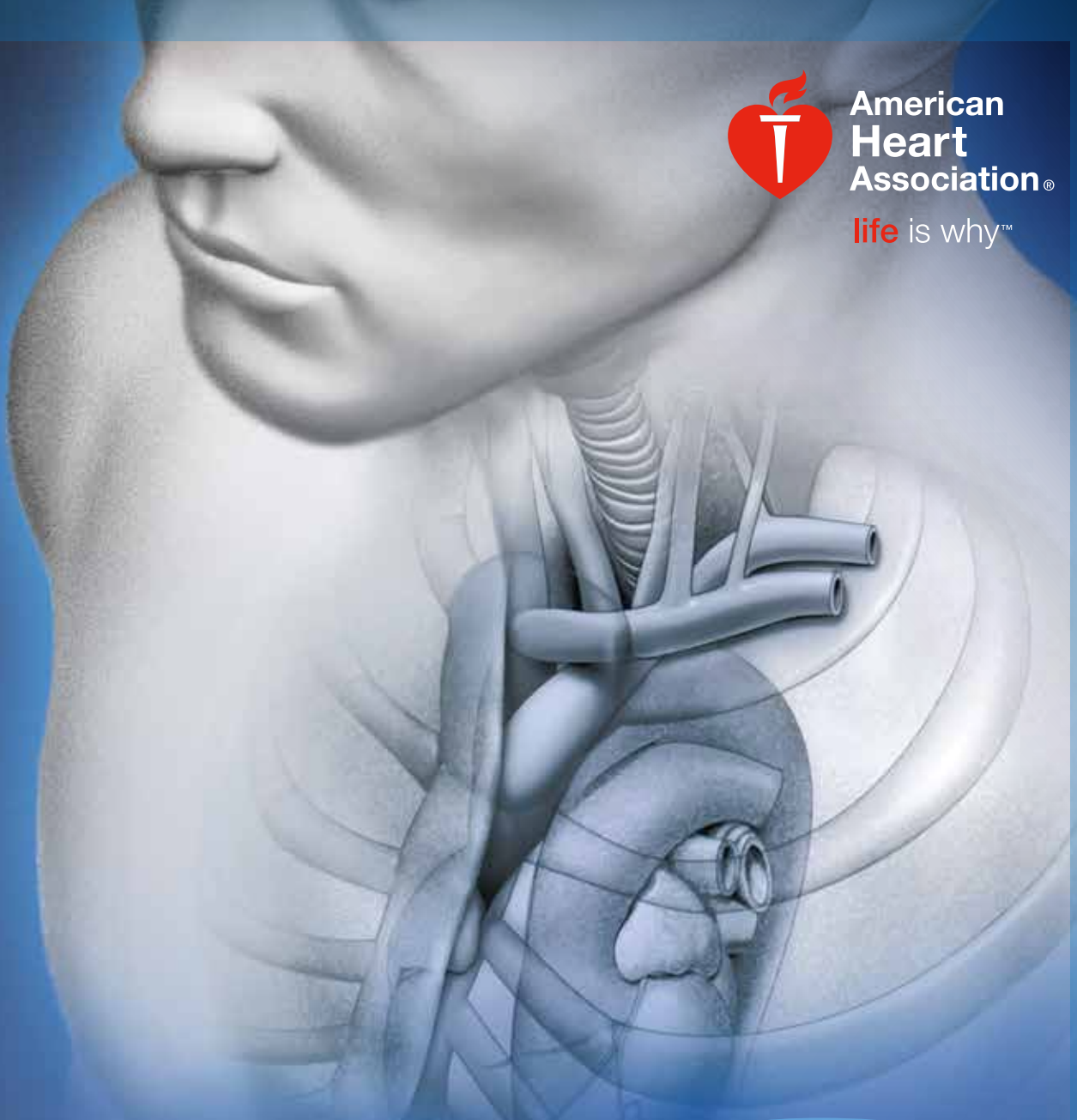




American  
Heart  
Association®

life is why™



# BLS

BASIC LIFE SUPPORT

PROVIDER MANUAL





**American  
Heart  
Association®**

**life** is why™

# BASIC LIFE SUPPORT

**PROVIDER MANUAL**

© 2016 American Heart Association  
ISBN 978-1-61669-407-4  
Printed in the United States of America  
First American Heart Association Printing February 2016  
15 14 13 12 11 10 9 8 7 6 5 4 3 2

## ***Acknowledgments***

The American Heart Association thanks the following people for their contributions to the development of this manual:

Mary Fran Hazinski, RN, MSN; Andrew H. Travers, MD, MSc;  
Sandra K. Eustice, NREMT, EMS I/C; Brenda Schoolfield;  
and the AHA BLS Project Team.



To find out about any updates or corrections to this text, visit [www.heart.org/cpr](http://www.heart.org/cpr), navigate to the page for this course, and click on “Updates.”

