American Red Cross

Guidelines Highlights 2020

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Science and Technical Content

The scientific content and evidence within the American Red Cross *Guidelines Highlights 2020* is consistent with the most current science and treatment recommendations from:

- The International Liaison Committee on Resuscitation (ILCOR)
- The International Federation of Red Cross and Red Crescent Societies
- The Policy Statements, Evidence Reviews and Guidelines of:
    - American Academy of Pediatrics (AAP)
    - American College of Emergency Physicians (ACEP)
    - American College of Obstetrics and Gynecology (ACOG)
    - American College of Surgeons (ACS)
    - Committee on Tactical Combat Casualty Care (CoTCCC)
    - Obstetric Life Support™ (OBLS™)
    - Society of Critical Care Medicine (SCCM) and the American College of Critical Care Medicine (ACCM)
    - Surviving Sepsis Campaign (SSC)

Dedication

The American Red Cross *Guidelines Highlights 2020* are dedicated to the nurses, physicians, prehospital professionals, therapists, technicians, law enforcement, fire/rescue, advanced practice professionals, lifeguards, first responders, lay responders and all other professionals and individuals who are prepared and willing to take action when an emergency strikes or when a person is in need of care. These updates and guidelines are also dedicated to the employees and volunteers of the American Red Cross who contribute their time and talent to supporting and teaching lifesaving skills worldwide.

Acknowledgments

Many individuals shared in the development of the American Red Cross Guidelines Highlights 2020 in various scientific, technical, editorial, creative and supportive ways. Their commitment to excellence made these updates and guidelines possible.

Content Direction

The development of these updates and guidelines would not have been possible without the leadership, valuable insights and dedication of the subject matter experts, who generously shared their time to ensure the highest quality programs.

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American Red Cross Scientific Advisory Council

Since 1909, the American Red Cross has provided best-in-class resuscitation, first aid and safety education and certification, enabling students to obtain the competency required for effective recognition and care and leading to better outcomes for all those treated.

Behind every course stands a team of experts ensuring that what is taught is based on the latest clinical and educational science. This team, known as the American Red Cross Scientific Advisory Council, is a panel of 60+ nationally and internationally recognized experts from a variety of medical, nursing, EMS, scientific, educational and academic disciplines.

With members from a broad range of professional specialties, the Council has an important advantage: a broad, multidisciplinary expertise in evaluating existing and new assessment methodologies and technologies, therapies, and procedures, and the educational methods to teach them. Additionally, with on-the-ground experience, its members bring the know-how for real-world experience. The Council provides authoritative guidance on resuscitation, first aid, CPR, nursing, prehospital medicine, emergency and critical care, rescue practices, emergency preparedness, aquatics, disaster health and education.

We encourage you to visit our Scientific Advisory Resource Center at redcross.org/science.

We would like to extend our gratitude to the members of the American Red Cross Scientific Advisory Council for their guidance and ongoing commitment.

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Special thanks to the program development team for their expertise to bring this program through to completion:
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Introduction

American Red Cross *Guidelines Highlights 2020* is a summary of the key guidelines found in American Red Cross *Focused Updates and Guidelines 2020*. Whereas American Red Cross *Focused Updates and Guidelines 2020* provides a more comprehensive summary of the scientific evidence from recent reviews, American Red Cross *Guidelines Highlights 2020* reviews selected new guidelines and changes that are most impactful on delivery of education and resuscitation care. Supporting evidence reviews are unreferenced in this summary publication but can found in the full *Focused Updates and Guidelines 2020*. Readers should refer to American Red Cross *Focused Updates and Guidelines 2020* for evidence summaries and insights into each of these topics. Topics that are not discussed in American Red Cross *Guidelines Highlights 2020* but are part of American Red Cross *Focused Updates and Guidelines 2020* are listed in Appendix A. Readers are encouraged to review the full American Red Cross *Focused Updates and Guidelines 2020* to ensure education delivered and care provided is based on the latest science and American Red Cross guidelines.

In *Guidelines Highlights 2020*, each guideline is noted as new, revised, updated or unchanged. Guidelines that existed previously but now recommend a change in process or actions are classified as revised, whereas guidelines with minor changes in wording (for example, following a change in the strength of a recommendation) are classified as updated. Guideline actions that are based on stronger, higher-certainty evidence are typically worded as “should be,” whereas those based on lower-certainty evidence are typically worded as “may be considered.”

American Red Cross *Guidelines Highlights 2020* presents a summary of key guidelines in the topic areas of First Aid, Basic Life Support, Advanced Life Support, Pediatric Advanced Life Support, Neonatal Life Support, Aquatics and Education. In First Aid, new guidance for the use of tourniquets to control life-threatening extremity bleeding in children is provided. In Basic Life Support, key guidelines include the use of the two-thumb/encircling hands technique by all persons for performing infant chest compressions in CPR and providing one breath/ventilation every 2 to 3 seconds for a child or infant with a pulse but insufficient respiratory effort and during CPR with an advanced airway in place. In Advanced Life Support, key guidelines are presented for the management of cardiac arrest in pregnancy. In Pediatric Advanced Life Support, key guidelines include updated recommendations for management of septic shock and updated emphasis on use of bag-mask ventilation (BMV) over advanced airways for the initial resuscitation of children and infants in the out-of-hospital setting. In Neonatal Life Support, key guidelines include clear guidance for oxygenation targets for resuscitation. In Aquatics, key guidelines cover the importance of unique approaches to drowning process resuscitation. In Education, key guidelines stress the importance of leadership training and the correct role of cognitive aids.

Accompanying the *Guidelines Highlights 2020* and reflecting updated science and guidelines are new and updated American Red Cross Emergency Code Cards for Basic Life Support, Advanced Life Support and Pediatric Advanced Life Support (see Red Cross Learning Center).

First Aid

Suspected Stroke: Supplementary Oxygen Use

NEW • For individuals with suspected stroke, supplemental oxygen should not be routinely used.

No improvement in survival or favorable neurologic outcomes was found in a recent review evaluating the use of supplemental oxygen for acute suspected stroke.

Opioid-Associated Emergency: Naloxone Dosing Frequency

UPDATED • Following an initial dose of naloxone, subsequent doses of either intramuscular (IM) or intranasal (IN) naloxone should be repeated every 2 to 3 minutes until desired response is achieved.

NEW • Intranasal doses should be administered with a new nasal device with each repeated dose.

Dosing frequency has been updated to match current manufacturer recommendations and research data. Intranasal (IN) naloxone is available as a 2-mg and 4-mg formulation. Pharmacokinetic data in healthy volunteers showed that IN naloxone bioavailability is approximately 50% relative to IM administration; therefore, dosing of IN naloxone is recommended at 4 mg/dose in severe overdose situations. A 2-mg IN dose of naloxone may not be sufficient to provide reversal of opioid overdose in patients exposed to high concentrations of opioids. Healthcare professionals and trained lay responders using 2-mg formulations would likely see improved response from more frequent dosing and thus, faster and higher systemic concentrations.

