Learning Objectives

- List the reasons the heart stops beating
- Define components of cardiopulmonary resuscitation (CPR)
- Describe each step in sequence of survival and how it relates to the emergency medical services (EMS) system

Learning Objectives

- List the steps of one- and two-rescuer adult CPR
- List the steps of infant and child CPR
- Describe the technique of external chest compressions on an adult, child, and infant
Learning Objectives

- List the circumstances in which you can stop CPR
- Demonstrate proper technique of chest compressions on an infant, child, and adult
- Demonstrate steps of adult one- and two-rescuer CPR

Learning Objectives

- Demonstrate infant and child CPR
- Relate the concept of early defibrillation to survival of the patient
- Demonstrate the application and operation of an automated external defibrillator (AED)

Circulatory System

- Transports O₂ and other nutrients to tissues of body
- Removes CO₂ and other waste products from tissues
Circulatory System

- Basic components (3 Ps):
  - Pump (heart)
  - Pipes (blood vessels that link system)
  - Plasma (fluid portion of blood)

- Heart
  - Fist-sized muscle with four chambers
    - Atria
      - Right and left upper chambers
    - Ventricles
      - Right and left lower chambers
Circulatory System

- **Heart**
  - Right atrium
    - Receives blood full of waste products and low on O₂ from veins
    - Blood moves into right ventricle through a one-way valve
  - Right ventricle
    - Moves blood to lungs with each contraction

- **Lungs**
  - Exchange of fresh O₂ for CO₂ takes place
  - Tiny blood vessels (capillaries) surround each alveoli (air sacs) in lungs
  - Walls of microscopic capillaries are so thin and in contact with alveoli they create membrane through which O₂ and CO₂ can easily pass
  - O₂-rich blood then returns to left atrium

- **Lungs**
  - Valve opens to allow blood to flow from left atrium into left ventricle
  - Powerful contractions of left ventricle move O₂-rich blood throughout rest of body
  - One-way valves allow blood to flow between atria and ventricles while also preventing flow of blood from ventricles back into atria

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Circulatory System

- Arteries
  - Vessels that carry oxygenated blood away from heart
  - With each contraction, a pulse can be felt anywhere that an artery passes near the skin surface and over bone

- Arteries
  - Strong arterial pulses can be felt
  - On either side of neck (carotid arteries)
  - In groin crease between abdomen and thigh (femoral arteries)
  - At palm-side of wrist near thumb (radial arteries)
  - Inner upper arm between elbows and shoulder (brachial arteries)
Circulatory System

- Arteries
  - Arteries continue to become smaller until they connect with arterioles and capillaries
  - Exchange of O₂ for CO₂ occurs in capillaries intertwined throughout tissues in all parts of body
  - Capillaries dump deoxygenated blood into millions of very small veins

- Veins
  - Vessels that carry deoxygenated blood back to heart
  - Gradually increase in diameter and decrease in number as they move blood back to right atrium so entire process of circulation can begin again
Circulatory System

- Sudden cardiac arrest (SCA)
  - Heart stops beating and pulse is no longer felt
  - When blood stops flowing through circulatory system
    - O₂ and nutrients cannot be delivered to tissues
    - Waste products cannot be removed
    - Can rapidly lead to tissue damage and major organ damage
    - Begin CPR

CPR

- CPR
  - Simple technique that combines rescue breathing and external chest compressions to oxygenate and circulate blood when heart stops beating
  - Rescue breathing
    - Moves O₂ in lungs where it can move across thin tissue into blood
  - External chest compressions
    - Moves oxygenated blood throughout body
  - Goal
    - Maintain life until defibrillator arrives

CPR

- Defibrillation
  - Electric shock to heart
Cardiopulmonary Resuscitation (CPR)

- Sequence of survival (chain of survival)
  - Recognize an emergency
  - Activate emergency medical services (EMS)
  - Provide:
    - CPR
    - Rescue breathing
    - First aid
    - Automated external defibrillator (AED)
    - O₂
    - Advanced care
    - Hospital care

