



CPR PRO



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Getting Started

Welcome

Introductions

Facility

Sign in sheet

Equipment Needed

Overview of the Course

Goal of the Course





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Course Overview

POST First Aid/CPR Update

Basic Life Support

Respiration and Circulation

Scene Safety

Initial Assessment & Positioning for Care

Starting CPR: Supporting Circulation

Continuing CPR: Supporting Respiration

Use of AEDs During CPR

Foreign Body Airway Obstruction

Skills

Final Assessment and Review





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

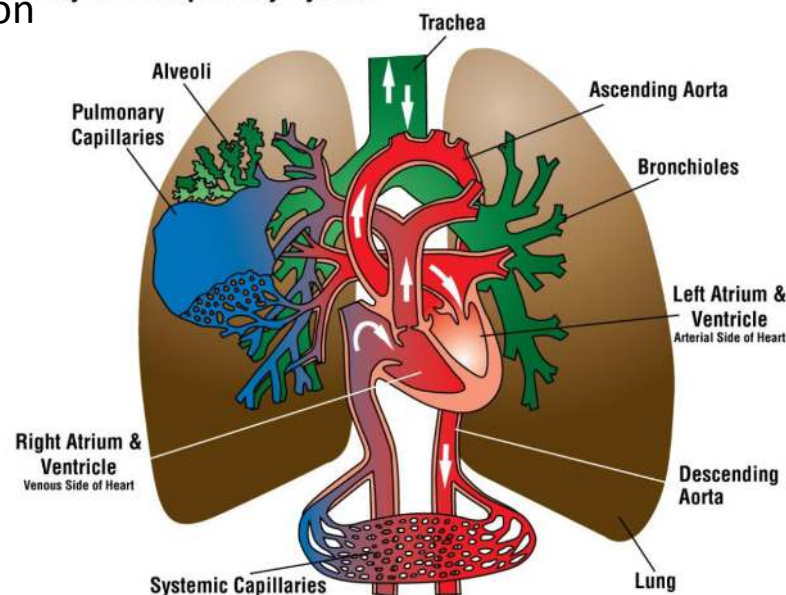
- Intake of oxygen
- Removal of CO₂

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

Airway and Respiratory System





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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Basic Life Support

Oxygen is vital for life

Primary concern

- initiating and maintaining circulation through compressions
- delivering oxygen to vital organs

Airway obstructions impede oxygen delivery

4-6 minutes without oxygen vital organs (especially the brain) and tissues begin to die

Immediate action is crucial to survival



Basic Life Support

Key Steps during Cardio-Pulmonary Resuscitation

Check for responsiveness

- activate EMS

Quickly check for normal breathing and a pulse

Provide chest compressions if not breathing normally and no pulse

Provide rescue breaths

Circulation

Airway

Breathing



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Basic Life Support

CPR Goal – provide critical blood flow to vital organs

- Probably will not restart the heart
- Delays damage to vital organs
- Improves chances of successful defibrillation

Ensure that EMS has been activated



Basic Life Support

Heart Attack

Term used to describe symptoms associated with blockage of arteries supplying the heart

Rescuer's role with unresponsive victim is to initiate CPR (use AED if available) and activate EMS

Rescuer's role with a responsive victim is supportive

- Assist to position of comfort
- Activate EMS
- Aid with medications if prescribed https://youtu.be/bseE0Od_zM
 - Nitroglycerine : every five minutes up to 3 doses



Basic Life Support

Heart Attack Signs and Symptoms

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



Basic Life Support

Drowning

- Defined as impaired respiration due to submersion/immersion in a liquid
- Either fatal or non-fatal
- Requires multifaceted medical interventions

Responder's role

- Initiate CPR immediately if unresponsive with supplemental oxygen
- Monitor vital signs if responsive, provide oxygen, be prepared to initiate CPR if necessary
- Transport to nearest medical facility

