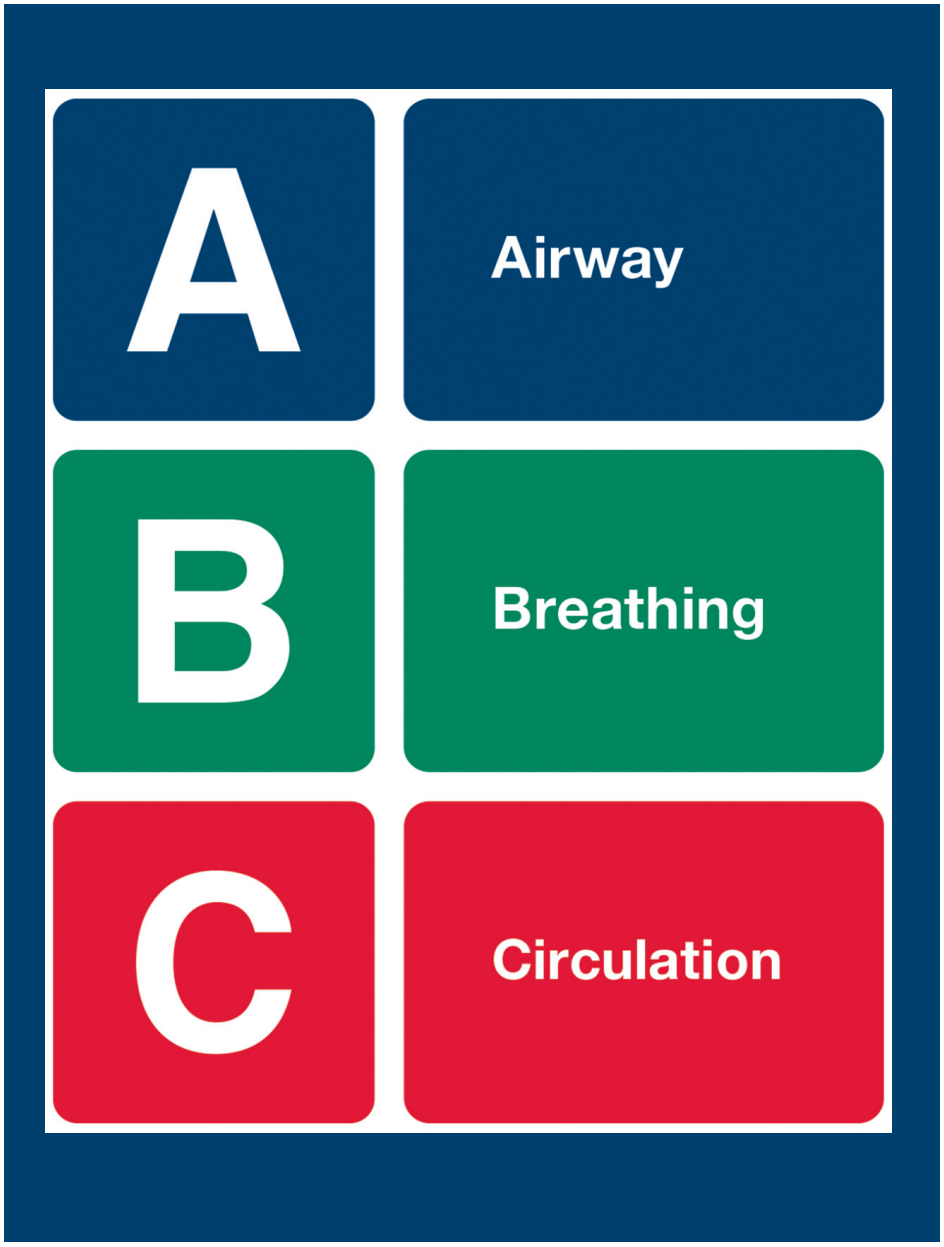
Supporting Respiration

Delivery Device

Bag Valve Mask

- Delivers rescue breaths by squeezing a ventilation bag
- Can be used with room air or oxygen
- Requires **two** rescuers for effective use
- Avoid over ventilation
- Single use/disposable



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Starting CPR

CPR for Drowning Victims

Conduct CPR **beginning with ventilations** for 2 minutes before activating EMS

Use the A-B-C protocol acronym to guide CPR efforts when responding to a drowning or immersion incident

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Starting CPR

Use of Oxygen

Supplemental oxygen **improves tissue oxygenation** during resuscitation after immersion incidents

Important for **victims of drowning or scuba diving** accidents

Ask your DAN Instructor about

the DAN Emergency Oxygen for Scuba Diving Injuries course.

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Starting CPR

Special Circumstances with Resuscitation

Pregnancy

- Effective compressions may require manual displacement of the uterus to her left
- Reduces pressure on returning blood flow

Opioid Overdose

- Became the leading cause of death between 25–60 year-olds in 2012
- Can lead to respiratory arrest and cardiac arrest
- Treat with Naloxone – interferes with action of opioids

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AEDs

The heart has a natural electrical system

- Electrical impulse *should* generate a heart contraction
- Contraction pumps blood to the body

Most common abnormality during cardiac arrest is ventricular fibrillation

The solution for *fibrillation* is . . .

defibrillation

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AEDs

Defibrillation generates a large shock to reset the electrical system

- Assists in re-establishing a normal heart rhythm

AEDs universally provide audible user prompts

"Attach pads to patient's bare chest"

CPR in conjunction with early defibrillation provides the highest rate of survival from cardiac arrest

Survival rates drop 7-10% for every minute the heart is in ventricular fibrillation

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AEDs

Cautions

- Do not use in standing water
- Discontinue use of oxygen and move it away from the individual

Troubleshooting

- Pad placement/attachment most frequent problem
  - Follow illustrations on pads then assure firm attachment
- Removing moisture or shaving off chest hair may be required

Maintenance

- Check AED status indicator
  - Replace battery if required
- Replace expired pads

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For

Cautions

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Foreign Body Airway Obstruction (FBAO)

Choking

Most common **obstruction in adults is food**

Partial obstructions (the person can speak and/or cough) do not require active intervention

Complete obstructions (the person cannot speak, breath, or cough) require rapid assistance

Ask if the person can speak -

If not, ask permission before delivering abdominal thrusts

If the person **becomes unconscious,** call for help and *start CPR*

Finger sweep should only be used when obstruction can be seen

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Foreign Body Airway Obstruction (FBAO)

Abdominal Thrusts

- Stand behind the person
- Put both arms around the abdomen
- Clench your fist, place it, thumb in, just above the navel
- Grasp your fist with the other hand
- Pull sharply inward and upward – firmly
- Repeat until the object is expelled, or the person loses consciousness

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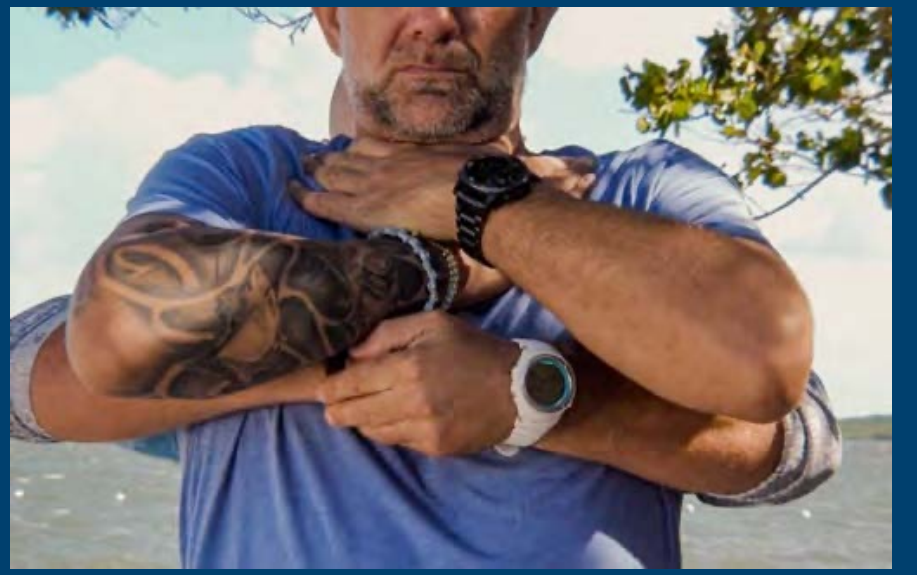

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Foreign Body Airway Obstruction (FBAO)

Chest Thrusts

- Stand behind the person encircling their chest
- Place your arms directly under their armpits
- Clench your fist, place it, thumb in, in the middle of the sternum
- Grasp your fist with the other hand
- Deliver 5 quick forceful thrusts
- Repeat until the object is expelled, or the person loses consciousness

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Foreign Body Airway Obstruction (FBAO)

Back Blows

- Stand to the side and slightly behind the victim
- Support the chest with one arm/hand and lean the victim forward
- Give up to 5 sharp blows between the shoulder blades with the heel of your other hand
- Repeat until the object is expelled, or the person loses consciousness

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Foreign Body Airway Obstruction (FBAO)

Continue applying FBAO techniques until the obstruction is relieved. Rotating techniques is acceptable.