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Cardiopulmonary Resuscitation (CPR)

- Recognition and early access
  - Rapid recognition of an emergency must occur
  - Important for all communities to be educated to:
    - Recognize signs and symptoms of cardiopulmonary emergencies
    - Know how to contact the local EMS system

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CPR

- Recognition and early access
  - If more than one rescuer is at scene:
    - One rescuer should call for help and get AED
    - The other should begin CPR
  - If rescuer is alone:
    - Phone first to activate 911 and obtain AED
    - Perform 2 minutes or five cycles of CPR
    - Then use AED if available

- "Phone fast"
  - Unresponsive children and victims of any age in cardiac arrest resulting from:
    - Near drowning
    - Drug overdose
    - Asphyxial arrest

CPR

- Early CPR
  - Helps preserve heart and brain function
  - Immediate CPR increases chances of survival
  - Widespread community CPR training
    - Increases odds of someone beginning CPR before arrival of medical help
CPR

- Early CPR
  - Compression only CPR
    - Goal: encourage people to act when they find cardiac arrest victim
    - Safe
    - Nearly as effective as standard CPR in first few minutes
  - Emergency first responder should:
    - Assume leadership
    - Begin ventilations, compressions

- Defibrillation
  - Ventricular fibrillation (VF)
    - Abnormal heart rhythm
    - Electrical impulses of heart suddenly become irregular and ineffective
    - Causes heart to stop beating
    - Defibrillation is only effective treatment
    - Survival probability decreases 7% to 10% each minute defibrillation is delayed

- Defibrillation
  - Automated external defibrillator (AED)
    - Lightweight, safe, accurate machine
    - Gives operator step-by-step voice prompts for AED operation
CPR

- Defibrillation
  - Public access defibrillation (PAD)
    - Goal of many communities is to promote PAD
    - Accomplished by:
      - Training more people in CPR and AED use
      - Placing AEDs in public places that are easily accessible

- Early advanced care
  - Final step in sequence of chain
  - Advanced care
    - Sophisticated emergency equipment and treatment that can be used to help stabilize patient before reaching hospital
      - Endotracheal intubation
      - Intravenous (IV) medications

Techniques of CPR

- CPR principles of the ABCs
  - Airway
  - Breathing
  - Circulation
Techniques of CPR

- Some techniques differ by age
  - Age definitions
    - Infant: birth–1 year old
    - Child: age 1 year–onset of adolescence or puberty (12–14 years of age)
    - Adult: adolescence age and older

Techniques of CPR

- Adult CPR
  - Assess responsiveness, summon EMS, and position patient
    - Once scene is determined safe:
      - Put on personal protection equipment (PPE)
      - Assess person’s responsiveness
  - If patient is unresponsive:
    - Make sure EMS is called
    - Make sure defibrillator is on the way
    - Position yourself and patient

Techniques of CPR

- Adult CPR
  - Position yourself and patient
    - Patient should be positioned on his/her back on firm surface
    - Patient’s arms should be placed at his/her sides
    - If patient is lying on side or face
      - Roll as a single unit
    - Position yourself beside patient where you can comfortably provide both rescue breathing and chest compressions
Techniques of CPR

- Adult CPR
  - A is for airway
    - Tongue is most common obstruction in unresponsive patients
    - Food is most likely cause of obstruction in conscious adults
    - Once patient determined unresponsive, open airway
  - If foreign body obstruction is visualized:
    - Clear airway
      - Finger sweep of mouth
      - Suctioning
  - If chest does not visibly rise and fall, and you do not hear or feel air movement, give two rescue breaths immediately
  - If airway is obstructed:
    - Attempt to clear airway through foreign body airway obstruction (FBAO) techniques

- B is for breathing
  - Once airway (A) is open and clear:
    - Determine if breathing (B) is present and adequate
    - Determine if patient needs assistance
    - To check breathing:
      - Place ear near patient’s mouth and nose while:
        - Look at chest for chest rise and fall
        - Listen for air movement
        - Feel for flow of air on your cheek
Techniques of CPR