# Contents

## Part 1 General Concepts

---

<b>Introduction</b>	<b>1</b>
BLS Course Objectives	1
Provider Manual	2
Age Definitions	2
Boxes	2
Review Questions	3
Student Notes	3
<b>High-Quality CPR</b>	<b>3</b>
Your Approach to a Resuscitation Attempt	3
Personal Protective Equipment	4
<b>The Chain of Survival</b>	<b>4</b>
Learning Objectives	4
Adult Chain of Survival	4
Chain of Survival for an In-Hospital Cardiac Arrest	5
Chain of Survival for an Out-of-Hospital Cardiac Arrest	6
Key Differences Between IHCA and OHCA Chains of Survival	6
Importance of Each Link in the Chain of Survival	7
Pediatric Chain of Survival	9
<b>Cardiac Arrest or Heart Attack?</b>	<b>9</b>
<b>Review</b>	<b>11</b>
<b>Student Notes</b>	<b>11</b>

## Part 2 BLS for Adults

---

<b>BLS General Concepts</b>	<b>13</b>
Overview	13
Learning Objectives	13
Basic Framework for CPR	13
High-Performance Rescue Teams	14
Main Components of CPR	14
<b>BLS Healthcare Provider Adult Cardiac Arrest Algorithm</b>	<b>14</b>

<b>Adult 1-Rescuer BLS Sequence</b>	<b>16</b>
Introduction	16
Verify Scene Safety, Check for Responsiveness, and Get Help	16
Assess for Breathing and Pulse	17
Locating the Carotid Pulse	18
Determine Next Actions	18
Begin High-Quality CPR, Starting With Chest Compressions	18
Attempt Defibrillation With the AED	19
Resume High-Quality CPR	19
<b>Adult Chest Compressions</b>	<b>19</b>
Importance of Chest Compressions	19
High-Quality Chest Compressions	19
Chest Compression Technique	20
Alternate Technique for Chest Compressions	20
<b>Adult Breaths</b>	<b>21</b>
<b>Opening the Airway</b>	<b>21</b>
Introduction	21
Head Tilt–Chin Lift	21
Jaw Thrust	22
Jaw-Thrust Maneuver	22
<b>Barrier Devices</b>	<b>23</b>
Introduction	23
Pocket Mask	23
Use of a Pocket Mask	23
<b>Bag-Mask Devices</b>	<b>25</b>
Bag-Mask Device	25
Bag-Mask Ventilation Technique (1 Rescuer)	26
Bag-Mask Ventilation Technique (2 Rescuers+)	26
<b>Adult 2-Rescuer BLS Sequence</b>	<b>27</b>
Introduction	27
Verify Scene Safety, Check for Responsiveness, and Get Help	27
Assess for Breathing and Pulse	27
Determine Next Actions	28
Begin High-Quality CPR, Starting With Chest Compressions	28
Attempt Defibrillation With the AED	28
Resume High-Quality CPR	28
<b>Team Roles and Duties for 2-Rescuer CPR</b>	<b>29</b>
Rescuer Tasks	29
<b>Review</b>	<b>31</b>
<b>Student Notes</b>	<b>32</b>

## Part 3 Automated External Defibrillator for Adults and Children 8 Years of Age and Older

33

<b>General Concepts</b>	<b>33</b>
Overview	33
Learning Objectives	33
Early Defibrillation	33
Public-Access Defibrillation	33
AED Arrival	34
<b>Using the AED</b>	<b>35</b>
Be Familiar With the AED Equipment in Your Setting	35
Universal Steps for Operating an AED	35
Do Not Delay High-Quality CPR After AED Use	36
<b>Special Circumstances</b>	<b>39</b>
Hairy Chest	39
Water	39
Implanted Defibrillators and Pacemakers	39
Transdermal Medication Patches	39
<b>Review</b>	<b>40</b>
<b>Student Notes</b>	<b>40</b>

## Part 4 Team Dynamics

41

<b>General Concepts</b>	<b>41</b>
Overview	41
Learning Objectives	41
<b>Elements of Effective Team Dynamics</b>	<b>42</b>
<b>Roles During a Resuscitation Attempt</b>	<b>42</b>
Clear Roles and Responsibilities	42
Knowing Your Limitations	43
Constructive Intervention	43
<b>What to Communicate</b>	<b>43</b>
Knowledge Sharing	43
Summarizing and Reevaluating	43
<b>How to Communicate</b>	<b>43</b>
Closed-Loop Communication	43
Clear Messages	43
Mutual Respect	43
<b>Debriefing</b>	<b>44</b>
<b>Review</b>	<b>44</b>
<b>Student Notes</b>	<b>44</b>