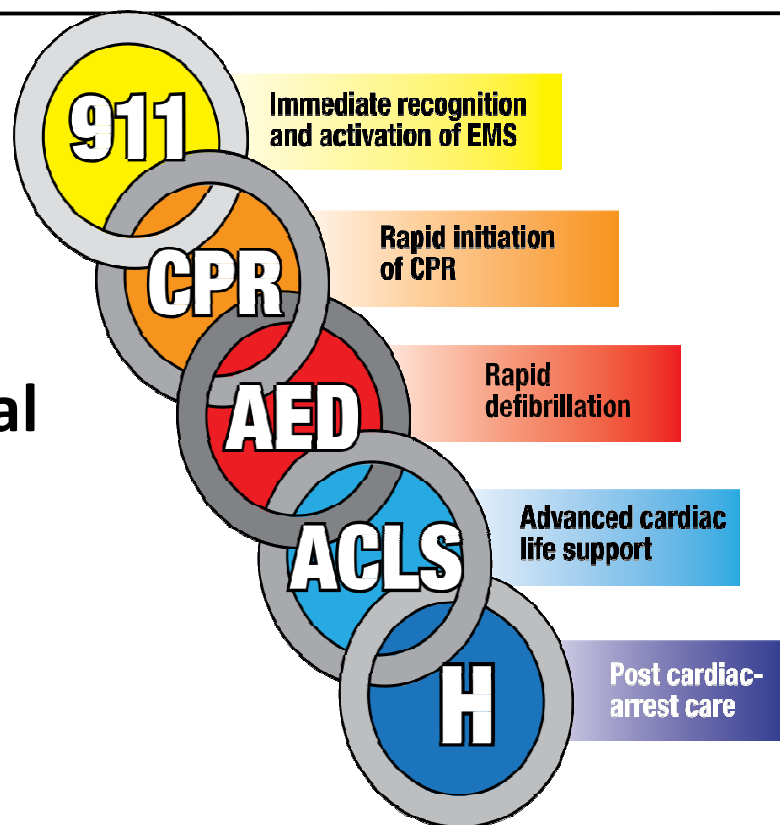


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Basic Life Support

5 Links in The Chain of Survival





Basic Life Support

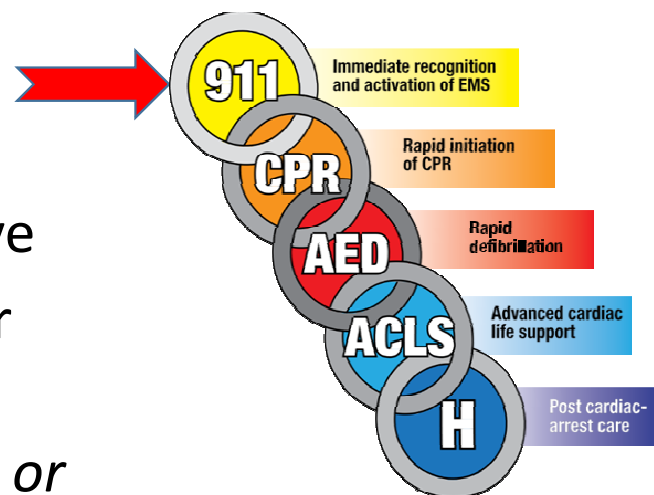
Early Access

Recognition of a problem should be followed by rapid action

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

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

Exceptions: *if victim is a child, infant or the victim of drowning and you are alone, do 2 minutes of CPR before calling EMS*