- **Adult CPR**
  - B is for breathing
    - Rescue breathing methods
      - Mouth-to-mask device
      - Mouth-to-barrier device
      - Mouth-to-stoma device
    - Vomiting in a cardiac arrest victim
      - Serious complication that can lead to long-term complications
      - If vomiting does occur:
        - Quickly roll patient to one side to allow airway to clear
        - Use gloved fingers to sweep mouth of any large objects
        - Suction airway before rolling patient back
        - Resume resuscitation attempts
    - Cricoid pressure
      - Technique used during rescue breathing when multiple rescuers are available
      - Pressure obstructs esophagus and reduces risk of vomiting
      - Prevents stomach contents from flowing into mouth and lungs
Techniques of CPR

- Adult CPR
  - C is for circulation
    - To assess circulation
      - Feel for carotid pulse while looking for signs of normal breathing, coughing, movement
      - Keep airway open
      - Feel for pulse for 5-10 seconds

- Adult CPR
  - C is for circulation
    - If not breathing, coughing, movement
      - Assume heart has stopped
      - Immediately begin chest compressions
    - If patient has pulse but is not breathing
      - Give rescue breaths

- Adult CPR
  - C is for circulation
    - Chest compressions
      - Application of external pressure on lower portion of sternum in rhythmic manner
      - Pressure acts to artificially circulate blood to major organs until defibrillation
Techniques of CPR

- Adult CPR
  - C is for circulation
    - To properly perform chest compression:
      - Position yourself on knees a few inches away from patient’s chest
      - Place heel of hand in center of patient’s chest at nipple line on lower half of sternum
      - Place second hand on top of first hand and interlace/flex fingers so only heel of hand remains on sternum
      - Position yourself directly over sternum and keep elbows as straight as possible
      - Pivot downward from hips to depress sternum with enough force to move chest 1½–2 inches in an average sized adult
      - Push hard and fast at a rate of 100 compressions/minute
      - Each compression cycle should be 50% depression, 50% relaxation

- Compression and ventilation ratios
  - For adult patient
  - Two rescue breaths given after each set of 30 compressions
  - Chest must be compressed at more than one compression per second
  - Recommended to count out loud, “1, 2, 3, ... 30”

- After performing 2 minutes of CPR
  - Stop CPR
  - Recheck patient’s carotid pulse
  - If no pulse, continue CPR
  - Stop to check carotid pulse every 2–5 minutes thereafter

Techniques of CPR

- Adult CPR
  - C is for circulation
  - Chest compressions on pregnant or obese patients
    - Performed in same manner
    - Use both hands on lower portion of sternum in middle of chest at nipple line
Techniques of CPR

- Adult CPR
  - C is for circulation
  - Once advanced airway is in place
    - "Cycles" of compressions and ventilations are eliminated
    - Continuous compressions performed at rate of 100/minute with no interruptions
    - Ventilations given over 1 second at 8–10 breaths/minute
    - Emergency personnel should change compressor role every 2 minutes

- Techniques of CPR

  - Adult CPR
    - C is for circulation
    - One- and two-person CPR
      - CPR performed most efficiently by two or more persons
      - Two-person CPR
      - If performing CPR alone and second rescuer arrives
        - Switch to two-person CPR
        - Ask second person to take over while you rest
        - Ensure EMS has been called

- Additional helpers
  - Third person
    - Should apply cricoid pressure
  - Additional helpers
    - Can bring equipment
    - Shelter patient and protect privacy
    - Direct ambulance personnel to patient
    - Ensure clear exit for ambulance
Skill 9-1
One-Person Adult CPR

- Establish unresponsiveness
  - If no response
    - Call for help
    - Call 9-1-1

- Open airway with head-tilt/chin-lift or jaw-thrust

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Skill 9-1
One-Person Adult CPR

- Look, listen, and feel for breathing

- If no signs of breathing, provide two rescue breaths

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Skill 9-1
One-Person Adult CPR