## Part 5 BLS for Infants and Children

45

<b>General Concepts</b>	<b>45</b>
Overview	45
Learning Objectives	45
<b>BLS Healthcare Provider Pediatric Cardiac Arrest Algorithm for the Single Rescuer</b>	<b>45</b>
<b>Infant and Child 1-Rescuer BLS Sequence</b>	<b>47</b>
Introduction	47
Verify Scene Safety, Check for Responsiveness, and Get Help	47
Assess for Breathing and Pulse	47
Infant: Locating the Brachial Artery Pulse	48
Child: Locating the Femoral Artery Pulse	48
Determine Next Actions	48
Was the Collapse Sudden?	49
Begin High-Quality CPR, Starting With Chest Compressions	49
Attempt Defibrillation With the AED	49
Resume High-Quality CPR	49
<b>Infant/Child Chest Compressions</b>	<b>49</b>
Compression Rate and Compression-to-Ventilation Ratio	49
Chest Compression Technique	50
Infant (1 Rescuer): 2-Finger Technique	50
Infant: 2 Thumb–Encircling Hands Technique	51
<b>Infant/Child Breaths</b>	<b>52</b>
Opening the Airway	52
Why Breaths Are Important for Infants and Children in Cardiac Arrest	52
Ventilation for an Infant or Child With a Barrier Device	52
<b>BLS Healthcare Provider Pediatric Cardiac Arrest Algorithm for 2 or More Rescuers</b>	<b>53</b>
<b>Infant and Child 2-Rescuer BLS Sequence</b>	<b>54</b>
Introduction	54
Verify Scene Safety, Check for Responsiveness, and Get Help	54
Assess for Breathing and Pulse	54
Determine Next Actions	54
Begin High-Quality CPR, Starting With Chest Compressions	55
Attempt Defibrillation With the AED	55
Resume High-Quality CPR	55
<b>Review</b>	<b>55</b>
<b>Student Notes</b>	<b>56</b>



<b>Part 6</b>		
<b>Automated External Defibrillator for Infants and Children Less Than 8 Years of Age</b>		<b>57</b>
	<b><i>AED for Infants and Children</i></b>	<b>57</b>
	Overview	57
	Learning Objectives	57
	Be Familiar With the AED Equipment in Your Setting	57
	Pediatric-Capable AEDs	57
	Delivering a Pediatric Shock Dose	57
	Choosing and Placing the AED Pads	58
	Use of an AED for Infants	58
	<b><i>Review</i></b>	<b>59</b>
	<b><i>Student Notes</i></b>	<b>59</b>
<b>Part 7</b>		
<b>Ventilation Techniques</b>		<b>61</b>
	Learning Objectives	61
	<b><i>CPR and Breaths With an Advanced Airway</i></b>	<b>61</b>
	<b><i>Rescue Breathing</i></b>	<b>62</b>
	<b><i>Techniques for Giving Breaths Without a Barrier Device</i></b>	<b>62</b>
	Overview	62
	Mouth-to-Mouth Breathing for Adults and Children	63
	Breathing Techniques for Infants	63
	<b><i>Review</i></b>	<b>65</b>
	<b><i>Student Notes</i></b>	<b>65</b>
<b>Part 8</b>		
<b>Opioid-Associated Life-Threatening Emergencies</b>		<b>67</b>
	<b><i>General Concepts</i></b>	<b>67</b>
	Overview	67
	Learning Objectives	67
	What Are Opioids?	67
	Adverse Effects	67
	Antidote to Opioid Overdose	67
	Naloxone Autoinjector	67
	Intranasal Naloxone	68
	<b><i>Opioid-Associated Life-Threatening Emergency (Adult) Sequence</i></b>	<b>68</b>
	Opioid-Associated Life-Threatening Emergency Response Sequence	68
	<b><i>Review</i></b>	<b>70</b>
	<b><i>Student Notes</i></b>	<b>70</b>

## **Part 9** **Choking Relief for Adults, Children, and Infants** **71**

---

<b>General Concepts</b>	<b>71</b>
Overview	71
Learning Objectives	71
Signs of Choking	71
<b>Choking Relief in a Responsive Adult or Child</b>	<b>72</b>
Abdominal Thrusts	72
Abdominal Thrusts With Victim Standing or Sitting	72
<b>Choking Relief in an Unresponsive Adult or Child</b>	<b>73</b>
Choking Relief in an Unresponsive Adult or Child	73
Actions After Choking Relief	74
<b>Choking Relief in Infants</b>	<b>74</b>
Choking Relief in a Responsive Infant	74
Choking Relief in an Unresponsive Infant	75
<b>Review</b>	<b>76</b>
<b>Student Notes</b>	<b>76</b>

## **Appendix** **77**

---

<b>Summary of High-Quality CPR Components for BLS Providers</b>	<b>79</b>
<b>Adult CPR and AED Skills Testing Checklist</b>	<b>80</b>
<b>Adult CPR and AED Skills Testing Critical Skills Descriptors</b>	<b>81</b>
<b>Infant CPR Skills Testing Checklist</b>	<b>82</b>
<b>Infant CPR Skills Testing Critical Skills Descriptors</b>	<b>84</b>
<b>Answers to Review Questions</b>	<b>85</b>
<b>Recommended Reading</b>	<b>85</b>

# life is why.™

At the American Heart Association, we want people to experience more of life's precious moments. That's why we've made better heart and brain health our mission. It's also why we remain committed to exceptional training—the act of bringing resuscitation science to life—through genuine partnership with you. Only through our continued collaboration and dedication can we truly make a difference and save lives.