Presyncope: First Aid

- UPDATED • A person with signs or symptoms of presyncope should be assisted to a supine position.
- NEW • Once the person is in a safe position, physical counterpressure maneuvers may be considered to stop symptoms of presyncope.
- NEW • If there are no extenuating circumstances, lower body physical counterpressure maneuvers should be used over upper body and abdominal physical counterpressure maneuvers.
- NEW • Physical counterpressure maneuvers should not be used when symptoms of a heart attack or stroke accompany presyncope.
- UPDATED • If no improvement occurs within 1 to 2 minutes, or if symptoms worsen or reoccur, lay responders should call 9-1-1 or the designated emergency number and prehospital professionals should transport the person to the hospital.

Presyncope, or near syncope, is the prodrome of syncope. When it progresses to syncope, there is loss of responsiveness/consciousness associated with loss of postural tone and collapse. Studies show that assisting a person to a supine position and performing physical counterpressure maneuvers reduces progression of presyncope due to orthostasis or vasovagal causes to syncope and the associated risk for injury from falling. Leg crossing and tensing may be a more effective physical counterpressure maneuver than arm squeezing/hand grip for preventing syncope.

Direct Pressure, Pressure Dressings, Pressure Points

- UNCHANGED • For individuals with life-threatening external bleeding, direct manual pressure must be applied to achieve initial bleeding cessation for wounds not amenable to a tourniquet, or when a tourniquet is not immediately available.
- UNCHANGED • When applying direct pressure, the dressing should be in direct contact with the bleeding source.
- UNCHANGED • When applying direct pressure, the dressing in contact with the bleeding source should not be removed.

UPDATED • Only one dressing should be used to apply pressure. If the dressing becomes soaked, while not preferred, adding one more dressing may be considered. If that dressing becomes saturated, the additional dressing may be removed and replaced with a new dressing.

UPDATED • Mechanical pressure, such as pressure bandages or devices, may be considered in situations when direct manual pressure is not feasible.

UNCHANGED • Indirect manual pressure (e.g., pressure points) should not be used for the treatment of life-threatening external bleeding.

REVISED • If direct pressure is applied and the bleeding is controlled, applying a pressure dressing may be considered to maintain bleeding cessation. Since pressure dressings may deliver less pressure to a wound comparatively than direct pressure, wounds with pressure dressings in place should be monitored for bleeding through the dressing. If bleeding recurs through a pressure dressing, additional layers of gauze/compression wrap should not be applied. Instead, apply direct manual pressure to the wound/original dressing.

Use of direct pressure is the gold standard for control of non-life-threatening bleeding and is the initial intervention for life-threatening bleeding while preparing for use of a tourniquet or hemostatic dressing. For non-life-threatening bleeding, limited evidence and best practices guidance support application of a dressing to the bleeding source with direct manual pressure and avoiding disruption of the clotting process by not removing this initial dressing. If bleeding is controlled, a pressure dressing may be applied, but since less pressure is applied with a pressure dressing than with manual pressure, the dressing should be monitored for recurrent bleeding and manual pressure resumed if this occurs. For life-threatening bleeding, consider use of a tourniquet for wounds on extremities that are amenable to their use, or the application of a hemostatic dressing with manual pressure.

Tourniquets

UPDATED • A manufactured tourniquet should be used as first-line therapy for life-threatening extremity bleeding and should be placed as soon as possible after the injury.

REVISED • If a manufactured tourniquet is not immediately available or if a properly applied manufactured tourniquet fails to stop bleeding, direct manual pressure with the use of a hemostatic dressing, if available, should be used to treat life-threatening extremity bleeding.

UNCHANGED • If a manufactured tourniquet is not available and direct manual pressure with or without the use of a hemostatic dressing fails to stop life-threatening bleeding, lay responders and healthcare professionals trained in the use of an improvised tourniquet may consider using one.

While evidence is limited, tourniquets, when applied appropriately, stop bleeding in the majority of cases and may be associated with a reduction in mortality due to bleeding. This has led to an upgraded strength of recommendation for use of a tourniquet for life-threatening bleeding from wounds on extremities that are amenable to tourniquet application. There is no clear evidence to support any one tourniquet design, such as ratcheting or elastic designs, compared with the common windlass rod design. Simulation studies show high failure rates for cessation of bleeding using an improvised tourniquet compared with a manufactured tourniquet.

Pediatric Tourniquets

NEW • A manufactured windlass or ratcheting tourniquet should be used to treat life-threatening extremity hemorrhage in children approximately 2 years of age and older. Preference for smaller children should be to use a device specifically designed to allow use on children. In older and large children, non-pediatric-specific windlass and ratcheting tourniquets may be considered.

NEW • The ability to snugly apply a tourniquet on a smaller child's extremity prior to engaging the windlass rod or ratcheting mechanism may be considered an indication that, once engaged, the tourniquet will be able to apply sufficient circumferential pressure to successfully occlude distal blood flow and to stop bleeding.

NEW • An elastic tourniquet may be considered in the absence of a windlass rod or ratcheting tourniquet that can achieve tightening in a child.

NEW • While the correct placement of a tourniquet is 2 to 3 inches above the wound, if such placement in a child does not allow sufficient tightening of the tourniquet, the tourniquet should be moved higher on the limb but not over a joint.

NEW • Direct pressure with a hemostatic dressing, if available, should be used for children with life-threatening extremity bleeding when an applied tourniquet does not tighten around the child's extremity.

NEW • Direct pressure with a hemostatic dressing, if available, should be used to treat life-threatening extremity bleeding in infants and children less than 2 years of age.

The ability to sufficiently tighten a manufactured tourniquet on the limb of a small child or infant has come into question. Limited evidence from a recent study with children between 2 and 7 years of age has shown successful application of a C-A-T® GEN7 windlass-type tourniquet, with occlusion of distal arterial pulses in limbs with a minimum circumference of 13 cm. Additional studies in volunteers and manikins report conflicting findings but in general support the recommendation for the use of tourniquets for life-threatening extremity hemorrhage in the pediatric population. Modifications in application such as moving the tourniquet higher on a limb may allow for adequate tightening in smaller limbs. If an applied tourniquet cannot be tightened on the extremity of a smaller child, use of direct pressure with a hemostatic dressing is recommended. For infants and children less than 2 years of age, direct pressure with a hemostatic dressing is recommended for the management of life-threatening extremity bleeding.