- Check for carotid pulse

- If no pulse, begin compressions on lower portion of sternum at nipple line
Skill 9-1
One-Person Adult CPR

- Place heel of one hand in appropriate spot, place other hand on top
  - Use force from heels of hands only
  - Push hard and fast
  - Allow chest to recoil to normal position between compressions

- Position yourself directly over patient's sternum
  - Keep elbows straight

- Provide two rescue breaths
  - Each breath over 1 second in delivery
  - Observe for chest rise

- After five cycles of 30 compressions and two ventilations, check again for breathing, movement, and pulse
  - If no pulse or breathing:
    - Resume CPR
  - If a pulse but no signs of breathing
    - Continue rescue breathing at rate of one breath every 5–6 seconds
Skill 9-2
Two-Person Adult CPR

- Establish unresponsiveness
- Unresponsive patient
  - One rescuer calls for help
  - Other opens patient’s airway with head-tilt/chin-lift or jaw-thrust

Skill 9-2
Two-Person Adult CPR

- Look, listen, and feel for breathing
- No signs of breathing
  - Provide two rescue breaths

Skill 9-2
Two-Person Adult CPR

- Check for carotid pulse
- If no pulse
  - One person performs 30 chest compressions
  - Second person gives two ventilations
  - Push hard and fast
  - Allow chest to recoil after each compression
Skill 9-2  
Two-Person Adult CPR

- After five cycles of 30 compressions, two ventilations
  - Rescue personnel at head should check signs of circulation
  - If no signs of circulation
    - Resume CPR

Techniques of CPR

- Infant and child CPR
  - Children older than 1 year
    - Injuries are leading cause of death
  - First step—Injury prevention
  - Sudden cardiac arrest is rare in infants and children

- Before 1 year of age
  - Most common causes of sudden death
    - Sudden infant death syndrome (SIDS)
    - Respiratory problems
    - Foreign body airway obstruction (FBAO)
    - Drowning

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Techniques of CPR

• Infant and child CPR
  ▶ To ensure best chance for survival for infants and children:
    * Provide 2 minutes of rescue intervention [basic life support (BLS)] before calling 9-1-1
    * EMS activation is third step
    * Early advanced care is final step

Techniques of CPR

• Infant and child CPR
  ▶ Defibrillation with AED
    * Proven effective intervention and recommended for children 1 year and older
    * Check local protocols
  ▶ BLS
    * Overall sequence is same for all ages
      ▶ Assess scene safety
      ▶ Use PPE
      ▶ Check for unresponsiveness
      ▶ Position patient
      ▶ Care for airway, breathing, circulation

Techniques of CPR

• Infant and child CPR
  ▶ Methods used for all ages
    * Head-tilt/chin-lift
    * Jaw-thrust
    * Cricoid pressure
    * Recovery position
Techniques of CPR

- Airway
  - Infant
    - Tongue is large for size of mouth
    - Airway small
    - Trachea is soft and collapsible
    - Proper head positioning may be only rescue technique needed for unconscious infant/child
    - Do not hyperextend neck

Techniques of CPR

- Breathing
  - For unconscious infants and children
    - Look, listen, and feel for breathing no more than 10 seconds
  - If patient's breathing is adequate and you do not suspect injury from trauma
    - Place infant/child on his/her side in recovery position

Techniques of CPR

- Breathing
  - If infant/child is not breathing
    - Give two rescue breaths
    - Avoid fast or hard breaths
    - The smaller the child, the smaller the breaths
Techniques of CPR

Breathing

- If infant/child not breathing
  - For infants:
    - Place your mouth over nose and mouth–gently blow for 1 second each breath
  - For children:
    - Slow mouth-to-mouth ventilations of 1 second work best
    - Inhale fresh air between rescue breath
  - For unresponsive infants and children with signs of circulation but no breathing:
    - Give one breath that causes chest to rise every 3–5 seconds
  - Use barrier devices and bag-mask ventilation with supplemental O₂

