

CPR and AED



The body must continuously supply tissues and cells with oxygen

- Respiratory System
 - Expansion pulls oxygen into lungs
 - Relaxation forces exhalation
- Circulatory System
 - Electrical impulses stimulate heart to push blood throughout body
 - Blood vessels absorb oxygen and send to heart and body
 - Veins return oxygen-poor blood back to heart and lungs
 - Cycle repeats



Sudden Cardiac Arrest (SCA)

Sudden cardiac arrest (SCA) can happen with little or no warning

- Victims abruptly become unresponsive and collapse
 - Abnormal gasping can occur
 - Breathing may stop
- Likely cause is unexpected disruption to heart's electrical system
 - Electrical pulses become disorganized
 - Ventricular fibrillation occurs
 - Blood flow with oxygen it carries stops
 - Brain damage occurs rapidly
 - Quickly leads to death



Cardiopulmonary Resuscitation (CPR)

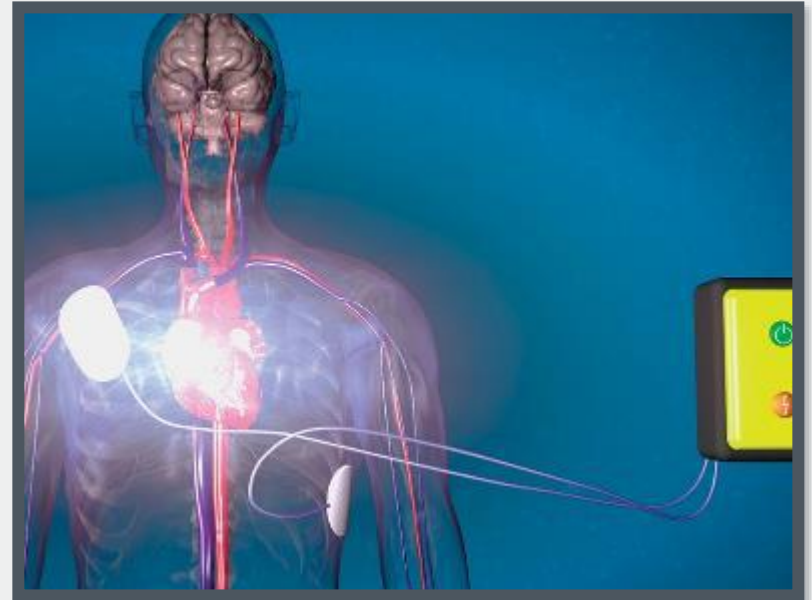
CPR is the immediate treatment for a suspected cardiac arrest

- Allows a bystander to restore limited oxygen to the brain through
 - Chest compressions
 - Rescue breaths
- CPR alone is not enough

Early Defibrillation

The most effective way to end fibrillation is defibrillation

- Shock is sent through heart to stop ventricular fibrillation, allowing normal activity to return
- Success dependent on how quickly defibrillation occurs
 - Each minute in cardiac arrest, chance of survival declines by ~10%
 - After as few as 10 minutes, survival is unlikely
 - Time from recognition of arrest to EMS arrival usually longer than 10 min



Automated External Defibrillator (AED)

A small, portable, computerized device that is simple to operate

- Open lid or push power button
- Provides voice instructions to guide attachment and use automatically
 - Analyzes heart rhythm
 - Determines if shock is needed
 - Charges itself to ready to defibrillate
 - Operator pushes button to deliver shock when prompted by AED



Chain of Survival

The greatest chance for survival exists when all the links are strong

- Early recognition of cardiac arrest and activation of EMS
- Immediate CPR with high-quality chest compressions
- Rapid defibrillation to the heart
- Effective basic and advanced EMS care and transport
- Effective post-cardiac arrest care at a hospital



Secondary Cardiac Arrest

Hazardous breathing conditions in a confined space, drowning, and drug overdoses can result in secondary cardiac arrest

- Without oxygen, heart weakens until signs of life become difficult or impossible to assess
- Immediate CPR, with effective rescue breaths, may be only chance to restore them



Opioid Overdose

Opioids, taken in excess, can depress and stop breathing

- Naloxone

- Temporarily reverses life-threatening effects of opioids
- Easily administered with auto-injector device or aerosol sprayed into nose
- Becoming more readily available to lay providers
- Laws regarding administration of naloxone vary by city and state; know the laws in your area



More likely to experience secondary cardiac arrest

- Age groups for CPR care
 - Infant is younger than 1 year of age
 - Child is 1 year to puberty
 - Adult is puberty and older
- Chain of survival
 - Prevention of emergencies
 - Early CPR with rescue breaths
 - Prompt EMS activation
 - Effective EMS care
 - Effective post arrest care

The chain of survival is often used to describe the best approach for treating sudden cardiac arrest.

The first three links of the chain for adults are typically the responsibility of a trained CPR provider.

Describe those links.

1. Early recognition of cardiac arrest and activation of EMS
2. Immediate CPR with high-quality chest compressions
3. Rapid defibrillation, or electrical shock, to the heart with an AED

Preparing to Help

Trained to do the following

- Recognize cardiac arrest
- Provide appropriate first aid care
- Make a decision to help
- Activate EMS
- Effectively perform high-quality CPR and use an AED



Recognizing an Emergency

Before helping, be able to recognize that a medical emergency exists

- Can be unexpected and confusing
- Does person appear unconscious?
- Person not moving and collapsed could have experienced sudden cardiac arrest
- You could be only chance for survival

Putting yourself in danger can make the situation worse

- Pause
- Look for hazards
- Consider hidden dangers
- If not safe, don't go in
- If it becomes unsafe, get out

Deciding to Help

It is a difficult decision and hesitancy is normal

- You might hesitate because you
 - Feel like the problem is too big for you to handle alone
 - Fear making things worse
 - Think you don't have a lot of medical knowledge
 - Think there are others around who might take charge



Deciding to Help

- If it is safe to do so, take action
- Put what you learn in this program to work
- Your actions can help to protect or save a life

You are on a busy street working with other employees to load a truck when one of them suddenly collapses. Another employee kneels next to her and tries to get her attention, but she does not respond. A crowd is starting to gather.