If the person at any time becomes unconscious:

- Carefully lower the individual to the ground.
- Activate EMS.
- Begin CPR (chest compressions followed by rescue breaths).
- Look in the mouth for the obstruction before each pair of breaths. Use a finger sweep to remove any visible objects.

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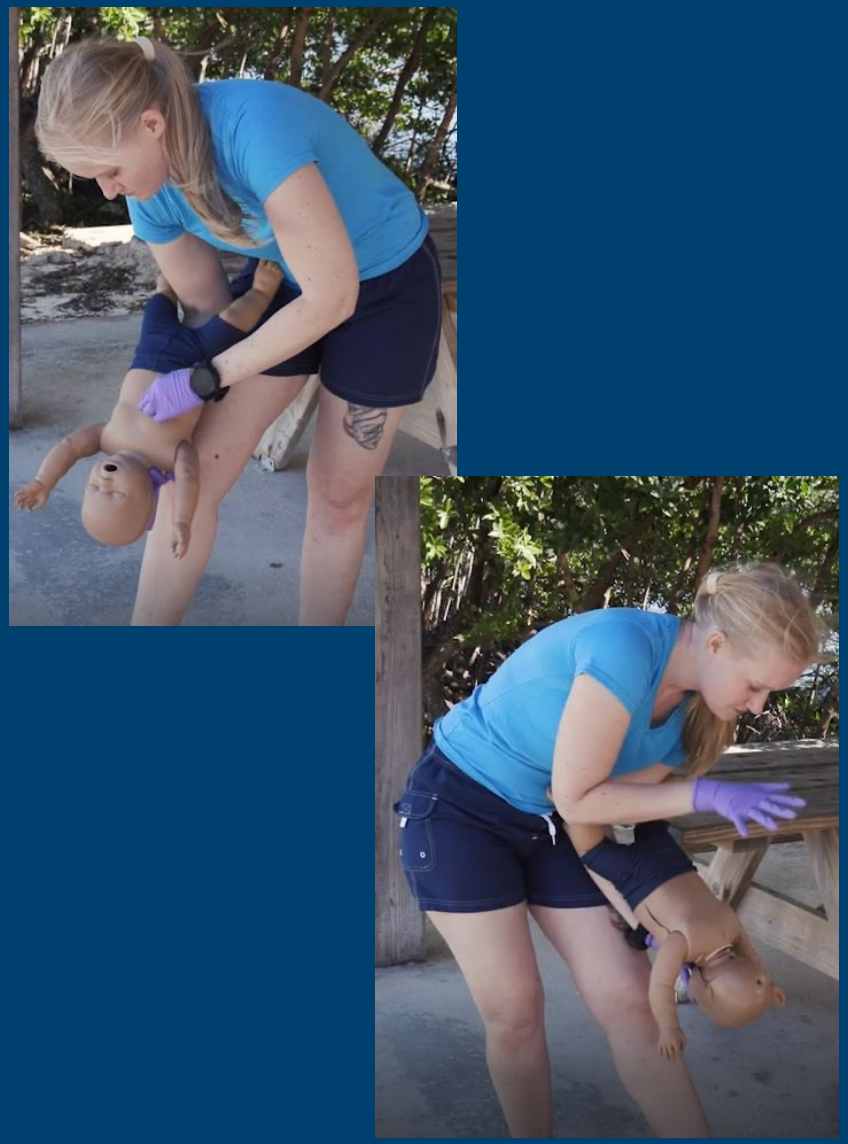

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Foreign Body Airway Obstruction (FBAO)

Choking – Infants

Infants explore with their mouths,

- aspiration of small objects very real concern.

Back Blows/Chest Thrusts

- Place infant's head face down along your forearm, support the head in your hand.
  - Keep head lower than the body
- ***Deliver five back blows between infant's shoulder blades.***
- *Immediately turn infant over, deliver **5 chest compressions.***
  - ***Maintain support of head***

Repeat until foreign body is removed, and infant begins breathing on own.

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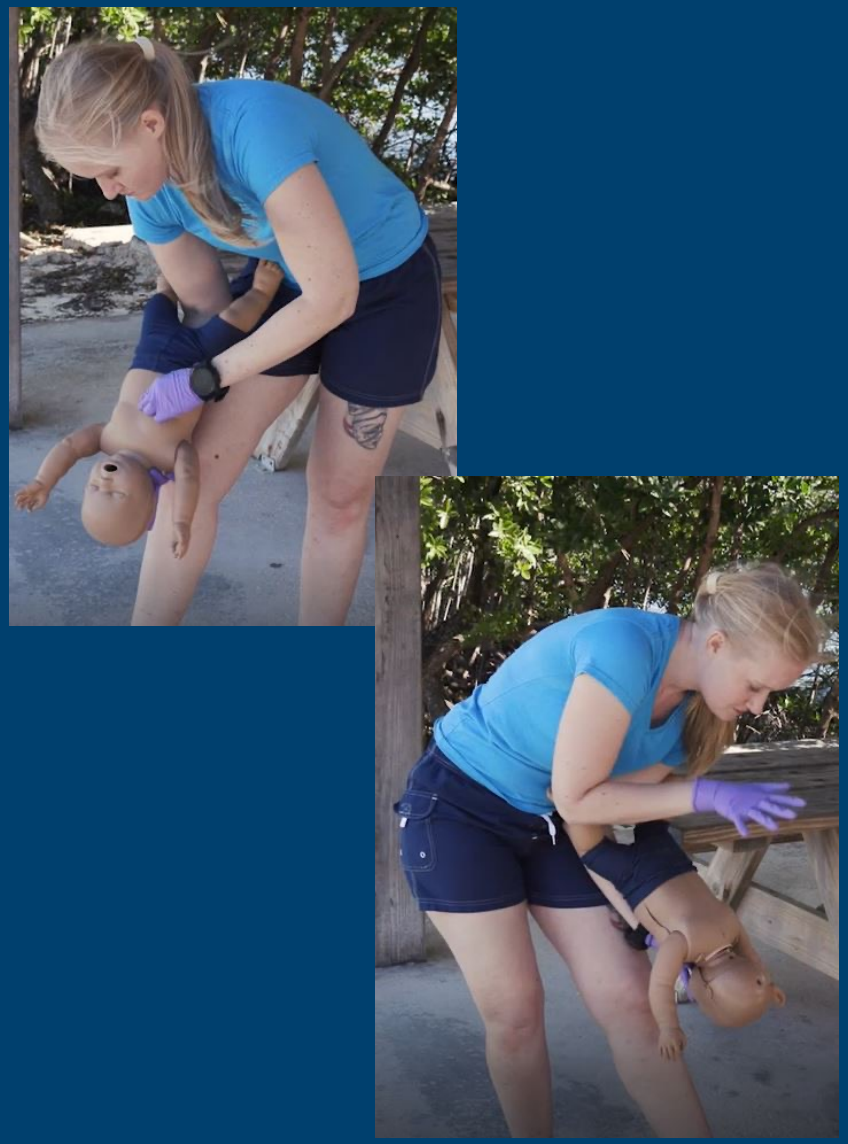