Circulation

- Infants
  - Check brachial pulse while looking for other signs of circulation
    - Normal breathing
    - Coughing
    - Movement

- To check brachial pulse, press your first and middle fingers gently on brachial artery–no more than 10 seconds
Techniques of CPR

- Circulation
  - Children
    - Feel for carotid pulse—no more than 10 seconds
    - If no pulse or heart rate <60 beats/minute with signs of poor perfusion
      - Immediately begin chest compressions

- Chest compressions
  - Infant: one-person technique
    - Place your index finger on sternum between nipples to landmark
    - Lay your middle and ring fingers next to index finger
    - Compress chest 1/3 to 1/2 of depth of chest
    - Allow sternum to return to its normal position following each compression without removing your fingers from infant's chest
    - Provide smooth and rhythmic compressions with equal time for compression and relaxation
    - Give 30 compressions followed by two ventilations

  - Infant: two-person technique
    - Compress infant’s chest with two-thumb-encircling-hands technique
    - Place your thumbs side by side over lower half of sternum with your hands encircling chest
    - Use both thumbs to compress chest to 1/3–1/2 of depth of chest as you squeeze thorax with your fingers
    - Give smooth, rhythmic compressions and release pressure between compressions to allow chest to return to its normal position
Techniques of CPR

- Chest compressions
  - Infant: two-person technique
    - Maintain compression rate and ventilation: compression ratio the same as with the two-finger technique
    - After 15 compressions, pause briefly to allow second rescuer to give two breaths
    - A third emergency first responder should apply cricoid pressure

Skill 9-3
One-Person Infant CPR

- Establish unresponsiveness
  - If infant unresponsive
    - Call for help

- Open airway
  - Use head-tilt/chin-lift or jaw-thrust
  - Look, listen, feel for breathing (5-10 seconds)
  - If no breathing, provide two rescue breaths
Skill 9-3
One-Person Infant CPR

- Check for brachial pulse and other signs of circulation and signs of normal breathing (5-10 seconds)
- No signs of circulation and collapse of infant is sudden
  - Immediately call for help
  - Begin compression

Techniques of CPR

- Chest compressions
  - Child: one-person technique
    - Place child on his/her back on firm surface
    - Position yourself vertically above child’s chest with your arm straight
    - Place heel of one hand over lower half of sternum and avoid compressing xiphoid process
    - Keep fingers of your hand extended so only heel of your hand is compressing child’s chest
Techniques of CPR

- Chest compressions
  - Child: one-person technique
    - Compress sternum about 1/3–1/2 the depth of chest
    - After each compression, allow chest to return to its normal position
    - Provide compressions at a rate of approximately 100/minute
    - Maintain an open airway with one hand while compressing chest with the other hand
    - After each set of 30 compressions:
      - Give two ventilations
      - Pause to check for pulse for no more than 10 seconds after five cycles of CPR

- Child: two-person technique
  - One person should manage airway while other does compression
  - A third person should apply cricoid pressure
  - At end of five cycles:
    - First responders should change positions with minimal interruption if two or more rescuers are available
    - Change compressors every 2 minutes

Complications of CPR

- Gastric inflation
  - To avoid gastric inflation
    - Make sure airway is open and ventilated just until chest visibly rises
    - Provide ventilation smoothly and slowly to keep air out of stomach
    - One rescuer should apply and maintain cricoid pressure
Vomiting

- If vomiting occurs
  - Immediately stop compressions
  - Roll patient to side
  - Sweep mouth with gloved finger
  - Suction airway
  - When airway is clear
    - Reposition patient
    - Resume CPR

Chest compressions

- Broken ribs as a result of CPR are common
  - Can cause other injuries inside chest and abdomen
  - Correct hand position during chest compressions may help prevent bone injury
  - If you hear or feel bones break
    - Verify your hand position is on lower half of sternum
    - Resume compression
  - Compress only with heel of your hand
  - Avoid compressions on xiphoid process

Family and Bystander Support

- Most family members want to be close during resuscitation of loved one
  - Let them be present as long as they do not interfere with resuscitation process
- If enough rescuers are present
  - One should talk to family, friends, and bystanders to:
    - Gather history of event
    - Explain procedures
    - Provide support
Effectiveness of CPR

- CPR can help sustain life until defibrillator and advanced care arrive.
- CPR produces less than 1/3 of heart’s normal blood flow.
  - Chance for survival decreases within minutes.
  - Important to quickly and aggressively perform CPR.