You have been trained as a CPR and AED provider and think you can help, but you hesitate because you are unsure about your ability to help.

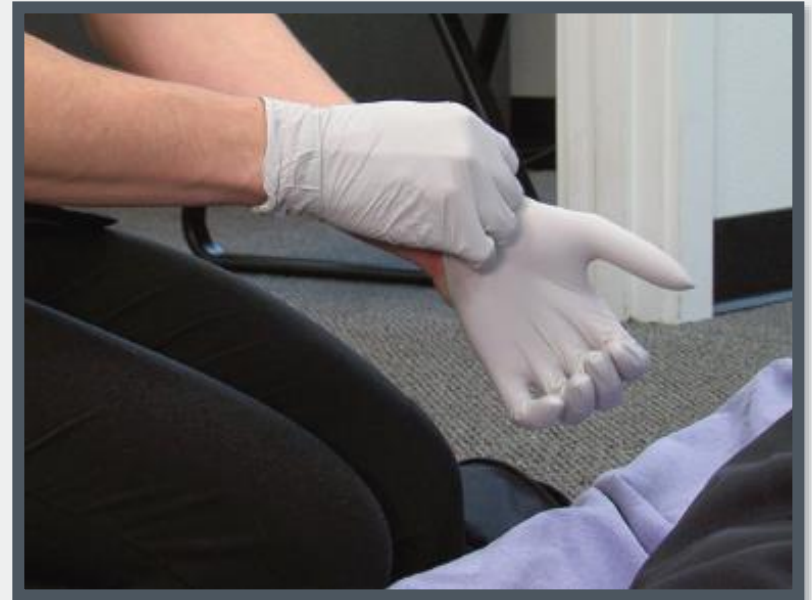
What should you do?

- If scene is safe, you should still approach and offer to help your coworker.
- You are only the first link in a progressive chain of emergency care
- Your involvement lasts only until relieved by another provider or responding EMS personnel — in most cases, a very short period of time
- Your training provides you with sound knowledge and skills designed only to help — and not harm — those in need
- Extensive medical knowledge is not necessary
- CPR and defibrillating, using an AED, are simple and easy to provide

Protecting Yourself

You can be exposed to blood or other potentially infectious body fluids

- Risk of contracting a disease is very low
- Wise to take simple measures to avoid exposure



Infectious bloodborne diseases and pathogens include

- Hepatitis B
- Hepatitis C
- HIV, the virus that causes AIDS

- Exposure can occur through
 - Direct contact with open wound or sore
 - Absorption through membranes of mouth, nose, and eyes
 - A skin puncture with a contaminated object
- Immediately report any exposure to your supervisor
- Follow written exposure control plan for additional care and advice

Standard Precautions

- Reducing exposure lowers the chance of infection
- This set of protective practices is used whether or not an infection is suspected
- To be effective, your approach is the same for everyone, regardless of relationship or age

Personal Protective Equipment (PPE)

Protective barriers worn to prevent exposure to infectious diseases

- Disposable gloves
 - Make sure readily available
 - Always use them
 - Inspect for damage or tears
 - Always remove gloves carefully
 - Use soap/water or a sanitizer to clean hands and exposed skin
- CPR mask/overlay shield
 - Prevent skin-to-skin contact during rescue breaths



Knowledge Check

You are caring for a coworker who has collapsed and is not breathing.

Because she is a close friend, it is not important to use personal protective equipment when doing CPR to protect yourself from possible exposure to an infectious disease.

True or False?

False

- Standard precautions is a set of protective practices used whether or not an infection is suspected
- To be effective, your approach is the same for everyone, regardless of relationship or age

Skill Guide 1: Removing Contaminated Gloves



Grasp First Glove

- After providing care, always remove contaminated gloves carefully
- Avoiding bare skin, pinch glove at palm with gloved fingers of opposite hand



Remove Inside Out

- Pull glove away from palm and toward fingers, turning glove inside out
- Gather glove you just removed with your gloved hand



Slide Finger under Second Glove

- Slide bare index finger inside wrist band of 2nd glove



Remove Inside Out

- Pull outwards and down, inverting glove and trapping first glove inside
- Discard gloves in appropriate container
- Use soap/water OR alcohol-based sanitizer to clean hands and exposed skin

Some basic legal considerations to be aware of as a CPR provider



- Implied consent
 - Assumes an unresponsive person would agree to be helped given the circumstances

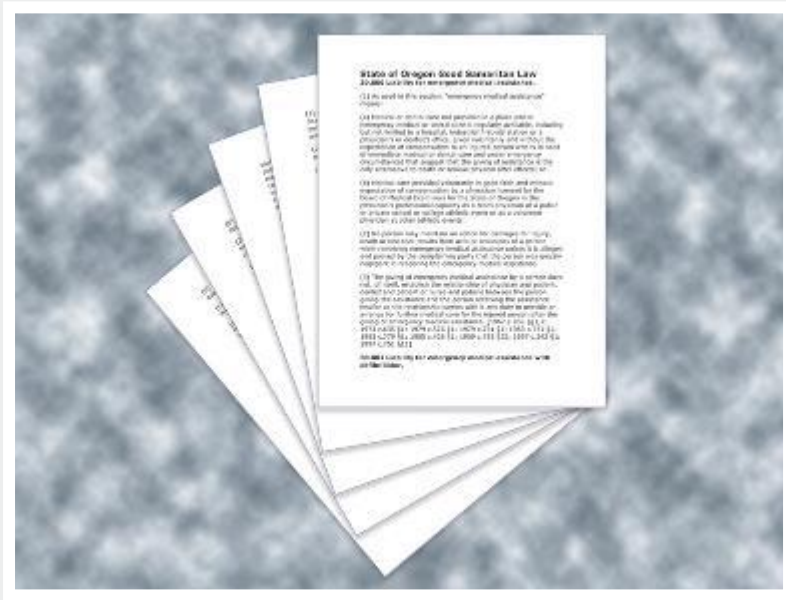


- Abandonment

- Remain with person until someone with equal or greater emergency medical training takes over
- If alone, may need to leave to get help
- Return to person as soon as you can

Good Samaritan Laws

These laws help protect anyone who



- Voluntarily provides assistance, without expecting or accepting compensation
- Is reasonable and prudent
- Does not provide care beyond training received
- Is not grossly negligent, or careless, in delivering emergency care

Good Samaritan Laws

Laws vary from state to state but common sense is always appropriate

- Activate EMS or an occupational emergency action plan (EAP)
- If the scene is unsafe, do not enter!
- Ask a responsive person for permission before giving care
- Never attempt skills that exceed your training
- Don't stop until someone with equal or greater training relieves you

Knowledge Check

You return from your lunch break to your work area and discover a coworker who appears to have collapsed and does not respond to your voice or touch.