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Section 2: First Aid

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Secondary Assessment

- **Assure** your own safety
  - Remember S-A-F-E
- **Leave** injured person in position found
- **Head-to-toe** evaluation looking for injuries
- **Gently palpate** in a systematic manner
  - Use personal protective equipment
  - Technique provided in student handbook
- **Call EMS** if any injury is identified

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Initial Assessment

Recovery Position

Good positioning to **help protect the airway**

Continually **check** to ensure that his condition does not deteriorate

Do not use for individuals with suspected spinal injury

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Lifting and Moving

General Considerations

Moving an injured person strongly discouraged

Exceptions:

- To move the person to their back for CPR
- Imminent danger (fire, explosive, traffic)

When moving is necessary –

Protect both first-aid provider and injured or ill person

Move in orderly, planned and unhurried fashion

Use the safest and easiest method

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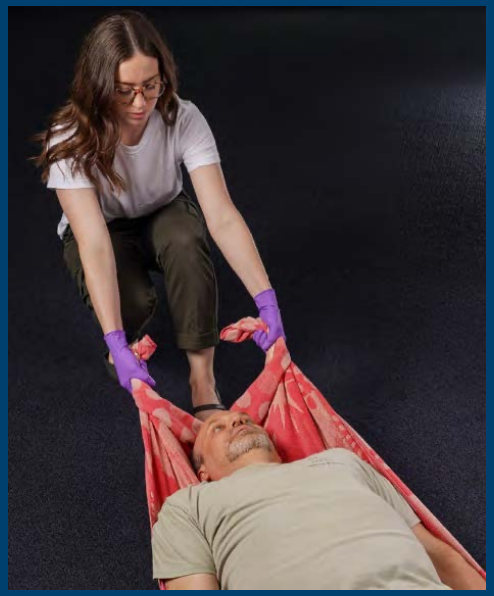

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Lifting and Moving

Techniques

Armpit-Forearm Drag

- Reach under armpits from behind grasping
- individual's opposite wrist
- Pull in direction of body's long axis

Shirt Drag (if individual is wearing collared shirt)

- Grasp shoulders and collar of shirt
- Use shirt to support head and pull along long axis

Coat or Blanket Drag

- Roll person onto side, tuck blanket underneath
- Return person to back, pull other edge of blanket out
- Gather blanket under head and neck for support
- Pull along long axis of person's body

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Lifting and Moving

Reminders

- **Maintain a straight rigid back**
- **Bend at hips not waist**
- **Keep your head in a neutral position**
- **Lift with legs**

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Control of External Bleeding

Direct Pressure

- **Apply with a gloved hand** to control bleeding
- Use **clean or sterile gauze** to aid
- Continue to **hold** **firm pressure** until bleeding is controlled
- Use **additional gauze** as necessary
  - Do not remove any gauze already in place over wound
- **Bandage** only after bleeding stops
- Seek medical assistance if indicated
  - tetanus booster may be indicated
- **Monitor** for signs of infection
  - of particular concern due to marine bacteria

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Control of External Bleeding

Hemostatic Dressings

- May be used in conjunction with a tourniquet or wound packing
- Should be used where tourniquets cannot be utilized
- Usually has a wavy blue line in the gauze
- Other dressing material must be removed to allow direct contact of hemostatic agent with bleeding site
- Advise medical personnel a hemostatic agent was utilized

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Control of External Bleeding

Wound Packing

- In the case of penetrating wounds such as propeller injuries or knife wounds,
- bleeding is occurring inside the wound.
  - Direct pressure on the external surface of the wound will not provide pressure at the source of the bleeding.
- For these wounds, dressing material should be packed into the wound
- lateral pressure applied and maintained during the wound packing process.

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Control of External Bleeding

Tourniquets

Should be:

- Utilized only when direct pressure is not effective
- Wide (at least 2" wide if an improvised tourniquet is used)
- Well-padded (6-8 layers of a bandaging material)
- Placed 1-2" proximal to the wound

Mark the injured person's forehead with a *T or TK* and time of placement

DO NOT REMOVE TOURNIQUET

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Control of External Bleeding

Tourniquets

Should ***NOT*** be:

- Placed directly over knees, elbows or other joints. Place the tourniquet 1-2" proximal to the joint.
- Made of wire or rope, narrow, excessively tight or insufficiently padded band as it may cause local damage to tissues in minutes.
- Removed until advanced medical care is available

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Control of External Bleeding

Tourniquets

Other styles

- One style of tourniquet uses a ratcheting mechanism rather than a windlass

- Apply as you would any other tourniquet

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Special Circumstances

Special Circumstances

Bandaging Joints

When applying bandages across joints, keep the limb in a comfortable position, and try to keep the joint immobilized to minimize further discomfort or bandage displacement.

Eyes

With eye injuries, it may be necessary to cover the injured eye to minimize pain and to provide comfort.

Fold clean gauze over the closed eyelids, then place tape over the eyes with anchors at the forehead and cheek.

Bandage both eyes in a manner that eliminate gaps at edges of bandage to prevent the injured eye from moving with the uninjured eye.

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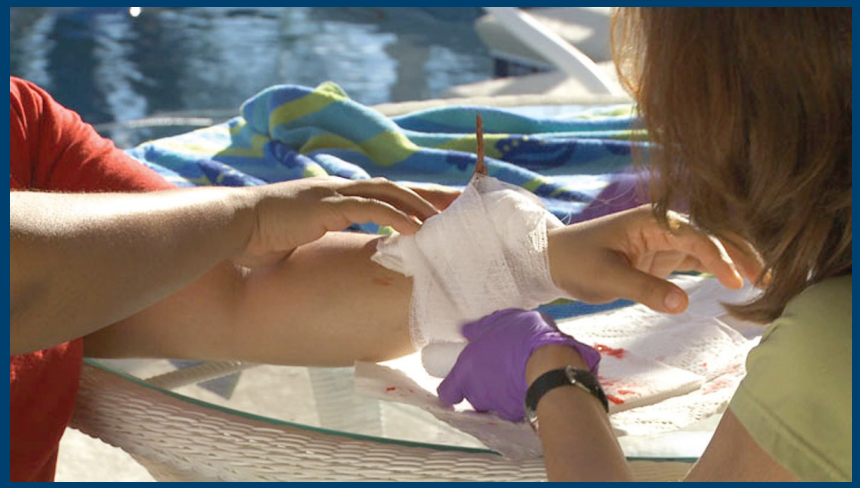

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Special Circumstances

Special Circumstances

Impaled objects – leave in place & secure

Exception **–** object impaled through the cheek into mouth. Gently remove object, dress both inside & outside mouth

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Traumatic Injuries

Internal bleeding

Internal bleeding can be a life-threatening condition. It requires immediate medical attention

It often results from blunt trauma, sudden deceleration injuries (such as a car collision), or certain bone fractures (e.g., femur or pelvis).

The following may indicate internal bleeding:

- Rigid or swollen abdomen
- Vomiting or coughing blood
- Blood in urine
- Bloody or tarry stool
- Intense muscle pain
- Difficulty moving the related joints
- Fainting or dizziness
- Low blood pressure
- Signs of shock

To treat the injured person for internal bleeding:

1. Open the airway if needed
2. Activate EMS (if not already activated)
3. Minimize movement of the injured person
4. Apply ice to the affected area (unless the internal bleeding is in the skull)
5. Evacuate to EMS as soon as possible