Basic Life Support

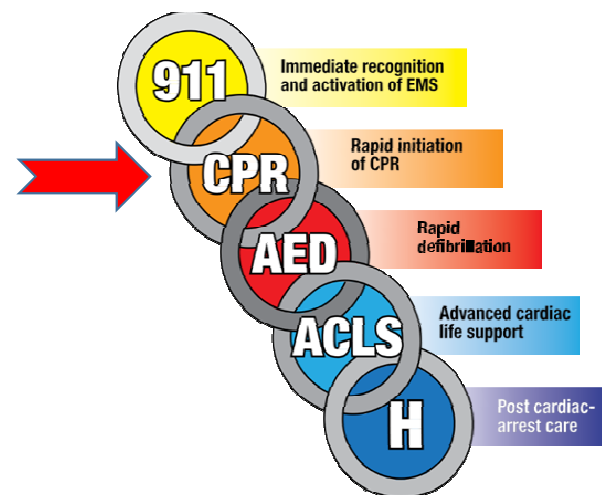
Early CPR

Early and aggressive CPR

supports life until advanced care is available

CPR keeps oxygenated blood

circulating to the brain and heart





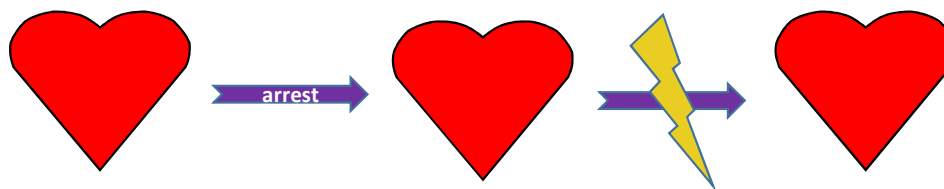
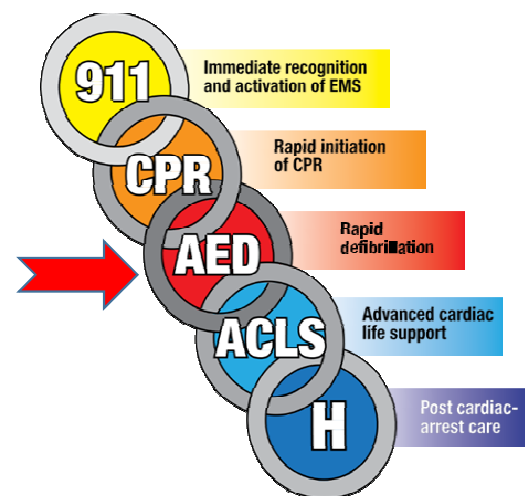
Basic Life Support

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





Basic Life Support

Advanced Life Support

Includes:

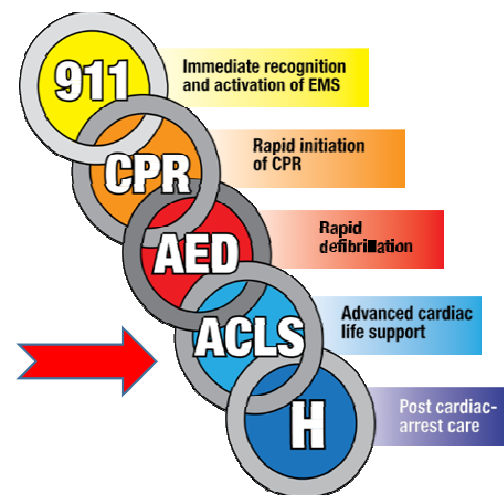
Advanced Airways

IV Medications

Advanced Heart Monitoring

Stabilizes patient for transport to
hospital

Good ALS care revolves around good BLS
care !





Basic Life Support

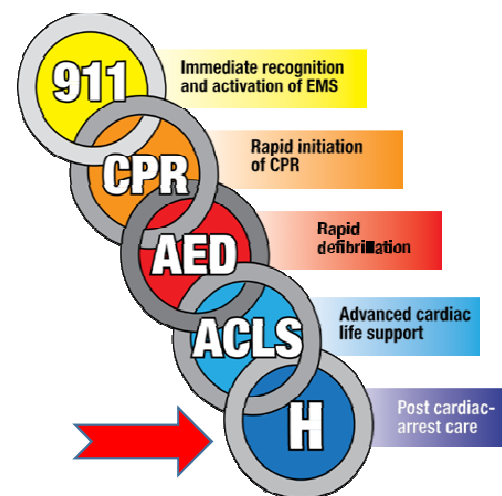
Post Cardiac-Arrest Care

Involves:

Maintaining airway

Heart Monitoring

Hospital interventions to treat the underlying cause of the cardiac arrest





Basic Life Support

Duty of Care

Legal obligation to provide care

- *Bystanders*: no legal obligation to respond
 - may have obligation to notify authorities
- *Health care providers*: acting in capacity of their profession may have a legal obligation to respond
- *Other professionals*: may include an obligation to provide care

ALWAYS ask permission before rendering aid of any kind

- “My name is _____. I know first aid. May I help you?”

Responsive person should give permission

- Permission is assumed for unresponsive person



Basic Life Support

Emotional Stress

Anxiety is normal

CPR does not always work

- Even when coupled with advanced cardiac care

Seek counseling rather than blame yourself

- You did not do anything wrong
- You did not make the condition worse
- CPR is only one link in the chain of survival



Scene Safety

Risk of Infection

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



Scene Safety

Exposure

Milk the wound, encourage it to bleed

Wash with soap and water

Flush eyes, nose and mouth with large amounts of running water

Wash contaminated material off as quickly as possible

Seek medical evaluation and counseling



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Scene Safety

Hepatitis B (HBV)

Affects the liver

50-100 x more infectious than HIV

Effective vaccination is available





Scene Safety

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

may not realize they are infected.