Effectiveness of CPR

- Even with advanced EMS systems, cardiac arrest survival rates are low.
- CPR must be coupled with aggressive advanced care to keep patient alive.
- After an unsuccessful resuscitation you may:
  - Grieve
  - Be disappointed
  - Have feelings of failure

Effectiveness of CPR

- Methods to reduce stress of event
  - Attend critical incident stress debriefing (CISD)
  - Discuss event with other rescuers
  - Try to maintain normal routine
  - Eat a healthy diet and drink plenty of hydrating fluid
  - Get enough sleep
  - Avoid excess caffeine, alcohol, nicotine

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Automated External Defibrillators

- Heart's electrical system
- Electrical impulses trigger heart’s muscle to pump
- Pacemakers inside heart muscle
  - Stimulate an orderly contraction of heart muscle
  - Atria contract, then ventricles follow

Automated External Defibrillators

- Heart’s electrical system
- Heart disease
  - Can lead to blockages that disrupt blood supply to heart muscle
  - Can cause life-threatening electrical disturbances
- Most common cause of cardiac arrest
  - Heart rhythm called ventricular fibrillation (VF)

Automated External Defibrillators

- Heart’s electrical system
- VF
  - Electrical impulses are so disorganized that the heart cannot pump blood
  - Circulation stops
  - Patient collapses
  - Only effective treatment is applying electrical current to heart—defibrillation
  - Attempts to stop chaotic activity in heart so heart’s normal pacemakers can resume an orderly rhythm that stimulates heartbeat to pump blood
Automated External Defibrillators

- Defibrillation technology
  - First developed for use in hospitals
  - Portable manual defibrillators were developed in the 1970s
  - Early automatic defibrillators
    - Interpreted rhythm
    - Charged automatically
    - Delivered shock
    - Proved effective but dangerous

Automated External Defibrillators

- Defibrillation technology
  - Semiautomated defibrillators
    - Used today
    - Safe
    - Accurate
    - Lightweight
    - Easy to operate

Automated External Defibrillators

- Special considerations
  - Children
    - Children older than 1 year of age
      - AED is recommended
    - Children aged 1–8 years
      - Pediatric dose attenuator system should be used
    - Use standard AED for pediatric victims of cardiac arrest if adaptor system is not available
Automated External Defibrillators

- Special considerations
  - Clothing
    - AED pads must be applied to patient's dry, bare chest
    - All clothing must be removed
  - Hairy chest
    - If patient has hairy chest, AED pads may not contact skin
  - Water
    - Delivering shocks on wet surface may cause burns to both patient and rescuers
    - May cause delivered electrical current to course around patient's body but not through it
    - Always remove patient from any standing water and dry patient's chest before attaching pads
Automated External Defibrillators

● Special considerations
  ➢ Transdermal medication patches
    • Placing pad over a medication patch may cause a burn
      or interfere with shock
    • Carefully remove patch and dry chest before applying
      pad
    • Dispose of patch carefully so no one is exposed to
      medication

Automated External Defibrillators

● Special considerations
  ➢ Implanted defibrillators/pacemakers
    • Devices are about the size of deck of cards and can be
      felt under skin
    • Placing pad over these devices may interfere with shock
    • Place pad at least 1 inch to side of implanted defibrillator
      or pacemaker