Until there's a world free of heart disease and stroke, the American Heart Association will be there, working with you to make a healthier, longer life possible for everyone.

## Why do we do what we do? life is why.

**Life Is Why** is a celebration of life. A simple yet powerful answer to the question of why we should all be healthy in heart and mind. It also explains why we do what we do: Lifesaving work. Every day.

Throughout your student manual, you will find information that correlates what you are learning in this class to **Life Is Why** and the importance of cardiovascular care. Look for the **Life Is Why** icon (shown at right), and remember that what you are learning today has an impact on the mission of the American Heart Association.

We encourage you to discover your **Why** and share it with others. Ask yourself, what are the moments, people, and experiences I live for? What brings me joy, wonder, and happiness? Why am I partnering with the AHA to help save lives? Why is cardiovascular care important to me? The answer to these questions is your **Why**.



## Instructions

Please find on the back of this page a chance for you to participate in the AHA's mission and **Life Is Why** campaign. Complete this activity by filling in the blank with the word that describes your **Why**.

Share your “\_\_\_\_\_ **Is Why**” with the people you love, and ask them to discover their **Why**.

**Talk about it. Share it. Post it. Live it.**    **#lifeiswhy**    **#CPRsavesLives**



is why.



## General Concepts

### Introduction

---

Welcome to the Basic Life Support (BLS) Provider Course. BLS is the foundation for saving lives after cardiac arrest. You will learn the skills of high-quality cardiopulmonary resuscitation (CPR) for victims of all ages and will practice delivery of these skills both as a single rescuer and as a member of a multirescuer team. The skills you learn in this course will enable you to recognize cardiac arrest, activate the emergency response system early, and respond quickly and confidently.

Despite important advances in prevention, sudden cardiac arrest remains a leading cause of death in the United States. Seventy percent of out-of-hospital cardiac arrests occur in the home. About half are unwitnessed. Outcome from out-of-hospital cardiac arrest remains poor. Only about 10% of adult patients with nontraumatic cardiac arrest who are treated by emergency medical services (EMS) survive to hospital discharge.

With the knowledge and skills you learn in this course, your actions can give victims the best chance of survival.

---

### ***BLS Course Objectives***

The BLS Course focuses on what rescuers need to know to perform high-quality CPR in a wide variety of settings. You will also learn how to respond to choking emergencies. After successfully completing the BLS Course, you should be able to

- Describe the importance of high-quality CPR and its impact on survival
  - Describe all of the steps of the Chain of Survival
  - Apply the BLS concepts of the Chain of Survival
  - Recognize the signs of someone needing CPR
  - Perform high-quality CPR for an adult
  - Describe the importance of early use of an automated external defibrillator (AED)
  - Demonstrate the appropriate use of an AED
  - Provide effective ventilations by using a barrier device
  - Perform high-quality CPR for a child
  - Perform high-quality CPR for an infant
  - Describe the importance of teams in multirescuer resuscitation
  - Perform as an effective team member during multirescuer CPR
  - Describe the technique for relief of foreign-body airway obstruction for an adult or child
  - Describe the technique for relief of foreign-body airway obstruction for an infant
-

**Provider Manual**

The *BLS Provider Manual* contains all of the information that you need to know to successfully complete the BLS Course. Take time to read this manual carefully.

Study the skills and lifesaving sequences carefully. During the course, you will have an opportunity to apply this knowledge as a rescuer in simulated emergency scenarios.

**Age Definitions**





The manual presents specific BLS skills and sequences for training rescuers to care for an unresponsive adult, child, or infant until the next level of care arrives. For the purposes of the BLS Course, age definitions are as follows:

Age	Definition
<b>Adults</b>	Adolescents (ie, after the onset of puberty) and older
<b>Children</b>	1 year of age to puberty
<b>Infants</b>	Less than 1 year of age (excluding newly born infants in the delivery room)

Signs of puberty include chest or underarm hair in males and any breast development in females.

**Boxes**

Throughout the *BLS Provider Manual*, you will find specific information highlighted by boxes with icons. Pay special attention to this important information.

Box	Contains
<p><b>Foundational Facts</b></p> 	Basic information that every BLS provider should know
<p><b>Critical Concepts</b></p> 	Especially important information
<p><b>Caution</b></p> 	Alerts to potential problems or risks
<p><b>Life Is Why</b></p> 	Why taking this course matters

**Review Questions**

Review questions are provided at the end of each part. You may use these to confirm your understanding of important BLS concepts.

**Student Notes**

A blank section is provided at the end of each part for taking notes. You may find it useful to record key points to remember or questions to ask your instructor.

**High-Quality CPR**

The BLS Course focuses on preparing students to perform CPR skills. CPR is a lifesaving procedure for a victim who has signs of cardiac arrest (ie, unresponsive, no normal breathing, and no pulse). Components of CPR are chest compressions and breaths.

