



# Basic Life Support

Provider Manual



# Table of Contents

<b>Unit One: General Concepts of Basic Life Support.....</b>	<b>4</b>
Delivering the Most Up-to-Date Guidelines Available .....	4
2015 BLS Guideline Changes .....	5
BLS Guideline Changes Since 2015.....	7
Initiating the Chain of Survival .....	8
<b>Unit Two: BLS for Adults .....</b>	<b>9</b>
One-Rescuer Adult BLS.....	9
One-Rescuer CPR .....	10
Two-Rescuer Adult BLS/CPR .....	11
Adult Mouth-to-Mask Ventilation .....	11
Adult Bag-Mask Ventilation in Two-Rescuer CPR.....	11
<b>Unit Three: BLS for Infants and Children.....</b>	<b>12</b>
One-Rescuer BLS for Infants and Children .....	12
Two-Rescuer BLS for Infants and Children.....	13
Child Ventilation.....	14
<b>Unit Four: Critical Concepts in BLS .....</b>	<b>15</b>
Rescue Breathing .....	15
CPR with an Advanced Airway .....	15
Ventilation .....	16
Infant Mouth-to-Mouth or Mouth-to-Nose .....	17
Automated External Defibrillator Use .....	17
<b>Unit Five: Relief of Choking.....</b>	<b>19</b>
Choking in an Adult or Child Older than One Year .....	19
Abdominal Thrusts (Heimlich Maneuver) .....	20
Choking in Infants (0-12 months).....	22
<b>Unit Six: Respiratory Arrest due to Opioids – Bystander Use of Naloxone.....</b>	<b>24</b>
<b>References.....</b>	<b>25</b>

# List of Figures

Figure 1: Pediatric Chain of Survival.....8

Figure 2: In-Hospital Adult Cardiac Arrest Chain of Survival.....8

Figure 3: Outside-of-Hospital Adult Cardiac Arrest Chain of Survival.....8

Figure 4: BLS Adult Algorithm .....9

Figure 5: BLS CPR Algorithm..... 10

Figure 6: BLS Infant and Child Algorithm ..... 12

Figure 7: BLS Rescue Breathing Adult or Child Algorithm..... 16

Figure 8: Child AED Placement..... 17

Figure 9: Adult AED Placement ..... 17

Figure 10: BLS AED Algorithm ..... 18

Figure 11: BLS Choking Adult or Child Algorithm..... 20

Figure 12: Abdominal Thrusts in a Child ..... 21

Figure 13: Abdominal Thrusts in an Adult..... 21

Figure 14: Choking in Infants ..... 22

Figure 15: BLS Choking Infant Algorithm..... 23

Figure 16: BLS Suspected Opioid Overdose Algorithm..... 24

# List of Tables

Table 1: 2015 BLS Changes.....6

Table 2: BLS Guideline Changes Since 2015.....7

Table 3: Differences in BLS for Adults and Children ..... 13

Table 4: Differences in BLS for Children and Infants ..... 13

Table 5: Rescue Breathing ..... 15

Table 6: Compression to Breath Ratios with/without Advanced Airway..... 15

Table 7: Adult and Child Airway Obstruction ..... 19

Table 8: Infant Airway Obstruction..... 22

# Unit One: General Concepts of Basic Life Support

Basic Life Support (BLS) has changed dramatically over the years to make it more accessible to the general public and more effective for the victim of cardiac arrest. Cardiac arrest is the leading cause of death in the world; individuals with a knowledge of BLS can intervene early and possibly prevent a death associated with sudden cardiac arrest. This training provides you with the knowledge to:

- Initiate the chain of survival as soon as a possible problem is identified
- Initiate immediate high-quality chest compressions for any victim
- Provide early defibrillation with an Automated External Defibrillator (AED) as soon as one is available
- Initiate rescue breathing when respiration is inadequate
- Perform BLS as a team
- Relieve a choking episode.