Basic Life Support

CPR Prior to Call for Help

NEW • A mobile phone with speaker, if available, should be used to call 9-1-1, allowing activation of emergency medical services to occur parallel to the beginning of CPR and to facilitate dispatcher guidance of CPR.

Previously a lone rescuer had to decide whether to perform CPR first or leave the side of a person in cardiac arrest to locate a phone and call 9-1-1 first. Mobile phones have become ubiquitous in our society, making it possible to call 9-1-1 in parallel with performing assessment and beginning CPR. The speaker function allows hands-free operation and the ability to receive instructions from a dispatch center while simultaneously providing CPR. The new guideline shifts the focus from finding a phone to the early performance of CPR and use of a mobile phone for both activation of emergency medical services and support of CPR through dispatcher instructions.

Starting CPR (A-B-C versus C-A-B)

UNCHANGED • Once cardiac arrest is recognized, resuscitation should begin with compressions.

UNCHANGED • Healthcare professionals may consider ventilations first in pediatric patients with primary respiratory etiologies.

UNCHANGED • For the drowning process resuscitation, once cardiac arrest is recognized, resuscitation should begin with ventilations (rescue breaths).

A uniform approach to CPR is believed to be important for retention of skills and thus performance of CPR in sudden cardiac arrest. A uniform approach is to open the airway and check for breathing, and for trained professionals, to check the pulse. CPR should then begin with delivery of chest compressions. However, not every cardiac arrest has a primary cardiac etiology, especially in children, who often have very low levels of oxygen in the blood at the time of arrest. For children and infants with a primary respiratory etiology of cardiac arrest, healthcare professionals may choose to begin CPR with ventilations. Drowning has a unique pathophysiologic process. The priority for resuscitation from drowning is to reverse the pathophysiology and get oxygen to the vital organs. For cardiac arrest from the drowning process, after determining cardiac arrest, the sequence is to provide two ventilations and then compressions.

Hand Position During Compressions

UNCHANGED • Chest compressions should be performed on the lower half of the sternum for adults and children.

UNCHANGED • Chest compressions should be performed just below the inter-mammary line (middle of the chest) on infants.

UNCHANGED • For adults, the two-hand technique should be used for chest compressions.

UNCHANGED • For children, either a two-hand or one-hand technique should be used for chest compressions.

NEW • For infants, the two-thumb/encircling hands technique should be used for chest compressions. For infants, the two-finger technique (two or three fingers placed in the middle of the chest) may be considered. If the required depth cannot be achieved with either the two-thumb/encircling hands technique or the two-finger technique in infants, a one-hand technique may be considered.

Past recommendations for use of the two-finger technique by single rescuers were based on concerns that the two-thumb/encircling hands technique may interfere with providing breaths. Studies using infant manikins show that for single rescuers, the two-thumb/encircling hands technique improves chest compression quality without compromising delivery of breaths or ventilation parameters. While the two-thumb/encircling hands technique is now the recommended technique to deliver chest compressions, the emphasis is on the delivery of high-quality CPR, including compressions of an adequate depth. If the required depth cannot be achieved with the two-thumb/encircling hands technique or the two-finger technique, a one-hand technique is an appropriate alternative consideration.

Ventilations for Patients with Respiratory Insufficiency or an Advanced Airway

UNCHANGED • For adults, 1 ventilation should be provided every 6 seconds for a person with a pulse but insufficient respiratory effort, and during CPR with an advanced airway in place.

- UPDATED • For children and infants, 1 ventilation should be provided every 2 to 3 seconds for a child or infant with a pulse but insufficient respiratory effort, and during CPR with an advanced airway in place.
- REVISED • Bag-mask ventilation (BMV) should be performed as a two-person technique.
- UNCHANGED • When there is only one healthcare professional to provide ventilation, a pocket mask should be preferred over bag-mask ventilation (BMV).

There is no recent evidence to suggest a need to change the recommended rate of ventilations for adults with respiratory insufficiency or with an advanced airway in place. In past updates, the pediatric rate was changed to conform to the adult rate because there was a belief that aligning the rates would help with retention by learners. Registry data and a recent study of CPR in intubated children found that higher ventilation rates were associated with higher odds of return of spontaneous circulation (ROSC) and survival to discharge. Without evidence of improved skill retention with use of a single ventilation rate for adults and children, and with some evidence supporting physiologic benefits with use of an increased ventilation rate in children, the ventilation rate for children and infants was returned to that taught in the past, one breath every 2 to 3 seconds.

The recommendation to perform bag-mask ventilation (BMV) as a two-person technique is essential for providing an adequate mask seal and thus adequate ventilation. However, it is recognized that factors such as limited personnel or the need to perform other time-critical interventions may preclude two-person BMV. Scientific data has shown that when a one-person technique must be used, a pocket mask provides better ventilation volumes than one-person BMV. But it is also recognized that use of one-person BMV over a pocket mask may be guided by factors in addition to ventilation volume, such as infection control, oxygenation and positive end-expiratory pressure (PEEP). Lastly, one-person BMV is acceptable and recommended with an advanced airway in place. This may lead to a decision to use one-person BMV over a pocket mask in a setting where there are not personnel available to provide two-person BMV.

Foreign Body Airway Obstruction Care

- UNCHANGED • Lay responders or healthcare professionals attempting to resolve a complete foreign body airway obstruction (FBAO) in a conscious adult or child should first provide up to 5 back blows until the foreign body is relieved or, if not relieved, transition to up to 5 abdominal and/or chest thrusts. If the foreign body is not relieved, they should continue with cycles of 5 back blows followed by 5 abdominal and/or chest thrusts until the obstruction is relieved.
- UNCHANGED • Lay responders or healthcare professionals attempting to resolve a complete foreign body airway obstruction (FBAO) in a conscious infant should first provide up to 5 back blows until the foreign body is relieved or, if not relieved, transition to up to 5 chest thrusts. If the foreign body is not relieved, they should continue with cycles of 5 back blows followed by 5 chest thrusts until the obstruction is relieved.

- UNCHANGED • Lay responders or healthcare professionals attempting to resolve a complete foreign body airway obstruction (FBAO) in an unconscious adult, child or infant should provide cycles of CPR (compressions and ventilations) with an additional step. After each set of compressions and ventilations, open the mouth, look for an object, and if seen, remove it with a finger sweep. Never do a finger sweep if an object is seen.
- UNCHANGED • Healthcare professionals with appropriate training may consider the use of Magill forceps to remove a foreign body obstructing the airway.