You immediately begin to help.

What legal concept related to providing care applies in this situation?

Implied consent

- Assumes your coworker would agree to be helped given the circumstances

Calling for Help

Emergency medical services (EMS) is a prehospital emergency medical response system developed within a community

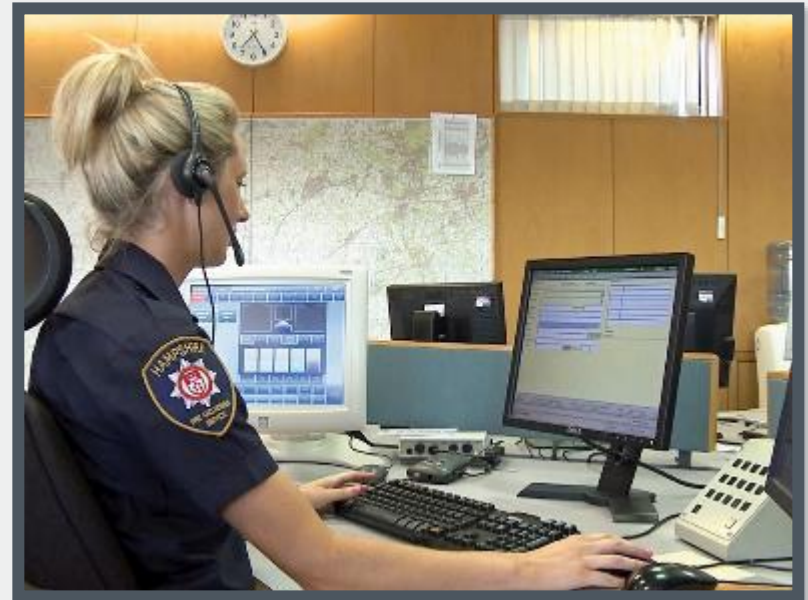
- Uses specialized communication equipment to gather information and dispatch resources to
 - Respond directly to emergency scenes
 - Provide advanced medical care
 - Transport ill or injured people to a hospital
- Activate by calling an emergency number, such as 911



Emergency Medical Services (EMS)

Dispatcher will guide you through call and guide you in care

- Will ask for basic information
 - Type of emergency
 - Location
 - Care being provided
- Answer clearly and concisely
- Resources will be notified to respond while you are on the line
- With mobile phone, activate EMS and use speaker to listen and provide care simultaneously



Knowledge Check

You enter a warehouse door to get to your work area and discover one of your coworkers lying motionless on the floor. He does not respond to your voice or touch.

Should you activate EMS?

Yes

- EMS activation is appropriate when someone is found to be unresponsive

Chest Compressions

Quality matters; focus on high-quality techniques



- Compress deeply, more than 2 inches
- Compress fast, 100-120 times per minute
 - Do not let speed result in shallow compression depth
- Allow chest wall to fully recoil between compressions
 - Avoid leaning on chest at top of each compression
- Normal to hear and feel changes in the chest wall
 - Forceful external chest compressions may cause chest injury, but are critical if person is to survive
 - Reassess hand positioning and continue compressions

Chest Compressions— Children and Infants

- Compression technique for children similar to that of adults



- Children
 - Use heel of 1 hand on lower half of breastbone
 - If this is difficult or if you are tired, use both hands
- Infants
 - Use tips of 2 fingers on breastbone
 - Just below nipple line

There are 3 measures of high-quality chest compressions for an adult.

What are they?

1. Compress deeply, more than 2 inches
2. Compress fast, between 100 to 120 times per minute
3. Get close but do not lean on chest, and allow the chest to fully recoil

Skill Guide 2: Chest Compressions-Adults



Position Your Hands

- Position person face up on firm, flat surface
- Kneel close to chest
- Place heel of one hand on center of chest, on lower half of breastbone
- Place heel of other hand on top of and parallel to first
- You can interlace your fingers to keep them off chest



Position Your Body

- Bring your body up and over chest so shoulders are directly above hands
- Straighten your arms and lock elbows



Compress

- Bending at waist, use upper body weight to push straight down at least 2 inches
- Lift hands, allow chest to fully return to normal position
- Move immediately into next compression
- Avoid leaning on chest at top of compression
- Continue compressions at a rate of 100–120 times per minute

Skill Guide 3: Chest Compressions- Children and Infants



Child — Positioning

- Position child face up on a firm, flat surface. Kneel close to chest
- Place heel of one hand on lower half of breastbone, just above point where ribs meet. Use both hands if needed
- Bring your body up and over chest so your shoulders are directly above your hand. Straighten your arm and lock your elbow



Child — Compress

- Bending at waist, use upper body weight to push straight down 1/3 depth of chest, or about 2 inches
- Lift your hand and allow chest to return fully to its normal position. Move immediately into downstroke of next compression
- Avoid leaning on chest at top of each compression.
- Continue compressions at a rate of 100–120 times per minute



Infant – Positioning

- Position infant face up on a firm, flat surface.
- Place 2 fingertips on breastbone just below nipple line.