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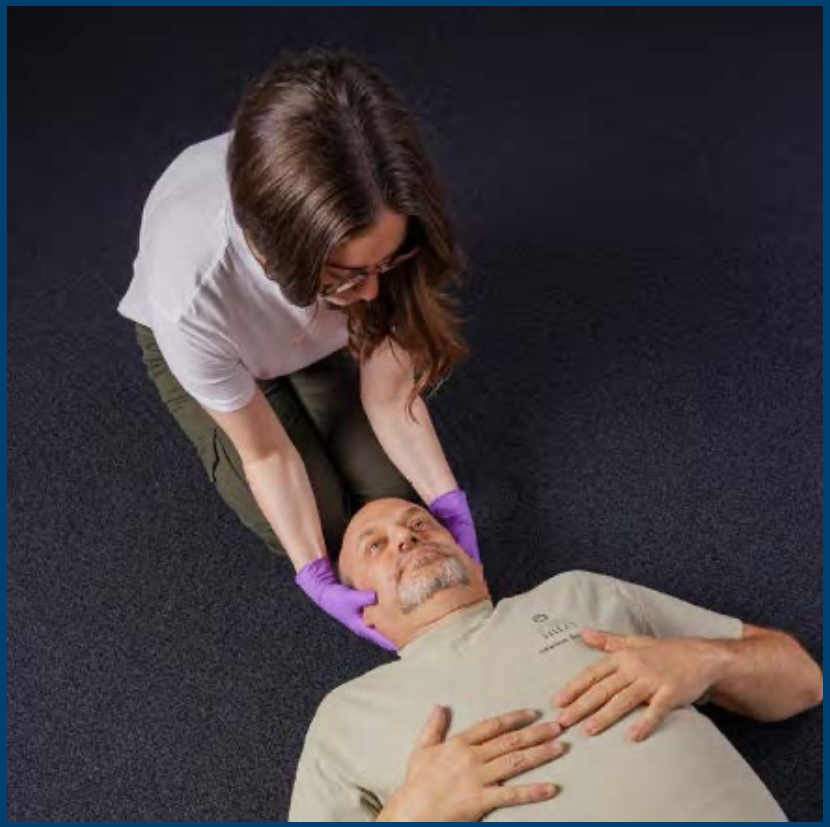

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Traumatic Injuries

Spinal Injury Management

If the injury mechanism is such that you suspect a spinal injury, your primary duty to the injured person is to deal with any immediate threats to their life.

Perform CPR if necessary. If CPR is not necessary, your role is to keep the injured person calm and still.

Activate EMS if you have not done so.

Kneel at the person's head

Place your hands on both sides of the person's head to keep them

immobile.

Do not attempt to straighten or realign the head unless the airway is compromised.

Be sure to talk to and reassure the person as you wait for EMS to arrive.

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Traumatic Injuries

Amputations

Sometimes a trauma involves the removal of a part of the body. Amputation injuries could range from a finger getting pinched in the hinge of a dive boat ladder to the severing of an entire limb.

With an amputation, control bleeding as necessary using the techniques

Be ready to treat for shock or provide CPR if necessary.

If the amputation is **incomplete** and the skin, muscle or tendons are still attaching the body part, immobilize it using a splint and bulky gauze. Never detach an incomplete amputation.

If the amputation is **complete**, attempt to preserve the parts, no matter how damaged they appear to be.

Wrap them in saline-moistened gauze, seal them in a plastic bag and place it in a container with ice.

Do not place the amputated part directly on or in the ice.

Ensure the amputated part is transported with the injured person.

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Special Circumstances

Wound infections

Skin is most effective defense against infection.

When breached, allows introduction of

- bacteria
- fungi
- viruses
- other organisms

Source of injury important as organic material increases risk of wound infection and delayed healing.

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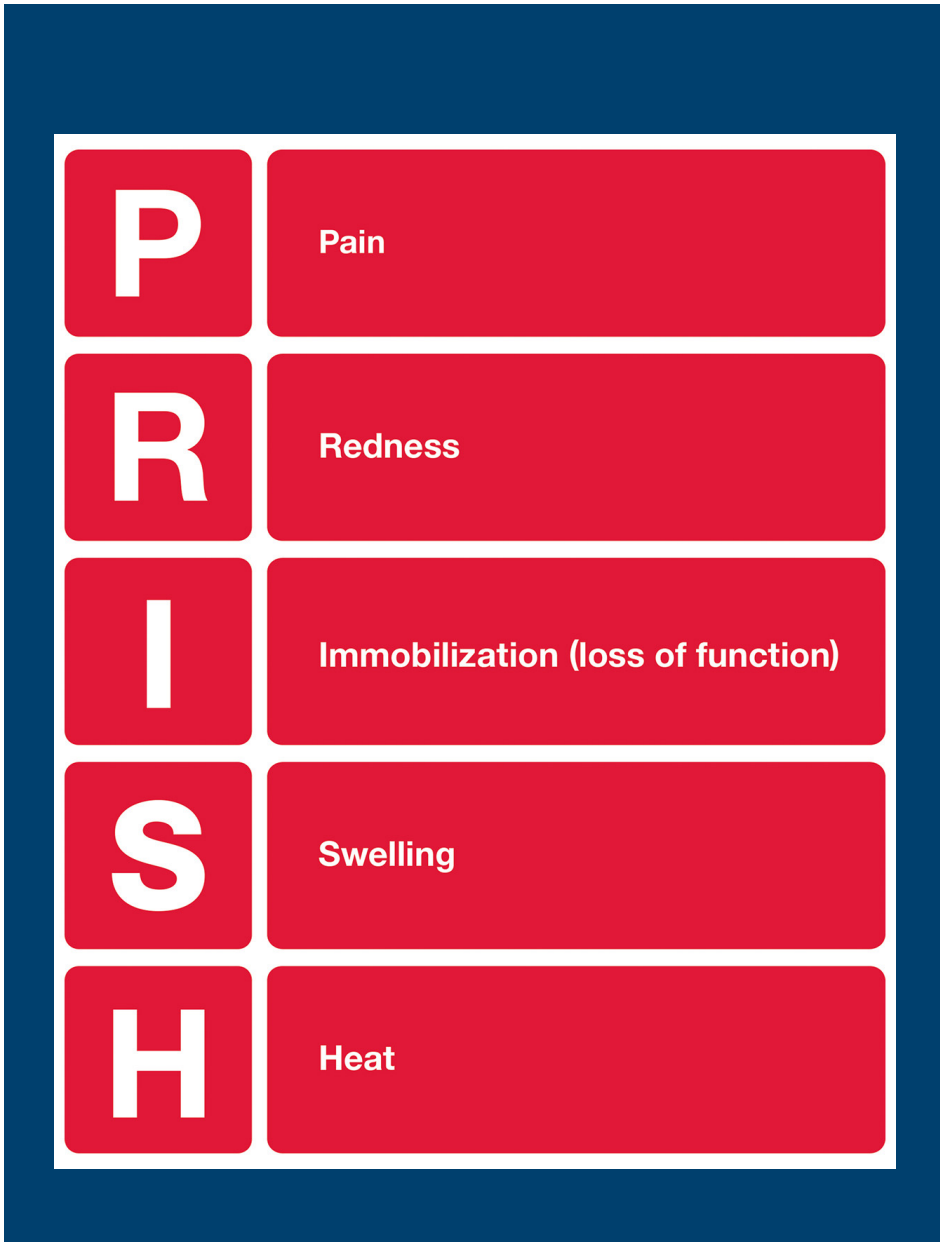

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Infections

Wound infections

Signs of infection appear within hours, days or even several weeks following injury.