Recent reviews confirm evidence for successful use of back blows, abdominal thrusts or chest thrusts/compressions for management of foreign body airway obstruction (FBAO), although all methods are reported to have the potential for causing harm. In addition, evidence has shown that often multiple methods may be needed. For an unconscious person with complete FBAO, use of CPR is a simple method to incorporate assessment, chest thrusts, finger sweeps when indicated and reassessment. For healthcare and EMS professionals trained in the use of Magill forceps, case series and an observational study describe relief of FBAO and greater odds of survival when Magill forceps are used as compared with when they are not.

Opioid-Associated Emergency Resuscitation

- UNCHANGED • CPR and AED use remain the first interventions for cardiac arrest in opioid overdose and should not be delayed or interrupted.
- UNCHANGED • For suspected cardiac arrest due to opioids, naloxone should be administered as soon as possible without disrupting or delaying CPR and AED use.

The most important intervention for cardiac arrest following suspected opioid overdose remains the immediate provision of high-quality CPR and AED use. While there is no direct evidence to support the use of naloxone in cardiac arrest due to suspected opioid overdose, it is expert consensus that if opioids are suspected, naloxone should be administered as soon as possible without disrupting or delaying resuscitation.

Advanced Life Support

Analysis of Rhythm During Chest Compressions

UPDATED • Compressions should be paused for rhythm analysis, even when using devices with artifact-filtering algorithms.

The use of artifact-filtering algorithms for analysis of electrocardiographic rhythm during CPR has been evaluated in animal and simulation studies. A lack of human studies evaluating survival, return of spontaneous circulation (ROSC) or CPR metrics led to a change from the previous suggestion that it would be reasonable for EMS systems using artifact-filtering algorithms to continue with their use to the new guideline of pausing compressions even with artifact-filtering software.

Vasopressors During Cardiac Arrest

UNCHANGED • Epinephrine 1 mg intravenous (IV) or intraosseous (IO) may be administered after initial defibrillation attempts are unsuccessful for cardiac arrest with a shockable rhythm and may be repeated every 3 to 5 minutes.

UPDATED • For cardiac arrest with non-shockable rhythms, epinephrine should be administered at 1 mg intravenous (IV) or intraosseous (IO) as early as possible and repeated every 3 to 5 minutes.

UNCHANGED • Vasopressin should not be used in place of epinephrine nor in addition to epinephrine for cardiac arrest.

Recent large trials show higher rates of return of spontaneous circulation (ROSC) following out-of-hospital cardiac arrest (OHCA) with use of epinephrine and a trend toward an increase in survival with both favorable and unfavorable neurologic outcome. A logical deduction is, for cardiac arrest, to administer epinephrine as early as possible for non-shockable rhythms and following initial defibrillation attempts to potentially increase the odds of earlier ROSC and survival with favorable neurologic outcome. No new studies suggest an alternative dose for epinephrine in cardiac arrest. The recommendation against vasopressin is likewise unchanged and reflects efforts to minimize the complexity of treatment algorithms that would result from adding a drug with no benefit or harm when compared with epinephrine alone or in combination.

Intravenous Versus Intraosseous Administration of Drugs During Cardiac Arrest

UPDATED • Intraosseous access may be considered as an alternative to intravenous access in emergency situations when intravenous access is unsuccessful or not feasible.

Observational studies of out-of-hospital cardiac arrest (OHCA) suggest reduced odds of return of spontaneous circulation (ROSC) and survival to hospital discharge in cases where intraosseous access was used to deliver resuscitative medications, compared with the use of intravenous access and medication delivery. The wording of this guideline is slightly changed from the previous recommendation, which suggested it is reasonable to establish intraosseous access if intravenous access is not readily available. The updated guideline reflects the study findings and the need to first attempt intravenous access, if possible, for delivery of medications in cardiac arrest.

Prognostication with Point-of-Care Echocardiography During CPR

NEW • Point-of-care (POC) ultrasonography may be considered for assessment of reversible etiologies of cardiac arrest.

NEW • Point-of-care (POC) ultrasonography should not have a role in prognostication for cardiac arrest.

Studies of point-of-care (POC) echocardiography following nontraumatic cardiac arrest show a wide range of sensitivities and specificities for cardiac motion in association with outcomes such as favorable neurological outcome at hospital discharge, survival to hospital admission or return of spontaneous circulation (ROSC). In addition, a standardized definition of cardiac motion during POC echocardiography is lacking.

Oxygen and Carbon Dioxide Target Levels After Return of Spontaneous Circulation

UPDATED • High-flow supplemental oxygen should be provided until the oxygen saturation can be measured, and then should be provided at the minimal level of supplemental oxygen needed to maintain an oxygen saturation of at least 94% but not exceeding 99%.

UPDATED • Ventilations should be provided, starting at a rate of 10 breaths per minute and adjusting as needed to keep the end-tidal CO_2 between 35 and 40 mmHg and the $PaCO_2$ between 40 and 45 mmHg.

UNCHANGED • The post-arrest patient should be monitored using capnography and pulse oximetry and, as available, PaO_2 and $PaCO_2$ to ensure ventilation and oxygenation levels are in the physiologic range.

Study findings suggest that for adults with return of spontaneous circulation (ROSC) after cardiac arrest in any setting, a strategy to avoid hypoxemia and hyperoxia is preferred. The evidence for or against mild hypercapnia is inconsistent and therefore guidance suggests targeting physiologic levels of end-tidal CO_2 or $PaCO_2$.

Post-Cardiac Arrest Seizure Prophylaxis and Treatment

NEW • Post-cardiac arrest seizures should be treated.

NEW • Healthcare professionals may consider continuous electroencephalogram (EEG) monitoring post-cardiac arrest.

NEW • Post-arrest prophylactic anticonvulsants should not be used.

Up to 30% of comatose patients in the post-cardiac arrest period will have seizures or epileptiform activity on electroencephalograms (EEG). Ongoing seizures may not be obvious with use of sedatives in the post-arrest period and often non-convulsive status cannot be detected without an EEG. An updated review found that seizure prophylaxis in the immediate post-cardiac arrest period is, in most studies, not of benefit for preventing seizures or for improving other clinical outcomes and carries the risk of side effects. However, ongoing seizures have the potential to worsen brain injury. Both active assessment for seizures using EEG and clinical signs and treatment of seizures if they occur should be employed in these patients.

Prognostication

NEW • Specific guidelines are available in the American Red Cross *Focused Updates and Guidelines 2020.*

Neuroprognostication in the post-cardiac arrest period should not be performed before 72 hours after return of spontaneous circulation (ROSC) and following return to normothermia. A multimodal approach using biomarkers, electroencephalogram (EEG) findings, imaging results and clinical examination is suggested to predict neurologic outcome in adults.

Management of Cardiac Arrest in Pregnancy

NEW • At least three healthcare professionals should perform CPR on a pregnant patient with associated modifications including chest compressions, airway/breathing, and left uterine displacement (LUD).