## Delivering the Most Up-to-Date Guidelines Available

The International Liaison Committee on Resuscitation (ILCOR) has been the definitive source for resuscitation guidelines for decades. ILCOR recommendations are based on cutting edge biomedical and clinical research. Organizations such as the American Heart Association (AHA) and the European Resuscitation Council (ERC) contribute to Consensus on Science and Treatment Recommendations (CoSTR) and then publish their findings in the journals *Circulation* and *Resuscitation*, respectively.

For decades, ILCOR conducted a scientific review process every five years (i.e. 2005, 2010, 2015) and published their results. These results were made into provider training manuals, student training manuals, and other resources. In fact, *American Resuscitation Council* used these peer-reviewed publications to create our learning materials, provider manuals, and exam questions. In 2016, however, ILCOR decided to update and publish their guidance every year to keep up with advancements in the field of resuscitation research. We, too, are dedicated to staying at the forefront of science. As such, we will update all of our education materials as ILCOR publishes new guidelines each year.

## 2015 BLS Guideline Changes

The last time ILCOR published 5-year guidance was in 2015. These BLS guidelines replaced 2010 guidelines and older.

- Research shows that beginning compressions early increases the chance of survival so the “CAB” (Chest Compressions, Airway, Breathing) sequence is recommended. Immediate initiation of high-quality chest compressions is of the utmost importance. High-quality cardiopulmonary resuscitation (CPR) includes:
  - Perform compressions at a rate between 100 and 120 per minute, regardless of the age of the victim
  - Chest compressions should be between 2 and 2.4 inches (5 to 6 cm) for adults and adolescents
  - The chest should be compressed to a depth of 1/3 the diameter of the chest in infants and children up to puberty. This is about 1.5 inches (4 cm) in infants and 2 inches (5 cm) in children.
  - Allow the chest to completely recoil between compressions. This allows the heart to fill with blood to prepare for the next compression
  - Do not interrupt compressions except to use an AED or change providers
  - Interruptions should be limited to no more than 10 seconds at a time
  - Chest compressions should make up at least 60% of the rescue time
  - Deliver each breath over 1 second, regardless of victim age
  - Prevent over-inflation of the lungs by avoiding rapid ventilations
  - Perform CPR as a team to perform activities more quickly and efficiently
  - When an advanced airway is in place, ventilate at 1 breath every 6 seconds (10 breaths per minute).
- Spend no longer than 10 seconds attempting to locate a pulse:
  - Carotid artery (neck) is preferred for adults and adolescents
  - Femoral artery (inner thigh) is preferred for smaller children
  - Brachial artery (upper arm) is preferred for infants.

A manual defibrillator is preferred for infants, but if one is not available then an AED should be used. If a pediatric dose attenuator is available on the AED, use it. If the dose attenuator is not available, use an adult AED for a victim of any age.

Guideline	Old Guideline	2015 Guideline
EMS Activation	<del>Provider should check for a response before activating EMS</del>	Call for help immediately, preferably while assessing the victim (pulse and breathing)
EMS Activation		<u>Alone with no cell phone:</u> Leave victim to activate EMS and get AED before CPR UNLESS an unwitnessed collapse of an infant or child. Give 2 minutes of CPR then activate EMS/get AED <u>Alone with cell phone:</u> Activate EMS first <u>Not alone:</u> Split duties; 1-2 people start CPR while 1-2 people activate EMS and get AED
Sequence	CAB (compressions, airway, breathing)	Confirmed in the 2015 guidelines: Do not delay the first 30 chest compressions
Compression Depth	<del>Used "at least" without a maximum depth</del>	<u>Infants to children up to puberty:</u> Compress the chest up to 1/3 of the chest diameter <u>Puberty, adolescence, adult:</u> Compression depth between 2 and 2.4 inches (5 to 6 cm)
Compression Frequency	<del>At least 100 compressions per minute</del>	No less than 100, no more than 120
Chest Recoil	Allow the chest to fully recoil between compressions	Confirmed in the 2015 guidelines: Do not lean on the chest between compressions; allow the heart to fully fill with blood
Compression-Only CPR	Compression-only CPR emerged since the 2010 update. It has been formalized in the 2015 guidelines for untrained rescuers	Untrained rescuers should provide chest compressions until EMS arrives or a trained provider arrives (or the victim starts to move). Rescue breathing should only be done if it can be done competently
Naloxone	New recommendation for 2015	Trained lay providers and EMS should provide intramuscular or intranasal naloxone in the case of known or suspected opioid overdose (abnormal or no breathing, no response, has a pulse)
Shock or CPR First?	<del>Highly complex recommendations that changed based on various circumstances</del>	Use AED in a witnessed cardiac arrest if immediately available; administer chest compressions until AED arrives and is on the victim, ready for use
Chain of Survival	<del>Same Chain of Survival for in-hospital and out-of-hospital cardiac arrest</del>	In-hospital and out-of-hospital Adult Cardiac Arrest Chain of Survival are different; primary providers and lay rescuers provide immediate care and then transfer care to the code team or EMS crew, respectively