High-quality CPR improves a victim's chances of survival. Study and practice the characteristics of high-quality CPR so that you can perform each skill effectively.

**Critical Concepts****High-Quality CPR**

- **Start compressions within 10 seconds** of recognition of cardiac arrest.
- **Push hard, push fast:** Compress at a rate of 100 to 120/min with a depth of
  - At least 2 inches (5 cm) for adults
  - At least one third the depth of the chest, about 2 inches (5 cm), for children
  - At least one third the depth of the chest, about 1½ inches (4 cm), for infants
- **Allow complete chest recoil** after each compression.
- **Minimize interruptions** in compressions (try to limit interruptions to less than 10 seconds).
- **Give effective breaths** that make the chest rise.
- **Avoid excessive ventilation.**

**Foundational Facts****Chest Compression Depth**

Chest compressions are more often too shallow than too deep. However, research suggests that compression depth greater than 2.4 inches (6 cm) in adults may cause injuries. If you have a CPR quality feedback device, it is optimal to target your compression depth from 2 to 2.4 inches (5 to 6 cm).

**Your Approach to a Resuscitation Attempt**

The BLS techniques and sequences presented during the course offer 1 approach to a resuscitation attempt. Every situation is unique. Your response will be determined by

- Available emergency equipment
- Availability of trained rescuers
- Level of training expertise
- Local protocols

## Personal Protective Equipment

Personal protective equipment (PPE) is equipment worn to help protect the rescuer from health or safety risks. PPE will vary based on situations and protocols. It can include a combination of items, such as

- Medical gloves
- Eye protection
- Full body coverage
- High-visibility clothing
- Safety footwear
- Safety helmets

Always consult with your local health authority or regulatory body on specific PPE protocols relevant to your role.

## Life Is Why



## High-Quality CPR Is Why

Early recognition and CPR are crucial for survival from cardiac arrest. By learning high-quality CPR, you'll have the ability to improve patient outcomes and save more lives.

## The Chain of Survival

### Learning Objectives

At the end of this part, you will be able to

- Describe the importance of high-quality CPR and its impact on survival
- Describe all of the steps of the Chain of Survival
- Apply the BLS concepts of the Chain of Survival

### Adult Chain of Survival

The AHA has adopted, supported, and helped develop the concept of emergency cardiovascular care (ECC) systems for many years. The term *Chain of Survival* provides a useful metaphor for the elements of the ECC systems-of-care concept.

Cardiac arrest can happen anywhere—on the street, at home, or in a hospital emergency department, intensive care unit (ICU), or inpatient bed. The system of care is different depending on whether the patient has an arrest inside or outside the hospital.

The 2 distinct adult Chains of Survival (Figure 1), which reflect the setting as well as the availability of rescuers and resources, are

- In-hospital cardiac arrest (IHCA)
- Out-of-hospital cardiac arrest (OHCA)





**Figure 1.** The AHA adult Chains of Survival. Links in the Chain of Survival for an adult cardiac arrest will differ based on whether the arrest occurs in or out of the hospital.

### **Chain of Survival for an In-Hospital Cardiac Arrest**

For adult patients who are in the hospital, cardiac arrest usually happens as a result of serious respiratory or circulatory conditions that get worse. Many of these arrests can be predicted and prevented by careful observation, prevention, and early treatment of prearrest conditions. Once a primary provider recognizes cardiac arrest, immediate activation of the resuscitation team, early high-quality CPR, and rapid defibrillation are essential. Patients depend on the smooth interaction of the institution's various departments and services and on a multidisciplinary team of professional providers, including physicians, nurses, respiratory therapists, and others.

After return of spontaneous circulation (ROSC), all cardiac arrest victims receive post-cardiac arrest care. This level of care is provided by a team of multidisciplinary specialists and may occur in the cardiac catheterization suite and/or ICU. A *cardiac catheterization suite or laboratory* (sometimes referred to as a “cath lab”) is a group of procedure rooms in a hospital or clinic where specialized equipment is used to evaluate the heart and the blood vessels around the heart and in the lungs. A cardiac catheterization procedure involves insertion of a catheter through an artery or vein into the heart to study the heart and its surrounding structures and function. Measurements are made through the catheter, and contrast material may be used to create images that will help identify problems. During the procedure, specialized catheters can be used to fix some cardiac problems (such as opening a blocked artery).

The links in the Chain of Survival for an adult who has a cardiac arrest *in the hospital* are

- Surveillance, prevention, and treatment of **prearrest conditions**
- Immediate **recognition** of cardiac arrest and **activation** of the emergency response system
- Early **CPR** with an emphasis on chest compressions
- Rapid **defibrillation**
- Multidisciplinary **post-cardiac arrest care**

### Chain of Survival for an Out-of-Hospital Cardiac Arrest

Most out-of-hospital adult cardiac arrests happen unexpectedly and result from underlying cardiac problems. Successful outcome depends on early bystander CPR and rapid defibrillation in the first few minutes after the arrest. Organized community programs that prepare the lay public to respond quickly to a cardiac arrest are critical to improving outcome from OHCA.