NEW • Continuous left uterine displacement (LUD) should be performed when the uterine fundus is at or above the umbilicus to reduce compression of the great vessels and improve blood flow back to the heart.

NEW • Defibrillation pads should be placed anterolateral or anteroposterior. Pads should not incorporate any breast tissue.

NEW • Intravenous access should be placed above the diaphragm on a pregnant patient. If intravenous access cannot be established, intraosseous access should be performed above the diaphragm in the proximal humerus.

NEW • A pregnant patient with out-of-hospital cardiac arrest (OHCA) should be transported to an appropriate facility while high-quality CPR, including airway management and continuous left uterine displacement (LUD), is performed.

NEW • Electrocardiogram (ECG) rhythm interpretation should guide medication administration during a maternal code and does not differ from non-pregnant adults.

NEW • Fetal monitors should be immediately removed after pulselessness in maternal cardiac arrest, to maintain focus on maternal resuscitation.

NEW • Healthcare professionals should use the term “resuscitative cesarean (or vaginal) delivery” instead of “perimortem cesarean delivery” to more correctly describe the purpose/indication and increase the timeliness and sense of urgency for performing this procedure.

NEW • Point-of-care ultrasound (POC-US) should be used in the management of maternal cardiac arrest for identification of an intrauterine pregnancy and quick determination of gestational age to guide decision-making on resuscitative cesarean delivery (RCD). POC-US should not impede high-quality chest compressions.

NEW • Responders should stay focused on maternal care, thereby improving the patient's chances of survival.

NEW • Resuscitative cesarean delivery (RCD) should be performed within 5 minutes from the time of arrest in a pregnant patient in cardiac arrest with a uterus at or above the umbilicus, or greater or equal to 20 weeks' gestation.

NEW • Resuscitative cesarean delivery (RCD) may be considered earlier than 5 minutes and as soon as possible under the following circumstances:

  - No return of spontaneous circulation (ROSC) after 2 cycles of CPR
  - Intermittent ROSC after 2 cycles of CPR
  - Non-shockable rhythm
  - For out-of-hospital maternal cardiac arrest, immediately upon arrival to an emergency department without ROSC

NEW • Extracorporeal CPR (ECPR) may be considered to manage maternal cardiac arrest when there is no return of spontaneous circulation (ROSC) after resuscitative cesarean delivery (RCD), or for refractory CPR where the uterus has not yet reached the umbilicus and the patient is in an extracorporeal membrane oxygenation center with the capacity to care for critically ill pregnant patients.

NEW • Extracorporeal CPR (ECPR) may be considered for organ procurement in pregnant patients, post-arrest with circulatory determination of death.

NEW • Induction of cooling should not be routinely instituted in the out-of-hospital setting for cardiac arrest in a pregnant patient after return of spontaneous circulation (ROSC).

NEW • Targeted temperature management (TTM) may be considered for post-arrest care of pregnant patients.

The unique considerations for care of a pregnant woman, including evidence-based guidelines for resuscitation specific to maternal cardiac arrest and post-cardiac arrest care, were developed by and are credited to the Obstetric Life Support™ (OBLS™) curriculum.* Key aspects of these guidelines include the recommendations for responders to focus on maternal care, thereby improving chances of survival. The change of name from "perimortem cesarean delivery" to "resuscitative cesarean (or vaginal) delivery" more correctly describes the purpose of the procedure and increases the timeliness and sense of urgency for performing the procedure while focusing on maternal resuscitation and improved outcomes. Because resuscitative cesarean delivery (RCD) needs to be accomplished within 5 minutes, emphasis for EMS prehospital professionals and systems is on early transport as opposed to care on the scene, with early notification of hospitals to allow rapid mobilization of equipment and obstetrical and neonatal personnel. In addition, key aspects of resuscitation include (but are not limited to) the immediate removal of fetal monitors after pulselessness is established, modification of CPR with the use of three or more healthcare professionals to allow left uterine displacement (LUD) when the fundus is at or above the umbilicus, placement of defibrillation pads anterolateral or anteroposterior, and the use of supradiaphragmatic intravenous access, or if intravenous access is not feasible, supradiaphragmatic intraosseous access.

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Pediatric Advanced Life Support

Intraosseous Access

UNCHANGED • Intraosseous access may be considered as an acceptable alternative to intravenous access in children and infants.

No evidence beyond case reports of complications in neonates from intraosseous access was found in a recent systematic review evaluating intraosseous cannula placement and drug administration compared with intravenous cannula placement and drug administration during cardiac arrest for children and infants. Intraosseous access remains an acceptable alternative to intravenous access in children and infants.

Pediatric Advanced Airway Techniques

UPDATED • Bag-mask ventilation (BMV) should be used over advanced airway placement for the initial resuscitation of children and infants with out-of-hospital cardiac arrest (OHCA).

A recent systematic review found that for resuscitation from cardiac arrest in pediatric patients, use of tracheal intubation is not superior to use of bag-mask ventilation (BMV) for critical outcomes. In addition, some data suggest an association with harm for outcomes of survival to hospital discharge and survival with good neurological outcome with the use of tracheal intubation. These recent studies confirmed recommendations based on earlier studies.

Oxygen and Carbon Dioxide Target Levels

- UNCHANGED • Post-cardiac arrest oxygen and carbon dioxide levels should target normal physiological levels. Hyperoxia, hypoxia, hypercarbia, and hypocarbia should all be avoided.
- UNCHANGED • Post-cardiac arrest oxygenation may be guided by oxygen saturation targeting levels of 94% to 99%.

There is a paucity of data on potential target levels for oxygen (PaO_2) and carbon dioxide ($PaCO_2$) in children and infants following cardiac arrest with return of spontaneous circulation (ROSC), but data suggest harms from hyperoxia and hypercarbia. Targeting normal physiological levels remains the recommended approach to management of respiratory parameters in the post-arrest period.

EEG Monitoring and Seizure Management

- NEW • Post-cardiac arrest seizures should be treated.
- NEW • Continuous electroencephalogram (EEG) monitoring post-cardiac arrest may be considered.
- NEW • Post-arrest prophylactic anticonvulsants should not be used.

There are no recent reviews of post-cardiac arrest seizure management in children or infants; however, a review of post-arrest seizures in adults did not show that prophylactic anticonvulsants prevent seizures or improve clinical outcomes following cardiac arrest with return of spontaneous circulation (ROSC). Additionally, cardiac arrest data in children does not support routine use of prophylactic anticonvulsants. Despite this, seizures are known to increase cerebral metabolic demand and may worsen post-arrest brain injury, and thus should be promptly detected and treated.

General Approaches to Fluid Resuscitation

UNCHANGED • For children and infants in shock, a bolus of 20 ml/kg intravenous fluid should be administered for resuscitation. It is reasonable to consider repeating these fluid boluses as clinically indicated.