- Pain
- Redness
- Immobility (loss of function)
- Swelling
- Heat (elevated warmth of the infected area)

Other signs of infection:

- Pus and yellowish discharge
- Foul smell
- Swollen lymph nodes
- Fever
- Non-healing wounds
- Chills

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Splinting

- For use when EMS is delayed or not immediately available
- Immobilize in position found
- Immobilize the joint above and below the injury
- Use commercial or improvised splinting materials
- Pad around injury with roller gauze or other material
- Monitor peripheral circulation

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Dislocations

- Dislocation is when the normal position of a joint and function is disturbed
- Once dislocated, it typically takes less force to re-dislocate
- Sometimes soft tissues, like muscles, blood vessels, and nerves are also adversely affected
- Treat like a strain/sprain or a suspected fracture - splinting

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First Degree

Second Degree

Third Degree

Fourth Degree

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Burns

Tissue damage caused by heat, chemicals, electricity, sunlight or radiation

Superficial burns (first degree burns)
- Limited to outermost layer of skin
- Redness, mild swelling and discomfort

Partial thickness burns (second degree burns)
- Varies in depth of tissue involvement
- Blister formation and blanching possible

Full thickness burns (third degree burns)
- Involves all layers of skin; may extend deeper
- White, waxy appearance; often without blisters; insensate

Fourth degree burns
- involves muscle and/or bone tissue
- Often the result of high-voltage or thermal injury

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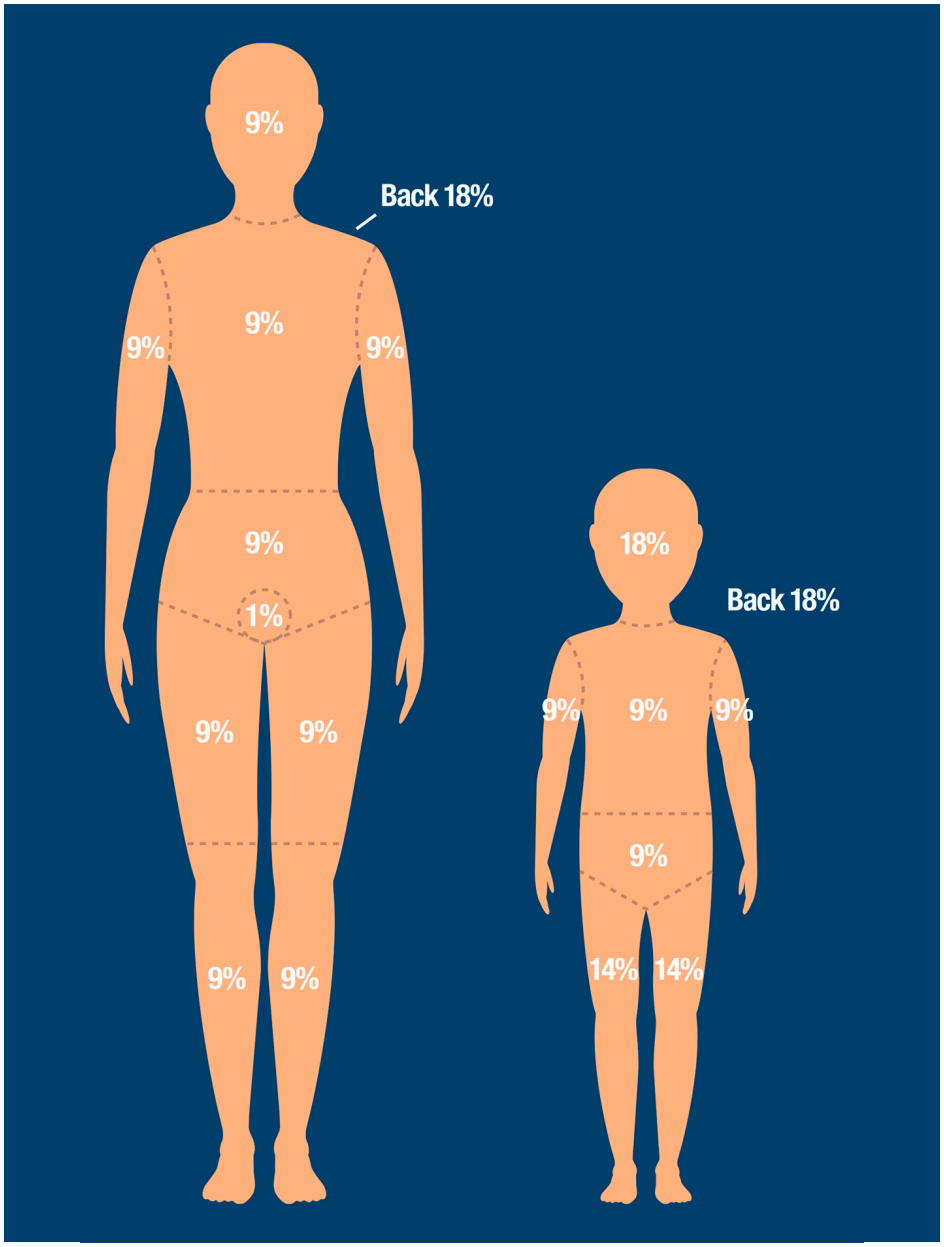

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Burns

Rule of Nines

For an adult:

- Head and neck 9%
- Anterior trunk (front of body) 18%
- Posterior trunk (back of body) 18%
- Each Arm (including the hand) 9% (total of 18%)
- Each leg (including the feet) 18% (total of 36%)
- Genitalia 1%

For a child:

- head and neck 18%
- anterior trunk 18%
- posterior trunk 18%
- arms (including hands) 9% each
- legs (including feet) 14% each

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Burns

First Aid

Remove patient from source of burn
Cool the burn for up to 15-20 minutes
Cover with clean, dry dressing
Call 911 for severe burns, especially those to face, hands, and feet

Do not

- Use ice to cool a burn
- Apply ointments, lotions or antiseptics
- Do not pop blisters

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Temperature Related Injuries

Hypothermia (cold) –

body core temperature <95° F/35° C

First-aid Response

Prevent further heat loss

Remove wet clothing

Provide warm dry coverings

Consider use of hot-water bottles or heating pads

Activate EMS for moderate to severe cases

AVOID rough handling

- May cause heart arrhythmias

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Temperature Related Injuries

Hyperthermia (hot) –

- body is overheated and normal cooling mechanisms are overwhelmed

Heat rash – pimple-like rash

- Due to excessive sweating
- Cool individual
- Keep area dry

Heat Cramps – muscle spasms

- Due to excessive fluid loss due
  - Associated with strenuous activity
- Stop all activity
- Rest in cool place
- Drink clear fluids (sport drinks)

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Temperature Related Injuries

Heat Exhaustion

- Also due to excessive fluid loss

Warning signs

- Heavy sweating
- Nausea/Vomiting
- Headache
- Muscle cramps

- Fatigue
- Weakness
- Fainting

First Aid

- Remove from heat
- Rest
- Remove unnecessary clothing
- Place in cool environment
- Drink clear liquids (sport drinks)
- Cool with sponging head, neck, torso

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Temperature Related Injuries

Heat Stroke **Life-threatening condition**

Body core temperatures may exceed 106°F/41°C

Warning signs

- Rapid pulse
- Red, hot, often dry skin
- Strange behavior
- Hallucinations
- Confusion
- Seizures
- Coma
- Death

First Aid

- Remove from heat
- Activate EMS
- Rest
- Remove unnecessary clothing
- Place in cool environment
- Aggressive cooling
  - Cold packs, water-soaked towels
  - Fans/Vents

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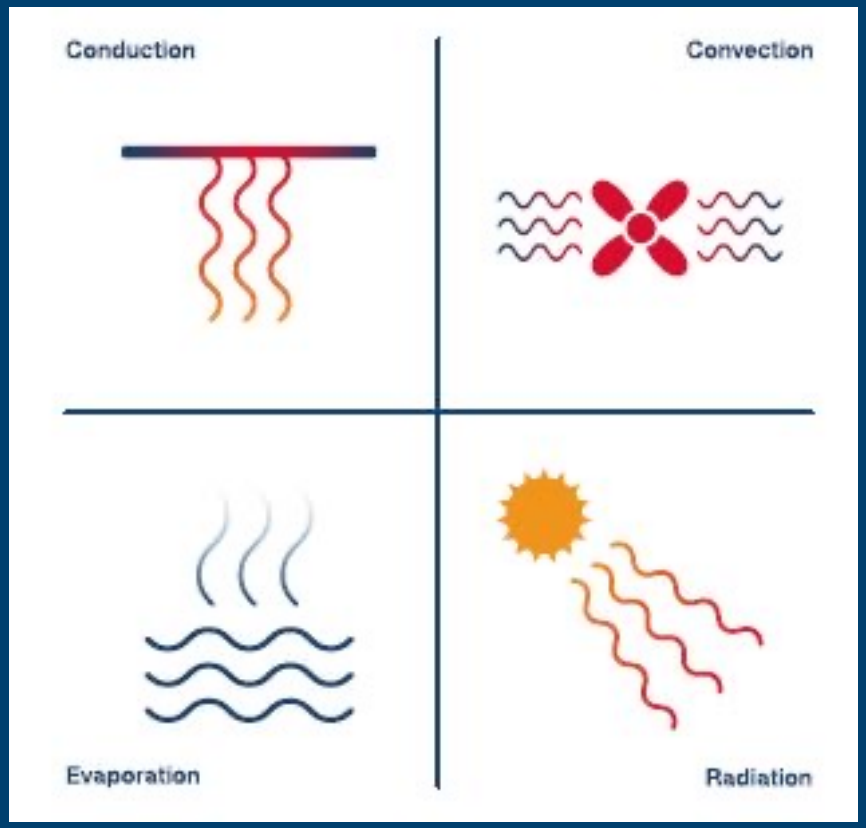