Lay rescuers are expected to recognize the victim’s distress, call for help, start CPR, and initiate public-access defibrillation until EMS arrives. EMS providers then take over resuscitation efforts. Advanced care, such as administration of medications, may be provided. EMS providers transport the cardiac arrest victim to an emergency department or cardiac catheterization suite. Follow-up care by a team of multidisciplinary specialists continues in the ICU.

The links in the Chain of Survival for an adult who has a cardiac arrest *outside the hospital* are

- Immediate **recognition** of cardiac arrest and **activation** of the emergency response system
- Early **CPR** with an emphasis on chest compressions
- Rapid **defibrillation** with an AED
- Effective **advanced life support** (including rapid stabilization and transport to post-cardiac arrest care)
- Multidisciplinary **post-cardiac arrest care**

### Key Differences Between IHCA and OHCA Chains of Survival

Element	IHCA	OHCA
<b>Initial support</b>	Depends on an <b>in-hospital system</b> of appropriate <b>surveillance, monitoring, and prevention</b> with <b>responsive primary provider teams</b> .	Depends on <b>community</b> and <b>EMS providers</b> for support.
<b>Resuscitation teams</b>	Resuscitation efforts depend on the smooth interaction of the institution’s <b>various departments</b> and services (such as the patient ward, emergency department [ED], cardiac catheterization laboratory, and ICU) and on a <b>multidisciplinary team of professional providers</b> , which includes physicians, nurses, respiratory therapists, pharmacists, counselors, and others.	<b>Lay rescuers</b> are expected to recognize the patient’s unresponsiveness, call for help, and activate the emergency response system. They initiate CPR and use an AED (if available) until a team of <b>EMS providers</b> takes over resuscitation and then transports the patient to an <b>ED and/or cardiac catheterization laboratory</b> , before the patient is transferred to an <b>ICU</b> for continued care.
<b>Available resources</b>	Depending on the facility, in-hospital <b>multidisciplinary teams</b> may have immediate access to additional personnel as well as resources of the <b>ED, cardiac catheterization laboratory, and ICU</b> .	In out-of-hospital settings, lay rescuers may have access to an <b>AED</b> , such as through their local <b>public-access defibrillation system, emergency or first aid equipment, and dispatch-</b>

(continued)



(continued)

Element	IHCA	OHCA
		<b>assisted guidance.</b> EMS crews/paramedics may find themselves alone, with no <b>resources</b> except those they <b>brought with them.</b> Additional <b>backup resources</b> and equipment may take some time to arrive.
<b>Resuscitation constraints</b>	Both settings may be affected by factors such as <b>crowd control, family presence, space constraints, resources, training, transportation, and device failures.</b>	
<b>Level of complexity</b>	Both IHCA and OHCA cases are typically <b>complex,</b> requiring teamwork and coordination among responders and care providers.	

**Importance of Each Link in the Chain of Survival**




Notice that the links in the Chain of Survival are not separate, but connected. Each link describes an action during a resuscitation attempt that is critical to a successful outcome. If one link is broken, the chance for a good outcome is decreased. These mutually dependent links represent the most important actions in the management of cardiac arrest. The importance of each link is described in Table 1.

**Table 1. Importance of Each Link in the Chain of Survival**




Link	Description
<b>In-hospital cardiac arrest (IHCA)</b>	
 <p><b>Surveillance, prevention, and treatment of prearrest conditions</b></p>	<ul style="list-style-type: none"> <li>• For adult patients who are in the hospital, cardiac arrest usually happens as a result of serious respiratory or circulatory conditions that get worse.</li> <li>• Many arrests can be predicted and prevented by careful observation, prevention, and early treatment of prearrest conditions.</li> </ul>
 <p><b>Immediate recognition of cardiac arrest and activation of the emergency response system</b></p>	<ul style="list-style-type: none"> <li>• You must first recognize that the victim is in cardiac arrest based on unresponsiveness, no breathing (or no normal breathing or only gasping), and no pulse.</li> <li>• Once you have recognized that the victim is in cardiac arrest, activate the emergency response system or ask someone else to do it.</li> <li>• The sooner you activate the emergency response system, the sooner the next level of care will arrive.</li> </ul>

(continued)

(continued)