Infant – Compress

- Compress at least 1/3 depth of chest, or about 1 1/2 inches.
- Lift fingers and allow chest to return fully to its normal position. Move immediately into downstroke of next compression.
- Continue compressions at a rate of 100–120 times per minute

Rescue Breaths

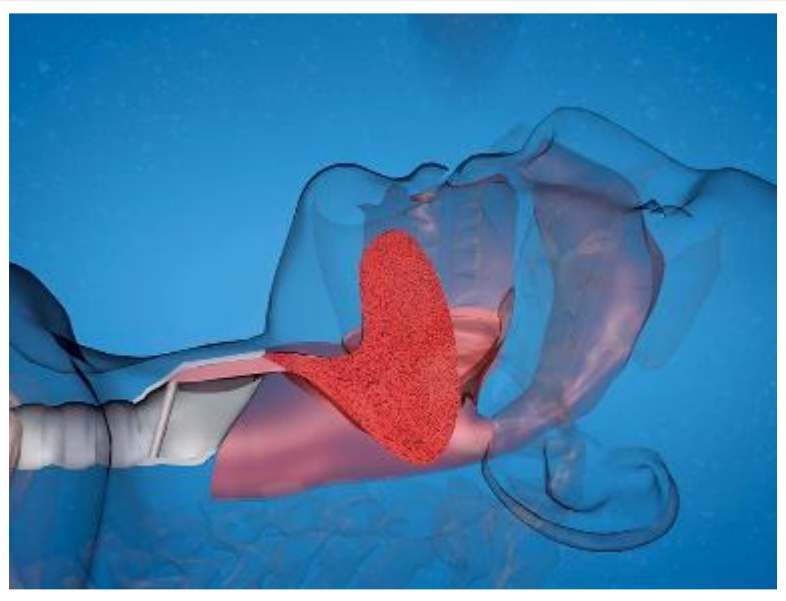
Artificial breaths given by blowing air into mouth to inflate lungs



- Air you breathe contains ~21% oxygen
- Exhaled air contains 16%-17% oxygen
- Exhaled oxygen is enough to support someone's life

Establishing an Airway

You need to make sure there is an open airway



- An unresponsive person can lose muscle tone
- Flat on back, base of the tongue can relax and obstruct the airway
- Lifting jaw forward, while keeping mouth open, pulls tongue away from back of throat and opens airway

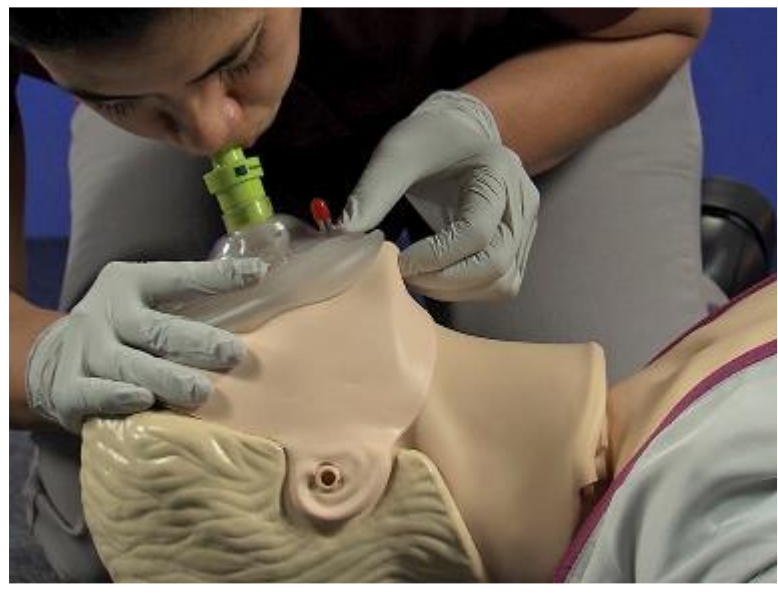
Establishing an Airway

Open a person's airway by using the head tilt-chin lift technique



- Place hand on forehead, fingertips of other hand under chin
- Apply firm, backward pressure on forehead while lifting chin upward, tilting head back and moving jaw forward
- Avoid pressing into soft tissue of chin with fingers, this can obstruct airway
- Leave mouth slightly open
- Establishing an open airway is higher priority than protecting possible injury to spine

Using Barrier Devices



- Use a protective barrier when giving rescue breaths to minimize exposure to infectious disease
 - CPR mask
 - Overlay shield

Delivering Breaths

Each breath should be ~1 second long, only enough air to create a visible rise of the chest



- 2 breaths given at a time, quickly, in less than 10 seconds
 - Let person exhale between breaths
 - Take regular breath before delivering 2nd
 - If you remove your hands, airway will close
 - Open airway each time give rescue breath
- If cannot get chest to rise, reposition head further back and try another breath
- Avoid blowing too hard or long
 - Pushes air into stomach, makes breaths more difficult and increases chance of vomiting

Same for children and infants as for adults

- If possible use appropriately sized barrier device for child or infant
- Do not give too much air in a single breath
 - Only enough to make chest visibly rise
- If using an adult CPR mask with infant, rotate 180 degrees for better seal
- When using a shield or no barrier device
 - Cover infant's mouth and nose with your mouth for airtight seal

Knowledge Check

What is the recommended length and volume of a rescue breath?

- Each breath should be about 1 second in length and only have enough air to create a visible rise of the chest, but no more
- Additional air is unnecessary

Skill Guide 4: Rescue Breaths-CPR Mask



Position Mask

- Inspect mask to make sure one-way valve is in place
- Place mask flat on person's face with top of mask over bridge of nose
- Use thumb and forefinger to provide uniform pressure around top of mask
- Use thumb of your hand lifting chin to control bottom

Open Airway

- Hook fingertips of hand controlling bottom of mask under bony ridge of chin
- Tilt head and lift chin to open airway
- Lift face up into mask to create an airtight seal

Deliver Breath

- Blow through valve opening to deliver breaths
- Each breath is 1 second in length
- Give only enough air to create a visible rise of chest, but no more
- Remove mouth and let person exhale after each breath
- Take a regular breath before delivering another rescue breath

Children and Infants

- When possible, use appropriately sized mask
- Be careful not to give too much air

Skill Guide 5: Rescue Breaths-CPR Shield



Position Shield

- Place breathing port of shield between teeth and into person's mouth



Open Airway

- Place one hand across forehead
- Hook fingertips of other hand under bony ridge of chin
- Tilt head and lift chin to open airway
- Seal nose by pinching nostrils closed over or under the shield