UNCHANGED • A lower volume of fluid, 5 to 10 ml/kg, may be considered for children and infants with heart failure.

UNCHANGED • A lower volume of 10 ml/kg may be considered for neonates.

UNCHANGED • Fluid resuscitation should target restoring normovolemia.

UNCHANGED • After each bolus there should be reassessment for signs of hypervolemia.

UNCHANGED • Fluid resuscitation should begin with a crystalloid fluid and use either a balanced or unbalanced solution.

No new studies support a change in guidance for the general approach to fluid management in pediatric shock.

Pediatric Hemorrhagic Shock Care

UNCHANGED • Severe, life-threatening bleeding must be controlled immediately using any available resources, such as direct pressure, hemostatic dressing, wound packing, tourniquet for extremities, or invasive and surgical techniques as clinically indicated.

UNCHANGED • A fluid bolus of 20 ml/kg of body weight of crystalloid fluid should be administered for hemorrhagic shock.

UNCHANGED • Packed red blood cells or whole blood should be administered after the initial fluid bolus for hemorrhagic shock.

UNCHANGED • Crystalloid fluid boluses may be repeated as clinically indicated for hemorrhagic shock if blood products are not immediately available.

UNCHANGED • Tranexamic acid (TXA) may be considered for hemorrhagic shock.

Guidance for management of pediatric hemorrhagic shock is unchanged. After an initial fluid bolus, providing blood is the key to the resuscitation of hemorrhagic shock. It is recognized that blood may not always be available and in these settlings repeated fluid boluses may be warranted for persistent shock after the initial fluid bolus. Red Cross guidelines for hemorrhagic shock resuscitation continue to be consistent with the American College of Surgeons Committee on Trauma and the Committee on Tactical Combat Casualty Care.

Pediatric Cardiogenic Shock Care

- UNCHANGED • A fluid bolus of 5 to 10 ml/kg of crystalloid fluid should be administered for cardiogenic shock over 10 to 20 minutes.
- UNCHANGED • After each bolus, the child or infant should be reassessed for signs of hypervolemia and worsening cardiac failure.
- UNCHANGED • Milrinone may be considered as clinically indicated, and epinephrine, dopamine, or dobutamine additively or independently may be considered as clinically indicated for cardiogenic shock.

Children and infants who remain in cardiogenic shock despite appropriate adequate fluid resuscitation or who cannot tolerate ongoing aggressive fluid therapy (e.g., those in cardiogenic shock) are candidates for vasoactive therapy. No new evidence has been identified since this topic was last reviewed.

Pediatric Septic Shock Care

- UPDATED • Up to 40 to 60 mL/kg in bolus fluid (in 10 to 20 mL/kg aliquots) should be administered over the first hour, titrated to clinical markers of cardiac output, and discontinued if signs of fluid overload develop for the initial resuscitation of children and infants with septic shock or other sepsis-associated organ dysfunction.
    - In the absence of intensive care availability, a decreased fluid bolus of up to 40 mL/kg (in 10 to 20 mL/kg aliquots) over the first hour should be considered, titrated to clinical markers of cardiac output and discontinued if signs of fluid overload develop.
    - In the absence of both hypotension and intensive care availability, maintenance fluids should be administered instead of bolus fluids.
- NEW • Balanced/buffered crystalloids, rather than 0.9% saline, should be used for the initial resuscitation of children and infants with septic shock or another sepsis-associated organ dysfunction.
- UNCHANGED • Albumin should not be used in the initial resuscitation of children and infants with septic shock or another sepsis-associated organ dysfunction.
- UPDATED • Starches should not be used in the acute resuscitation of children and infants with septic shock or other sepsis-associated organ dysfunction.

A systematic review of different volume resuscitation strategies for children with septic shock in advanced care settings found no difference in mortality between the restrictive and liberal fluid resuscitation groups. Graded guidance is provided based on the availability of intensive care. It is recognized that the graded approach may have limited applicability in the United States, but still should be considered in areas where PICU availability, resources and/or consultation are not readily available. The guidance for use of balanced/buffered crystalloid is based on studies including over 30,500 children with sepsis and showing an association between use of balanced/buffered crystalloid and lower odds of mortality.

Neonatal Life Support

Initial Oxygen Concentration for Preterm Newborns

NEW • When resuscitating a preterm newborn (less than 35 weeks' gestation), healthcare professionals should start with an oxygen concentration between 21% and 30% (close to atmospheric concentration) and titrate oxygen concentration using pulse oximetry.

Preterm newborns are thought to be at particular risk from exposure to high concentrations of oxygen during resuscitation at birth, potentially resulting in bronchopulmonary dysplasia, retinopathy and intraventricular hemorrhage. For newborn infants less than 35 weeks' gestation receiving respiratory support at birth, a recent systematic review showed no difference with use of an initial lower oxygen concentration (50% or less) compared with a higher oxygen concentration (greater than 50%) for the risk of short- and long-term mortality, or long-term moderate-severe neurodevelopmental impairment, retinopathy, necrotizing enterocolitis, bronchopulmonary dysplasia or intraventricular hemorrhage. The Red Cross guideline reflects a balance between the need to prevent hypoxia during resuscitation of preterm newborns and the potential toxicity from high concentrations of oxygen.

Initial Oxygen Concentration for Term and Late Preterm Neonatal Resuscitation

- NEW • When resuscitating a term or late preterm newborn, healthcare professionals should start with atmospheric oxygen concentration (21%) and titrate oxygen concentration using pulse oximetry.
- NEW • A concentration of 100% should not be used as the starting level for initial resuscitation of the term or late preterm newborn.

High oxygen concentrations at birth may cause tissue and vital organ damage to newborns. A recent systematic review evaluating the initial use of 21% oxygen compared with 100% oxygen in newborn infants born at 35 weeks' gestation or greater who required respiratory support at birth found that among survivors assessed for critical outcomes of neurodevelopmental impairment or hypoxic-ischemic encephalopathy, there was no difference in the risk for development of either outcome when respiratory support at birth started with 21% oxygen compared with 100% oxygen. However, a large reduction was found in short-term mortality and without adverse effects with the initial use of 21% oxygen compared with 100% oxygen. The recommendation to commence resuscitation with 21% oxygen does not imply continued use of room air if a newborn does not respond to interventions. Red Cross guidelines recommend that oxygen should be titrated based on oximetry readings.

Intraosseous Versus Umbilical Vein Routes of Fluid and Drug Administration During Newborn Resuscitation

- UPDATED • Umbilical venous catheterization should be the primary method of vascular access during newborn resuscitation in the delivery room. If umbilical venous access is not feasible, healthcare professionals may consider the intraosseous route for vascular access during newborn resuscitation.
- UPDATED • Healthcare professionals should use either umbilical venous access or the intraosseous route depending on their training, equipment availability and/or local protocols outside of the delivery room to administer fluids and medications during newborn resuscitation.