Automated External Defibrillators

● Special considerations
  ➢ Metal surfaces
    • Ensure neither you nor patient is in contact with metal
      surface
  ➢ Jewelry and glasses
    • Placing AED pad over metal necklace may result in small
      burns and interfere with delivering shock
    • Move necklace out of way or remove it
    • Glasses may be removed
    • Do not let these tasks delay defibrillation
    • Keep patient’s belongings safe and later document their
      placement
Automated External Defibrillators

Universal steps for AED operation

Power
- Press AED power button
- Allow voice prompts to guide your actions

Patient
- Attach pads to an unresponsive patient’s bare, dry chest
  - If possible do not stop CPR to apply pads
  - If delay is necessary, keep it to a minimum

Automated External Defibrillators

Universal steps for AED operation

Power
- Press AED power button
- Allow voice prompts to guide your actions

Patient
- Remove backing from pad and apply it to chest as directed on pad
- Place one pad on upper right chest below collarbone
- Place second pad on left outer chest wall a few inches below armpit

Automated External Defibrillators

Universal steps for AED operation

Analyze
- Machine may analyze automatically or prompt you to push ANALYZE button
- First clear area
- State, “Analyzing; do not touch the patient”
- Make visual sweep of area to check that patient is clear
- CPR and airway management stops
- If shockable rhythm is present
  - Machine states “Shock indicated”
  - Machine will begin to charge
Automated External Defibrillators

Universal steps for AED operation

Shock
- Before pressing SHOCK button
- Clear area again
- Loudly state that everyone should clear
- Visually sweep area to be sure no one is touching patient
- Push SHOCK button
- Deliver first shock, if indicated, within 90 second of arrival at patient’s side

Automated External Defibrillators

Universal steps for AED operation

Shock
- Standard protocol:
  - Turn AED on and attach to patient as soon as it is available
  - Perform 2 minutes of CPR, then stop compressions
  - If a “No shock advised” message occurs, immediately begin another cycle of CPR for 2 minutes
  - If patient begins to breathe or move, stop CPR and reassess patient
  - Provide rescue breathing if patient’s breathing is inadequate
  - If breathing is adequate, place patient in recovery position

Skill 9-4
Universal AED sequence

- Place AED next to AED operator and turn on AED
- Attach AED pads to patient’s chest as directed on pads
Skill 9-4
Universal AED sequence

- Allow AED to analyze patient’s rhythm
  - Do not touch patient
- If AED states that shock is advised
  - Ensure everyone is clear of patient

 Skill 9-4
Universal AED sequence

- Press SHOCK button

- After shock
  - Immediately resume CPR for approximately 2 minutes (five cycles of 30:2)

Automated External Defibrillators

- Lone rescuer
  - Once established that patient is unresponsive
    - Immediately call for help
    - Open airway and check for breathing
    - If patient not breathing
      - Provide two rescue breaths and then check for pulse
    - If patient was found down for an undetermined amount of time
      - Give 2 minutes/five cycles of 30:2 CPR first
Automated External Defibrillators

- AED maintenance
  - AED operator must ensure AED is ready and operational when needed
  - AED manufacturers provide specific recommendations for day-to-day and ongoing maintenance
  - Routinely complete an inventory checklist
  - Suggested items to be carried with AED:
    - Three packages of AED pads (frequently check expiration date)
    - One pair of heavy-duty scissors
    - Small towel
    - Two or three disposable razors
    - Several pairs of gloves
    - Barrier devices

Automated External Defibrillators

- Event and system quality assurance
  - Medical director or designee will do an in-depth case review every time CPR is given and AED is used
  - Review determines
    - Whether patient was treated according to protocol
    - Standards of practice
  - Data should be collected to help determine strengths and challenges in local EMS system

Automated External Defibrillators

- Event and system quality assurance
  - All steps in sequence of survival should be monitored, survival rates calculated
  - Skill maintenance
    - Quality assurance issue
    - Emergency first responder who seldom responds to cardiac arrests needs frequent practice drills
  - Practice integrated airway maintenance, CPR, AD operations in a variety of situation and scenarios
  - Skill review and practice sessions are recommended at a minimum of every 6 months
Questions?