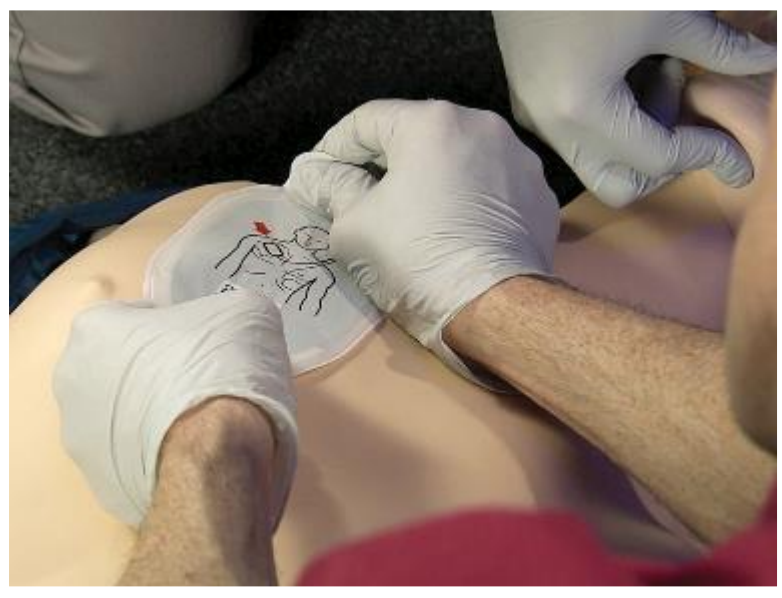


Deliver Breath

- Take a normal breath
- Open your mouth wide
- Press your mouth on shield around person's mouth to create airtight seal
- Blow through port to deliver breath
- Each breath is 1 second in length
- Give only enough air to create a visible rise of chest, but no more
- Remove mouth and let person exhale before delivering 2nd rescue breath
- Use the same technique to give direct mouth-to-mouth rescue breaths if you elect not to use a barrier device.

Automated External Defibrillation (AED)

AEDs are simple to use; voice, lights, and screen instructions guide you



- Open lid or hit power to turn on
- Adhere defibrillation pads to bare chest
 - Remove clothing from torso
 - Locate and pull out defibrillation pads
 - Pads have pictures to show proper placement
 - Peel pads from backing sheets and place as shown in pictures
 - One below right collarbone, above nipple, beside breastbone
 - Other pad lower on left side, over ribs, and few inches below armpit

Automated External Defibrillation (AED)



- Allow AED to analyze heart rhythm
 - Automatically analyzes once pads in place
 - Most pads already connected to device
 - Stop CPR
 - Be certain that no one is touching the person
 - If defibrillation advised, AED will begin to charge for shock delivery

Automated External Defibrillation (AED)



- Deliver shock if directed by AED
 - Make sure no one is in contact with person before delivering shock
 - For most AEDs, a button is pressed to deliver the shock
 - Once delivered, immediately resume CPR, starting with chest compressions

Automated External Defibrillation (AED)

Children and infants

- Most AEDs have specially designed pads or mechanisms
- Steps same for child or infant as for adult
- Pad placement is different for smaller chests
 - Place one pad on center of chest below collarbones
 - Attach second pad on center of back between shoulder blades
- Use AED configured for adult if one specifically equipped for child or infant is not available

AED Troubleshooting & Considerations

Designed to detect problems during use and guide corrective actions

- If troubleshooting message occurs, stay calm and follow voice instructions
- CPR should be provided, without interruption, until problem corrected or another AED becomes available
- Do not pause CPR longer than 10 seconds
- If problem with pads is indicated
 - Press pads firmly, especially in center
 - Make sure pads' cable connector is firmly connected to AED

AED Troubleshooting & Considerations

If chest is wet, dry before applying pads

- If chest becomes wet after application
 - Remove pads
 - Dry chest
 - Apply new set of pads, if available
- If chest hair excessive, shave hair in areas where pads will be placed
- If pads placed on chest hair, not adhering
 - Remove pads and shave hair
 - Attach new set of pads, if available, or re-apply original pads



Other troubleshooting messages

- If analysis interrupted due to movement, stop all sources of movement, i.e., chest compressions or rescue breaths
- If need to replace a battery, may be only enough energy for limited number of shocks and only a few more minutes of operation
- If AED fails to operate, depleted battery should be removed and replaced with new one
- If battery needs replacement during resuscitation, it should be replaced during a CPR interval

AED Troubleshooting & Considerations

- A person should be removed from standing water before using AED
 - Okay when lying on wet surface
 - AED should never be immersed in water or have fluids spilled on it
- AEDs can be used safely on metal surfaces
 - Make sure pads do not directly touch any metal surface

AED Troubleshooting & Considerations

- Surgically implanted device in chest
 - Noticeable lump and surgical scar visible
 - If device in way of pad placement, place edges at least 1-inch from device
- Defibrillating over medication patches can reduce effectiveness of shock
 - If patch interfering with placement
 - Use gloved hand to peel off patch
 - Wipe away remaining residue
 - Replace pads

You have been asked to respond to a meeting room with an AED.

As you enter the room, you see another provider performing chest compressions on a man who is lying on the floor.

You kneel next to the man and lay the AED next to his head.

What are the 4 basic steps you will take to use the AED on him?

1. Turn on the AED
2. Adhere defibrillation pads to bare chest
3. Allow the AED to analyze the heart rhythm
4. Deliver a shock if directed to by the AED

Skill Guide 6: Using an AED— Adults



Perform CPR

- If person is unresponsive and not breathing, immediately perform CPR
- Provide continuous cycles of 30 compressions and 2 rescue breaths



If Available, Attach AED

- Turn on AED and bare person's chest
- Peel first pad from backing and place below right collarbone, above nipple and beside breastbone
- Remove second pad from backing and place on left side, over ribs, and a few inches below armpit



If Indicated, Deliver Shock

- Allow AED to analyze heart. Stop CPR. Do not touch the person
- If shock is advised, clear everyone and press button to deliver shock



Resume CPR

- Quickly resume CPR with chest compressions
- Follow any additional voice instructions from AED
- Continue until another provider or EMS personnel take over
- If person responds, stop CPR and place in recovery position
- Leave AED on and attached

Skill Guide 7: Using an AED— Children and Infants



Perform CPR

- If child is unresponsive and not breathing, immediately perform CPR
- Provide continuous cycles of 30 compressions and 2 rescue breaths