Link	Description
 <p><b>Early CPR with an emphasis on chest compressions</b></p>	<ul style="list-style-type: none"> <li>• If the victim is in cardiac arrest, begin high-quality CPR without delay.</li> <li>• High-quality CPR started immediately after cardiac arrest can greatly improve a victim’s chance of survival.</li> <li>• Bystanders who are not trained in CPR are encouraged to at least provide chest compressions. Chest compressions can be performed by those with no training and can be guided by dispatchers over the telephone.</li> </ul>
 <p><b>Rapid defibrillation</b></p>	<ul style="list-style-type: none"> <li>• Rapid defibrillation in combination with high-quality CPR can double or triple the chances of survival. Provide defibrillation with a manual defibrillator or AED as soon as the device is available.                             <ul style="list-style-type: none"> <li>– The AED is a lightweight, portable device that can identify lethal heart rhythms and deliver a shock to terminate the abnormal rhythm and allow the heart’s normal rhythm to resume.</li> <li>– AEDs are simple to operate, allowing lay rescuers and healthcare providers to attempt defibrillation safely.</li> </ul> </li> </ul>
 <p><b>Multidisciplinary post-cardiac arrest care</b></p>	<ul style="list-style-type: none"> <li>• Once ROSC is achieved, the next link is for the patient to receive post-cardiac arrest care.</li> <li>• This advanced level of care is provided by a multidisciplinary team of healthcare providers. They focus on preventing the return of cardiac arrest and tailor specific therapies to improve long-term survival.</li> <li>• Post-cardiac arrest care may be provided in the cardiac catheterization suite and/or ICU.</li> </ul>

**Out-of-hospital cardiac arrest (OHCA)**

 <p><b>Immediate recognition of cardiac arrest and activation of the emergency response system</b></p>	<ul style="list-style-type: none"> <li>• You must first recognize that the victim is in cardiac arrest based on unresponsiveness, no breathing (or no normal breathing or only gasping), and no pulse.</li> <li>• Once you have recognized that the victim is in cardiac arrest, activate the emergency response system or ask someone else to do it.</li> <li>• The sooner you activate the emergency response system, the sooner the next level of care will arrive.</li> </ul>
 <p><b>Early CPR with an emphasis on chest compressions</b></p>	<ul style="list-style-type: none"> <li>• If the victim is in cardiac arrest, begin high-quality CPR without delay.</li> <li>• High-quality CPR started immediately after cardiac arrest can greatly improve a victim’s chance of survival.</li> <li>• Bystanders who are not trained in CPR are encouraged to at least provide chest compressions. Chest compressions can be performed by those with no training and can be guided by dispatchers over the telephone.</li> </ul>
 <p><b>Rapid defibrillation with an AED</b></p>	<ul style="list-style-type: none"> <li>• Rapid defibrillation in combination with high-quality CPR can double or triple the chances of survival. Provide defibrillation with a manual defibrillator or AED as soon as the device is available.                             <ul style="list-style-type: none"> <li>– The AED is a lightweight, portable device that can identify lethal heart rhythms and deliver a shock to terminate the abnormal rhythm and allow the heart’s normal rhythm to resume.</li> <li>– AEDs are simple to operate, allowing lay rescuers and healthcare providers to attempt defibrillation safely.</li> </ul> </li> </ul>

(continued)

(continued)

Link	Description
 <p data-bbox="116 436 448 569"><b>Effective advanced life support (including rapid stabilization and transport to post-cardiac arrest care)</b></p>	<ul style="list-style-type: none"> <li>• Advanced life support (ALS) bridges the transition from BLS to more advanced care. ALS can occur in any setting (both out of hospital and in hospital). Effective ALS teams may provide the patient with additional care if needed, such as                             <ul style="list-style-type: none"> <li>– 12-lead electrocardiogram or advanced cardiac monitoring</li> <li>– Electrical therapy interventions (eg, cardioversion)</li> <li>– Obtaining vascular access</li> <li>– Giving appropriate drugs</li> <li>– Placing an advanced airway</li> </ul> </li> </ul>
 <p data-bbox="148 745 421 808"><b>Multidisciplinary post-cardiac arrest care</b></p>	<ul style="list-style-type: none"> <li>• Once ROSC is achieved, the next link is for the patient to receive post-cardiac arrest care.</li> <li>• This advanced level of care is provided by a multidisciplinary team of healthcare providers. They focus on preventing the return of cardiac arrest and tailor specific therapies to improve long-term survival.</li> <li>• Post-cardiac arrest care may be provided in the cardiac catheterization suite and/or ICU.</li> </ul>

### Pediatric Chain of Survival

In adults, cardiac arrest is often sudden and results from a cardiac cause. In children, cardiac arrest is often secondary to respiratory failure and shock. Identifying children with these problems is essential to reduce the likelihood of pediatric cardiac arrest and maximize survival and recovery. Therefore, a prevention link is added in the pediatric Chain of Survival (Figure 2):

- **Prevention** of arrest
- Early high-quality **bystander CPR**
- **Rapid activation** of the emergency response system
- Effective **advanced life support** (including rapid stabilization and transport to post-cardiac arrest care)
- Integrated **post-cardiac arrest care**



**Figure 2.** The AHA pediatric Chain of Survival.

### Cardiac Arrest or Heart Attack?

People often use the terms *cardiac arrest* and *heart attack* interchangeably, but they are not the same.

- **Sudden cardiac arrest** occurs when the heart develops an abnormal rhythm and can't pump blood.
- A **heart attack** occurs when blood flow to part of the heart muscle is blocked.

Make sure that you understand the difference by carefully studying Table 2.