Less contagious than Hepatitis B

No immunization available



Scene Safety

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



Scene Safety

Standard Precautions

Use PPE (Personal Protective Equipment)

- Gloves, face masks, eye protection, gowns

Avoid contaminated sharp objects

- Dispose of sharps in an approved container

Thoroughly wash hands after providing care



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Scene Safety

Avoid becoming a victim

Think S A F E

Remember S-A-F-E

S Stop

- Stop
- Think
- Act

A Assess the scene

- Scene safe?
- Safe to approach?
- Any hazards?
- Additional risks?

F Find and locate the 1st aid kit (and oxygen and AED unit)

- First aid kits contain critical supplies such as barriers

E Exposure protection

- Use barriers such as gloves and mouth-to-mask barrier devices
- Don gloves and inspect them for damage



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Initial Assessment

Assessing Responsiveness

Tap and shout “are you OK?”

State your name and desire to help

If the injured patient responds, leave in position found

If the injured patient does not respond, scan quickly to determine if he is breathing normally, and simultaneously check for a pulse

Call or send someone to call EMS immediately





Initial Assessment

Log Roll

Protect **neck and spine**

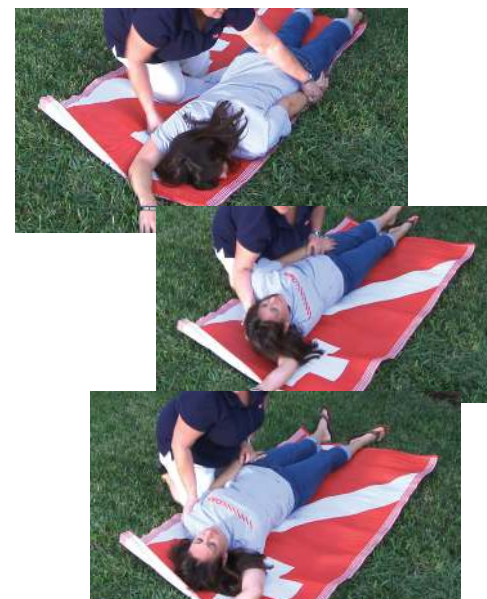
Use to move patient onto his back

If the patient is:

- unresponsive
- not breathing normally
- does not have a definite pulse

call for EMS & initiate CPR

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





Initial Assessment

Pulse Check: Adult/Child

- Use carotid artery in the neck
- Place two fingers on “Adam’s Apple”
- Slide fingers toward you and slightly upward into groove on side of neck
- Allow 5-10 seconds
- Adjust pressure to locate pulse but avoid excessive pressure





Initial Assessment

Pulse Check: Infant

- Use brachial artery on upper arm
- Place two fingers on inner arm just under armpit
- Find groove formed by muscles
- Use gentle pressure
- Allow 5-10 seconds
- Adjust pressure to locate pulse but avoid excessive pressure





Initial Assessment

Recovery Position

Good position to **help protect the airway**

Continually check to ensure condition does not deteriorate

Do not use for patients with suspected spinal, hip, or pelvic injury





Supporting Circulation

Starting CPR - Adult

Call for help first

Locate position for compressions

imaginary line between nipples

Stack hands on each other

center of chest along imaginary line

Use heels of hands for compressions

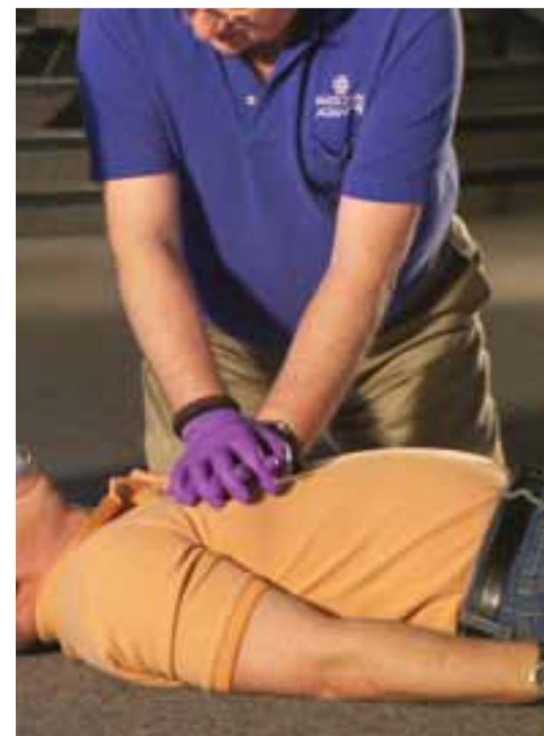
fingers off chest wall

Position shoulders directly over hands

elbows locked

Pivot from hips keeping back and arms straight

Release compression pressure without losing contact with chest wall





Supporting Circulation

Starting CPR - Adult

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

Compressions too fast:

adequate heart refill with blood

Compressions too slow:

inadequate circulation

Compress to depth of 2-2 ½ inches/5-6 cm

30 compressions, then 2 ventilations





Supporting Circulation

Two-Rescuer CPR - Adult

One rescuer is the “compressor”

one rescuer is the “ventilator”