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Temperature Related Injuries

Cooling Measures - **mechanisms for heat loss**

Conduction

- transfer from warmer object to cooler object by direct contact

  Ex: bath or shower

Convection

- response to movement of fluid or gas

  Ex: fan or air conditioning

Evaporation

- heat absorbed by sweat then released/removed as gas

  Ex: sponging

Radiation

- transfer of electromagnetic energy from warmer to cooler

  Ex: move to shady location

  out of sun

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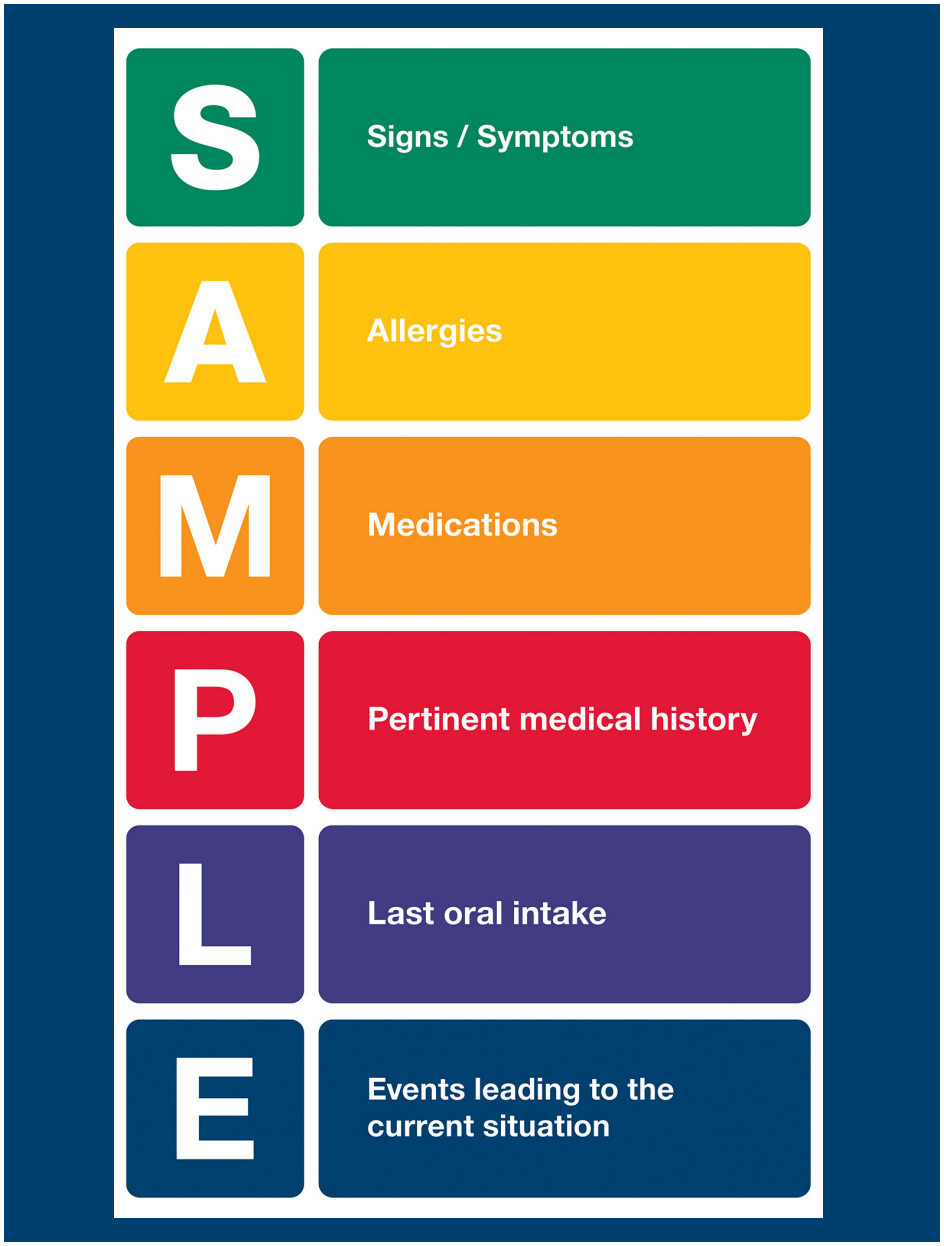

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Medical Emergencies

History

- When talking to an injured or ill person, gather and record a history of the event(s) that led to the injury or illness.
- **Use the mnemonic "S-A-M-P-L-E"**
- S-A-M-P-L-E stands for:

  Signs/Symptoms

  Allergies

  Medications

  Pertinent medical history

  Last oral intake

  Events leading to the current situation

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Medical Emergencies

Asthma

Non-contagious respiratory condition characterized by airway narrowing

Heart Attack

Coronary artery blockages – symptoms may include:

- Heavy pressure or squeezing in center of chest or back
- Shoulder, arm or neck/jaw pain
- Nausea, vomiting
- Shortness of breath
- Indigestion, heartburn
- Sweating
- Sense of impending doom

NOTE: Not all heart attacks are painful

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Signs of Hypoglycemia	Signs of Hyperglycemia
hunger	increased thirst
tremors or seizures	headaches
anxiety	difficulty concentrating
sweating	blurred vision
dizziness or lightheadedness	frequent urination
sleepiness	fatigue (weak, tired feeling)
confusion and/or changes in level of consciousness	
difficulty speaking	
nervousness	
weakness	

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Medical Emergencies

Diabetic Emergencies

Two classes – high blood sugar and low blood sugar

High blood sugar = Hyperglycemia

Rarely needs emergent treatment

More of a long term problem

Low blood sugar = Hypoglycemia

May quickly become a serious medical emergency

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Signs of Hypoglycemia	Signs of Hyperglycemia
hunger	increased thirst
tremors or seizures	headaches
anxiety	difficulty concentrating
sweating	blurred vision
dizziness or lightheadedness	frequent urination
sleepiness	fatigue (weak, tired feeling)
confusion and/or changes in level of consciousness	
difficulty speaking	
nervousness	
weakness	

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Medical Emergencies

Diabetic Emergencies

If a known diabetic **behaves in an uncharacteristic manner, is confused or shaking**, suggest they check their blood sugar (blood glucose).

Treatment for hypoglycemia if able to swallow without choking **provide high sugar concentration**

- Glucose tablets
- Candy/Jelly beans
- Fruit leather
- Orange juice

If the diabetic cannot swallow, call 911 for assistance.