**Table 2. Sudden Cardiac Arrest vs Heart Attack**

	<b>Sudden Cardiac Arrest</b>	<b>Heart Attack</b>
<b>What it is</b>	<p><b>Sudden cardiac arrest</b> occurs when the heart develops an abnormal rhythm and can't pump blood.</p> <p>Sudden cardiac arrest results from an abnormal heart rhythm. This abnormal rhythm causes the heart to quiver so it can no longer pump blood to the brain, lungs, and other organs.</p> <p>Sudden cardiac arrest is often a “<b>rhythm</b>” problem.</p>	<p>A <b>heart attack</b> occurs when blood flow to part of the heart muscle is blocked.</p> <p>A heart attack occurs when a clot forms in a blood vessel carrying oxygenated blood to the heart muscle. If the blocked vessel is not reopened quickly, the muscle normally nourished by that vessel begins to die.</p> <p>A heart attack is a “<b>clot</b>” problem.</p>
<b>What happens</b>	<p>Within seconds, the person becomes unresponsive and is not breathing or is only gasping. <b>Death occurs within minutes if the victim does not receive immediate lifesaving treatment.</b></p>	<p>Signs of a heart attack may appear immediately or last weeks or longer, and may include</p> <ul style="list-style-type: none"> <li>• Severe discomfort in the chest or other areas of the upper body</li> <li>• Shortness of breath</li> <li>• Cold sweats</li> <li>• Nausea/vomiting</li> </ul> <p>Typically, during a heart attack, the heart continues to pump blood. <b>The longer the person with a heart attack goes without treatment, the greater the possible damage to the heart muscle.</b></p> <p>Occasionally, the damaged heart muscle triggers an abnormal rhythm that can lead to sudden cardiac arrest.</p> <p>Heart attack symptoms in women can be different from those in men, and women may be more likely to experience</p> <ul style="list-style-type: none"> <li>• Pain in the jaw, arms, back, or neck</li> <li>• Light-headedness</li> <li>• Nausea/vomiting</li> </ul>
<b>What is the link?</b>	<p>Most heart attacks do not lead to sudden cardiac arrest, though a small percentage of people with a heart attack will develop sudden cardiac arrest. But when sudden cardiac arrest occurs, heart attack is a common cause. Other conditions may also change the heart's rhythm and lead to cardiac arrest.</p>	

**Sudden cardiac arrest** is a **leading cause of death**. Nearly 360 000 out-of-hospital cardiac arrests occur annually in the United States. Fast action can save lives.

## Review

---

1. In which locations do most out-of-hospital cardiac arrests occur?
  - a. Healthcare clinics
  - b. Homes
  - c. Recreational facilities
  - d. Shopping centers
2. Which is the most common cause of cardiac arrest in children?
  - a. Cardiac problem
  - b. Congenital or acquired heart defect
  - c. Respiratory failure or shock
  - d. Infection and sepsis
3. What is the third link in the adult out-of-hospital Chain of Survival?
  - a. Advanced life support
  - b. High-quality CPR
  - c. Prevention
  - d. Rapid defibrillation
4. Which statement best describes sudden cardiac arrest?
  - a. When respiratory distress in adults occurs and the heart rate does not change
  - b. When the heart rate is 40 to 60/min and respirations increase
  - c. When blood flow to the heart is blocked and the heart rate increases
  - d. When an abnormal rhythm develops and the heart stops beating unexpectedly

See Answers to Review Questions in the Appendix.

## Student Notes

---

---

---

---





## BLS for Adults

### BLS General Concepts

---

#### **Overview**

This section describes BLS for adults. You will learn to perform high-quality CPR skills, both as a single rescuer and as a member of a multirescuer team.

Use adult BLS skills for victims who are adolescents (ie, after the onset of puberty) and older. Signs of puberty include chest or underarm hair in males and any breast development in females.

---

#### **Learning Objectives**

At the end of this part, you will be able to

- Recognize the signs of someone needing CPR
  - Perform high-quality CPR for an adult
  - Provide effective ventilations by using a barrier device
- 

#### **Basic Framework for CPR**

Everyone can be a lifesaving rescuer for a cardiac arrest victim (Figure 3). Which CPR skills you use will depend on your level of training, experience, and confidence (ie, rescuer proficiency). The type of victim (child vs adult) as well as the availability of equipment and other rescuers to assist will determine CPR efforts.

Consider the following examples:

- **Hands-Only CPR.** A single rescuer with little training and limited equipment who witnesses a cardiac arrest in a middle-aged man might provide only chest compressions until help arrives.
- **30:2 CPR.** A lifeguard who rescues a drowning young child or an adult in cardiac arrest will provide both chest compressions and breaths, using a ratio of 30 compressions to 2 breaths.
- **Teamwork.** Emergency responders who are called to a scene to care for a cardiac arrest victim will perform multirescuer coordinated CPR: one rescuer performs chest compressions, a second rescuer gives breaths with a bag-mask device, and a third rescuer uses the defibrillator. With a team approach, several lifesaving actions are performed at the same time.