**Table 1: 2015 BLS Changes**

## BLS Guideline Changes Since 2015

ILCOR has published guideline updates each year since 2017. The changes are shown in Table 2 below.

<b>2017 BLS Guidelines</b>
Dispatchers should provide chest compression-only CPR instructions to callers for adults with suspected out-of-hospital cardiac arrest (OHCA)
Bystanders should perform chest compressions for all patients in cardiac arrest
Bystanders who are trained, able, and willing to give rescue breaths and chest compressions should do so for all adult patients in cardiac arrest
Bystanders should provide CPR with ventilation for infants and children less than 18 years of age with OHCA
Bystanders who cannot provide rescue breaths as part of CPR for infants and children less than 18 years of age with OHCA, should at least provide chest compressions
Before placement of an advanced airway (supraglottic airway or tracheal tube), EMS providers should perform CPR with cycles of 30 compressions and 2 breaths
EMS providers should perform CPR with 30 compressions to 2 ventilations or continuous chest compressions with positive-pressure ventilation (PPV) without pausing chest compressions until a tracheal tube or supraglottic device is placed
For EMS systems, a reasonable alternative to conventional CPR for witnessed shockable OHCA is minimally interrupted cardiac resuscitation
Whenever an advanced airway (tracheal tube or supraglottic device) is inserted during CPR, it may be reasonable for providers to perform continuous compressions with PPV delivered without pausing chest compressions
After placement of an advanced airway, it may be reasonable for the provider to deliver 1 breath every 6 s (10 breaths per min) while continuous chest compressions are being performed
<b>2018 BLS Guidelines</b>
Adult Cardiac Arrest Algorithm was changed (see text for details)
<b>2019 BLS Guidelines</b>
EMS Dispatchers should offer dispatcher-assisted CPR instructions for presumed pediatric cardiac arrest
EMS Dispatchers should offer dispatcher-assisted CPR instructions for pediatric cardiac arrest when no bystander CPR is in progress
<b>2020 BLS Guidelines</b>
Awaiting peer-reviewed publication of 2020 ILCOR Updates

**Table 2: BLS Guideline Changes Since 2015**

## Initiating the Chain of Survival

Research shows that BLS can increase the rate of survival for certain victims of cardiac arrest. Typically, pediatric victims begin the collapse process after suffering dehydration or respiratory problems. This population rarely experiences primary cardiac arrest. If respiratory events and dehydration can be prevented, cardiac arrest can often be avoided. Therefore, it is critical to prevent the need for resuscitation in infants and children.



**Figure 1: Pediatric Chain of Survival**

For adult victims it is critical that the Adult Cardiac Arrest Chain of Survival is initiated quickly and performed effectively. The Adult Cardiac Arrest Chain of Survival has been updated to include a different response whether the cardiac arrest takes place inside or outside of the hospital.



**Figure 2: In-Hospital Adult Cardiac Arrest Chain of Survival**



**Figure 3: Outside-of-Hospital Adult Cardiac Arrest Chain of Survival**