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Medical Emergencies

Other Medical Emergencies

Exertional Dehydration

- Due to vigorous exercise and profuse sweating
- Results in loss of electrolytes
- Attempt rehydration with 5-8% carbohydrate-electrolyte solutions

Concussion

- Mild traumatic brain injury
- Symptoms may include feeling dazed, dizzy, unsteady, headache, visual disturbances, confusion, memory loss
- Must be evaluated by a health care provider
- Activity must be restricted until released by a doctor

Dental Avulsion

- Greatest chance of tooth survival is reimplantation within an hour
- Store tooth in a noted solution; seek immediate care

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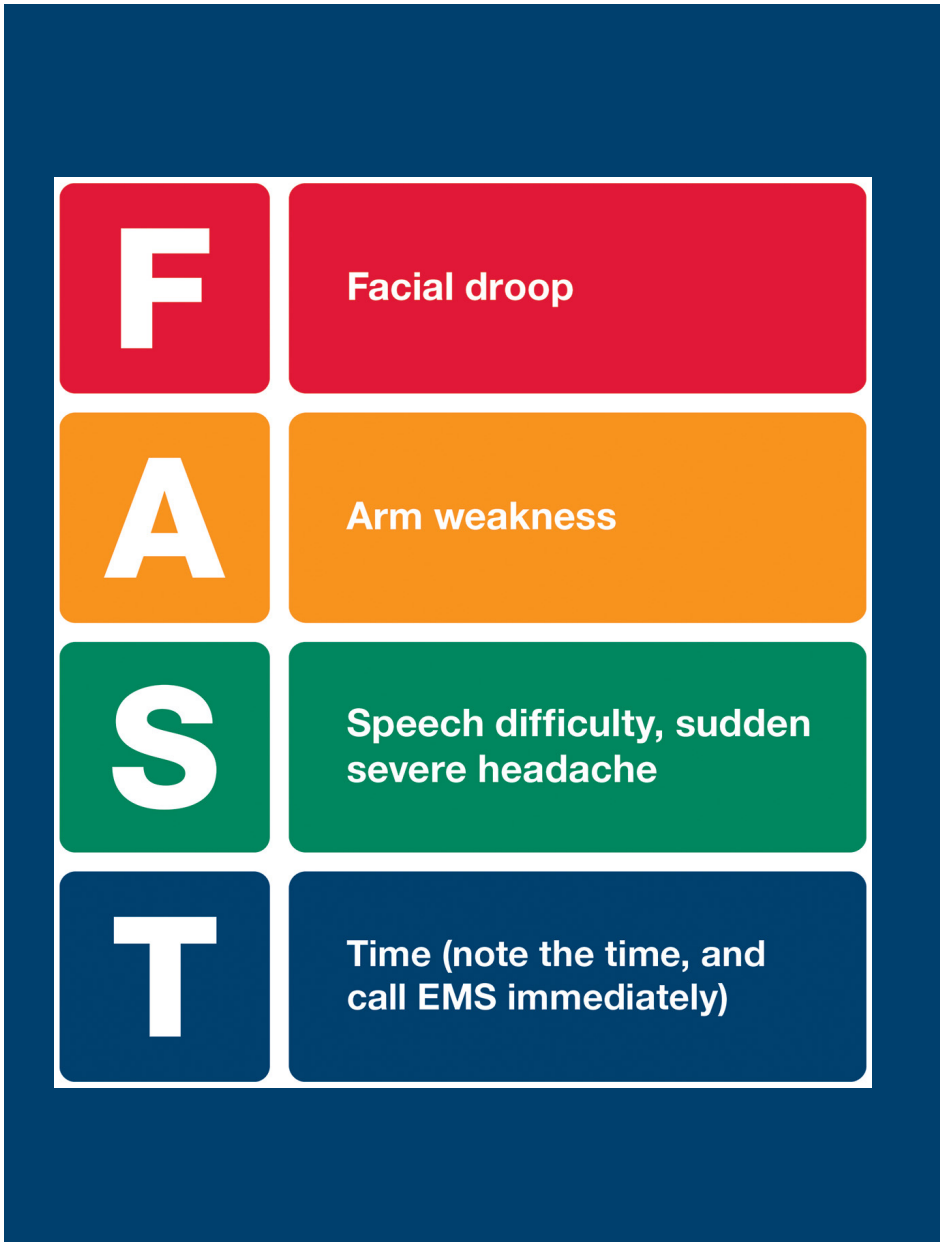

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Medical Emergencies

Stroke

- Leading cause of long-term disability
  - Third leading cause of death
- Suspect stroke in absence of head trauma if:
  - Sudden loss of motor function
  - Inability to understand or formulate words
  - Loss of visual field

Think F-A-S-T to assess for possibility of stroke

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Neurological Assessment

F-A-S-T examination is an easy way to determine if signs neurological injury are present

- Occurs on one side of the face; can involve left or right side
- Ask the injured person to raise both arms, wait 10 seconds for any lowering
- Inability to speak clearly or verbalize. Often associated with facial droop
- Call 9-1-1 (emergency services) if any of these symptoms are present

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Neurological Assessment

Remember F-A-S-T First

Regardless of cause, if a neurological injury is suspected

- Call local EMS immediately
- Be prepared to initiate CPR
- If injury is dive related, provide oxygen first aid
- Complete full neurological assessment

Note:
Performing a neurological assessment should never interfere with EMS activation, evacuation or essential first-aid measures such as CPR or stopping severe bleeding.

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Medical Emergencies

Seizures

Result from a sudden massive electrical discharge in the brain

- First-aid priority is to move objects that may be struck, cause injury

Poisoning

Can be eaten, inhaled, injected or absorbed

- Call EMS immediately if suspected
- Signs/Symptoms
  - Nausea, vomiting
  - Abnormal blood pressure
  - Headache
  - Abdominal pain
  - Altered pupils
  - Altered mental status

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Life Threatening Complications

Anaphylactic Shock

Severe allergic reaction may occur subsequent to envenomations.

Signs and symptoms (mild/moderate)

- Generalized itching (pruritis)
- Bloodshot, puffy eyes
- Facial swelling (eyes, lips)
- Localized or diffuse swelling
- Localized redness, raised rash (hives)

Signs and symptoms (severe)

- Airway narrowing
- Respiratory distress
- Cardiac arrest

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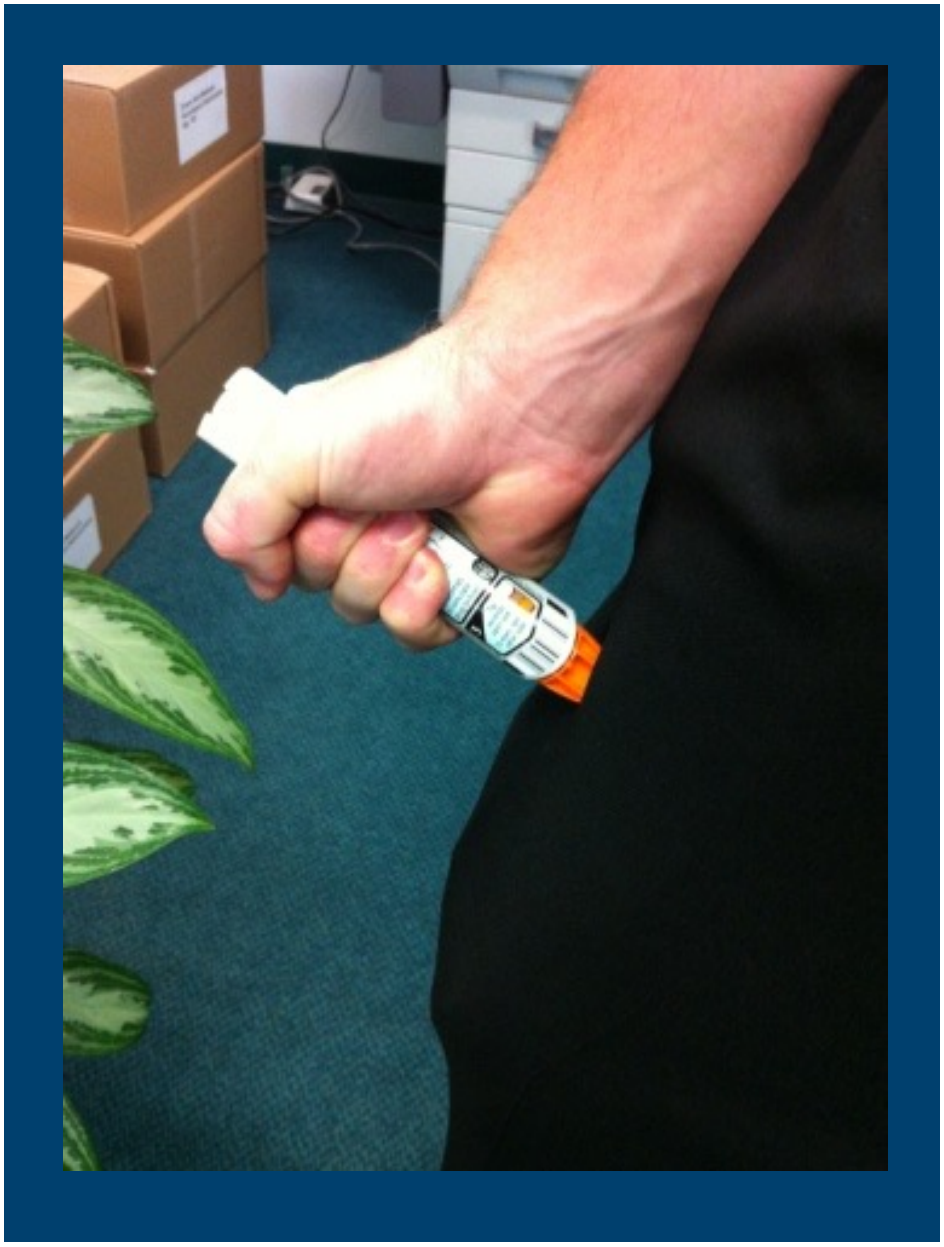