No recent studies provide evidence comparing placement of an intraosseous cannula with placement of an intravenous cannula and drug administration in neonates with severe bradycardia and inadequate perfusion requiring chest compressions. Several case reports have described serious adverse effects of intraosseous access in neonates, such as tibial fractures or extravasation of fluid and medications resulting in compartment syndrome and amputation. Current evidence supports the umbilical venous route for access during resuscitation in the delivery room, while allowing for the intraosseous route in circumstances where the umbilical venous route is not feasible or for settings outside of the delivery room and depending on availability of equipment, training and experience.

Prognostication: Impact of Duration of Intensive Resuscitation

UPDATED • Healthcare professionals should consider a discussion with the clinical team and family regarding discontinuation of resuscitative efforts after 20 minutes of CPR and all the indicated resuscitative actions following birth.

No evidence showed that any specific duration of resuscitation consistently predicts mortality or moderate to severe neurodevelopmental impairment. A high risk for mortality and for moderate to severe neurodevelopmental impairment among survivors was noted if return of spontaneous circulation (ROSC) is not achieved in newborn infants despite 10 to 20 minutes of intensive resuscitation. However, survival and survival without moderate to severe impairment is reported with use of therapeutic hypothermia following ROSC after prolonged resuscitation in infants. In addition, studies suggest that it may take as long as 20 minutes to accomplish steps of resuscitation up to the point of epinephrine administration.

Aquatics

CPR in Cardiac Arrest Following Drowning

NEW • It is reasonable to initiate compression-ventilation CPR (CV-CPR) for cardiac arrest following drowning in children. If CV-CPR is not possible or lay responders are not willing, compression-only CPR (CO-CPR) should be performed.

Compression-ventilation (CV-CPR) appears to offer improved neurologically favorable survival in a subgroup population of 5- to 15-year-olds with cardiac arrest following drowning. A study from the CARES registry is the largest analysis to date of bystander CPR performed following drowning and suggests that when cardiac arrest is from a primarily respiratory etiology (as it often is in children), the use of CV-CPR may offer improved neurologically favorable survival. This study also found that CV-CPR was also associated with significantly greater odds for survival to hospital discharge in all age groups.

Beginning CPR with Compressions or Breaths

UNCHANGED • For adults, children and infants with the drowning process and after determining the presence of cardiac arrest, resuscitation should start by opening the airway, providing 2 rescue breaths, and then continuing CPR by providing cycles of 30 compressions followed by 2 rescue breaths/ventilations.

Although there is no new evidence regarding starting resuscitation from cardiac arrest following drowning with rescue breaths/ventilations, data for cardiac arrest following drowning shows that compression-ventilation CPR (CV-CPR) is associated with greater odds of survival to hospital discharge as compared with compression-only CPR (CO-CPR), and with favorable neurological status in 5- to 15-year-olds. This supports the urgency to provide ventilations in hypoxic cardiac arrest, such as in the drowning process, and indirectly supports beginning CPR with ventilations when cardiac arrest is due to the drowning process. In addition, experts felt that in order to reverse the unique pathophysiology of the drowning process, delivering breaths as soon as possible was essential.

In-Water Resuscitation

NEW • In-water resuscitation (IWR) can be considered in cases where a lifeguard has proper training in the technique and is comfortable performing it without causing an unsafe environment for the lifeguard or the person.

NEW • Though in-water resuscitation (IWR) can be performed without the aid of additional equipment, floating and propelling equipment should be considered.

During the process of drowning, the most significant physiologic insult and therefore, primary cause of morbidity and mortality, is systemic hypoxemia. In addition, the unique physiology of the drowning process necessitates early provision of ventilations. Although studies of in-water resuscitation (IWR) have found that it increases the time and perceived difficulty of a rescue and the amount of water aspiration by the person, the earlier an intervention can be applied to reverse systemic hypoxemia and the drowning process, such as with IWR, the greater the chances should be for survival. Studies have found that IWR is feasible to provide mouth-to-mouth, bag-mask and laryngeal tube ventilation. Because water rescues are inherently physically demanding, the use of rescue equipment may decrease those demands.

Drowning and Prognostic Factors

UNCHANGED • Submersion duration should be used as a prognostic indicator when making decisions surrounding search and rescue resource management/operations.

UNCHANGED • Age, EMS response time, water type (fresh or salt), water temperature and witnessed status should not be used when making prognostic decisions.

There is no new evidence for the prognostic factors of age of the submerged child or adult, EMS response time, submersion duration or water temperature. New studies evaluating the prognostic factors of salinity and witnessed status reported mixed results for survival and favorable neurological outcomes. In general, submersion durations of less than 10 minutes have been found to be associated with a very high chance of a good outcome, but there are continued rare case reports of survival after prolonged submersion supporting case-by-case decisions that balance risk and potential for survival with good outcomes.

Education

Cognitive Aids in Resuscitation

- UPDATED • Healthcare professionals may consider using cognitive aids during resuscitation.
- NEW • Lay responders should not use cognitive aids during initiation of CPR.

Pocket card flowcharts, algorithms and other cognitive aids are commonly used in resuscitation courses and hospitals. Evidence from a recent systematic review provided conflicting results but suggests that cognitive aids may improve performance during resuscitation as well as patient outcomes by decreasing the cognitive load of individuals or teams collectively. Other evidence has shown that teaching to cognitive aids or memorizing flowcharts versus teaching on principles and critical decision-making can have negative impacts on performance in resuscitation and outcomes for patients. For lay responders, evidence of potential clinically important delays in initiating CPR with use of cognitive aids and feedback devices supports the guideline recommendation against use of cognitive aids during initiation of CPR.

First Responder Engaged by Technology

NEW
- Medical and disaster event notification systems via mobile positioning system or text message alerts should be used for individuals.

UNCHANGED
- Individuals who are in close proximity to a suspected out-of-hospital cardiac arrest (OHCA) and are willing to be notified by a smartphone app with mobile positioning system or text message alert system should be notified.

The use of social media and technology such as smartphone apps with mobile positioning systems or text message alerts has the potential to increase citizen bystander CPR response rates, defibrillation and survival from cardiac arrest. Studies show higher rates of bystander CPR with event notification to citizen responders via smartphone apps with mobile positioning systems or text message alerts compared with no such notification, and faster response times with citizen responder event notification via technology or social media. No difference in rates of return of spontaneous circulation (ROSC) or survival with favorable neurological outcome at discharge were found in a recent review for citizen CPR responder notification via technology or social media, but further study is still needed.