When Available, Attach AED

- Turn on AED and bare child's chest
- Peel first pad from backing and place in center of chest below collarbones
- Roll child and place second pad on center of back between shoulder blades



If Indicated, Deliver Shock

- Allow AED to analyze heart. Stop CPR. Do not touch the child
- If shock is advised, clear everyone and press button to deliver shock



Resume CPR

- Quickly resume CPR with chest compressions
- Follow any additional voice instructions from AED
- Continue until another provider or EMS personnel take over
- If child responds, stop CPR and place in recovery position
- Leave AED on and attached

Primary Assessment — Unresponsive Person

A simple way to quickly identify a life-threatening condition



- If safe, check for responsiveness
- If unresponsive, activate EMS and get an AED, if available
- Check for normal breathing

Primary Assessment — Unresponsive Person

If person unresponsive, send a bystander to activate EMS and get AED; if alone, do this yourself and quickly return



- If alone with unresponsive child or infant, provide 2 minutes CPR before leaving to call EMS
- Check for normal breathing
 - Take no longer than 10 seconds
 - Normal is effortless, quiet, and regular
 - If unsure, assume not normal
 - Weak, irregular gasping, snorting, or gurgling sounds can occur early in cardiac arrest
- If no breath, or only gasping, perform CPR
- If unresponsive but breathing normally and uninjured, use side-lying recovery position

Recovery Position



- Protect airway, drain fluids from mouth, keep tongue from blocking airway
- Frequently assess breathing of anyone in recovery position
- Person's condition could quickly become worse and require additional care

- When head, neck, or back injury suspected
 - Best to leave person in position found
 - If airway threatened, quickly roll person to clear and protect it
 - Keep head, shoulders and torso from twisting
- Always perform primary assessment to determine need for CPR

A fellow employee collapses near you during a staff meeting. As a trained CPR provider, you move to help.

You kneel next to him, squeeze his shoulder, and loudly ask, “Are you all right?” He is unresponsive, so you direct other employees to activate EMS and get the company’s AED.

You look closely at the face and chest for breathing; he makes a brief gasping snort, but then remains still.

What do you do next?

- Perform CPR immediately, starting with compressions
- Irregular gasping, snorting, or gurgling sounds do not provide oxygen and do not indicate normal breathing

Skill Guide 8: Primary Assessment—Unresponsive



Assess Scene

- Pause and assess for safety
- If unsafe, or if becomes unsafe at any time, GET OUT!



Check for Response

- Tap or squeeze shoulder and ask loudly, "Are you all right?"
- If unresponsive, have someone activate EMS and get an AED



Look for Normal Breathing

- Position person face-up on a firm, flat surface
- Look at face and chest for normal breathing. Take no longer than 10 seconds. If unsure, assume breathing is not normal
- Weak, irregular gasping, snorting, or gurgling is not normal breathing



Provide Indicated Care

- If person not breathing, or only gasping, perform CPR, begin with compressions
- If normal breathing is found, place an uninjured person in recovery position

Skill Guide 9: Recovery Position



Prepare

- Place arm nearest you up alongside head
- Bring far arm across chest and place back of hand against cheek
- Grasp far leg just above knee and pull it up so the foot is flat on ground



Roll

- Grasping shoulder and hip, roll person toward you in a single motion, keeping head, shoulders, and body from twisting
- Roll far enough for face to be angled toward ground



Stabilize

- Position elbow and legs to stabilize head and body. Ensure no pressure on chest that restricts breathing
- Make sure head ends up resting on extended arm and head, neck, and body are aligned
- If person seriously injured, do not move unless fluids are in airway, or you need to leave to get help

Caring for Cardiac Arrest

Immediate, high-quality CPR and defibrillation can double or even triple the chance of surviving sudden cardiac arrest

- Pause and assess scene for hazards
- If dangerous, do not approach
- If safe, assess for responsiveness
- If unresponsive, send someone to activate EMS and get an AED
- Check for normal breathing
- If not normal, begin compressions
- Quality matters
 - Push hard and fast
 - Do not lean on chest



Caring for Cardiac Arrest

Immediate, high-quality CPR and defibrillation can double or even triple the chance of surviving sudden cardiac arrest

- After 30 compressions, give 2 rescue breaths
- Establish airway first and give only enough air to see chest rise
- Do this in less than 10 seconds
- Perform ongoing CPR cycles of 30 compressions and 2 rescue breaths
- Compress hard and fast, letting chest fully recoil after each compression



Caring for Cardiac Arrest

Use AED immediately when it arrives. If another person available to operate, continue CPR until AED ready

- Turn on AED
 - Adhere defibrillation pads to bare chest
 - Allow to analyze heart
 - If shock advised, make sure no one touching person before delivering
 - After delivered, resume CPR
- AED voice instructions and analysis will guide care
- Do not stop until signs of life, another provider or EMS takes over, or too exhausted to continue



Caring for Cardiac Arrest

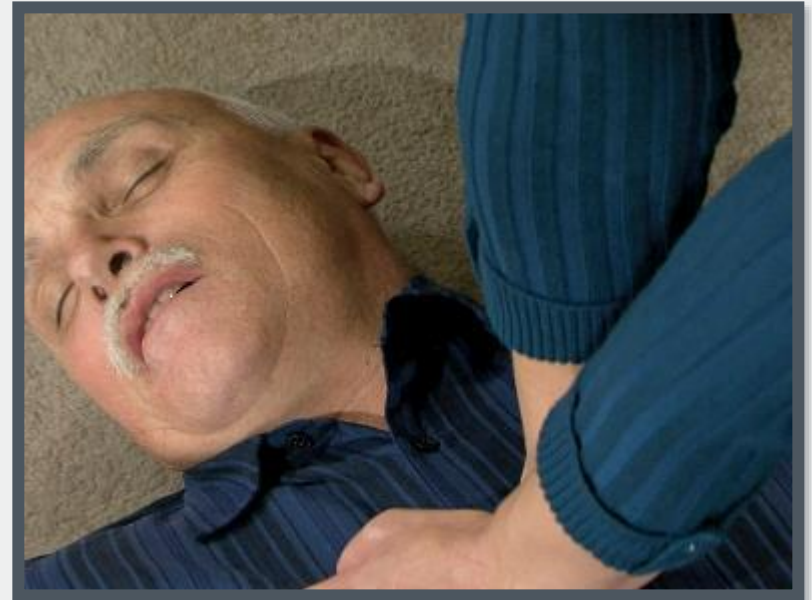
- If person responds, stop CPR and place in recovery position
 - Leave AED on and attached
- If shock not indicated, resume CPR
 - Continue to follow AED's instructions
- Avoid interruptions in compression
- Take turns performing CPR
 - Switch compressors every few minutes
 - During automatic AED analysis that occurs every 2 minutes is best
- Do the best you can