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

**Compress to depth of 2-2 ½ inches/5-6 cm
30 compressions, then pause compressions for
2 ventilations**

Switch roles every 2 minutes/5 cycles

reduces rescuer fatigue

maintains effectiveness





Supporting Circulation



Starting CPR - Child

Children generally considered 1 year to puberty
consider size for compression effectiveness

If alone do 2 minutes of CPR then call EMS

Locate position for compressions

same as for adult

Use one or two hands in center of the chest

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

30 compressions, then 2 ventilations

Compress to a depth of *approximately*
2 inches/5 cm (1/3 chest depth)



Supporting Circulation



Two-Rescuer CPR - Child

**One rescuer is the “compressor”,
one rescuer is the
“ventilator”**

**Continue compressions at a
rate of 100-120
compressions per minute**

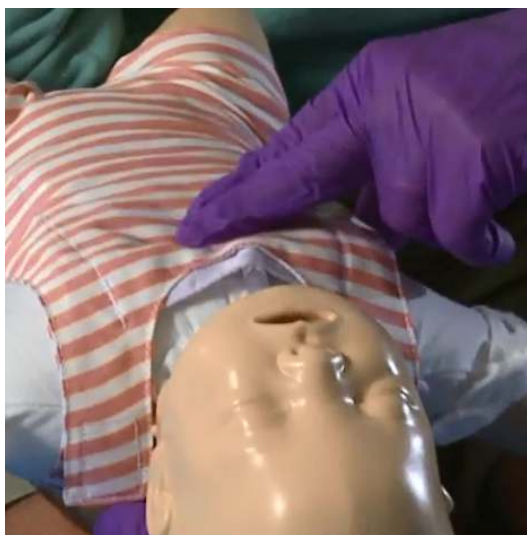
Depth 1/3 depth of chest

**Compression : Ventilation
Ratio changes to 15 :2**

**Switch roles every 10 cycles/2
minutes**



Supporting Circulation



Starting CPR - Infant

Infants considered less than 1 year

If alone do 2 minutes of CPR then call EMS

Locate compression site -

imaginary line between nipples

Use 2-3 fingers in center of chest

Compress to a depth of 1/3 depth of chest

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

30 compressions, then 2 ventilations



Supporting Circulation



Two-Rescuer CPR - Infant

One rescuer is the “compressor”,
one rescuer is the “ventilator”
Continue compressions at a rate of
100-120 compressions per minute
Compress to a depth of 1/3 chest
depth
Compression: Ventilation Ratio
changes to 15 :2
Switch roles every 10 cycles/2
minutes



Supporting Respiration

Rescue Breathing without Compressions

If a pulse is present but the victim is not breathing

Open airway

Provide a single rescue breath (all ages)

Continue with a breath every 5-6 seconds for adults

3-5 seconds for infants

Continue to monitor pulse every two minutes

Be prepared to initiate full CPR



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Supporting Respiration

Rescue Breathing without Compressions

Mouth to Mouth
CPR or Pocket Mask
Bag-valve mask





Supporting Respiration

Rescue Breathing for Adults

Use head-tilt-chin-lift to open airway

Create seal with barrier device

(or mouth to mouth directly on victim while pinching nose closed)

Rescue breaths sufficient for gentle chest rise-and-fall, no more

1 second breath

1 second for exhale

1 second for next breath

If rescue breaths do not go in, reposition head and try again





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Supporting Respiration

Rescue Breathing for Children

Same technique as for adults

Use head-tilt-chin-lift to open airway

Create seal with barrier device

(or mouth to mouth directly on victim while pinching nose closed)

Adjust rescue breath volume for smaller lung capacity; should be sufficient for gentle chest rise-and-fall, no more

1 second breath

1 second for exhale

1 second for next breath





Supporting Respiration

Rescue Breathing for Infants

Use less extension on head-tilt-chin-lift to open airway

Create seal with barrier device

Turn oronasal mask 180°

OR cover mouth **and** nose with your mouth to ventilate

Only use puffs of air for rescue breaths volume should be sufficient for gentle chest rise-and-fall, no more