Hemorrhage Control Trainer Requirements

NEW
- Low-fidelity hemorrhage control trainers should:
  - Contain durable product that will withstand hundreds of uses.
  - Not contain latex.
  - Have average dimensions of an adult human arm.
  - Be portable to allow for transport.
  - Be priced in an affordable range that would allow for widespread distribution to resources that would benefit from training.
  - Employ technologies that do not encumber the educational mission of the device.

NEW • High-fidelity hemorrhage control trainers should:

- Have material that has realistic tissue densities, does not contain latex, and allows for decontamination.
- Have a circumference that allows for adequate tourniquet application.
- Allow for application of a tourniquet proximally and for direct manual pressure.
- Have anatomic landmarks, weight, and other characteristics (such as articulating joints) to allow for a realistic simulation experience.
- Have a real-time feedback mechanism that demonstrates the need for continuous appropriate pressure.
- Have a real-time feedback mechanism that demonstrates appropriate application of a tourniquet.
- Have the ability to detect force from both direct pressure and a tourniquet.
- Be preprogramed to allow for varying scenario bleeding presentations.
- Provide a multisensory experience that simulates the presence of bleeding and barriers to application (such as voice prompts, presence of fluids).

Tourniquet and hemorrhage control training on a manikin have been shown to be associated with subsequent successful application and may motivate the learner to act when faced with life-threatening bleeding. Specific guidance on requirements for hemorrhage trainers has been developed.

Team and Leadership Training

UNCHANGED • Educators should include team dynamics education in resuscitation courses.

NEW • Educators should provide specific team leader education for those whose roles include leadership of a resuscitation team or who will be in a position to direct a resuscitation.

Studies evaluating the inclusion of specific leadership or team training compared with no such training among students taking resuscitation courses report improved survival following team training for pediatric cardiac arrest, decreased hospital mortality in surgical patients following a surgical team training program, and increased return of spontaneous circulation (ROSC) for out-of-hospital cardiac arrest (OHCA) with second-tier paramedic response.

Appendix A

Guidelines Not Covered in American Red Cross *Guidelines Highlights 2020*

Please refer to the American Red Cross *Focused Updates* and *Guidelines 2020* for updates and guidelines related to the following topics.

First Aid

General

- Glove Use for First Aid

Sudden Illness

- Stroke: Recognition by Lay Responders
- Nontraumatic Chest Pain in Adults: Timing of Aspirin
- Anaphylaxis: Assisting with and Administering Epinephrine
- Opioid-Associated Emergency: Recognition by Lay Responders
- Hypoglycemia: Glucose Administration Routes and Forms
- Seizures: Recovery Position

Life-Threatening Bleeding

- Hemostatic Dressings
- Bleeding Control Kits

Injuries

- Acute Closed Extremity Joint Injuries: Compression Wrapping
- Mild Traumatic Brain Injury (Concussion): First Aid
- Avulsed Permanent Tooth: Temporary Storage
- Caustic Attacks: First Aid
- Burn Care and Cooling

Environmental Emergencies

- Exertional Hyperthermia and Heatstroke: Cooling Techniques
- Snakebites: Pressure Immobilization Bandaging

Basic Life Support

Systems of Care

- Assessment
- Dispatch Diagnosis of Cardiac Arrest
- Public Access AED Programs

Cardiopulmonary Resuscitation

- CPR Period Prior to Defibrillation
- Firm Surface for CPR
- Compression Depth, Rate, and Recoil
- Duration of CPR Cycles (2 minutes versus other)
- Manual CPR Methods for Adults: Compression-Ventilation and Compression-Only CPR
- Compression-to-Ventilation Ratio: Healthcare Professionals
- Compression-to-Ventilation Ratio: Lay Responders
- Dispatcher CPR Instructions
- Feedback for CPR Quality
- Debriefing
- Mechanical CPR Devices
- Harm from CPR to Persons Not in Cardiac Arrest
- Automated External Defibrillation Use in Children and Infants
- Analysis of Rhythm During Chest Compressions
- Rhythm Check Timing
- Alternative Techniques
- Termination of Resuscitation Rules
- Mental Health Referral for Team Members Following a Resuscitation

Advanced Life Support

Cardiopulmonary Resuscitation

- Assessment
- Rhythm Check Timing
- Physiologic Monitoring and Feedback for CPR Quality
- Double Sequence Defibrillation

Post-Cardiac Arrest Care

- Post-Cardiac Arrest Prophylactic Antibiotics
- Targeted Temperature Management
- Prognostication
- Mechanical Chest Compressions

Management of Cardiac Arrest Associated with Pulmonary Embolism

- Management of Cardiac Arrest Associated with Pulmonary Embolism

Pediatric Advanced Life Support

Pediatric Cardiopulmonary Resuscitation

- Assessment
- Compression and Ventilation Sequence
- Pediatric CPR Techniques
- Ventilations for Patients with Respiratory Insufficiency or an Advanced Airway
- Automated External Defibrillation Use
- Feedback for CPR Quality
- Resuscitation of Pediatric Patients with Congenital Heart Disease and Acute Cardiac Disease
- Resuscitation of Pediatric Patients with Hypertension
- Termination of Resuscitation Rules

Neonatal Life Support

Neonatal Resuscitation

- Laryngoscopy and Suctioning of Meconium at Birth for Non-Vigorous Newborns
- Sustained Inflation at Birth
- Dose, Route, and Interval of Epinephrine for Neonatal Resuscitation

Post-Resuscitation Care

- Rewarming of Hypothermic Newborns
- Induced Hypothermia in Settings with Limited Resources
- Post-Resuscitation Glucose Management

Aquatics

First Aid for Aquatic Environmental Emergencies

- Jellyfish Stings
- Exposure to Pool Chemicals

Safety and Prevention

- Pool Fences
- Life Jackets

Education

Testing and Training

- First Aid Education in Primary and Secondary Schools
- Spaced Learning Versus Massed Learning in Resuscitation Training
- CPR Feedback Devices in Training
- Opioid Education and Naloxone Distribution
- Resuscitation Performance: Debriefing

Disaster Health

- Older Adults and Disaster Planning

Guidance During the COVID-19 Pandemic

Minimizing the Risk of COVID-19 Transmission

- Guidance for Healthcare Professionals
- Guidance for Lay Responders

Management of Suspected and Confirmed COVID-19 Patients

- Ventilatory Care
- Fluid Therapy and Vasoactive Agents
- End-of-Life Planning and Termination of Resuscitation
- Lay Responder CPR and First Aid During the COVID-19 Pandemic

COVID-19 and Aquatics

- COVD-19 and Aquatics

COVID-19 and Educational Programs

- COVID 19 and Educational Programs