Compression-Only CPR

An approach being widely promoted to people not trained in CPR

- Instructions can be shared via social media, PSAs, or EMS dispatchers
- It is a limited approach
- Rescue breaths are essential for all cardiac arrests, especially children
- Perform both compressions and breaths during CPR
- If unable or unwilling to perform rescue breaths, provide high-quality, uninterrupted compressions at a minimum



Caring for Cardiac Arrest

Children and infants

- Most cardiac arrests are result of loss of airway or breathing
- Emphasis on effective rescue breaths as part of CPR is important
- When alone with an unresponsive child or infant, provide 2 minutes of CPR before leaving to activate EMS and get AED

You have responded to a store customer who collapsed.

Your primary assessment indicated she was in cardiac arrest and you have started CPR.

Another employee has gone to activate EMS and get an AED.

Describe the basic details for performing CPR and using an AED in this situation.

- Begin CPR starting with compressions
- Perform ongoing cycles of 30 chest compressions and 2 rescue breaths
- Take no longer than 10 seconds to give the 2 rescue breaths
- Stop CPR when the AED is attached and ready to analyze

Skill Guide 10: Caring for Cardiac Arrest— Adults



Assess Person

- If safe, tap or squeeze shoulder
- Ask loudly, "Are you all right?"
 - No response!
- Have someone activate EMS and get an AED
- Check face and chest for normal breathing
 - Normal breathing absent!



Give 30 Compressions

- Place heel of hand on center of chest
- Place heel of other hand on top of first
- Bring body up and over chest, use upper body weight to push down hard, at least 2 inches
- Push fast, 100–120 times per minute
- Allow chest to fully recoil



Give 2 Rescue Breaths

- Use barrier device, tilt head, lift chin to open airway
- Make chest visibly rise with each breath
- Take a fresh breath between rescue breaths
- Give breaths in less than 10 seconds
- Provide cycles of 30 compressions and 2 rescue breaths



Use an AED

- If AED available, stop CPR, use immediately
- Turn AED on, follow instructions
- Deliver shock if indicated
- Resume CPR after shock delivered or no shock advised
- Continue until another provider/EMS take over, signs of life, or too exhausted to continue

Skill Guide 11: Caring for Cardiac Arrest— Children



Assess Child

- If safe, tap or squeeze shoulder
- Ask loudly, "Are you all right?"
 - No response!
- Have someone activate EMS and get an AED
 - If alone, perform CPR for 2 minutes before doing this yourself
- Check face and chest for normal breathing
 - Normal breathing absent!



Give 30 Compressions

- Place heel of hand on lower half of breastbone, just above point where ribs meet. Use both hands if needed
- Bring body up and over chest, using upper body weight to push down at least 1/3 depth of chest or about 2 inches
- Push fast, at a rate of 100-120 times per minute. Allow chest to fully recoil



Give 2 Rescue Breaths

- Use barrier device, tilt head, lift chin to open airway
- Make chest visibly rise with each breath, no more
- Take a fresh breath between rescue breaths
- Give breaths in less than 10 seconds
- Provide cycles of 30 compressions and 2 rescue breaths
- Continue until another provider/EMS take over, signs of life, or too exhausted to continue

Skill Guide 12: Caring for Cardiac Arrest— Infants



Assess Infant

- If safe, tap the foot
- Ask loudly
 - No response!
- Have someone activate EMS and get an AED
 - If alone, perform CPR for 2 minutes before doing it yourself
- Check face and chest for normal breathing
 - Normal breathing absent!



Give 30 Compressions

- Place 2 fingertips on breastbone just below nipple line
- Compress at least 1/3 depth of chest or about 1 ½ inches
- Push fast, 100–120 times per minute
- Allow chest to fully recoil



Give 2 Rescue Breaths

- Use barrier device, tilt head, lift chin to open airway
- Make chest visibly rise with each breath
- Take a fresh breath between rescue breaths Give breaths in less than 10 seconds
- Provide cycles of 30 compressions and 2 rescue breaths
- Continue until another provider/EMS take over, signs of life, or too exhausted to continue

Multiple Provider Approach to CPR

Commonly more than one trained provider is available to help when cardiac arrest occurs

- Work together to improve performance and reduce interruptions
- Switching providers every 2 minutes helps to maintain CPR quality
- Communicate about switches ahead of time
- Coordinate your actions to switch smoothly and minimize interruption time



Multiple Provider Approach to CPR

Minimize interruption

- Prior to AED Arrival
 - Switch providers at end of CPR cycle
 - While person about to move out is giving rescue breaths, new provider can get into position to start compressions
- When AED Arrives
 - If another person available to operate AED, do not stop CPR
 - Continue compressions until AED is ready to analyze heart rhythm
- After AED is Attached
 - Switch when AED analyzes heart, every 2 minutes
 - New CPR provider positions to perform compressions and new AED provider gets in place to operate AED
 - After shock delivered or if no shock indicated, start compressions

As a trained CPR provider, you respond to a situation in which CPR is already being performed for an employee who has collapsed.

An AED is coming but has not yet arrived.

The CPR provider looks exhausted.

How would you smoothly integrate yourself to take over doing the CPR?