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Life Threatening Complications

Treating Anaphylactic Shock

- This is a medical emergency – ***alert emergency medical services immediately***
- Assist the injured person with administration of allergy medications
  - If prescribed for them personally.
- If airway narrowing or difficulty breathing is present, consider use of an epinephrine auto-injector
  - if prescribed for the injured person.
- Monitor airway and breathing.

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Life Threatening Complications

Cardiogenic Shock

Refers to a reduction in the heart's ability to circulate blood to the brain and vital organs.

Causes include:

- heart attack (myocardial infarction)
- unstable arrhythmias
- envenomations, especially box jellyfish

Note: stonefish venom may

- have vascular effects causing hypotension
- result in decreased blood flow to brain and vital organs

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Life Threatening Complications

Cardiogenic Shock

Signs and Symptoms

- Hypotension (low BP)
- Pale /Cool /Clammy skin
- Cold hands and feet
- Severe shortness of breath
- Weak pulse
- Altered mental status
- Nausea/Vomiting
- Chest pain that radiates to the arms, shoulder, neck or back
- Unconsciousness
- Cardiac arrest

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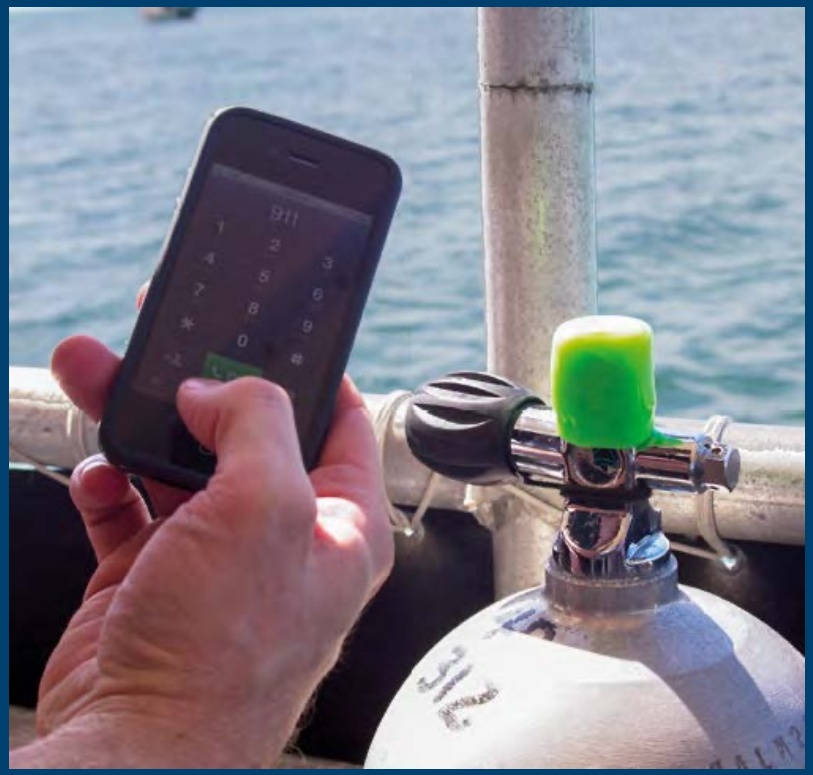

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Life Threatening Complications

Treating Cardiogenic Shock

- This is a medical emergency – ***alert emergency medical services immediately***
- Have the person lie down on their back or in a position of comfort
- Check for signs of circulation – if absent begin CPR
- Keep the person warm and comfortable

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Life Threatening Complications

Hypovolemic Shock

Decrease in circulating blood volume

- results in a deficiency of blood supply to vital organs.

Blood loss is secondary to internal or external bleeding.

Signs and Symptoms

- Anxiety or agitation
- Confusion
- Rapid breathing
- Unconsciousness
- Pale / cool / clammy skin
- Generalized weakness
- Decreased urine output

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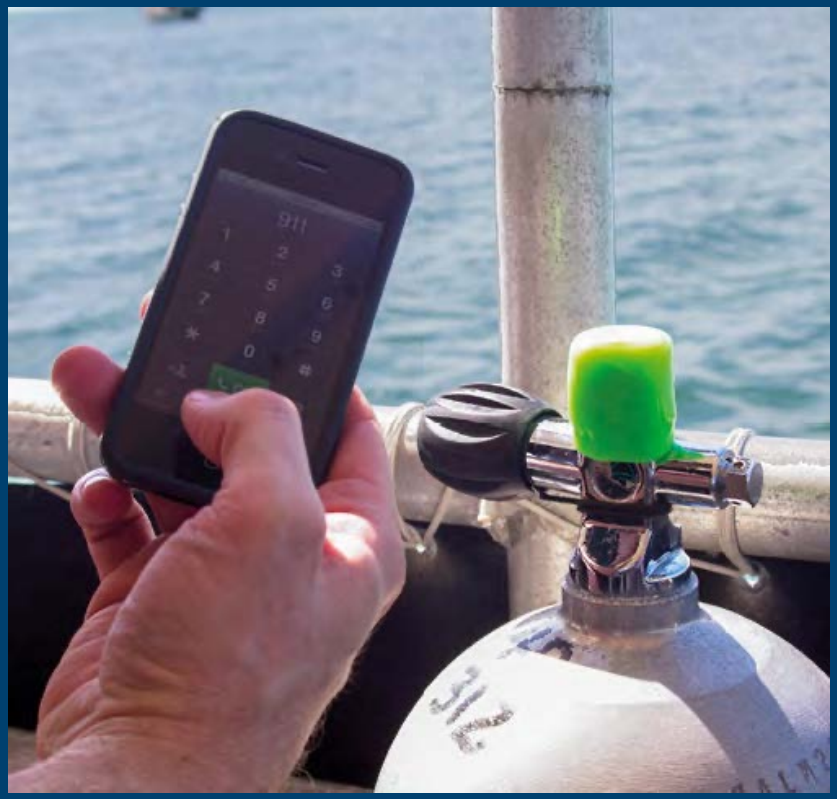

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Life Threatening Complications

Treating Hypovolemic Shock

- This is a medical emergency
  – ***alert emergency medical services immediately***
- Attempt to stop all external bleeding with direct pressure
- Have the person lie down on their back
- Check for signs of circulation
  – if absent begin CPR
- Keep the person warm and comfortable

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Emergency Action Plans

Elements to Include

- **Locations** for all emergency kits and supplies
- **Communication equipment** and how to use it
- **Local resources**
  - EMS
  - Nearest medical facility
  - Transport option to nearest medical facility
- **Direction for EMS** to get to your location if required
- **DAN Emergency Hotline** number (919-684-9111)
- **Method to document** nature of injury and care rendered

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Emergency Action Plans

Diver (or Injured/Ill Person) Information to Record

- Person's name, address, DAN member number
- Emergency contact information
- Person's medical history
  - S-A-M-P-L-E, discussed later
- Signs and symptoms
- Dive profile (if applicable)

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Emergency Action Plans

Emergency Equipment

- First-aid Kits
  - Appropriate for environment and anticipated use
- Communication equipment as appropriate
- Oxygen Units (if trained in its use)

Thank you!

We hope you have enjoyed and learned from the DAN BLS: CPR and First Aid course.