Supporting Respiration

Compression: Ventilation Ratios

Victim	One Rescuer	Two Rescuers	How to Compress	Depth
Adult	30:2	30:2	Two Hands	2-2 ½ inches (5-6 cm)
Child	30:2	15:2	One or two hands	2 inches (1/3 of chest depth)
Infant	30:2	15:2	Two or three fingers (one rescuer) Two thumbs (two rescuers)	1/3 chest depth

NOTE: The rate of compressions is 100-120/minute for all ages



Cardiopulmonary Resuscitation

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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CPR for Drowning Victims

Use ABC for children and drowning, anyone suspected the cause was compromised breathing.

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

Airway

Breathing

Circulation





Supporting Respiration

Compressions only CPR

Only if proper barriers for ventilations cannot be utilized

REMINDER: Full CPR always recommended

Compression only CPR is for the:

Unwilling

Unable

Untrained



AEDs During CPR

Use of Automated External Defibrillators (AEDs)

The heart has a natural electrical system

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

Most common abnormality during cardiac arrest is ventricular fibrillation

- Disorganized, ineffective heart muscle contractions
- Effective contractions stop, therefore circulation stops

The solution for *fibrillation* is . . . *defibrillation*





AEDs During CPR

Use of Automated External Defibrillators (AEDs) continued

Defibrillation generates large shock to reset heart's electrical system

- Assists in re-establishing a normal heart rhythm

AEDs universally provide audible user prompts

- Follow directions

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

Each minute defibrillation is delayed reduces survival rate 7-10 %



AEDs During CPR

AED Pad Placement

Adults and children

- Right side under collar bone
- Left chest wall under arm
- Follow illustrations on pads

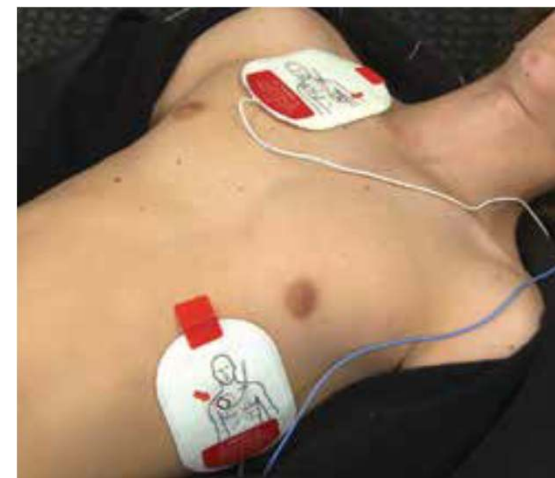
Infants

- Center of chest and center of back

For infants and children use adapter if available

- If adapter is not available, it is still OK to use

NOTE: AEDs can be used in wet environments but sure chest may need to be dried before placing pads





AEDs During CPR

Cautions

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

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





Foreign Body Airway Obstruction

Choking

Most common obstruction:

Adults = food

Children and infants = small objects

Partial obstructions

- victim can speak and/or cough
- does not require active intervention

Complete obstructions

- victim cannot speak, breath, or cough
- requires rapid assistance

If the victim **becomes unconscious** call for help and **start CPR**

Finger sweep

- only use when obstruction can be seen





Foreign Body Airway Obstruction

Severe Obstruction Intervention for Adults and Children

Use **abdominal thrusts** (Heimlich maneuver)

- Stand behind victim, put both arms around victim
- Make fist with one hand, place thumb side against abdomen between navel and tip of sternum
- Grasp fist with other hand, pull sharply inward & upward.
- Repeat until object is expelled or the person loses consciousness.

IF the victim becomes unconscious Call EMS and begin CPR





Foreign Body Airway Obstruction

Severe Obstruction Intervention for 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.





Foreign Body Airway Obstruction

Drowning

Aspiration of water can be suspected **BUT**

- Usually only a small amount
- Removal is not part of first aid

Regurgitation common and can compromise airway

- Turn victim on side (use recovery position technique)
- Wipe or suction vomitus from mouth



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Skills

- **Scene Safety Assessment**
- **Donning and Doffing Gloves**
- **Initial Assessment**
- **Recovery Position**
- **Chest Compressions**
- **Rescue Breathing**
- **Full CPR**
- **AED Use**
- **Foreign Body Airway Obstruction**



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Questions?