- Communicate about the switch ahead of time
- Coordinate your actions to switch smoothly and minimize interruption time
- Prior to the arrival of an AED, switch at the end of a CPR cycle, while the person who is going to move out is giving rescue breaths

Skill Guide 13: Multiple Provider Approach to CPR



Consider a Switch

- CPR is tiring
- When available, switch CPR providers about every 2 minutes
- Clearly communicate switches ahead of time so everyone understands



Prior to Arrival of an AED

- Incoming CPR provider moves into place while outgoing provider is giving rescue breaths
- New CPR provider immediately begins compressions when rescue breaths are completed



When AED Is Attached

- Switch roles when AED analyzes heart
- This occurs about every 2 minutes
- Immediately begin compressions after a shock is delivered or when AED advises no shock is indicated



More than 2 Providers

- Rotate extra providers in if more than 2 providers are present

Choking

Choking can occur when a solid or small object enters a narrowed part of airway and becomes stuck



- On inhalation, object can be drawn tighter in and block air from entering lungs
- A forceful thrust beneath ribs and up into diaphragm can pressurize air in chest and pop obstruction out
- Compression of chest over the breastbone can create enough pressure to expel an object

Mild Obstruction

With a mild blockage, a person can speak, cough, or gag



- Typically cleared naturally through forceful coughing
- Allow someone to try to resolve the problem on his or her own
- Stay close and be ready to take action if things worsen

Severe Obstruction

A person cannot take in enough air to dislodge the object



- Signs of severe obstruction include
 - Very little or no air exchange
 - Lack of sound
 - Inability to speak or cough forcefully
- Person may hold his or her hands to the throat while attempting to clear obstruction
- Person without air exchange requires your help to survive

Children and infants



- Approach for child nearly the same as for adult
 - Kneel behind child to deliver thrusts
 - Use less force
- Choking in infant differentiated by sudden onset
- Signs include
 - Weak ineffective coughs
 - Lack of sound even when attempting to breathe

You are in the company cafeteria eating lunch with a coworker. He is laughing at something you said when he suddenly stops, grasps his throat with his hands, and stands up quickly.

He clearly looks distressed, so you stand up next to him and ask, “Are you choking?” He is unable to answer you and completely silent.

You decide to perform abdominal thrusts.

Describe how to perform them.

- Stand behind him
- Reach around and locate his navel with your finger
- Make a fist with your other hand and place the thumb side against the abdomen, just above your finger and below his ribs
- Grasp your fist with the other hand and give a quick inward and upward thrust to expel the obstruction
- Repeat thrusts until he can breathe normally

Skill Guide 14: Choking— Adults



Assess Person

- Ask, “Are you choking?”
- If person nods yes, or is unable to speak or cough, act quickly
- If available, have a bystander activate EMS



Position Yourself

- Stand behind
- Reach around and locate navel
- Make fist with other hand and place thumb side against abdomen, just above navel and below ribs
- Grasp fist with other hand



Give Thrusts

- Quickly thrust inward and upward into abdomen
- Repeat. Each thrust needs to be given with intent of expelling object
- Continue until person can breathe normally



If Person Unresponsive

- Carefully lower to ground
- Activate EMS and get AED, if one available
- Begin CPR, start compressions
- Look in mouth for an object before giving rescue breaths. Remove any object seen
- Continue CPR until obvious signs of life, or another provider or EMS personnel take over

Skill Guide 15: Choking— Child



Assess Child

- Ask, “Are you choking?”
- If child nods yes or is unable to speak or cough, act quickly
- If available, have a bystander activate EMS



Position Yourself

- If needed, kneel behind child
- Reach around and locate navel
- Make fist with other hand and place thumb side against abdomen, just above navel and below ribs
- Grasp fist with other hand



Give Thrusts

- Quickly thrust inward and upward into abdomen
- Repeat. Each thrust needs to be given with intent of expelling object
- Continue until child can breathe normally



If Child Becomes Unresponsive

- Carefully lower to ground
- If alone, provide 2 minutes CPR before activating EMS, getting AED
- Begin CPR, start compressions
- Look in mouth for an object before rescue breaths. Remove any object seen
- Continue CPR until obvious signs of life, or another provider or EMS personnel take over

Skill Guide 15: Choking— Infants



Assess Infant

- Look at infant's face
- If infant has weak, ineffective coughs, or lack of sound even when clearly attempting to breathe, act quickly
- If available, have a bystander activate EMS



Give 5 Back Blows

- Lay infant face down over your forearm with legs straddled and with head lower than the chest. Support the head by holding the jaw.
- Using heel of other hand, give 5 back blows between shoulder blades.



Give 5 Chest Thrusts

- Sandwich infant between your forearms and turn onto back.
- Place 2 fingers on breastbone just below nipple line and give 5 chest thrusts
- Repeat back blows and chest thrusts until infant can breathe normally



If infant Unresponsive

- Gently place infant on firm surface
- If alone, provide 2 minutes of CPR before activating EMS yourself
- Look in mouth before giving rescue breaths. Remove any object seen
- Continue CPR until signs of life, or another provider or EMS personnel take over

Additional Considerations

Emotional Considerations

Caring for someone in an emergency can create emotional distress



- Common reactions
 - Anxiety
 - Trembling or shaking
 - Sweating
 - Nausea
 - Fast breathing
 - Pounding heartbeat
- This is a normal
- Calm yourself and acknowledge your limitations as a provider

When an emergency is over, a provider is often left alone



- With limited time for closure, you can experience a variety of reactions
 - Feeling abandoned or helpless
 - Recalling event over and over
 - Self-doubt about not doing enough
 - Difficulty concentrating
 - Heaviness in the chest
 - Upset stomach or diarrhea
 - Difficulty sleeping or nightmares

Emotional Considerations

These feelings are normal and should pass with time; actions that help



- Share your feelings
- Talk with someone you trust to listen without judgment
- Get back to normal routine ASAP
- Accept it will take time to resolve emotions
- If unpleasant feelings persist, formal assistance from a professional counselor may be helpful

You responded and performed CPR on a coworker who collapsed. She is now being transported by EMS to a hospital. The experience was overwhelming and you have not heard the status of her condition.

The experience has clearly left you shaken. You keep going over your actions in your head and wonder if you did enough.

How can you help address the feelings you are having?

- It is normal to feel anxious and emotional following an emergency
- Try to share your feelings with someone you trust
- If possible, return to your normal routine, and give yourself time to resolve your emotions about the experience
- If your unpleasant feelings persist, consider seeing a professional counselor